Final Feasibility Study Report for Interim Action Work Plan Custom Plywood Site Anacortes, Washington

Prepared by Hart Crowser under Direction and Contract with Washington State Department of Ecology under Agreement with GBH Investments, LLC

September 2011
17330-27

WASHINGTON STATE DEPARTMENT OF ECOLOGY

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ACRONYMS AND ABBREVIATIONS

AET	apparent effects threshold
ARAR	applicable or relevant and appropriate requirement
ARCS	Assessment and Remediation of Contaminated Sediments Guidance Document
bgs	below ground surface
BMPs	best management practices
CAD	contained aquatic disposal
CAP	Cleanup Action Plan
CDF	confined disposal facility
COA	City of Anacortes
COC	constituent of concern
COPC	constituent of potential concern
cPAHs	carcinogenic polycyclic aromatic hydrocarbons
CSLs	cleanup screening levels
CSM	conceptual site model
cy	cubic yard
DAHP	Department of Archaeology and Historic Preservation
DCA	disproportionate cost analysis
DL	detection limit
DMMP	Dredged Material Management Program
DMMU	Dredged Material Management Unit
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
EPA	US Environmental Protection Agency
FRTR	Federal Remediation Technology Roundtable
FS	Feasibility Study
GBH	GBH Investments, LLC
HPA	Hydraulic Project Approval
IAWP	Interim Action Work Plan
IC	institutional control
JARPA	Joint Aquatic Resource Permit Application
KPC	Ketchikan Pulp Company
MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
MNA	monitored natural attenuation
MNR	monitored natural recovery
MTCA	Model Toxics Control Act
NAVD88	North American Vertical Datum of 1988
ND	not detected (or non-detect)
OHW	Ordinary High Water
O & M	operation and maintenance
PCBs	polychlorinated biphenyls

PCP	pentachlorophenol
pg/g	picograms per gram
PLP	Potentially Liable Party
POC	point of compliance
ppt	parts per trillion
PSDDA	Puget Sound Dredge Disposal Analysis (Program)
PSI	Puget Sound Initiative
RI	Remedial Investigation
SAIC	Science Applications International Corporation
SEA	Shorelands and Environmental Assistance (Program)
SEPA	State Environmental Policy Act
sf	square feet
SHPO	State Historic Preservation Officer
SMA	sediment management area
SMS	sediment management standards
SQS	sediment quality standards
SVE	soil vapor extraction
TCP	Washington State Department of Ecology; Toxics Cleanup Program
TEC	Toxic Equivalent Concentration (WAC 173-340-708[8][d]) (MTCA 2007)
TLC	thin-layer capping
TOC	total organic carbon
TPH	total petroleum hydrocarbon
TVS	total volatile solids
UCL	upper confidence limit
µg/L	micrograms per liter
USACE	U S Army Corps of Engineers
VCP	Voluntary Cleanup Program
VOC	volatile organic compound
WQC	water quality certification

FEASIBILITY STUDY REPORT
FOR INTERIM ACTION WORK PLAN
CUSTOM PLYWOOD SITE
ANACORTES, WASHINGTON

1.0 INTRODUCTION

This document is prepared under the direction of the Washington State Department of Ecology (Ecology) Toxics Cleanup Program (TCP) in accordance with an agreement with GBH Investments, LLC (GBH) to present the interim action remediation Feasibility Study (FS) for selected upland and in-water portions of the Custom Plywood Site located in Anacortes, Washington (Figure 1-1). GBH is the current property owner and Potentially Liable Party (PLP) under provisions of the Washington State Model Toxics Control Act (MTCA – Chapter 173-340 WAC). The Custom Plywood Site is one of several Anacortes Area Bay-Wide priority sites for Fidalgo/Padilla Bays being addressed by the TCP under the Puget Sound Initiative (PSI). The Custom Plywood Site includes property owned by GBH Investments, LLC (GBH) covering approximately 6.6 acres of upland and 34 acres of intertidal and subtidal areas (Figure 1-2). Additional state-owned aquatic areas are also included within the Site area addressed by this FS. The Custom Plywood Site was the location of lumber and plywood milling operations beginning in about 1900. Milling activities produced wood waste and chemical contaminants affecting Site soils, groundwater, and sediments that are the focus of this FS.

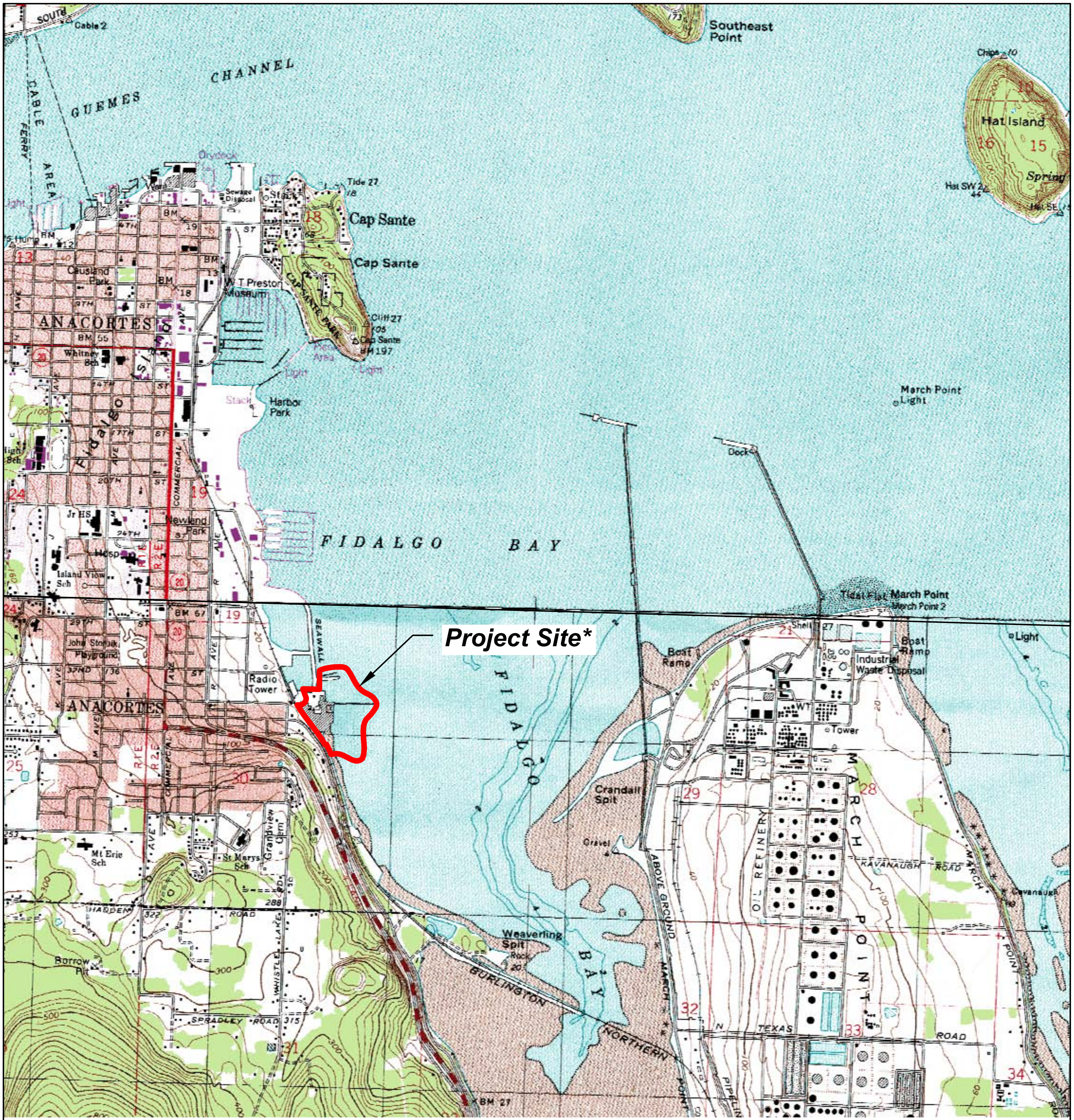
This FS is intended to further identify and evaluate potential areas of upland aquatic contamination, and to inform cleanup and habitat restoration decisions. Results of this FS also confirm the priority areas for cleanup as part of a MTCA Interim Action Work Plan (IAWP). Related requirements under state Sediment Management Standards (SMS – Chapter 173-204 WAC) are also addressed.

This FS is based on a Remedial Investigation (RI) Report for an Interim Action Work Plan finalized in September 2011 that was prepared by AMEC Geomatrix for GBH (AMEC 2011). The RI was completed in response to Ecology Agreed Order DE 5235, dated March 17, 2008, to identify the nature and extent of contaminated soil and groundwater in the upland and sediments in the intertidal and subtidal portions of the Site. The RI further identified preliminary cleanup screening levels for affected soil, groundwater, and sediment relative to applicable requirements of MTCA, SMS, and other regulatory criteria. RI findings were supported by previous Site investigations and other actions described in Section 2.0 of this FS.

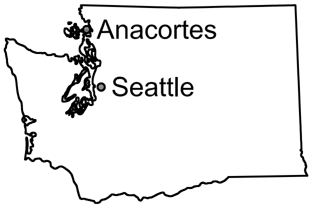
1.1 Custom Plywood Site FS Approach and Organization

This FS describes the Site setting and conditions, summarizes site history, and provides a synopsis of RI results informing the overall FS process in Section 2.0. Information from the previous RI and additional investigations support a conceptual site model (CSM) presented in Section 3.0 describing sources, pathways, and receptors for the upland and in-water portions of the Site addressed in this FS. Remedial action objectives including applicable cleanup levels are identified in Section 4.0, with upland and aquatic areas planned for remediation as part of the IAWP identified in Section 5.0. In accordance with WAC 173-340-350(8), the FS then screens potential remedial technologies and alternatives in accordance with applicable MTCA threshold and SMS cleanup action requirements (Section 6.0). MTCA and SMS evaluation criteria are presented in Section 7.0, with remedial alternatives evaluated in Section 8.0 based on these criteria. Section 8.0 also compares the alternatives, associated cost estimates, and benefits. Section 9.0 presents conclusions and recommendations for a preferred alternative.

Appendix A presents the 2010 SAIC Supplementary Fidalgo Bay and Custom Plywood Mill Sediment Dioxin Study. Appendix B presents mitigation memos including the Conceptual Wetland Mitigation Plan, Alternatives to Protect the Custom Plywood Interim Remediation Action and Improve Nearshore Habitat, and Conceptual Habitat Mitigation Alternatives Development Timeline. Appendix C presents the Remediation Alternatives Preliminary Cost Estimates. Appendix D presents the Preliminary Cost Estimates Backup Calculations. Appendix E presents the Supplemental Field Investigation, Sediment Dioxin and Wood Waste (Hart Crowser 2011)



Source: Base map prepared from USGS 7.5-Minute Series Topographic Map, Anacortes North and Anacortes South Quadrangles.



0 0.5 1

Scale in Miles

N

* Represents upland and aquatic portions of the site included with current Feasibility Study.

Custom Plywood Site
Anacortes, Washington

Vicinity Map

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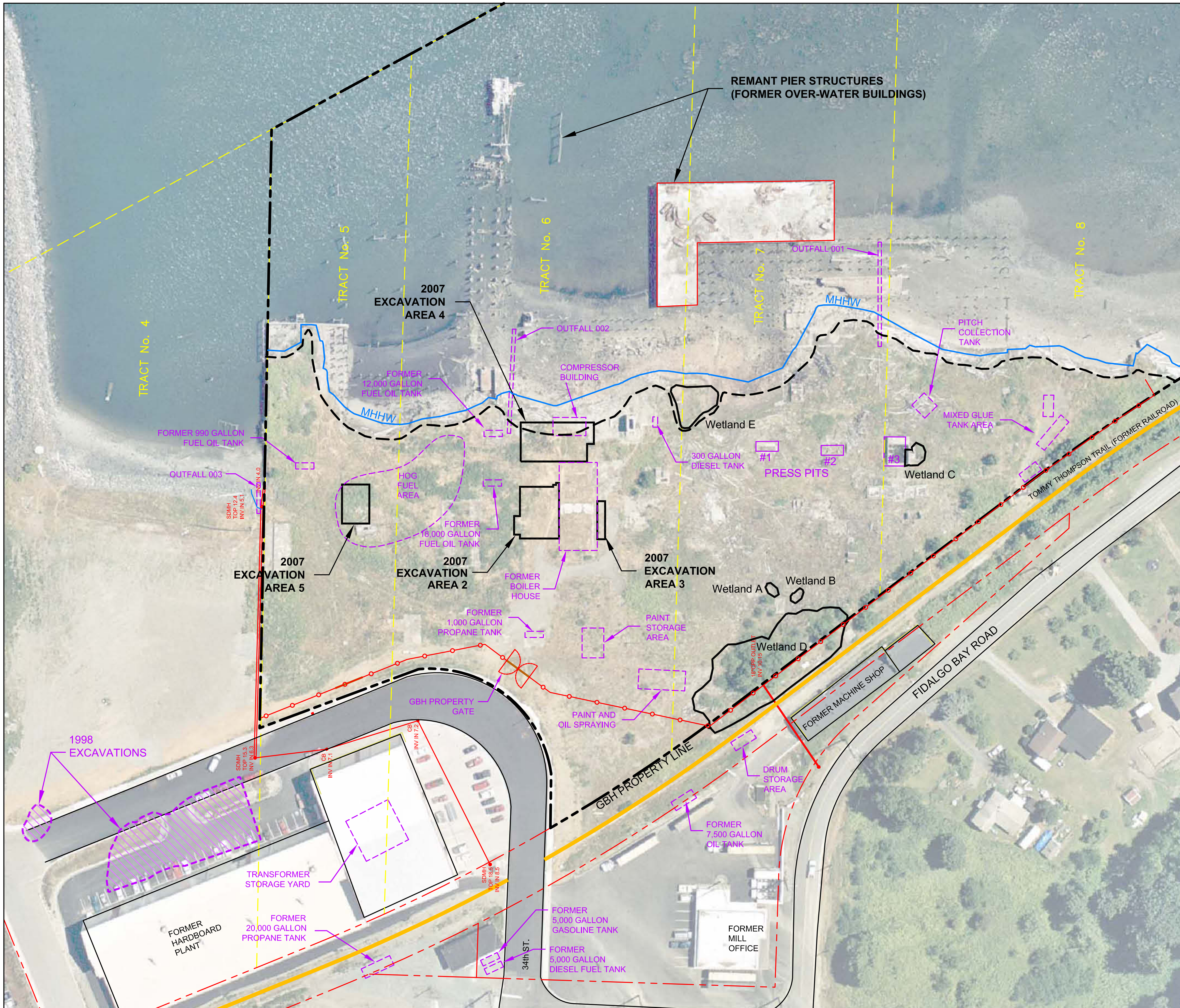
Figure

1-1

EAL 01/31/11 1733027-FS-001.dwg



- - - Ordinary High Water

MHHW Mean Higher High Water

Fence

Storm Drain Line

Historical Feature

Note: Adapted from AMEC Geomatrix (2010) First Draft Remedial Investigation (RI) Report Figure 3.

Source: Aerial photo courtesy of City of Anacortes, 2003.

N

0 100 200

Scale in Feet

Custom Plywood Site
Anacortes, Washington

Site Features Map

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Figure **1-2**

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2.0 SITE SETTING AND HISTORICAL AND CURRENT ACTIVITIES

This summary of the Site setting and historical and current activities is based on several sources including:

- The Custom Plywood Site Remedial Investigation (RI) conducted by AMEC (AMEC 2011);
- The dioxin investigation of Fidalgo and Padilla Bays adjacent to the former Custom Plywood Mill conducted by SAIC (SAIC 2010);
- Intertidal zone investigations of sediments and water immediately adjacent to the Site in 2010 and 2011 (Hart Crowser 2010 and 2011);
- Additional supplemental investigations conducted by others; and
- Input from Ecology and the current property owner.

Information from these sources is further evaluated and compiled in the following sections to provide an overview of the Site background setting, historical use, remediation, and additional investigations.

2.1 Site Definition and Setting

For purposes of this Feasibility Study (FS) report, the "Site" is defined by the extent of contamination on, or in the vicinity of the Custom Plywood Mill facility. The Site includes the footprint of the former plywood mill at its maximum extent during operation, including property currently owned by GBH Investments, LLC (GBH), and property owned by other parties. The Site also encompasses offshore areas extending beyond the Inner Harbor Line, and state aquatic lands located offshore and affected by dioxin contamination above the Fidalgo Bay background concentration. Ecology determined the site boundary following the 2010 sediment quality sampling and testing by SAIC (see Section 2-4, below).

Property, for purposes of this FS, is defined as the tracts of land (Tract Nos. 4 through 10) currently owned by GBH, including upland and tideland seaward to the Inner Harbor Line (Figure 2-1). According to Skagit County Assessor's records, the main part of the former Custom Plywood Site is an irregularly shaped parcel that covers approximately 6.6 acres of upland and 34 acres of intertidal and subtidal areas currently owned by GBH (Figure 1-2). The remaining portions of the former Custom Plywood Site property consist of roughly 7 upland acres and 1.3 tideland acres that are owned and redeveloped by other parties.

Historically, the parcels that make up the property were identified as uplands, nearshore, and tideland areas. The upland areas of the property are relatively flat or gradually slope downward toward Fidalgo Bay and consist of heavily disturbed sites containing relict foundations and structures, concrete and wood debris, vegetation (native and non-native), and wetlands. The nearshore areas are generally higher because of armament measures (ecology blocks and riprap) placed as of part of an emergency erosion control action following a high wave and storm event in the winter of 2010. The intertidal areas of the property slope downward toward Fidalgo Bay and contain former concrete structures (an L-shaped pier) supported by piles, individual pilings, considerable quantities of wood waste embedded in the substrate, and structural debris from previous buildings on the property. The immediate subtidal portion of the property is a low-slope mudflat that contains large amounts of wood debris and sawdust, and is covered by overwater structures (Figure 1-2).

The current understanding of the Site setting in uplands, nearshore, and tideland areas is based on previous and current investigations, and is represented by the Cross Section A-A’ provided on Figure 2-2.

2.1.1 Vertical Elevation Datum

For purposes of this FS report and associated figures and drawings, upland areas of the Site were assigned the North American Vertical Datum of 1988 (NAVD88), and nearshore, intertidal and tideland areas were assigned the Mean Higher High Water (MHHW) datum.

2.1.2 Site Habitat

Upland Area

The upland of the former Custom Plywood Site property is characterized as a heavily disturbed site containing relict foundations and structures, concrete and wood debris, vegetation (native and non-native), and wetlands (Figure 1-2). The vegetation is dominated by a mixture of native and non-native vegetation consisting of grasses (including fescue, ryegrass, and dunegrass), Canada thistle, wild carrot, teasel, white sweet-clover, poison hemlock, tansy, and other weedy species. No trees are present on the property.

The northwestern portion of the property is used as a boat storage yard. The remnants of former structures, including concrete foundations and pilings and abandoned tanks from previous industrial activities, are scattered across the property. Portions of the aboveground foundations have been removed from the property. Several debris piles containing wood, metal, and other material are located throughout the property.

Wetlands

Five wetland areas (Wetlands A through E) are located within the southern portion of the property (Figure 1-2). These wetlands were delineated and their boundaries accepted by the US Army Corps of Engineers and the Washington State Department of Ecology's Shorelands and Environmental Assistance (SEA) Program. Wetlands A (120 square feet [sf] in area), B (124 sf in area), and D (9,910 sf in area) are freshwater wetlands, and Wetlands C (367 sf in area) and E (1,389 sf in area) are estuarine wetlands. The freshwater wetlands are small and appear to be created because of unfilled test pits and stormwater collecting on the property. Wetlands A and B are rated as Category IV systems, Wetland D is rated as a Category III system, and Wetlands C and E are rated as Category II systems. Wetland D is located in an area exceeding the preliminary soil screening levels based on the previously delineated extent of contamination (AMEC 2011). Wetlands A, B, C, and E are located adjacent or immediately adjacent to the identified exceedance areas (AMEC 2011). Given this information, the on-site wetlands are currently at risk or have a potential risk of becoming contaminated.

Nearshore and Intertidal Area

The shoreline of the Custom Plywood Site property contains industrial debris and significant quantities of naturally occurring woody debris (Figure 1-2). Woody debris ranges in size from small to exceptionally large. Active erosion is occurring along the northeast and central portion of the property where storm events and long-period waves have locally destabilized the shoreline. Within the central portion of the shoreline, ecology blocks covered in a geotextile fabric and concrete/debris were placed near the MHHW line during an emergency erosion control action following a high wave and storm event in the winter of 2010. The southernmost tip of the property is armored with riprap, which extends off site to the south.

The intertidal zone contains an L-shaped pier supported by piles, individual pilings, considerable quantities of wood waste embedded in the substrate, and structural debris from previous buildings on the property (Figure 1-2). More than 1,500 pilings associated with the former Custom Plywood Site are present on the property. Rockweed (*Fucus*) is present on a variety of structures and debris along the central and northern portions of the shoreline.

Surf smelt spawning has been documented in small areas along the property shoreline. Given the shoreline and intertidal conditions and the presence of wood debris, it is questionable whether spawn is viable along the northern and central portions of the intertidal zone. Hydrogen sulfide odor is also noticeable along portions of the shoreline.

Exiting site conditions show an actively eroding shoreline upon which ecology blocks and rubble have been placed to help stabilize the shoreline and prevent or slow further erosion. The in-water structures provide some protection from wind and wave energy. Coastal wave modeling for the property shows that a majority of the wave energy propagates from the northeast, which is aligned with the longest fetch but differs from the predominant wind pattern. This suggests that the beach face is subject to acute, episodic erosion events where predominant conditions support a smaller stable grain size, but where storm events undermine the beach face and cause significant erosion.

Subtidal Area

The immediate subtidal portion of the property is a low-slope mudflat that contains large amounts of wood debris, sawdust, and is covered by overwater structures (Figure 1-2). This heavily impacted zone contains macroalgae (*Ulva* ssp.) and an abundance of cyanobacteria and reducing bacteria (likely *Beggiatoa* sp.) that are indicative of sulfide-rich sediments. This apparent reducing layer is present at the surface at several locations on the mudflat.

Deeper in the subtidal zone, extensive eelgrass beds are documented on and adjacent to the former Custom Plywood Site property. These beds are contiguous with the larger Fidalgo Bay eelgrass population. The condition of the shoreward limits of the eelgrass bed appeared good, but distribution was clearly limited by the presence of wood debris and, possibly, by sulfide conditions.

The Custom Plywood Site property is subject to tidal inundation during winter storm events. Documented storm surges have overtopped the existing shoreline edge and flowed into the upland portion of the property. During a winter storm event in January 2010, tidal inundation occurred over most of the property.

2.2 Historical Use Summary

As summarized in the RI, the property was originally developed as a saw and planing mill from around 1900 until it burned down sometime between 1925 and 1937. Through the years, the property changed hands several times, and was rebuilt and added onto until Custom Plywood Site became the operating entity sometime before 1991. The facility was used as a sawmill and plywood manufacturing plant until most of the wooden structures in the main plant area, many of which were built in the 1940s, were consumed in a fire on November 28, 1992. The current Site layout is shown on Figure 1-2.

Except for the parcels on the periphery that have been sold and redeveloped, the main part of the former mill property has been unused since 1992. In December 2007, the main part of the former mill property was sold to GBH. For further discussion of the history of site operation and ownership and the history and characteristics of surrounding properties, refer to the Custom Plywood Site RI conducted by AMEC (2011).

2.3 Previous Investigations and Limited Remediation Activities

Since 1993, previous property owners, the City of Anacortes, Washington State Department of Ecology (Ecology) and the US Environmental Protection Agency (EPA) have conducted a series of environmental characterization and sampling and analysis investigations near the Site, before the Agreed Order process that started in 2008. These investigations were conducted to define the extent of contamination and evaluate the condition of the soil, groundwater, and offshore sediments. Each successive investigation targeted data gaps identified in the previous investigations.

A brief summary of Site environmental characterization and sampling investigations are summarized, for the purpose of this FS, in Table 2-1. A brief summary of historical remediation activities are detailed in Table 2-2. Further discussion of the individual investigations and findings between 1993 and 2010 are presented in the Custom Plywood Site RI (AMEC 2011). Sampling locations for historical upland and sediment investigations from 1993 to 2010 are shown on Figure 2-1. A representation of the Site setting in uplands, nearshore, and tideland areas, based on previous and current investigations, is depicted in the Cross Section A-A' on Figure 2-2.

Investigations conducted between 1993 and 1995, generally, were limited and concentrated sampling in areas with the highest likelihood of contamination. Significant concentrations of petroleum hydrocarbons, particularly in the heavy oil range, were identified in shallow soils around the press pits and the compressor house in the central part of the Site (Figure 2-1). Subsequent studies identified isolated occurrences of polychlorinated biphenyls (PCBs) and inorganics (arsenic, cadmium, chromium, lead, and mercury) around the former boiler house, and petroleum hydrocarbons in the former hog fuel area.

Investigations conducted between 1995 and 2003 culminated in the development of an Interim Remedial Action Plan for soil removal within the upland excavation areas 2 though 5, as noted on Figure 1-2 (Geomatrix 2007). The Interim Remedial Action Plan was implemented by GBH without Ecology's oversight and included excavation and disposal of the soil in the northern tracts (Tracts 5 and 6) first, followed by planned excavation and disposal of the soil in the southern tracts (Tracts 7 and 8) a year later. The first phase of the interim action work on the northern tracts was conducted in July 2007 to remove soils from four areas where constituents of potential concern (COPCs) exceeded Method A cleanup levels. A more complete description of the northern interim cleanup action is provided in the Custom Plywood Site RI (AMEC 2011). After the limited interim action in 2007, Ecology required the subsequent work be conducted within the Puget Sound Initiative (PSI) program under an Agreed Order to be consistent with the approach at other PSI-led sites in Fidalgo Bay. Consequently, negotiations for an RI/FS and Agreed Order commenced.

2.4 2010 Investigations

Following the limited interim action in July 2007, an additional remedial investigation was carried out by AMEC in July 2008 with supplemental investigations in April and August 2009. Additional sampling and surveying were conducted to further define the extent of contamination and to evaluate the conditions of the soil, groundwater, offshore sediments, and benthic habitat. For further details on the methods and procedures for the additional remedial investigations, refer to the Custom Plywood Site RI (AMEC 2011).

Since 2009, three more environmental characterization and sampling and analysis investigations were conducted near the Site. One investigation evaluated the chemistry of clam tissue and further evaluated the chemistry of offshore sediments adjacent to the Site and within Fidalgo Bay (SAIC 2010). The second and third investigations better defined the extent of contamination in the intertidal zone sediments and water immediately adjacent to the Site (Hart Crowser 2010 and Hart Crowser 2011).

A brief summary of current site environmental characterization and sampling investigations are detailed in Table 2-1. Sampling locations for the 2010 investigation are shown on Figure 2-3 and Figure 2-4. The results of the Hart Crowser 2011 Supplemental Field Investigation, Sediment Dioxin and Wood Waste are presented in Appendix E and are summarized below, but are not included in the figures and tables included in this FS.

2.4.1 Supplementary Custom Plywood Site and Fidalgo Bay Sediment Dioxin/Furan Study

In June 2010, SAIC conducted a supplementary investigation (SAIC 2010) of Fidalgo and Padilla Bays and areas adjacent to the former Custom Plywood Site to determine potential sources of dioxin contamination observed in previous investigations (SAIC 2008, AMEC 2008). A copy of the SAIC report is presented as Appendix A of this FS. The purpose of this supplementary sediment investigation was to determine the bay-wide background concentrations of dioxin/furan in Fidalgo and Padilla Bays and to further characterize and delineate the extent of dioxin/furan in sediment and clam tissue in nearshore sediments adjacent to the former Custom Plywood Site.

For purposes of this FS, the discussion below is limited to dioxin/furan toxic equivalent concentration (TEC) and total organic carbon (TOC) results within the greater Fidalgo Bay and adjacent to the former Custom Plywood Site. SAIC used dioxin/furan TEC data from both Fidalgo and Padilla Bays to calculate the Fidalgo/Padilla Bay dioxin/furan congener TEC background value. For further discussion of the supplementary sediment and tissue study, refer to SAIC (2010) report in Appendix A.

Available sediment sample locations and dioxin/furan test results collected by AMEC (2008, 2010) and Geomatrix (2008) adjacent to the former Custom Plywood Site and Fidalgo Bay have been compiled and present on Figure 2-3.

Dioxin/furan TEC analytical results for the former Custom Plywood Mill Site and Fidalgo Bay are provided in Appendix A (Tables B-1 through B-7). Conventional analytical results including TOC for the former Custom Plywood Site and Fidalgo Bay are also provided in Appendix A (Tables B-8 through B-11).

Former Custom Plywood Site - Dioxin and TOC Results

Additional sediment samples were collected adjacent to the former Custom Plywood Site and were analyzed to further evaluate potential impacts from Site historical activities and releases.

Sediment samples collected nearshore to the Site had a wide range of TEC concentrations from 1.2 to 81.2 picograms per gram (pg/g, hereafter referred to in parts per trillion, ppt), with an average concentration of 8.9 ppt (Appendix A). The greatest TEC concentration occurred in intertidal and subtidal locations in close proximity to the Site (Figure 2-3). The lowest TEC concentrations were identified both in central Fidalgo Bay and in the intertidal area south of the Site.

Two sediment samples had TEC concentrations greater than 25 ppt. Sediment samples CT-01A and A3-32 (SAIC 2010) had concentrations of 81.2 and 41.01 ppt, respectively. The remaining sediment samples were generally less than 10 ppt.

Using spatial modeling, SAIC determined that both dioxin/furan TEC values and TOC (SAIC 2010) displayed distinct plumes emanating from the northern extent of the former Custom Plywood Site boundary, suggesting that the Site is a source of elevated sediment concentrations. As shown on Figure 2-3, the two elevated sediment samples, CT-01A and A3-32, affect the plotted TEC concentration contours. Additional sediment sampling was completed in December 2010 to address the spatial horizontal and depth data gaps observed on Figure 2-3. The findings are described in the Supplemental Field Investigation, Sediment Dioxin and Wood Waste report completed in May 2011 and is presented in Appendix E of this document.

The greatest TOC content occurred at intertidal locations in close proximity to the Site, with a maximum of 5.6 percent. In general, TOC content was most enriched closer to shore (SAIC 2010).

Fidalgo Bay - Dioxin and TOC Results

Additional sediment samples were collected bay-wide to determine the relative background concentrations of dioxin/furan congeners in Fidalgo Bay.

Sediment samples collected within the Fidalgo Bay background area ranged from 0.31 to 2.2 ppt, with an average of 0.86 ppt (Appendix A). The greatest TEC values occurred in sediment samples collected from central Fidalgo Bay, closest to the former Custom Plywood Site. TOC content within the Fidalgo Bay background area ranged from 0.31 to 1.35 percent, with the greatest concentrations associated with finer grained sediment (SAIC 2010).

Dioxin Background Concentration in Fidalgo and Padilla Bay area

In 2010, SAIC used bay-wide background dioxin/furan TEC results collected from both Fidalgo and Padilla Bays to calculate background based on the 95 percent Upper Confidence Limit (UCL). The resulting dioxin/furan TEC background screening level for Fidalgo Bay was 0.93 ppt. Based on this calculated sediment contamination screening level for Fidalgo Bay, detected TEC concentrations in nearshore sediment samples collected near the former Custom Plywood Site exceed the regional background value for dioxin/furans (Figure 2-3).

The apparent boundary of dioxin/furan contamination extends beyond the Custom Plywood Site nearshore area into locations sampled as part of Fidalgo Bay background. Using spatial modeling, SAIC approximated that approximately 590 acres of surface sediment in Fidalgo Bay have dioxin/furan congener TEC values greater than background level.

Though based on direction from Ecology, the 95 percent UCL dioxin/furan TEC background screening level for Fidalgo Bay was set as 1.4 ppt. This working definition of the dioxin/furan TEC background screening level for Fidalgo Bay was calculated via 95 percent UCL on the true mean under the log-normal distribution assumption, using 1/2 detection limit (DL) for not detected (ND). For purposes of this FS, the 95 percent UCL dioxin/furan TEC background screening level for Fidalgo Bay is set as 1.4 ppt.

2.4.2 Intertidal Investigations, Custom Plywood Site Test Pits

In August 2010, Hart Crowser collected sediment and water samples from nine test pits, designated HC-TP-1 through HC-TP-9, within the intertidal area during morning low tides along the Site shoreline, as presented on Figure 2-4 (Hart Crowser 2010). The sampling locations were selected to supplement explorations completed by AMEC in 2008 and 2009 (AMEC 2011) and to fill in special data gaps in the intertidal area as determined by Ecology (Figure 2-4). Analytical results for sediment and water samples are provided in Tables 2-3 through 2-7.

Analytical results for sediment samples were compared to applicable Sediment Quality Standards (SQS) and Cleanup Screening Levels (CSLs) listed in the Sediment Management Standards (SMS) regulation. The SQS defines the concentration below which there is no adverse effect on benthic organisms. The CSL is established as the concentration above which minor adverse effects are expected.

Analytical results for sediment samples are summarized in Table 2-3. Sediment samples with TOC concentrations outside the 0.5 to 3.5 percent range for organic carbon-normalization were also compared to dry weight Apparent Effects Threshold (AET) criteria for non-polar organic compounds in Table 2-3. Organic carbon-normalized results for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) were compared to SMS criteria (Table 2-4) as an overall evaluation of sediment quality at each of the selected sampling locations. Analytical results for sediment samples are further compared to applicable MTCA Method A and B unrestricted screening criteria in Table 2-5. Note that applicable MTCA Method A and B unrestricted screening criteria are provided for comparison purposes only (Table 2-5) and are not generally used for screening criteria for sediment samples.

Analytical results for water samples were compared to applicable marine water quality screening criteria as shown in Table 2-6. Analytical results for water samples are summarized in Table 2-7.

Sediment chemical concentrations exceeded applicable SMS criteria only in sample HC-TP-S-05, for zinc and cPAHs. Diesel- and/or lube oil-range hydrocarbons were detected in seven of nine test pit locations; however, SMS criteria have not been established for TPH. Test pit samples had relatively high concentrations of ammonia and sulfide, likely a result of anoxic conditions due to wood debris within the test pits.

Dissolved arsenic exceeded applicable marine water quality screening criteria in six of nine test pits. Total mercury exceeds marine water quality screening criteria in the samples analyzed; however, this may be to the result of suspended solids in the water samples. Dissolved silver only exceeded the marine water quality screening criteria in sample HC-TP-W-02. Diesel- and/or lube oil-range hydrocarbons were detected in 7 of the 9 samples with the highest concentrations found in sample HC-TP-S-01. The water samples contained cPAHs, likely associated with petroleum hydrocarbons, and exceeded applicable marine water quality screening criteria. Ammonia and sulfide concentrations were relatively high in the water samples, likely from anoxic conditions caused by wood debris.

For further discussion of the additional environmental characterization and sampling investigation refer to the Intertidal Investigations, Custom Plywood Site Test Pits letter report conducted by Hart Crowser (2010).

2.4.3 Supplemental Field Investigation, Sediment Dioxin and Wood Waste

In December 2010, Hart Crowser collected additional sediment samples from intertidal and subtidal areas to fill depth and areal extent data gaps for dioxin hot spots and wood waste. Samples for dioxin analysis were collected from twenty-nine sediment cores and thirteen surface grab samples. The wood waste distribution data was collected from twenty-three additional cores and the surface grab samples.

The highest accumulations of wood waste were observed near the shoreline in the vicinity of the former mill. Wood waste noted further from the shoreline generally contained fewer wood chips, wood chunks, fragments, fine wood particles, and sawdust and contained more terrestrial wood waste such as twigs, sticks, and bark. Most core samples collected from within the inner harbor line contained wood waste over their entire depth (approximately 3 to 9 feet). Surface sediment samples collected from the north and northeast area of the site between the inner and outer harbor lines only contained wood bark and twigs and may indicate that the outer extent of wood waste in this area may be just outside the inner harbor line. This result may be also indicate past use in that area (i.e., log handling as opposed to processing). Similarly, surface sediment samples collected east and southeast of the site between −3 and −4 MLLW elevations only contained wood bark and twigs, suggesting that the wood waste boundary in this area may be between these two elevations.

The highest dioxin concentrations were detected in the northern half of the site near the former mill and appear to be associated with wood waste, particularly sawdust. The highest concentrations appear to be within the inner harbor line.

Refer to Appendix E, for the full report prepared by Hart Crowser (2011). The findings presented in this report will be fully evaluated in the Phase II draft CAP for in-water remediation to be prepared in late 2012.

Table 2-1 - Summary of Previous and Current Environmental Characterization and Sampling Investigations

Previous (Pre-2010) [1]			
Investigation Event	**Investigation Description**	**Exploration Type Nomenclature**	
1993 Preliminary Environmental Evaluation (John A. Pinner and	Collected and analyzed surface water samples and a soil sample as a preliminary environmental evaluation. Samples locations not clearly located in	Surface Water:	One from Press Pit #2 and one from a depression north of Press Pit #2.
		Soil:	One northeast of Press Pit #3.
1995 Phase I and Limited Phase II Environmental Site Assessment (Enviros, 1995a)	Collected and analyzed hand-auger (HA) and shallow grab soil samples from areas with the highest likelihood of contamination.	Hand-auger:	HA3, HA4, HA5, HA6, HA7, HA8, HA9, HA11, HA14, HA17, HA18
		Soil:	G15-S
1995 Preliminary Sediment Sampling Report (Enviros, 1995b)	Collected and analyzed sediment samples offshore of the Site as a preliminary characterization study of sediment chemistry.	Sediment:	S1, S2, S3, S4a, S4b, S4c, S4d, S5, S6, S7, S8, S9, S10, S11, S12
1997 Marine Habitat and Resources Survey (URS Greiner, 1997)	Conducted a marine habitat and resources survey offshore of the City of Anacortes and the Site in the area from the shoreline to the outer harbor line.	Survey:	Vegetation and surficial sediment surveys, bathymetric contours, video data noting distribution of eelgrass and macroalgae, sediment grain size, wood content, and fauna present.
1997 Phase I and Limited Phase II Environmental Site Assessment (Woodward-Clyde, 1997a)	Collected and analyzed soil samples from thirteen test pits on the upland portion of the V Place property owned by the City of Anacortes.	Test Pit:	AN1, AN2, AN3, AN4, AN5, AN6, AN7, AN8, AN9, AN10, AN11, AN12, AN13
1997 Survey for Petroleum and Other Chemical Contaminants in the Sediments of Fidalgo Bay (Ecology, 1997b)	Collected and analyzed sediment samples to investigate the extent of oil and chemical contamination within Fidalgo Bay.	Sediment:	Outer_26, Outer_17, Inner_8
1997 Soil Sampling, 3205 V Place Property (Woodward-Clyde, 1997b)	Collected and analyzed soil samples from three test pits from the area described in Woodward-Clyde (1997a) as having the highest concentrations of TPH.	Test Pit:	ANX1, ANX2, ANX4
1997 Custom Plywood Soil Sampling (Woodward-Clyde, 1997c)	Collected and analyzed soil samples from four borings and fifteen hand-auger/shovel sample locations to investigate the presence of PCBs in the upland soils on the Site	Boring:	CP-GP1, CP-GP2, CP-GP3, CP-GP22
		Hand-auger /Shovel:	CP-HA20, CP-HA21, CP-HA23, CP-HA24, CP-HA25, CP-HA26, CP-HA27, CP-HA28, CP-HA29, CP-HA30, CP-HA31, CP-HA32, CP-HA33, CP-HA34, CP-HA??
1997 EMAP Program (Ecology, 1997a)	Collected and analyzed sediment samples for conventionals (i.e. total organic carbon), metals, SVOCs, and PCBs within Fidalgo Bay.	Station:	WA000007 and WA000008

Table 2-1 - Summary of Previous and Current Environmental Characterization and Sampling Investigations

Previous (Pre-2010) [1]			
Investigation Event	**Investigation Description**	**Exploration Type Nomenclature**	
1997 Limited Phase II Site Assessment (Woodward-Clyde, 1997d)	Collected and analyzed soil samples from eleven test pits on the northern property boundary of the Site to determine the extent of heavy petroleum hydrocarbon contamination.	Test Pit:	ANA-TP1, ANA-TP2, ANA-TP3, ANA-TP4, ANA-TP5, ANA-TP6, ANA-TP7, ANA-TP8, ANA-TP9, ANA-TP10, ANA-TP11
1998 Site Investigation and Remedial Options Evaluation (Woodward-Clyde, 1998b)	Collected and analyzed soil and grab groundwater samples from seven push-probes, five hand-augers, and three shallow soil sample locations to: (1) delineate the extent of petroleum-impacted soil and groundwater in the press pit area; (2) identify potentially impacted soil in the vicinity of the resin/caustic storage shed and the former mixed glue tank; and (3) assess the quality of surface water contained in the press pits for disposal purposes. A preliminary evaluation of remedial options was also developed for the Site.	Push-probe:	CP-GP4 through CP-GP10
		Hand-auger:	CP-HA36 through CP-HA40
		Soil:	CP-HARC-A, CP-HARC-B, CP-HAGT
		Grab Groundwater:	CP-GP5, CP-GP7, CP-GP8
2000 START Preliminary Assessment/Site Inspection (EPA, 2000)	Collected and analyzed ten sediment samples, 61 soil samples, six grab groundwater samples, and one shoreline seep sample to document the nature and extent of contamination that may be present at the Site.	Sediment:	FB01 through FB10
		Boring:	BH01 to BH06, PP01 to PP08, CB01 to CB03, CB03b and CB04, RC01 to RC03, GT01 to GT03, UL01 to UL03, BG01, SL01
2003 Draft Engineering Evaluation/Cost Analysis and Cleanup Action Plan (URS, 2003)	Prepared for the City of Anacortes and the Anacortes Public Development Authority (PDA) to evaluate soil and groundwater cleanup alternatives in the upland portion of the Site. Intended to summarize previous investigations, evaluate remedial technologies, and provide a conceptual plan for preferred remedial action. Note: document was not finalized and the work was not performed.	No additional explorations were completed, summarized previous investigations.	
2003 Chemical Contamination, Acute Toxicity in Laboratory Tests, and Benthic Impacts in Sediments of Puget Sound (Ecology and NOAA, 2003)	Collected and analyzed sediment samples as a survey of background conditions within Puget Sound. Three stations were located within Fidalgo Bay and are close enough to provide potential background conditions in the vicinity of the Site.	Station:	17-1-50, 17-2-51, 17-3-52

Table 2-1 - Summary of Previous and Current Environmental Characterization and Sampling Investigations

Previous (Pre-2010) [1]			
Investigation Event	**Investigation Description**	**Exploration Type Nomenclature**	
2006 Wetlands Delineation Study (Geomatrix, 2006)	Conducted a study of the Site and several small areas were identified as wetlands that met all three jurisdictional wetland criteria used by the US Army Corps of Engineers and Ecology to define a wetland.	Survey:	Wetland Delineation
2007 Underwater Habitat Survey (Geomatrix, 2007b)	Conducted an underwater survey offshore of the Site in the area from the shoreline to the outer harbor line.	Survey:	Underwater survey of the extent of eelgrass, macroalgae, and debris in the marine areas near the Site.
2007 to 2009 Additional Remedial Investigation and Supplemental investigations (AMEC Geomatrix 2007 to 2010)	Collected and analyzed soil, groundwater, and offshore sediment samples, and conducted a bathymetric and benthic habitat survey for the Site. Samples included; (1) soil samples at 58 push probes and nine monitoring well boreholes, (2) groundwater samples at nine new monitoring wells and two existing monitoring well locations, and (3) sediment samples at nine test pits and four seep locations.	Soil:	GMX-S1 to GMX-S58 Nine monitoring well boreholes
		Groundwater:	GMX-MW-01 to GMX-MW-09, ANCP-MW-01 and ANCP-MW-02
		Sediment:	TP-01 to TP-09 SEEP1 to SEEP4
		Survey:	Bathymetric and benthic habitat survey witin the Site.
Current (Post-2010) [1, 2]			
2010 Supplemental Shoreline Test Pit Investigation (Hart Crowser, 2010)	Collected and analyzed soil samples from nine test pits in the shoreline area to further investigate the chemical conditions.	Test Pit:	HC-TP-1 through HC-TP-9
2010 Fidalgo Bay Dioxin Study (SAIC 2010, Geomatrix 2008)	Collected and analyzed sediment samples for dioxins within Fidalgo Bay.	Station:	FB-01 to FB-10, PB-01 to PB-10, CPD-1 to CPD-21, CT-01A, CT-01B, CT-02 to CT-05; ST-2, ST-3, ST-4, ST-6, ST-10, ST-11, ST-14, ST-16, ST-19, ST-26, ST-27, ST-32

Notes:

1) For further discussion of the individual investigations and findings of previous (between 1993 and 2010) investigations, refer to the Custom Plywood Remedial Investigation (RI) conducted by AMEC (2010).

2) For further discussion of the individual investigations and findings of current investigations, refer to Section 2.0.

3) Refer to Figure 2-1 for historical uplands and sediment exploration locations pre-2010.

Site - Former Custom Plywood Mill property.

Table 2-2 - Summary of Previous Limited Cleanup Remediation Activities

Previous (Pre-2010) [1]		
Remediation Event	**Remediation Description**	**Remediation Area**
1998 Soil Remediation Report for 3205 V Place (Woodward-Clyde, 1998a)	Conducted a limited cleanup action on the City of Anacortes' V Place property in the areas where soil is heavily impacted by hydraulic oil located near the hardboard plant (Woodward-Clyde, 1997 a,b,c,d). Three groundwater monitoring wells (MW-1, MW-2, and MW-3) were installed downgradient of the soil excavation areas. Following three years of groundwater monitoring, the City of Anacortes received a "No Further Action" letter under the VCP through Ecology's NMRO. In 2002, the monitoring wells were decommissioned.	City of Anacortes V Place properties Areas #1, #2, #3
2007 Interim Remedial Action Areas 2 through 5 (Geomartix, 2007)	Conducted a interim remedial action on the Site in the areas where concentrations of COPCs exceeded unrestricted MTCA Method A soil cleanup levels. Four of the five identified areas (Areas 2-5) were excavated and disposed of off-site. Approximately, 1,500 tons of contaminated soil was disposed of at Rabanco's Subtitle D landfill in Klickitat County.	Former Custom Plywood properties

Notes:

1) For further discussion of the individual remediation activities, refer to the Custom Plywood Remedial Investigation (RI) (AMEC 2010).

2) Refer to Figure 3 for historical uplands remediation action locations.

Table 2-3 - Analytical Results for Intertidal Sediment Samples - AET Criteria (Hart Crowser 2010)

Sample ID	AETs		HC-TP-S-01	HC-TP-S-02	HC-TP-S-03	HC-TP-S-04	HC-TP-S-05	HC-TP-S-06	HC-TP-S-07
Sampling Date	LAET	2LAET	8/10/10	8/10/10	8/9/10	8/9/10	8/10/10	8/9/10	8/9/10
Depth in Feet			5.5 to 6.0	5 to 6	6 to 7	6.5 to 7.5	2 to 3	5 to 6	5 to 6
Conventionals in %									
Total Organic Carbon			8.6	21.7	2.08	0.91	12.3	11.3	17.5
Preserved Total Solids			16.3	27.2	50.9	63.6	26.4	35.4	26.8
Total Solids			16.3	26.2	53.2	70.3	31.8	39.6	27.3
Conventionals in mg/kg									
Ammonia (NH3) as Nitrogen (N)			18.4	22.8	27.8	16.4	3.9	1.1	29.9
Sulfide			1340	667	273	43.6	2120	322	509
TPH in mg/kg									
Diesel Range Organics			650	91	9.4 U	7.1 U	31	24	54
Lube Oil			9300	690	19	14 U	200	290	210
Metals in mg/kg									
Arsenic			28 U	18 U	9.2 U	7.4	37 U	13 U	19 U
Cadmium			1	2.4	2.3	1	4	1	2.2
Chromium			53	76	33.5	28.3	114	26	33
Copper			76	156	24.2	17	228	73.6	29.8
Lead			80	57	5	3	120	138	16
Mercury			0.4	0.41	0.04	0.03 U	1.04	0.06 U	0.07 U
Silver			2 U	1 U	0.5 U	0.4 U	2 U	0.8 U	1 U
Zinc			146	170	58	38	463	155	132
PAHs in ug/kg									
Benzo(a)anthracene	1300	1600	400 U	290	20	4.8 U	**2300**	260	260
Benzo(a)pyrene	1600	3000	81 UJ	180 J	16	4.8 U	**2300** J	350	270
Chrysene	1400	2800	400 U	310	22	4.8	**2100**	350	240
Dibenz(a,h)anthracene	230	540	81 UJ	19 UJ	14 U	4.8 U	**360** J	64	34
Indeno(1,2,3-cd)pyrene	600	690	81 UJ	64 J	14 U	4.8 U	**760** J	160	120
Total Benzofluoranthenes	3200	3600	350 J	310 J	29	5.3	2400 J	500	300
TEQ Equivalent			35	249.5	21.12	0.578	2903	451.9	343.8

Table 2-3 - Analytical Results for Intertidal Sediment Samples - AET Criteria (Hart Crowser 2010)

Sample ID	AETs		HC-TP-S-08		HC-TP-S-09	
Sampling Date	LAET	2LAET	8/9/10		8/9/10	
Depth in Feet			6.5 to 7.5		4 to 5	
Conventionals in %						
Total Organic Carbon			1.28		19	
Preserved Total Solids			68.6		40.3	
Total Solids			74		46.2	
Conventionals in mg/kg						
Ammonia (NH3) as Nitrogen (N)			8.52		2.89	
Sulfide			53.1		752	
TPH in mg/kg						
Diesel Range Organics			6.6	U	12	U
Lube Oil			13	U	190	
Metals in mg/kg						
Arsenic			6.2	U	14	U
Cadmium			1.2		0.8	
Chromium			15.9		17	
Copper			8.6		44.3	
Lead			2	U	43	
Mercury			0.03	U	0.07	U
Silver			0.4	U	0.8	U
Zinc			28		94	
PAHs in ug/kg						
Benzo(a)anthracene	1300	1600	4.8	U	140	J
Benzo(a)pyrene	1600	3000	4.8	U	180	
Chrysene	1400	2800	4.8	U	160	
Dibenz(a,h)anthracene	230	540	4.8	U	50	U
Indeno(1,2,3-cd)pyrene	600	690	4.8	U	90	
Total Benzofluoranthenes	3200	3600	4.8	U	240	
TEQ Equivalent					228.6	

U = Not detected at the reporting limit indicated.
J = Estimated value.
Bold = Concentration is greater than LAET.
Bold/Box = Concentration is greater than 2LAET.

Table 2-4 - Analytical Results for Intertidal Sediment Samples - SMS Criteria (Hart Crowser 2010)

Sample ID	SMS		HC-TP-S-01(a)	HC-TP-S-02(a)	HC-TP-S-03	HC-TP-S-04	HC-TP-S-05(a)	HC-TP-S-06(a)	HC-TP-S-07(a)
Sampling Date	SQS	CSL	8/10/10	8/10/10	8/9/10	8/9/10	8/10/10	8/9/10	8/9/10
Depth in Feet			5.5 to 6.0	5 to 6	6 to 7	6.5 to 7.5	2 to 3	5 to 6	5 to 6
Conventionals in %									
Total Organic Carbon			8.6	21.7	2.08	0.91	12.3	11.3	17.5
Preserved Total Solids			16.3	27.2	50.9	63.6	26.4	35.4	26.8
Total Solids			16.3	26.2	53.2	70.3	31.8	39.6	27.3
Conventionals in mg/kg									
Ammonia (NH3) as Nitrogen (N)			18.4	22.8	27.8	16.4	3.9	1.1	29.9
Sulfide			1340	667	273	43.6	2120	322	509
TPH in mg/kg									
Diesel Range Organics			650	91	9.4 U	7.1 U	31	24	54
Lube Oil			9300	690	19	14 U	200	290	210
Metals in mg/kg									
Arsenic	57	93	28 U	18 U	9.2 U	7.4	37 U	13 U	19 U
Cadmium	5.1	6.7	1	2.4	2.3	1	4	1	2.2
Chromium	260	270	53	76	33.5	28.3	114	26	33
Copper	390	390	76	156	24.2	17	228	73.6	29.8
Lead	450	530	80	57	5	3	120	138	16
Mercury	0.41	0.59	0.4	0.41	0.04	0.03 U	1.04	0.06 U	0.07 U
Silver	6.1	6.1	2 U	1 U	0.5 U	0.4 U	2 U	0.8 U	1 U
Zinc	410	960	146	170	58	38	**463**	155	132
PAHs in mg/kg OC									
Benzo(a)anthracene	110	270	4.65 U	1.34	0.96	0.53 U	18.70	2.30	1.49
Benzo(a)pyrene	99	210	0.94 UJ	0.83 J	0.77	0.53 U	18.70 J	3.10	1.54
Chrysene	110	460	4.65 U	1.43	1.06	0.53	17.07	3.10	1.37
Dibenz(a,h)anthracene	12	33	0.94 UJ	0.09 UJ	0.67 U	0.53 U	2.93 J	0.57	0.19
Indeno(1,2,3-cd)pyrene	34	88	0.94 UJ	0.29 J	0.67 U	0.53 U	6.18 J	1.42	0.69
Total Benzofluoranthenes	230	450	4.07 J	1.43 J	1.39	0.58	19.51 J	4.42	1.71
TEQ Equivalent			0.407	1.150	1.015	0.064	23.602	3.999	1.965

Table 2-4 - Analytical Results for Intertidal Sediment Samples - SMS Criteria (Hart Crowser 2010)

Sample ID	SMS		HC-TP-S-08		HC-TP-S-09(a)	
Sampling Date	SQS	CSL	8/9/10		8/9/10	
Depth in Feet			6.5 to 7.5		4 to 5	
Conventionals in %						
Total Organic Carbon			1.28		19	
Preserved Total Solids			68.6		40.3	
Total Solids			74		46.2	
Conventionals in mg/kg						
Ammonia (NH3) as Nitrogen (N)			8.52		2.89	
Sulfide			53.1		752	
TPH in mg/kg						
Diesel Range Organics			6.6	U	12	U
Lube Oil			13	U	190	
Metals in mg/kg						
Arsenic	57	93	6.2	U	14	U
Cadmium	5.1	6.7	1.2		0.8	
Chromium	260	270	15.9		17	
Copper	390	390	8.6		44.3	
Lead	450	530	2	U	43	
Mercury	0.41	0.59	0.03	U	0.07	U
Silver	6.1	6.1	0.4	U	0.8	U
Zinc	410	960	28		94	
PAHs in mg/kg OC						
Benzo(a)anthracene	110	270	0.38	U	0.74	J
Benzo(a)pyrene	99	210	0.38	U	0.95	
Chrysene	110	460	0.38	U	0.84	
Dibenz(a,h)anthracene	12	33	0.38	U	0.26	U
Indeno(1,2,3-cd)pyrene	34	88	0.38	U	0.47	
Total Benzofluoranthenes	230	450	0.38	U	1.26	
TEQ Equivalent					1.203	

U = Not detected at the reporting limit indicated.
J = Estimated value.
(a) TOC concentration is outside range (0.5 to 3.5%) for OC normalization.
Bold = Concentration is greater than SQS.

Table 2-5 - Analytical Results for Intertidal Sediment Samples - MTCA Method A and B Criteria (Hart Crowser 2010)

Sample ID	MTCA		HC-TP-S-01	HC-TP-S-02	HC-TP-S-03	HC-TP-S-04	HC-TP-S-05	HC-TP-S-06	HC-TP-S-07
Sampling Date	Method A	Method B	8/10/10	8/10/10	8/9/10	8/9/10	8/10/10	8/9/10	8/9/10
Depth in Feet			5.5 to 6.0	5 to 6	6 to 7	6.5 to 7.5	2 to 3	5 to 6	5 to 6
Conventionals in %									
Total Organic Carbon			8.6	21.7	2.08	0.91	12.3	11.3	17.5
Preserved Total Solids			16.3	27.2	50.9	63.6	26.4	35.4	26.8
Total Solids			16.3	26.2	53.2	70.3	31.8	39.6	27.3
Conventionals in mg/kg									
Ammonia (NH3) as Nitrogen (N)			18.4	22.8	27.8	16.4	3.9	1.1	29.9
Sulfide			1340	667	273	43.6	2120	322	509
TPH in mg/kg									
Diesel Range Organics	2000		650	91	9.4 U	7.1 U	31	24	54
Lube Oil	2000		**9300**	690	19	14 U	200	290	210
Metals in mg/kg									
Arsenic	20	24(0.67[1])	*28 U*	18 U	9.2 U	7.4	*37 U*	13 U	19 U
Cadmium	2		1	**2.4**	**2.3**	1	**4**	1	**2.2**
Chromium			53	76	33.5	28.3	114	26	33
Copper			76	156	24.2	17	228	73.6	29.8
Lead	250		80	57	5	3	120	138	16
Mercury	2		0.4	0.41	0.04	0.03 U	1.04	0.06 U	0.07 U
Silver			2 U	1 U	0.5 U	0.4 U	2 U	0.8 U	1 U
Zinc			146	170	58	38	**463**	155	132
PAHs in ug/kg									
Benzo(a)anthracene			400 U	290	20	4.8 U	2300	260	260
Benzo(a)pyrene			81 UJ	180 J	16	4.8 U	2300 J	350	270
Chrysene			400 U	310	22	4.8	2100	350	240
Dibenz(a,h)anthracene			81 UJ	19 UJ	14 U	4.8 U	360 J	64	34
Indeno(1,2,3-cd)pyrene			81 UJ	64 J	14 U	4.8 U	760 J	160	120
Total Benzofluoranthenes			350 J	310 J	29	5.3	2400 J	500	300
TEQ Equivalent	100	140	35	**249.5**	21.12	0.578	**2903**	**451.9**	**343.8**

Table 2-5 - Analytical Results for Intertidal Sediment Samples - MTCA Method A and B Criteria (Hart Crowser 2010)

Sample ID	MTCA		HC-TP-S-08		HC-TP-S-09	
Sampling Date	Method A	Method B	8/9/10		8/9/10	
Depth in Feet			6.5 to 7.5		4 to 5	
Conventionals in %						
Total Organic Carbon			1.28		19	
Preserved Total Solids			68.6		40.3	
Total Solids			74		46.2	
Conventionals in mg/kg						
Ammonia (NH3) as Nitrogen (N)			8.52		2.89	
Sulfide			53.1		752	
TPH in mg/kg						
Diesel Range Organics	2000		6.6	U	12	U
Lube Oil	2000		13	U	190	
Metals in mg/kg						
Arsenic	20	24(0.67[1])	6.2	U	14	U
Cadmium	2		1.2		0.8	
Chromium			15.9		17	
Copper			8.6		44.3	
Lead	250		2	U	43	
Mercury	2		0.03	U	0.07	U
Silver			0.4	U	0.8	U
Zinc			28		94	
PAHs in ug/kg						
Benzo(a)anthracene			4.8	U	140	J
Benzo(a)pyrene			4.8	U	180	
Chrysene			4.8	U	160	
Dibenz(a,h)anthracene			4.8	U	50	U
Indeno(1,2,3-cd)pyrene			4.8	U	90	
Total Benzofluoranthenes			4.8	U	240	
TEQ Equivalent	100	140	0		$\boxed{\mathbf{228.6}}$	

U = Not detected at the reporting limit indicated.
J = Estimated value.
Bold = Concentration is greater than MTCA Method A.
Bold/Box = Concentration is greater than MTCA Method B.
(1) MTCA Method B Carcinogen screening level for direct contact with soil.
Italic = Reporting limit is greater than screening criteria.

Table 2-6 - Screening Levels For Water Samples Based On Marine Surface Water Criteria (Hart Crowser 2010)
Former Custom Plywood Mill, Anacortes, Washington

Analyte	Surface Water ARAR - Aquatic Life - Marine/Acute - Ch. 173-201A WAC (µg/L)	Surface Water ARAR - Aquatic Life - Marine/Acute - Clean Water Act §304 (µg/L)	Surface Water ARAR - Aquatic Life - Marine/Acute - National Toxics Rule, 40 CFR 131 (µg/L)	Surface Water ARAR - Aquatic Life - Marine/Chronic - Ch. 173-201A WAC (µg/L)	Surface Water ARAR - Aquatic Life - Marine/Chronic - Clean Water Act §304 (µg/L)	Surface Water ARAR - Aquatic Life - Marine/Chronic - National Toxics Rule, 40 CFR 131 (µg/L)	Surface Water ARAR - Human Health – Marine – Clean Water Act §304 (µg/L)	Surface Water ARAR - Human Health – Marine – National Toxics Rule, 40 CFR 131 (µg/L)	Surface Water, Method B, Carcinogen, Standard Formula Value (µg/L)	Surface Water, Method B, Non-Carcinogen, Standard Formula Value (µg/L)	Screening Level (µg/L)
TPH											
TPH, diesel range organics	--	--	--	--	--	--	--	--	--	--	**500** [2]
TPH, heavy oils	--	--	--	--	--	--	--	--	--	--	**500** [2]
TPH, mineral oil	--	--	--	--	--	--	--	--	--	--	**500** [2]
Dissolved Metals											
Arsenic, inorganic	69	69	69	36	36	36	0.14	0.14	0.098	18	**0.14**
Cadmium	42	40	42	9.3	8.8	9.3	--	--	--	20	**8.8**
Chromium (total)	--	--	--	--	--	--	--	--	--	--	**--**
Copper	4.8	4.8	2.4	3.1	3.1	2.4	--	--	--	2,700	**2.4**
Lead	210	210	210	8.1	8.1	8.1	--	--	--	--	**8.1**
Mercury	1.8	1.8	2.1	0.025	0.94	0.025	0.3	0.15	--	--	**0.025**
Silver	1.9	1.9	1.9	--	--	--	--	--	--	26,000	**1.9**
Zinc	90	90	90	81	81	81	26,000	--	--	17,000	**81**
cPAHs											
Benzo[a]anthracene	--	--	--	--	--	--	0.018	0.031	--	--	**0.018**
Benzo[a]pyrene	--	--	--	--	--	--	0.018	0.031	0.03	--	**0.018**
Chrysene	--	--	--	--	--	--	0.018	0.031	--	--	**0.018**
Dibenzo[a,h]anthracene	--	--	--	--	--	--	0.018	0.031	--	--	**0.018**
Indeno[1,2,3-cd]pyrene	--	--	--	--	--	--	0.018	0.031	--	--	**0.018**

Notes
1. -- = Not established.
2. Screening levels based on MTCA Method A cleanup levels.

Abbreviations
µg/L = micrograms per liter.
ARAR = applicable or relevant and appropriate requirements
CFR = code of federal regulations
TPH = total petroleum hydrocarbons
WAC = Washington Administrative Code

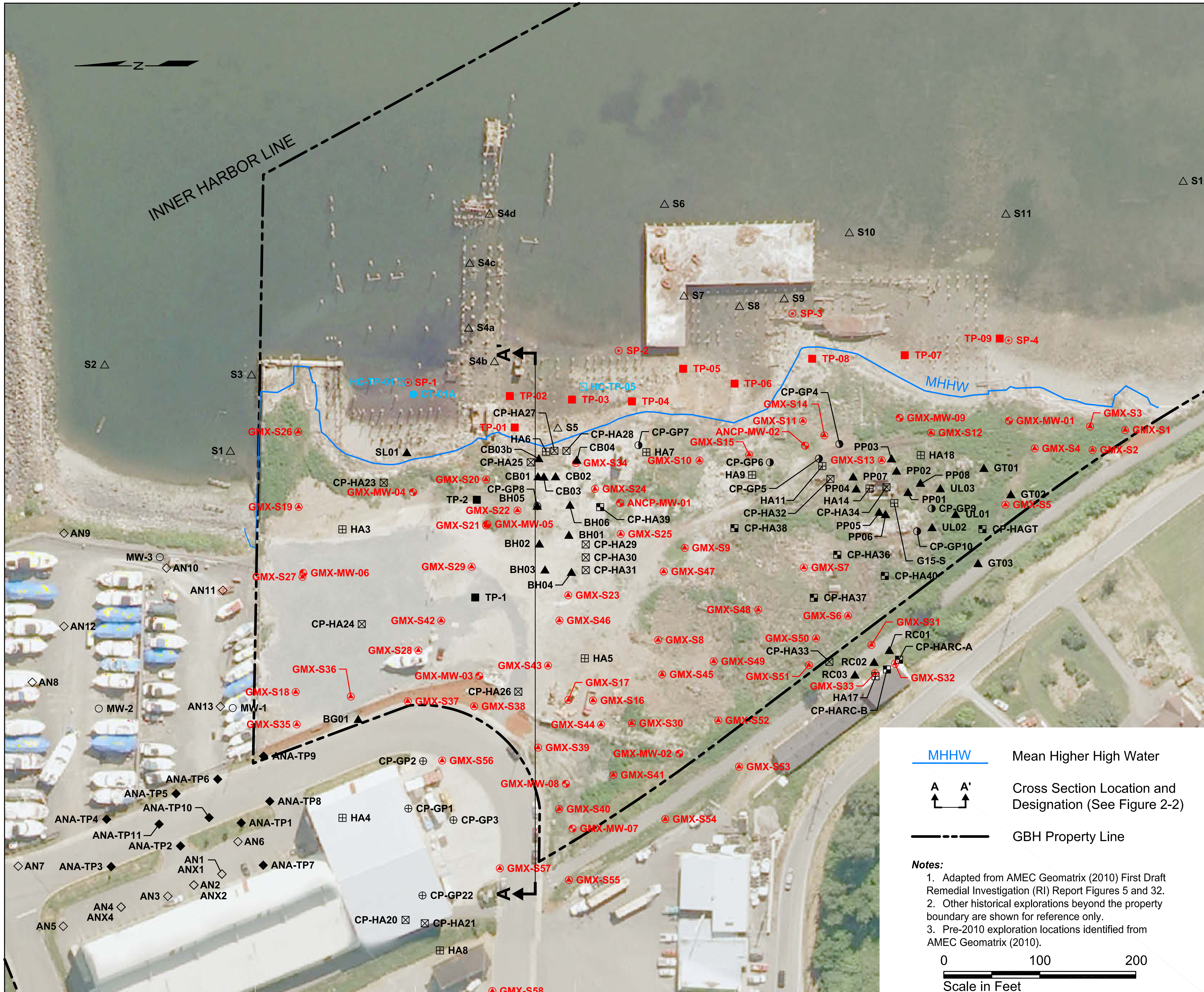
Table 2-7 - Analytical Results for Water Samples (Hart Crowser 2010)

Sample ID Sampling Date	Marine Water Criteria	HC-TP-W-01 8/10/10	HC-TP-W-02 8/10/10	HC-TP-W-03 8/9/10	HC-TP-W-04 8/9/10	HC-TP-W-05 8/10/10	HC-TP-W-06 8/9/10
Conventionals in mg/L							
Total Suspended Solids		1990	1220	6560	2160	760	2620
Ammonia (NH3) as Nitrogen (N)		3.18	3.23	1.77	6.88	1.12	0.315
Sulfide		93.5	88.4	25.1	22.9	31.8	5.67
TPH in mg/L							
Diesel Range Organics	0.5	**0.95**	**0.82**	0.27	0.11	0.4	0.13
Lube Oil	0.5	**9.8**	**4.7**	**0.89**	0.2 U	**2.3**	**1.7**
Dissolved Metals in ug/L							
Arsenic	0.14	0.03 U	0.04 T	**1.4**	0.12	**1.32**	**1.86**
Cadmium	8.8	0.013 U	0.013 U	0.013 U	0.013 U	0.013 U	0.016 T
Chromium	--	0.459	0.135	0.742	0.247	0.786	0.112
Copper	2.4	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.69
Lead	8.1	0.23 U	0.23 U	0.23 U	0.23 U	0.243 T	1.57
Mercury	0.025	**0.318**	**0.436**	**0.872**	**0.0613**	**0.443**	**0.0478**
Silver	1.9	0.005 U	**6.32**	0.005 U	0.005 U	0.005 U	0.005 U
Zinc	81	1.52	1.3	1.56	1.17	4.23	74.6
PAHs in ug/L							
Benzo(a)anthracene	0.018	**0.4 J**	**0.25 J**	**0.17 J**	**0.08 J**	*0.041 UJ*	**0.25 J**
Benzo(a)pyrene	0.018	**0.38**	**0.18**	**0.15**	**0.091**	**0.088**	**0.43**
Chrysene	0.018	**0.34**	**0.18**	**0.097**	**0.1**	*0.03 UJ*	**0.35**
Dibenz(a,h)anthracene	0.018	**0.22**	*0.03 U*	*0.03 U*	*0.03 U*	*0.03 U*	**0.1**
Indeno(1,2,3-cd)pyrene	0.018	**0.25**	**0.087**	**0.068**	**0.05**	**0.1**	**0.3**
Total Benzofluoranthenes	0.018	**0.58**	**0.26**	**0.19**	**0.12**	**0.17**	**0.66**

Table 2-7 - Analytical Results for Water Samples (Hart Crowser 2010)

Sample ID Sampling Date	Marine Water Criteria	HC-TP-W-07 8/9/10	HC-TP-W-08 8/9/10	HC-TP-W-09 8/9/10
Conventionals in mg/L				
Total Suspended Solids		3320	9600	2610
Ammonia (NH3) as Nitrogen (N)		2.52	3.24	1.27
Sulfide		50.2	19.8	15.2
TPH in mg/L				
Diesel Range Organics	0.5	**0.51**	0.45 J	**1.2**
Lube Oil	0.5	**1.2**	**2.2 J**	**12**
Dissolved Metals in ug/L				
Arsenic	0.14	**1.27**	**1.67**	**0.84**
Cadmium	8.8	0.013 U	0.013 U	0.013 U
Chromium	--	0.372	0.385	0.336
Copper	2.4	0.23 U	0.23 U	0.23 U
Lead	8.1	0.23 U	0.23 U	0.553 T
Mercury	0.025	**0.226**	**0.311**	**0.208**
Silver	1.9	0.005 U	0.005 U	0.005 U
Zinc	81	2.01	1.77	1.05
PAHs in ug/L				
Benzo(a)anthracene	0.018	**0.39 J**	**0.25 J**	**0.24 J**
Benzo(a)pyrene	0.018	**0.38**	**0.2**	**0.3**
Chrysene	0.018	**0.26**	**0.23**	**0.23**
Dibenz(a,h)anthracene	0.018	**0.07**	**0.039**	**0.034**
Indeno(1,2,3-cd)pyrene	0.018	**0.18**	**0.082**	**0.16**
Total Benzofluoranthenes	0.018	**0.4**	**0.25**	**0.56**

U = Not detected at the reporting limit indicated.
J = Estimated value.
T = Value is between the method reporting limit and method detection limit.
Bold = Concentration is greater than the Marine Surface Water Criteria.
Italic = Reporting limit is greater than screening criteria.



	2010 Exploration Location and Number
CT-01A	Sample (SAIC 2010)
HC-TP-05	Test Pit (Hart Crowser 2010)
	Pre-2010 Exploration Location and Number
HA4	Hand Auger or Grab Sample (Enviros 1995a)
S1	Sediment Sample (Enviros 1995b)
AN1	Test Pit Sample (Woodward-Clyde 1997a,b)
CP-GP1	Geoprobe Sample (Woodward-Clyde 1997c)
CP-HA26	Hand Auger or Grab Sample (Woodward-Clyde 1997c)
ANA-TP3	Test Pit Sample (Woodward-Clyde 1997d)
CP-GP9	Geoprobe Sample (Woodward-Clyde 1998b)
CP-HA40	Hand Auger or Grab Sample (Woodward-Clyde 1998b)
SL01	Soil Boring (EPA 2000)
	AMEC Geomatrix Exploration Location and Number
TP-01	Test Pit (Geomatrix 2007; AMEC 2009)
GMX-MW-02	2008 and 2009 Monitoring Well (AMEC 2009)
GMX-S6	2008 and 2009 Soil Sample (AMEC 2009)
SP-1	August 2008 Seep Sample (AMEC 2009)
MW-1	Decommissioned Monitoring Well

MHHW	Mean Higher High Water
A A'	Cross Section Location and Designation (See Figure 2-2)
	GBH Property Line

Notes:

1. Adapted from AMEC Geomatrix (2010) First Draft Remedial Investigation (RI) Report Figures 5 and 32.
2. Other historical explorations beyond the property boundary are shown for reference only.
3. Pre-2010 exploration locations identified from AMEC Geomatrix (2010).

0 100 200

Scale in Feet

Custom Plywood Site
Anacortes, Washington

Historical Site and Exploration Plan

17330-27 (FS) 2/11

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Figure **2-1**

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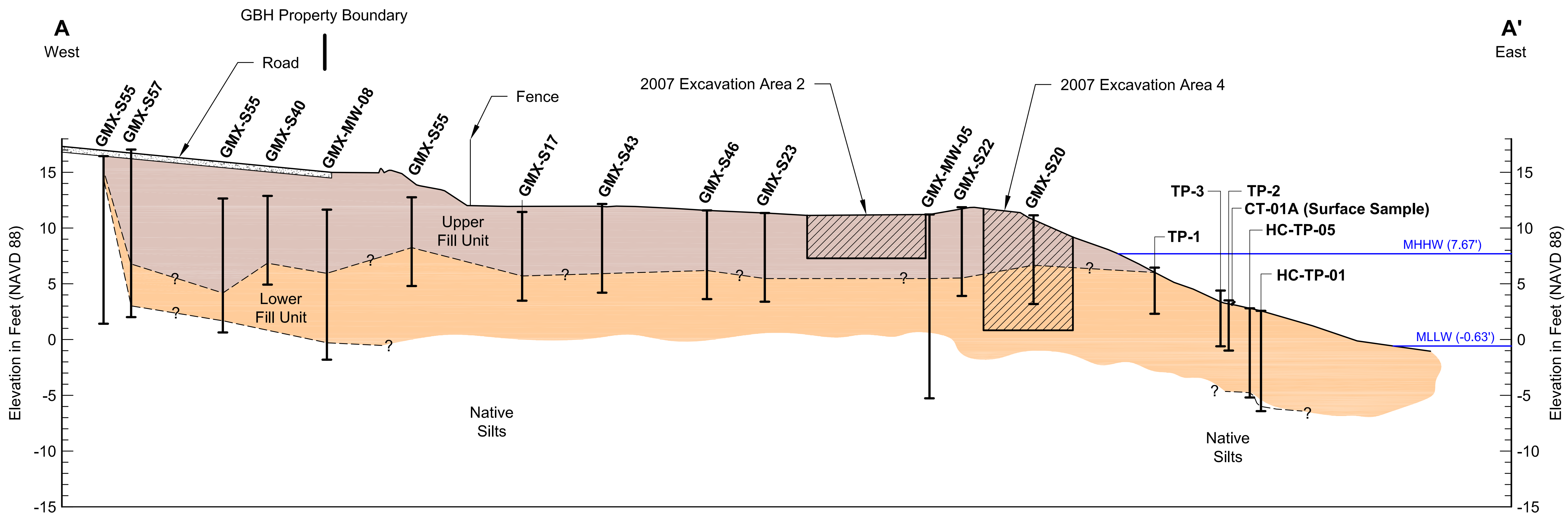

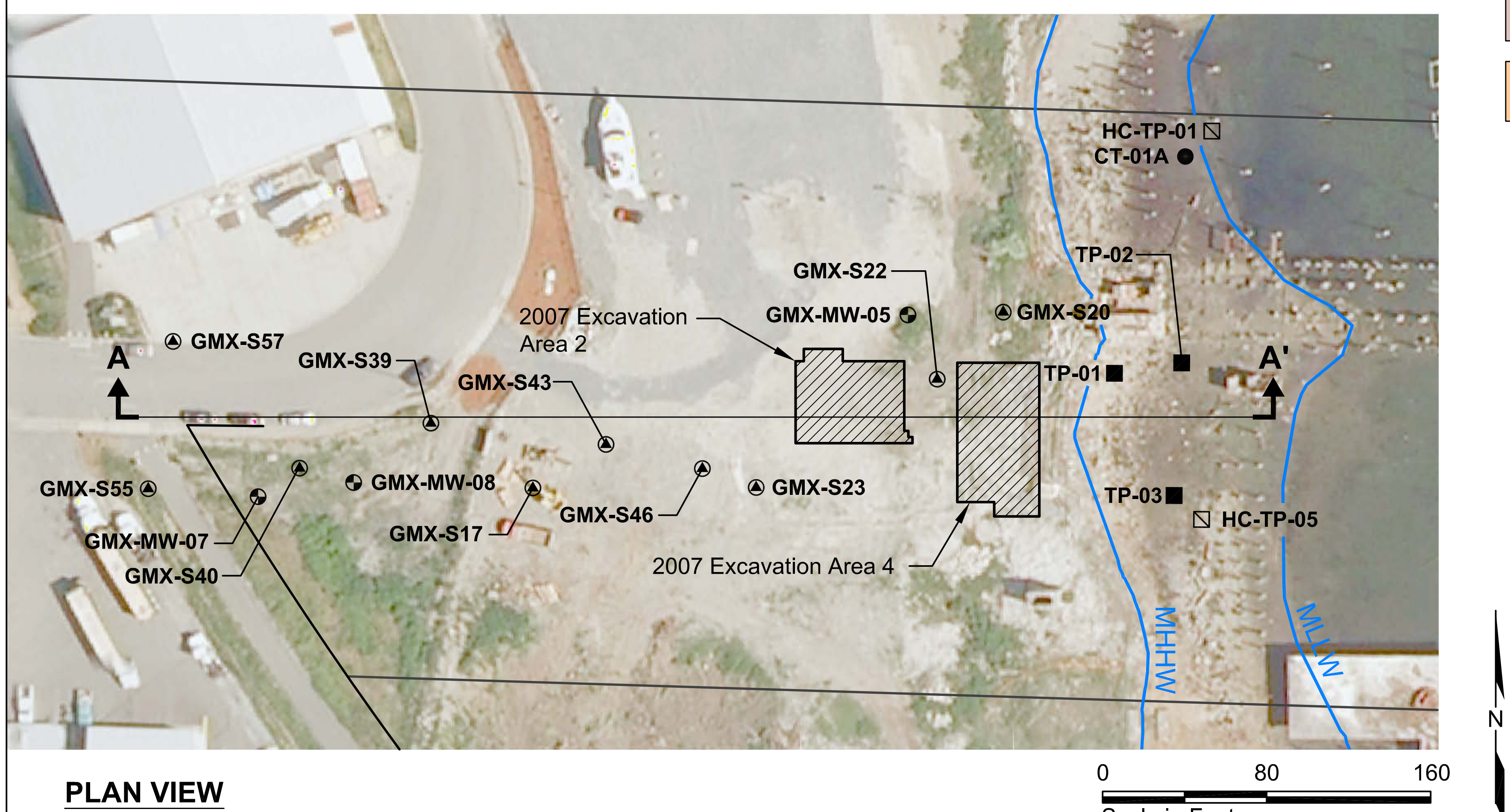

PLAN VIEW

Upper Fill Unit	Silty Sand with Gravel, Brick Fragments, and Buried Building Debris
Lower Fill Unit	Fine-Grained Wood (Sawdust to Bark Chip Sized) with Scattered Logs
GMX-S43	Exploration Name
(vertical bar)	Exploration Location
MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
A A'	Cross Section Location and Designation

Horizontal Scale in Feet
0 50 100
0 10 20
Vertical Scale in Feet
Vertical Exaggeration x 5

Notes:
1. Adapted from AMEC Geomatrix (2010) First Draft Remedial Investigation (RI) Report Figure 30.
2. See Figure 2-1 for exploration types and report references.

Custom Plywood Site
Anacortes, Washington

Cross Section A-A'
Typical Site Fill Profile

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Figure
2-2

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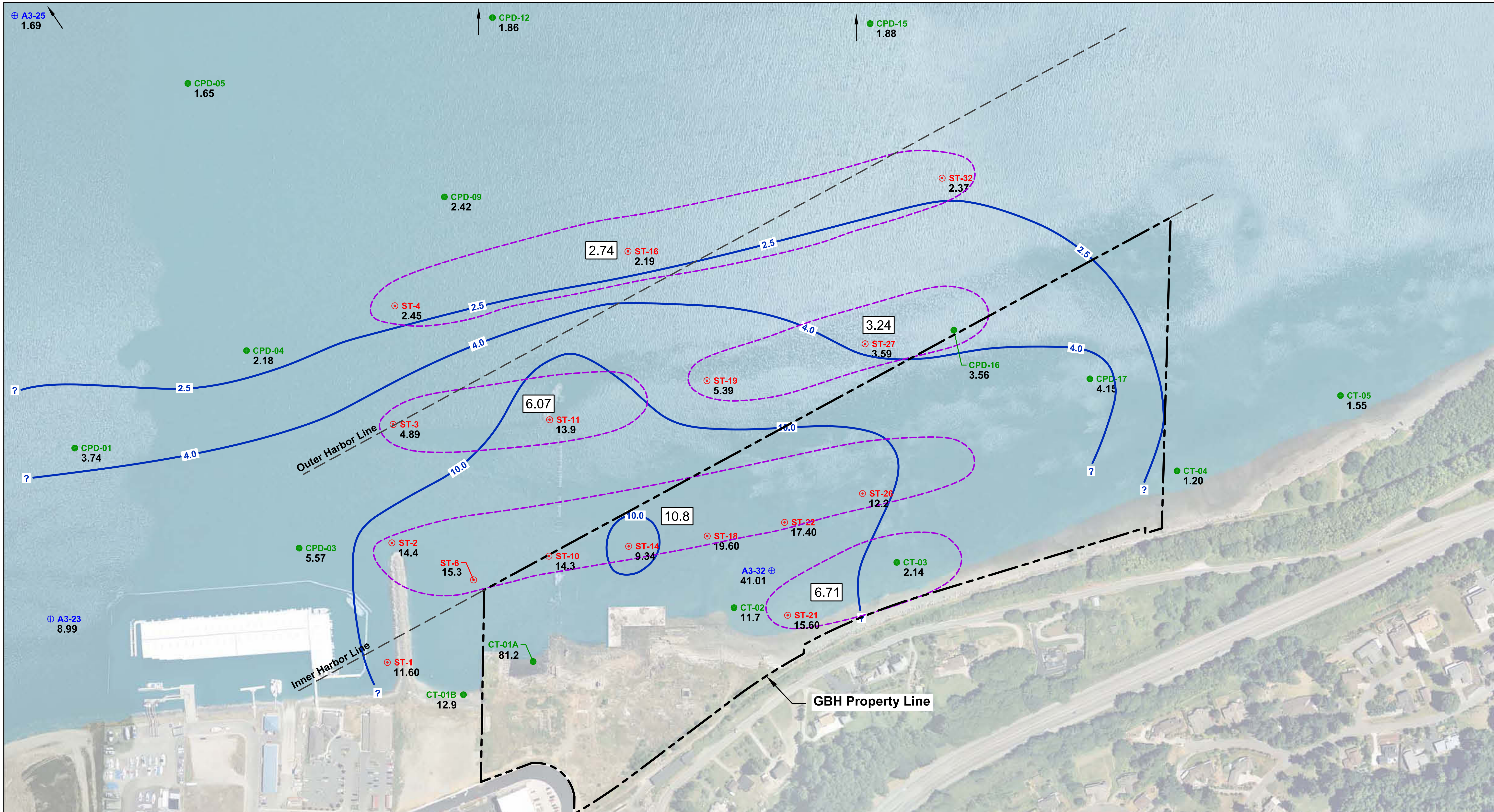

Sample Location and Number

CT-01A ● SAIC, 2010

A3-23 ⊕ SAIC, 2008

ST-1 ⦿ Geomatrix, 2008

A3-23 ⊕ 8.99 Discrete dioxin analysis with result in parts per trillion TEC

Composite Sample Group with result in parts per trillion TEC (AMEC Geomatrix 2010)

6.71 Group 1	3.24 Group 4
10.8 Group 2	2.74 Group 5
6.07 Group 3	

2.5 Dioxin TEC Contour

Note: AMEC Geomatrix composite samples were not used for contours.

Source: Aerial photo courtesy of City of Anacortes, 2003.

N

0 300 600

Scale in Feet

Custom Plywood Site
Anacortes, Washington

Sediment Sample Locations and Dioxin Analytical Testing Results

17330-27 (FS) 2/11

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Figure **2-3**

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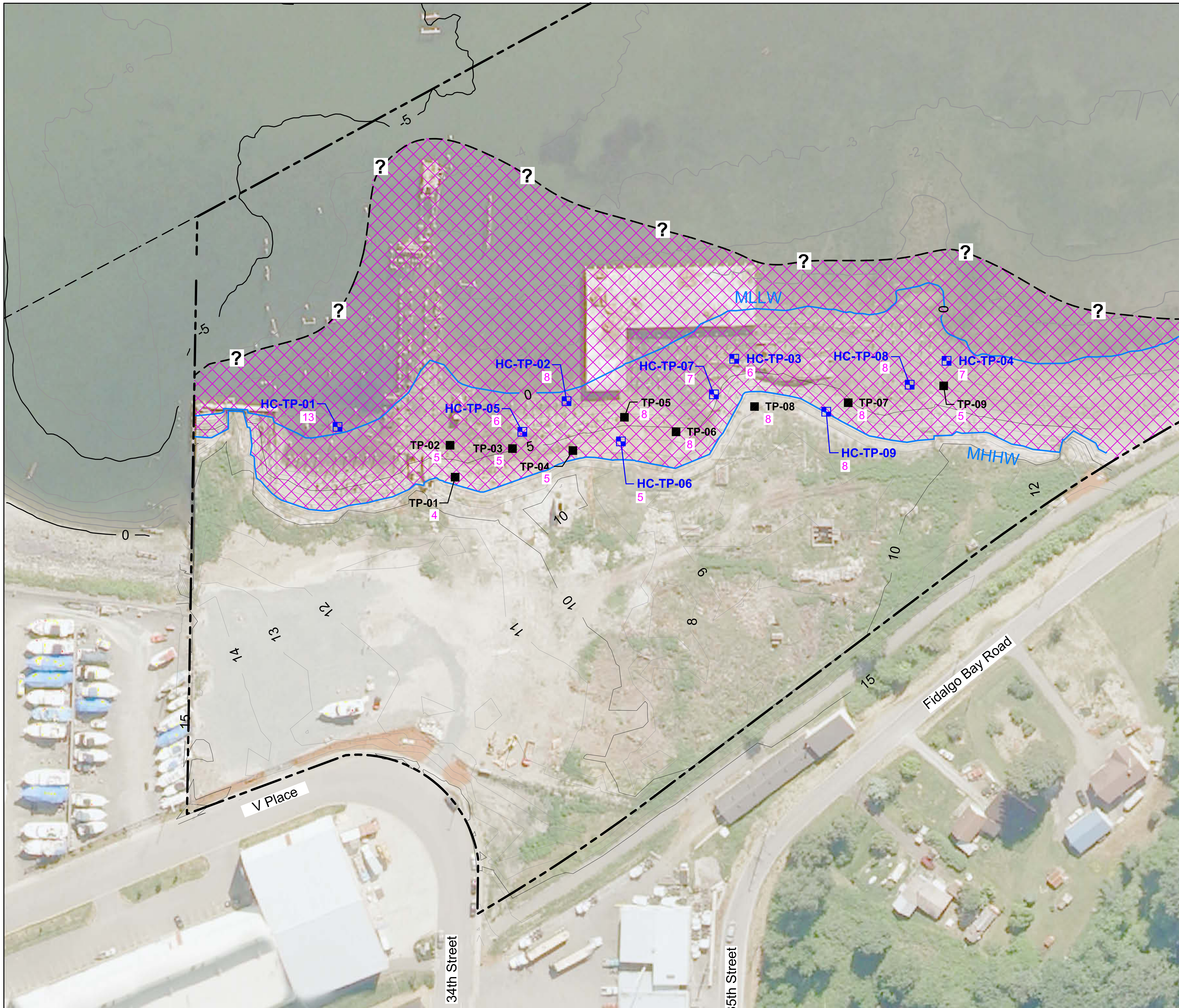


Exploration Location and Number

Test Pit (Hart Crowser, 2010)

TP-01 Test Pit (Geomatrix, 2007, AMEC, 2009)

7 Approximate Fill Thickness in Feet (Combined near-surface debris and wood waste)

MHHW Mean Higher High Water

MLLW Mean Lower Low Water

GBH Property Line

Inferred Extent of Wood Waste up to 6 Feet

Notes:

1. Property line, tracts, and MHHW are based on First Draft Remedial Investigation Report Figures (AMEC Geomatrix, 2010).
2. Seaward of MHHW: Elevations in feet (MLLW).
3. Landward of MHHW: Elevations in feet (NAVD 88).

Source: Aerial photo courtesy of City of Anacortes, 2003.

N

0 100 200

Scale in Feet

Custom Plywood Site
Anacortes, Washington

Site and Exploration Plan for Intertidal Investigations

17330-27 (FS) 2/11

HARTCROWSER

Figure
2-4

EAL 02/1/11 1733027-FS-006.dwg

3.0 CONCEPTUAL SITE MODEL

The conceptual site model (CSM) for the Custom Plywood Site describes the physical and chemical conditions of the upland portion of the GBH property area and adjacent aquatic area addressed in this FS. The CSM is a representation that identifies the potential or suspected sources of hazardous substances, the types and concentration of hazardous substances, potentially contaminated media, and actual and potential exposure pathways and receptors (WAC 173-34-200) present at the Custom Plywood Site.

The Custom Plywood CSM is a set of hypotheses derived from existing site data and knowledge gained from environmental evaluations conducted at other sites. This model summarizes our current understanding of the environmental processes underway at the site based on data available in December 2010.

The following sections summarize:

- The suspected/confirmed contaminant sources and media present at the Custom Plywood Site (Section 3.1);
- The contaminant release mechanisms, transport, and exposure pathways that can allow contaminants to migrate from source areas to potential receptors (Section 3.2);
- The potential receptors that could be impacted by the contaminants (Section 3.3); and
- A summary of completed exposure pathways (Section 3.4).

Completed exposure pathways are summarized in Section 3.4. The CSM builds on information presented in the AMEC Geomatrix RI (2011) and additional site data presented in Section 2.0 of this FS. A generalized CSM for the Custom Plywood Site is depicted on Figure 3-1.

3.1 Contaminant Sources and Affected Media

Lumber milling and plywood operations took place at the Custom Plywood Site for over 100 years. The GBH upland and overwater parcel tracts are the focus of this FS. Although operational details are lacking, former plant operations produced copious amounts of wood waste fill placed in upland and aquatic portions of the site over many years. Site operations ceased following the 1992 fire, with no continuing primary sources of contamination.

The primary sources of contaminants at the Custom Plywood Site are identified in Section 3.1.1. Secondary sources of contaminants and the environmental media (e.g., soil, groundwater, sediments) impacted by the contaminants are discussed in Section 3.1.2.

3.1.1 Primary Sources and Contaminants

Historical sources and processes releasing wood waste and hazardous chemical materials to the environment during mill operation are not well known or documented. The 2010 AMEC Geomatrix RI identified petroleum hydrocarbons (diesel and heavy oil), cPAHs, and metals as COPCs in soil and groundwater, and dioxin/furans as COPCs for sediments. Wood waste was also identified as a potential deleterious substance. The process used to further evaluate and identify COPCs is described in Section 4.0 of this FS.

The 2010 AMEC Geomatrix RI noted that total petroleum hydrocarbons (TPH) were the most widely used and released hazardous material at the Site. TPH contamination and localized free product in site fill appear most prevalent near the press pit area in the south central portion of the upland area of the GBH property (Figure 5-1). Other suspected contaminant sources include burned debris from the 1992 fire, with PAHs and dioxins expected as typical products of combustion. Existing creosote-treated pilings are an additional potential source of cPAHs in the aquatic and upland environments.

Other upland contaminants include pentachlorophenol (PCP) detected in a limited number of soil samples. No information was reported in the AMEC Geomatrix RI regarding the possible use of wood waste treatment compounds on the Custom Plywood Site. PCP was a common ingredient in sap stain formulations historically applied at many plywood mills. The 2011 AMEC Geomatrix RI further notes that the distribution and relatively low concentrations of metals detected in soil are indicative of typical and limited historical industrial practices associated with building paint and equipment. No widespread or higher concentration sources of metals or metal waste streams were reported.

In the aquatic environment, thick sections of sawdust, mill ends, and other wood waste fill were deposited near former overwater structures associated with former site operations, as summarized and described in Section 2.0 of this FS. The seaward extent of wood waste as a source of contamination in the aquatic environment was not established by the AMEC Geomatrix RI and related site investigations to date, although additional field sampling was conducted in December 2010 and presented in a report completed in May 2011 (Hart Crowser 2011) to address this data gap (refer to FS Section 2.0). In sufficient quantities, wood waste can represent an environmental pollutant and deleterious substance per SMS criteria (WAC 173-240-200(17)). Potentially deleterious effects of wood waste have been evaluated in biological response studies such as those conducted during the FS for the former Scott Paper site north of Custom Plywood (GeoEngineers, AMEC Geomatrix, and Anchor 2008). Results of these studies with regard to wood waste and associated total volatile solids (TVS) content are summarized further in Section 4.0 of this FS.

Dioxin is the other notable contaminant in the aquatic environment. Dioxin sources associated with site activities were not documented by the AMEC Geomatrix RI; however, surface sediment dioxin concentrations uniformly ranging from about 10 to 20 total TEC occur over much of the aquatic area of the site based on current sampling analytical data reported in the RI and by SAIC (2010) (Figure 2-4). Two other "outlier" dioxin concentrations of 81 and 41 ppt were detected as shown on Figure 2-4. With the exception of these two higher concentration samples, the relatively uniform occurrence of dioxin suggests that dioxins were redistributed in the aquatic environment following release from some combination of local Custom Plywood sources, and possibly from off-site sources such as the former Scott Paper mill site to the north. Dioxin concentrations tend to diminish seaward toward the central part of Fidalgo Bay.

3.1.2 Secondary Sources of Contamination and Affected Media

TPH and other chemical constituents including cPAHs and total metals in soil represent a source of residual contamination in the upland portion of the site. Soil contaminants are present in upland fill materials exceeding 15 feet in thickness in some areas of the site (refer to Section 5 of this FS). As a secondary source of contamination, TPH in soil appears to affect both the "upper" and "lower" fill units identified in the AMEC Geomatrix RI. Concrete, brick, and other debris are the distinguishing components of the upper unit, while wood waste is more prevalent in the lower unit. Residual soil contaminants have the potential to migrate to groundwater, surface water, and sediments.

Elevated concentrations of metals such as arsenic, copper, and nickel are present in groundwater in some upland areas of the site. Limited sampling data exist to define the overall extent and prevalence of these constituents or possibly other COPCs in groundwater. The degree to which groundwater represents a secondary source of contamination, therefore, is uncertain. However, remediation of soil as secondary contaminant source is expected to remove groundwater as a contaminated media.

Sediment containing wood waste is an ongoing source of contamination in the aquatic environment. Wood waste accumulation in nearshore areas and near former overwater structures exceeds 6 feet in places. As part of the sediment profile, wood waste can adversely affect benthic habitat by its presence in the biologically active zone and by potentially generating sulfide, ammonia, phenols, and related degradation products harmful to marine biota. As noted above, the seaward extent and magnitude of wood waste in quantities sufficient to promote adverse impacts is uncertain and was further addressed in the May 2011 supplemental sediment field investigation report.

Near-surface sediments throughout the aquatic portion of the site are further impacted by dioxin concentrations exceeding Fidalgo Bay background levels. Deeper portions of the sediment profile were also affected as shown in the May 2011 supplemental field investigation. Elevated dioxin concentrations were encountered in deeper sediments associated with relatively thick, nearshore accumulations of wood waste. As wood waste quantities decrease seaward, dioxin is more likely restricted to surface sediments because of secondary redistribution following in-water fill placement or erosion of near-shore deposits.

3.2 Release Mechanisms and Transport Processes

The primary release mechanisms and transport processes by which contaminants can migrate from sources to receptors are identified in this section. For the upland environment, contaminants can migrate from source areas to receptors by the routes described below for affected media.

3.2.1 Potential Exposure Routes

Surface soils

- Direct ingestion or dermal contact;
- Volatilization and dispersion to the air;
- Wind erosion to the air;
- Uptake into plants;
- Stormwater runoff into surface water and/or sediments; and
- Soil erosion from sloughing, and wave action.

Subsurface soils

- Direct ingestion or dermal contact; and

- Infiltration, percolation or dissolution/desorption into groundwater.

Groundwater

- Direct ingestion or dermal contact; and

- Flow into surface water including tidal flushing.

Volatilization of contaminants from soil or groundwater to air represents an additional transport mechanism. This mechanism is discounted and not considered further for the Fs based on information presented in the 2010 RI indicating limited potential for release. The release mechanisms and transport processes identified for the aquatic environment include:

- Erosion or exposure of wood waste through wave and tidal action;

- Migration of sulfide, ammonia, phenols, and related wood waste constituents to aquatic receptors;

- Transfer of groundwater/surface water chemical contaminants to sediment (adsorption);

- Direct contact of COPCs with human or ecological receptors; and

- Uptake of COPCs by marine organisms.

3.3 Receptors

Several classes of human and ecological receptors have been identified. For the upland portion of the site, potential human receptors include current and future site workers and other incidental users such as visitors who may be exposed to contaminated soil, groundwater, and surface water. Upland ecological receptors include plants and animals exposed to contaminated soil, groundwater, and surface water, as well as secondary food chain consumers such as birds and mammals.

For the aquatic environment, potential human receptors include current and future site users (noting that GBH property portion of the site is currently restricted to commercial or industrial uses) who may be exposed to surface water or sediment via direct contact, or consumption of marine biota. Ecological receptors include organisms in the biologically active zone such as shellfish and other benthic fauna exposed to sediment via direct contact and secondary food chain consumers such as fish and birds.

3.4 Summary of Completed Exposure Pathways

For a COC to present a risk to human health and/or the environment, the pathway from the COC to the receptor must be completed. The COC to receptor pathways judged to be present at the Custom Plywood Site are discussed in this section by contaminated media.

3.4.1 Upland Soils

Human Receptors

- Direct contact with COCs in upland fill soils within 15 feet below ground surface via the dermal contact or ingestion pathways.

Ecological Receptors

- Direct contact with COCs in upland soils and within 6 feet below ground surface, including contact with near-surface soil and burrowing pathways; and

- Direct uptake to plants, other terrestrial species, and secondary biological food chain/consumption pathways.

3.4.2 Groundwater and Upland Runoff

The pathways judged to be present that may allow COCs in groundwater and upland runoff to reach receptors include the following.

Human Receptors

- Direct contact (dermal contact, or incidental ingestion) with groundwater and surface water pathways.

Ecological Receptors

- Direct contact (dermal contact, plant uptake, and possibly food chain consumption) by terrestrial species pathways.

3.4.3 Sediment

The pathways judged to be present that could potentially allow COCs in groundwater and surface water to reach receptors in sediments and marine waters include:

Human Receptors

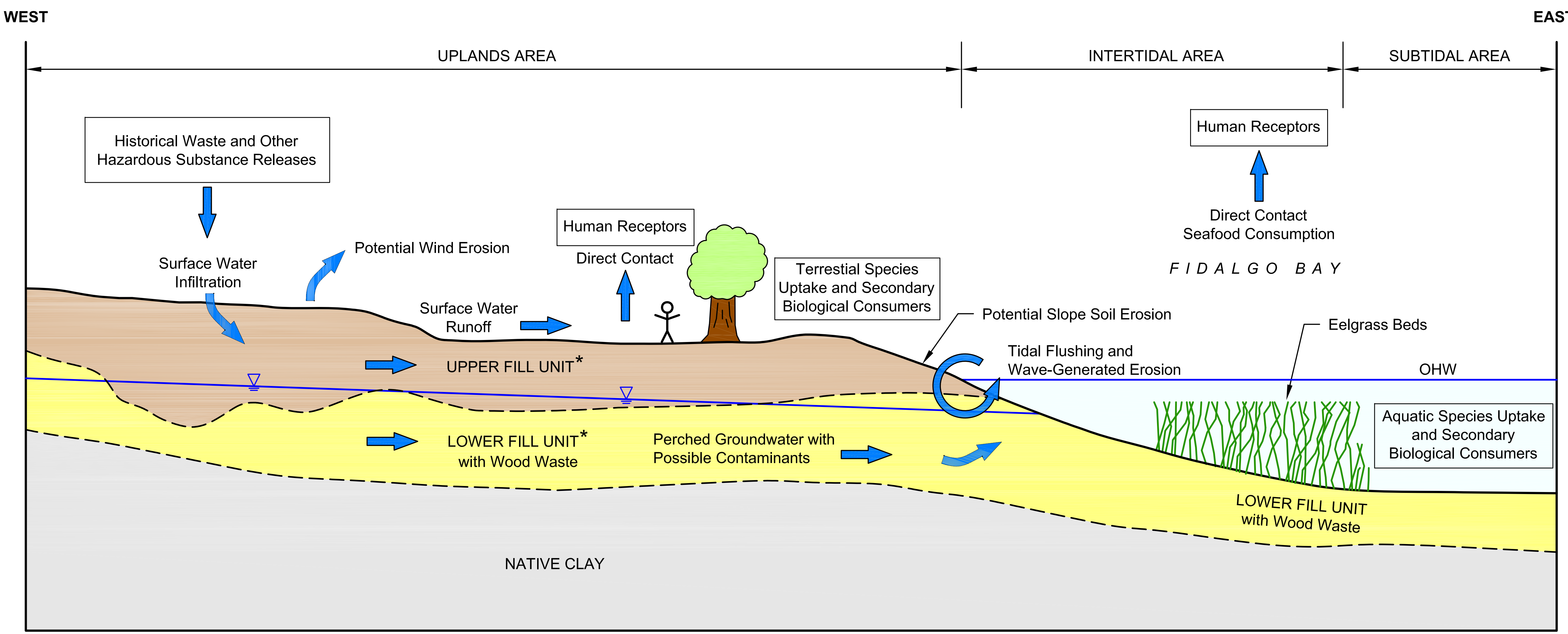
- Direct contact (dermal contact, or incidental ingestion) pathways; and

- Consumption of affected marine species pathways and incidental consumption of marine waters.

Ecological Receptors

- Direct contact and/or uptake of contaminants including wood waste and wood waste degradation products pathways; and

- Food chain consumption of affected marine species pathways.



* Secondary Contaminant Sources

Not to Scale

Custom Plywood Site
Anacortes, Washington

Conceptual Site Model
Generalized Site Cross Section
Looking North

17330-27 (FS) 2/11

HARTCROWSER

Figure
3-1

JAB 01/31/11 1733027-FS-007.dwg

4.0 CLEANUP REQUIREMENTS

The following sections identify remedial action objectives and preliminary cleanup standards for the former Custom Plywood Site as the focus of this FS. Remedial action objectives and preliminary cleanup standards were developed to address Model Toxics Control Act (MTCA), Sediment Management Standards (SMS), and other applicable state and federal regulatory requirements for upland and in-water cleanup efforts. These requirements address conditions relative to potential human and ecological receptor impacts. Requirements also consider related habitat, land use, and potential cultural resources issues. Together, project remedial action objectives and cleanup standards provide the framework for evaluating remedial alternatives described later in this FS, and for selecting a preferred alternative.

4.1 Remedial Action Objectives

The primary objective for the FS and planned MTCA/SMS cleanup actions focuses on substantially eliminating, reducing, and/or controlling unacceptable risks to the environment posed by constituents of potential concern (COPCs) to the extent feasible and practicable. Applicable exposure pathways and receptors of interest for the upland and aquatic environment are summarized below.

4.1.1 Upland Environment

Human Health Receptors

This category includes current and future site users including workers and visitors potentially exposed to soil and groundwater associated with direct contact pathways and consumption of marine biota exposed to upland groundwater or eroded soils.

Ecological Receptors

This category includes biota potentially exposed to soil and groundwater associated with direct contact pathways and food chain uptake including marine biota exposed to eroding upland soils.

4.1.2 Marine Environment

Human Health Receptors

This category includes current and future site users exposed to sediment via direct contact pathways and consumption of marine biota and marine waters.

Ecological Receptors

This category includes organisms in the biologically active zone exposed to sediment by direct contact and food chain uptake. Specific cleanup levels associated with the media and pathways are described below in Section 4.2.

Related ecological-focused cleanup objectives for bay-wide remediation include:

- Providing suitable substrate for promoting recovery/recruitment of aquatic organisms in remediated areas; and
- Minimizing habitat and water quality impacts during construction.

The above remedial action objectives are presented as target goals to be achieved to the extent feasible and practicable. An additional objective is the preservation and protection of cultural resources should such objects be encountered during remedial actions.

4.2 Cleanup Standards

Cleanup standards include cleanup levels and points of compliance (POCs) as described in WAC 173-340-700 through WAC 173-340-760. Cleanup standards must also incorporate other state and federal regulatory requirements applicable to the cleanup action and/or its location. The following sections summarize applicable cleanup standards for the former Custom Plywood Site. Cleanup standards will be further evaluated and confirmed by the Washington State Department of Ecology (Ecology) in the Cleanup Action Plan (CAP) component of the Interim Action Work Plan (IAWP).

4.2.1 Preliminary Cleanup Levels and Points of Compliance

Preliminary cleanup levels consist of applicable MTCA, SMS, and other protective regulatory numerical criteria for soil, groundwater, and sediment. Criteria applicable to the former Custom Plywood Site are summarized in Tables 4-1 and 4-2, where such criteria have been established in soil and groundwater, respectively. In all cases, cleanup levels are identified as the lowest applicable or relevant and appropriate requirement (ARAR) criteria currently established. Cleanup levels for sediment are established through standard SMS criteria for chemical constituents and bioassay testing. Additional interim action cleanup criteria are established for wood waste and dioxins in sediment.

Key indicator hazardous substance constituents of concern (COCs) were identified, by media, following the AMEC Geomatrix RI, Hart Crowser 2010 test pit exploration effort, and SAIC 2010 aquatic dioxin investigation. As noted in the RI (Section 7, Tables 20 and 21), indicator hazardous substances were identified based on their frequency of occurrence, mobility and persistence in the environment, and/or their toxicological characteristics (WAC 173-340-703).

Points of compliance are identified in accordance with standard MTCA protocols for soil and groundwater, and in accordance with the SMS for affected sediments.

Soil

Preliminary soil cleanup levels are determined using MTCA Method B criteria for direct contact, and terrestrial, ecological, and groundwater protection (see Table 4-1, Preliminary Soil Cleanup Levels). Groundwater is not envisioned as a future drinking water source at the former Custom Plywood Site, and soil cleanup levels for groundwater protection, therefore, are established for the soil to groundwater to surface water pathway. Cleanup levels for some metals including arsenic, chromium, copper, mercury, and nickel are adjusted for regional background concentrations as provided in WAC 173-340-740(5)(c) and WAC 173-340-709.

Key Indicator Hazardous Substances. Key indicator hazardous substances in soil identified by the RI include:

- Diesel- and oil-range total petroleum hydrocarbons (TPH);
- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs); and
- Total metals including arsenic, cadmium, copper, lead, mercury, nickel, and zinc.

Other compounds including PCBs, pentachlorophenol, dioxins/furans, chromium, silver, and selenium were identified in site soils but had a limited number of detections or exceedances of screening levels. These compounds will be appropriately addressed through remedial actions focused on indicator hazardous substances. Other compounds including antimony, barium, beryllium, gasoline-range TPH, and volatile organic compounds (VOCs) were excluded as indicator hazardous substances at the RI stage because of very limited or no screening level exceedances. Continued evaluation at the FS level concurs with these conclusions.

Points of Compliance. The POC for human exposure via direct contact is 15 feet below the ground surface (bgs) for soil throughout the GBH property (WAC 173-340-740 (6)(d). The conditional POC for the biologically active soil zone is 6 feet bgs, assuming that an institutional control is established to limit exposure from excavation below this depth (WAC 173-340-7490 (4).

Groundwater

Preliminary groundwater cleanup levels are established based on protection of the groundwater to surface water pathway (see Table 4-2, Preliminary Groundwater Cleanup Levels). Cleanup levels are derived from the lowest concentration protective of human or ecological health from MTCA Method B, state surface water quality criteria (Chapter 173-201A WAC), Clean Water Act Section 304, or the National Toxics Rule (40 CFR 131).

Key Indicator Hazardous Substances. Limited groundwater data were reported in the RI for establishing indicator hazardous substances in groundwater. As a basis for identification as indicator hazardous substances, several constituents were detected during 2008 and 2009 sampling and testing of site groundwater monitoring wells and seeps. These included:

- Diesel- and oil-range TPH;
- cPAHs; and
- Metals including arsenic, copper, nickel, and zinc.

The above constituents are retained for FS evaluation purposes and represent COCs that to be addressed by the remedial alternatives described in Section 8 of this FS. Cadmium, lead, and mercury were COPCs identified for soil, and are included as additional COPCs for groundwater based on potential exposure pathways associated with Site construction activities. Accordingly, planned groundwater compliance monitoring to be completed following the upland cleanup action will include this combined metal suite.

Point of Compliance. Although planned soil remediation is expected to break the soil to groundwater to surface water pathway, a POC for groundwater throughout the GBH property component of the site may not be practicable

(Refer to Section 8). A conditional POC, therefore, is identified at the groundwater/surface water interface per provisions of WAC 173-340-720(8)(d)(i), Properties Abutting Surface Water. This conditional POC is located within surface water as close as technically possible to the point where groundwater flows into surface water. Identification of this conditional POC is subject to further conditions of WAC 173-340-720(8)(d)(i), including notice to the natural resource trustees and the US Army Corps of Engineers, and is also subject to long-term monitoring. The ability of each remedial alternative evaluated to meet the criteria specified in WAC 173-340-720(8)(d)(i) is assessed in Section 8.0.

Sediment

The SMS establishes applicable benthic cleanup criteria including sediment quality standards (SQS) and cleanup screening levels (CSLs). The SQS defines the level below which there is no adverse effect on biological resources and corresponds to no significant health risks to humans. The CSL is established as the level above which minor adverse effects are defined for station clusters of potential concern as defined under the SMS.

Sediment quality investigations supporting the RI identified SMS CSL bioassay failures, but no exceedances of SQS chemical criteria. The RI indicated that other contributing factors such as holding times may have promoted bioassay failure. The RI also included results of relatively limited dioxin testing in sediments within the former Custom Plywood property area. SAIC conducted additional surface sediment sampling, collection, and testing near the former Custom Plywood facility and elsewhere in Fidalgo and Padilla Bays in 2010. Results from both investigations verified the presence of near-surface dioxin concentrations exceeding the 1.4 ppt background established by Ecology for Fidalgo Bay following SAIC's 2010 investigation (Appendix A). Dioxin concentrations ranged up to 81 ppt, with two locations exceeding 25 ppt. As indicated earlier, additional sediment quality sampling for dioxin was conducted in December 2010 and is presented in Appendix E (Hart Crowser 2011)**.**

Dioxin and Wood Waste as Key Indicator Hazardous Substances. No standard dioxin/furan screening criteria for sediments are established in MTCA or in the SMS; however, MTCA requires that cleanup levels be otherwise established on the basis of risk or background concentrations.

Aquatic portions of the former Custom Plywood Site could extend one-half mile or more seaward (encompassing approximately 440 acres) toward the center of Fidalgo Bay until dioxin concentrations approach background levels. This FS focuses on sediments located in the vicinity of the former Custom Plywood Site.

An interim action cleanup criterion of 10 ppt TEC (encompassing approximately 22 acres) was established as the minimum, or lower action threshold to provide a practicable means to assess candidate remediation technologies, alternatives, and comparative costs in this FS. A higher action threshold of 25 ppt TEC (encompassing approximately 3.2 acres) was established as a trigger for consideration of more vigorous remedial measures (e.g., dredging or thick capping), given the greater relative risk to receptors at higher dioxin concentrations.

Although wood waste is considered a deleterious substance under the SMS, there are no promulgated standards for cleanup. Previous investigations documented extensive and abundant wood waste from historical filling in nearshore areas and extending 50 feet or more beyond Mean Higher High Water (MHHW). Wood waste also spatially coincides with dioxin concentrations elevated above the 10 ppt lower action cleanup threshold.

Given current understanding of the nature and extent of wood waste in the aquatic portions of the Custom Plywood Site, a practical approach is to define interim action cleanup criteria according to the following:

- **Higher Action Threshold.** More vigorous remediation (e.g., dredging vs. thin capping) considered for areas with wood waste accumulation of 1 foot or greater below existing mudline; and

- **Lower Action Threshold.** Remaining areas with conspicuous visual surficial wood waste considered for less vigorous remediation (e.g. thin capping vs. thick capping).

Quantitative data on wood waste volume percentages, offshore depth extent, related total volatile solids (TVS), and total organic carbon (TOC) are very limited and do not provide a basis to guide the application of these interim action cleanup criteria. Higher and lower action threshold areas were determined from available exploration sample descriptions and related visual observations.

Point of Compliance. According to SMS requirements, the POC is represented by the biologically active sediment zone within the uppermost 10 centimeters (cm) below mudline. This includes protection from potential exposure to deeper contaminants or contaminant migration.

4.2.2 Potentially Applicable Regulatory Requirements

MTCA and SMS regulatory provisions form the primary basis for evaluating and implementing FS alternatives for remediation at the Custom Plywood Site.

Following selection of a preferred alternative from this FS, MTCA requirements guide the process for preparing a cleanup action plan (CAP). The combined FS and CAP together with the RI and EDR form the MTCA IAWP for this project. Additional MTCA, SMS, and other regulatory requirements are further addressed in the engineering design report (EDR) and project design plans and specifications. Upland and in-water cleanup components are planned to be performed as phased actions, with Phase I upland remediation beginning in 2011, and in-water work (Phase II) planned to begin in 2013.

Applicable federal regulations and associated permitting requirements will be addressed for in-water cleanup components. Although exempt from procedural requirements of certain state and local laws and related permitting requirements, pertinent substantive compliance requirements remain applicable. Formal procedural requirements would also remain in effect if Ecology determines that an exemption would result in loss of approval by a federal agency. Applicable exempted state laws include:

- Chapter 70.94 RCW – Washington Clean Air Act;
- Chapter 70.95 RCW – Solid Waste Management – Reduction and Recycling;
- Chapter 70.105 RCW – Hazardous Waste Management;
- Chapter 75.20 RCW – Construction Projects in State Waters;
- Chapter 90.48 RCW – Water Pollution Control Act; and
- Chapter 90.58 RCW – Shoreline Management Act.

The exemption also applies to local government permits and approvals associated with the remedial action. Although the upland and in-water remedial action is expected to be exempt from these procedural requirements, compliance with substantive provisions of these regulatory programs is required. Construction actions associated with cleanup are further subject to requirements of the State Environmental Policy Act (SEPA – Chapter 43.21C RCW).

MTCA does not provide a procedural exemption from federal permitting. Federal permitting for in-water work could likely be conducted under the Nationwide 38 permit program administered by the US Army Corps of Engineers (USACE), or, alternatively, under a Clean Water Act Section 404 permit. Additional permitting requirements pertain under Clean Water Act Section 401 (Water Quality Certification), and the Endangered Species Act (agency consultation). In addition, the Fidalgo Bay region is known to be archaeologically sensitive, and USACE involvement in Clean Water Act permitting triggers provisions of Section 106 of the National Historic Preservation Act of 1966, and the Archeological and Historical Preservation Act (16 USCA 469). Federal permitting issues will be coordinated with the USACE and other federal agencies, and state and local agencies will be contacted to other discuss substantive regulatory compliance issues. In addition, the Samish Indian Nation, Swinomish Tribal Community, and other tribes with Usual and Accustomed treaty rights within Fidalgo and Padilla Bays, and the Washington State Department of Archaeology and Historic Preservation (DAHP) will be consulted on cultural resource and archaeological matters.

Further coordination or combining of permitting/substantive compliance efforts for the phased remedial action is also beneficial, considering the actions to be selected, scheduling considerations, and other factors.

Regulatory Requirements Summary

The following sections summarize further information on regulatory and substantive compliance requirements that are potentially applicable to upland and in-water remediation activities.

Solid and Hazardous Waste Management – Chapter 70.105 RCW and Chapter 173-303; and Related Federal Resource Conservation and Recovery Act – 42 USC 6921-6949a and 40 CFR Part 268, Subtitle D

Triggering Activity. Potential for generating, handling, and disposing of dredged material containing designated hazardous wastes.

Substantial physical and chemical characterization data from previous investigations summarized in Section 2 did not indicate that materials that could be designated as hazardous wastes are present in marine sediments at the former Custom Plywood Site. In the unlikely event that such materials are encountered during the remedial actions, they will be handled in accordance with the requirements of these statutes.

Water Quality Standards for Surface Waters of the State of Washington – Chapter 90.48 RCW and Chapter 173-201A WAC

Triggering Activity. Potential for construction activities for the upland and in-water remedial action to adversely affect surface waters of the state.

Potential water quality concerns are associated with in-water construction activities involving dredging and capping. These activities are subject to applicable water quality criteria established under state and related federal Clean Water Act laws and regulations to minimize or eliminate potential water quality degradation. Water quality issues would be addressed through standard in-water work windows, controls on construction means and methods, best management practices (BMPs), and monitoring. Applicable water quality standards, in-water work restrictions, and BMPs will be addressed based on substantive compliance with typical Section 401 Water Quality Certification (WQC) requirements. Section 401 WQC conditions will be further identified during preparation of a Joint Aquatic Resource Permit Application (JARPA) for the in-water Phase II of the Interim Action (i.e., seaward of OHW).

Clean Water Act Sections 303, 311, 312, 401, and 404 – 33 US Code (USC) 1252 et seq.

Triggering Activity. Dredging and placement of sediment capping materials within navigable waters of the United States, protection of surface water quality, and filling or removal of wetlands.

Placement of in-water capping materials or potential dredging is expected to be addressed through the USACE Nationwide 38 permit program or a Section 404 permit, as described above. Water quality protection issues will be addressed by identifying water quality standards, in-water work restrictions, BMPs, and monitoring substantive compliance with Section 401 and state regulatory requirements. Jurisdictional wetlands (wetland areas connected to navigable waters) will be addressed through a Section 404 permit following JARPA preparation for the in-water phase of the work.

Planned upland and in-water cleanup actions will be reviewed for consistency and substantive compliance with applicable state and local wetland protection and restoration requirements. Substantive requirements apply to in-water work and related upland work.

Puget Sound Dredged Material Management Program

Triggering Activity. Potential open water disposal of dredged materials at a designated Puget Sound location (presumed non-dispersive site).

The Puget Sound Dredged Material Management Program (DMMP) is a cooperative program administered by the USACE in coordination with EPA, DNR, and Ecology. DMMP requirements and corresponding sampling characterization testing protocols under the Puget Sound Dredge Disposal Analysis (PSDDA) program would apply if dredging and open water disposal of dredged materials are confirmed as a viable disposal option for dredging components of the project. Additional characterization data of the potential dredged materials would be required to meet DMMP requirements, given the presence of dioxins/furans and wood waste. Acceptance of the material for disposal is subject to a suitability determination by the DMMP agencies.

SEPA – Chapter 43.21C RCW, Chapter 197-11 WAC, and Chapter WAC 173-802

Triggering Activity. Permit application or proposed regulatory cleanup action under MTCA or SMS, and impacts to critical areas.

Provisions of WAC 197-11-250 provide for integration of the MTCA and State Environmental Policy Act (SEPA) procedural requirements to reduce duplication and improve public participation, including common public review and comment. Key components for addressing SEPA requirements include submittal of a SEPA checklist, threshold determination for whether potential environmental impacts are deemed as significant, and identification of potential mitigation measures if necessary. A determination would be made regarding impacts and needed mitigation. Mitigation will likely involve actions contemplated as part of the remedial action to restore wetlands and enhance forage fish spawning habitat in the marine portions of the site.. More comprehensive evaluation in an Environmental Impact Statement, if needed, would have a significant impact on project schedule.

Shoreline Management Act – Chapter 90-58 RCW and Chapter 173-27 WAC

Triggering Activity. Construction work within the shoreline zone.

Planned upland and in-water cleanup actions will be reviewed for consistency and substantive compliance with applicable local shoreline programs/master plans. Substantive requirements apply to in-water work and related upland work, if any, within 200 feet of the shoreline.

Wetlands – Water Pollution Control Act Chapter 90-48 RCW, WAC 365-190-090, and Chapter 173-201A WAC

Triggering Activity. Construction work within wetlands.

Potential water quality concerns are associated with in-water construction activities involving dredging and filling wetlands. These activities are subject to applicable water quality criteria established under state and related federal Clean Water Act laws and regulations to minimize or eliminate potential water quality degradation. Water quality issues would be addressed through standard in-water work windows, controls on construction means and methods, BMPs, and monitoring. Applicable water quality standards, in-water work restrictions, and BMPs will be addressed based on substantive compliance with typical Section 401 Water Quality Certification requirements.

An Isolated Wetlands Information Sheet has been submitted to Ecology's Shorelands and Environmental Assistance Program to comply with state permit requirements for work in wetlands. Project applicants are required to: 1) avoid impacting wetlands, 2) minimize unavoidable impacts, and 3) mitigate any impacts. Current mitigation concepts include construction of new estuarine habitat within the existing upland footprint of the former Custom Plywood Site to compensate for loss of wetlands during remediation.

Fish and Wildlife Habitat Conservation – Chapter 77-85 RCW and WAC 365-190-130

Triggering Activity. Construction work within fish and wildlife habitat conservation areas and within the shoreline zone.

Fish and wildlife habitat conservation issues related to herring, smelt and other forage fish spawning areas will be addressed through review and substantive compliance with the local and state regulatory programs. Project applicants are required to: 1) avoid impacting fish and wildlife habitats, 2) minimize unavoidable impacts, and 3) mitigate any impacts.

Current mitigation concepts include enhancement of nearshore habit through removal of existing debris and placement of a suitable sandy habitat substrate.

Saltwater Habitats of Special Concern – WAC 220-110-250

Triggering Activity. Construction work within the shoreline and intertidal zones.

Saltwater habitat issues related to areas containing juvenile salmon habitat, forage fish spawning habitat, rockfish habitat, eelgrass beds, macroalgae, and intertidal wetlands will be addressed through review and substantive compliance with the local shorelines management program. Project applicants are required to: 1) avoid impacting saltwater habitats, 2) minimize unavoidable impacts, and 3) mitigate any impacts.

Current mitigation concepts include enhancement of nearshore habit by debris removal and placing a suitable sandy habitat substrate. Affected eelgrass and offshore habitat areas will likely require replacement or other restoration measures.

Coastal Zone Management Act – 16 USC 1455

Triggering Activity. Construction activities requiring federal approval must be consistent with the State's Coastal Zone Management Program.

Coastal zone management issues will be addressed through review and substantive compliance with the local shorelines management program.

Washington Hydraulics Code – Chapter 70-95 RCW and Chapter 173-304 WAC

Triggering Activity. Use, diversion, obstruction, or change in the natural flow or bed of Fidalgo Bay from the in-water component of the remedial action.

The selected in-water cleanup alternative will be reviewed for consistency and substantive compliance with applicable conditions typically associated with Hydraulic Project Approval (HPA) permits issued for in-water construction projects. HPA permit conditions address activities that could create adverse conditions for fish and aquatic resources. It is anticipated that substantive requirement conditions will identify acceptable in-water work windows and minimum required construction BMPs to minimize potential impacts.

Rivers and Harbors Act – 33 USC 403 and CFR Parts 320 and 322

Triggering Activity. Alteration of waters of Fidalgo Bay as a navigable waterway.

Remediation activities could result in expected minor changes to the bathymetry of Fidalgo Bay. Bathymetric changes associated with such activities are subject to review by Ecology in coordination with the USACE and other agencies during the FS and design approval process. It is unlikely that any minor bathymetric changes would have a substantial impact on navigation, given the current and expected future vessel use in this portion of Fidalgo Bay.

Endangered Species Act – 16 USC 1531 et seq.

Triggering Condition. Presence or suspected presence of threatened or endangered species or critical habitat at or near the site at the time of anticipated work.

Triggering conditions associated with nearshore cleanup actions, such as major construction including excavation and contaminant capping, may require a biological assessment and federal consultation. Endangered species are known to occur on and near the former Custom Plywood Site. Cleanup activities will result in direct and indirect effects to listed species or the species' designated critical habitat.

Current mitigation concepts include enhancement of nearshore habit through debris removal and placement of a suitable substrate for juvenile salmon and forage fish spawning habitat, construction of new estuarine habitat within the existing upland footprint, and installation of a vegetated upland buffer.

National Historic Preservation Act of 1966 Section 106 – 16 USC 470 and 36 CFR Part 800

Triggering Activity. SEPA regulatory compliance, and federal permitting, assistance, and related involvement.

Section 106 requirements include determining an area of potential effects where, if present, historic properties could be affected. Potential project impacts will be determined in consultation with the State Historic Preservation Officer (SHPO) at the DAHP, the Samish Indian Nation, Swinomish Tribal Community, and other interested parties. Because of the historic and archaeological sensitivity of Fidalgo Bay, an Archaeological Monitoring Plan was prepared as part of the CAP. The Archaeological Monitoring Plan will be implemented during the upland and in-water remediation construction phases.

Indian Graves and Records –RCW Chapter 27.44 and Archaeological Sites and Resources – RCW Chapter 27.53

Triggering Activity. Construction project involving state funding.

In addition to the remediation being subject to Section 106 requirements, project activities will be reviewed with the DAHP, the Samish Indian Nation, and Swinomish Tribal Community, in accordance with Governor's Executive Order 0505. The purpose of the review is to determine potential impacts on cultural resources.

Archeological and Historical Preservation Act – 16 USCA 469

Trigger Activity. Discovery of archaeological or historic objects during remediation activities.

Discovery of archaeological or historic objects requires notification and action similar to the above listed federal and state archaeological regulations.

4.3 Physical Hazard and Debris Removal

Triggering Activity. Presence of upland and in-water debris including creosote-treated pilings that require removal to facilitate MTCA and SMS remediation and eliminate potential aquatic navigational obstructions.

Remnant concrete structures, foundations, and residual near-surface building and fill debris are present on the GBH property upland that must be removed to facilitate planned site cleanup. Upland debris must be removed to access deeper soils or place a surface containment cap. In-water pilings and the remnant concrete dock must also be removed for cleanup. These in-water structures also represent potential SMS deleterious substances and navigational obstructions under the Rivers and Harbors Act.

Table 4-1 - Preliminary Soil Cleanup Levels

Concentrations in mg/kg

Soil Constituent Key Indicator Hazardous Substances Identified in Bold	Cleanup Level	Regulatory Criteria MTCA Method B Soil-Direct Contact Unrestricted Land Use Carcinogen	MTCA Method B Soil-Direct Contact Unrestricted Land Use Noncarcinogen	MTCA Method B Protective of Groundwater as Marine Surface Water[a]	MTCA Method B Protective of Terrestrial Ecological Receptors [b]	Area Background[c]
Total Metals						
Arsenic	**8.47**	0.67	24	0.08	20	**8.47**
Cadmium	**1.21**	2[d]	80	1.21	25	1.2
Chromium (total)	117	2,000[d]	NE	NE	42	117
Copper	**52.9**	NE	3,000	1.07	100	**52.9**
Lead	**220**	250[d]	NE	1,620	**220**	NE
Mercury	**0.13**	2[d]	24	0.03	9	**0.13**
Nickel	**54.2**	NE	1,600	10.7	100	**54.2**
Zinc	**101**	NE	24,000	**101**	270	85.6
PCBs						
Total PCBs	0.5	NE	0.5	**NE**	2	NE
Dioxins and Furans						
Total ecological TEC dioxin	0.000005	NE	NE	NE	0.000005	
Total ecological TEC furan	0.000003	NE	NE	NE	0.000003	
TPH						
Diesel-range hydrocarbons	**1,700**	2,000[d]	NE	NE	**1,700**	
Oil-range hydrocarbons	**2,000**	**2,000[d]**	NE	NE	**8,500**	
Gasoline-range hydrocarbons (no benzene)	100	100[d]	NE	NE	200	
Gasoline-range hydrocarbons (with benzene)	30	30[d]	NE	NE	200	
SVOCs						
2-Chloronaphthalene	42.56	NE	6,400	42.56	NE	
2-Chlorophenol	1.15	NE	400	1.15	NE	
2-Methyl-4,6-dinitrophenol	NE	NE	NE	NE	NE	
2-Methylnaphthalene	320	NE	320	NE	NE	
2-Methylphenol	4,000	NE	4,000	NE	NE	
2-Nitroaniline	NE	NE	NE	NE	NE	
2-Nitrophenol	NE	NE	NE	NE	NE	
3-Methylphenol	4,000	NE	4,000	NE	NE	
4-Methylphenol	400	NE	400	NE	NE	
3,3'-Dichlorobenzidine	0.001	2.2	NE	0.001	NE	
3-Nitroaniline	NE	NE	NE	NE	NE	
4-Bromophenyl phenyl ether	NE	NE	NE	NE	NE	
4-Chloro-3-methyl phenol	NE	NE	NE	NE	NE	
4-Chloroaniline	320	NE	320	NE	NE	
4-Chlorophenyl phenyl ether	NE	NE	NE	NE	NE	
4-Nitroaniline	NE	NE	NE	NE	NE	
4-Nitrophenol	NE	NE	NE	NE	NE	
Acenaphthene	100.99	NE	4,800	100.99	NE	
Acenaphthylene	NE	NE	NE	NE	NE	
Aniline	180	180	NE	NE	NE	
Anthracene	18,560	NE	24,000	18,560	NE	
Benzidine	0.0007	0.0043	240	0.0007	NE	
Benzo[a]anthracene	**0.13**	NE	NE	**0.13**	NE	
Benzo[a]pyrene	**0.14**	**0.14**	NE	0.35	30	
Benzo[b]fluoranthene	**0.43**	NE	NE	**0.43**	NE	
Benzo(g,h,i)perylene	NE	NE	NE	NE	NE	
Benzo[k]fluoranthene	**0.43**	NE	NE	**0.43**	NE	
Benzyl alcohol	24,000	NE	**24,000**	NE	NE	
bis(2-Chloroethoxy) methane	NE	NE	NE	NE	NE	
bis(2-Chloroethyl) ether	0.003	0.91	NE	**0.003**	NE	
bis(2-Chloroisopropyl) ether	3200	NE	3,200	--	NE	
bis(2-Ethylhexyl) phthalate	4.85	71	1,600	4.85	NE	
bis(2-Ethylhexyl adipate	830	830	48,000	--	NE	
Butyl benzyl phthalate	539.6	NE	16,000	539.6	NE	
Carbazole	50	50	NE	--	NE	
Chrysene	**0.14**	NE	NE	**0.14**	NE	
Dibenzo[a,h]anthracene	**0.65**	NE	NE	**0.65**	NE	
Dibenzofuran	160	NE	160	--	NE	
Diethyl phthalate	248	NE	64,000	248	NE	

Table 4-1 - Preliminary Soil Cleanup Levels

Soil Constituent Key Indicator Hazardous Substances Identified in Bold	Cleanup Level	Regulatory Criteria MTCA Method B Soil-Direct Contact Unrestricted Land Use Carcinogen	MTCA Method B Soil-Direct Contact Unrestricted Land Use Noncarcinogen	MTCA Method B Protective of Groundwater as Marine Surface Water[a]	MTCA Method B Protective of Terrestrial Ecological Receptors [b]	Area Background[c]
SVOCs (Continued)						
Dimethyl phthalate	5,280	NE	80,000	5,280	NE	
Dibutyl phthalate	162	NE	8,000	162	200	
Di-n-octyl phthalate	1600	NE	1,600	NE	NE	
Fluoranthene	137.8	NE	3,200	137.8	NE	
Fluorene	837.4	NE	3,200	837.4	NE	
Hexachlorobenzene	0.0005	0.63	64	0.0005	31	
Hexachlorobutadiene	13	13	16	19.52	NE	
Hexachlorocyclopentadiene	480	NE	480	4,407	NE	
Hexachloroethane	0.13	71	80	0.13	NE	
Indeno[1,2,3-cd]pyrene	**1.26**	NE	NE	**1.26**	NE	
Isophorone	2.96	1,100	16,000	2.96	NE	
Naphthalene	137.4	NE	1,600	137.4	NE	
Nitrobenzene	4.42	NE	40	4.42	NE	
N-Nitrosodimethylamine	0.02	0.02	NE	NE	NE	
N-Nitroso-di-n-propylamine	0.002	0.14	NE	0.002	NE	
N-Nitrosodiphenylamine	0.48	200	NE	0.48	NE	
Pentachlorophenol	0.05	8.3	2,400	0.05	11	
Phenanthrene	NE	NE	NE	NE	NE	
Phenol	7,786	NE	48,000	7,786	NE	
Pyrene	2,400	NE	2,400	5,456	NE	
Pyridine	80	NE	80	NE	NE	
Total cPAHs - benzo(a)pyrene TEQ	**0.14**	**0.14**	NE	0.35	30	

Notes

[a] Calculated using fixed-parameter three-phase partitioning model WAC 173-340-747(4).
[b.] Based on simplified terrestrial evaluation in WAC 173-340-7492, criteria listed in Table 749-2 for all constituents except TPH. TPH criteria based on bioassay data reported by AMEC (2010).
[c] The screening level adjusted for regional background concentrations within Skagit/Whatcom counties or Western Washington as reported by Ecology (1994).
[d] MTCA Method A value.

mg/kg = milligrams per kilogram
NE = Not established
PCBs = polychlorinated biphenyls
SVOC = semivolatile organic compounds
TEQ = toxicity equivalent concentration
TPH = total petroleum hydrocarbons

Table 4-2 - Preliminary Groundwater Cleanup Levels

Concentrations in ug/L

Groundwater Constituent Key Indicator Hazardous Substances Identified in Bold	Cleanup Level[a]	Regulatory Criteria Surface Water ARAR - Aquatic Life - Marine/Acute - Ch. 173-201A WAC	Surface Water ARAR - Aquatic Life Marine/Acute - Clean Water Act §304	Surface Water ARAR - Aquatic Life - Marine/Acute - National Toxics Rule, 40 CFR 131	Surface Water ARAR - Aquatic Life - Marine/Chronic - Ch. 173-201A WAC	Surface Water ARAR - Aquatic Life - Marine/Chronic - Clean Water Act §304	Surface Water ARAR - Aquatic Life - Marine/Chronic - National Toxics Rule, 40 CFR 131	Surface Water ARAR - Human Health – Marine – Clean Water Act §304	Surface Water ARAR - Human Health – Marine – National Toxics Rule, 40 CFR 131	Surface Water, Method B, Carcinogen, Standard Formula Value	Surface Water, Method B, Non-Carcinogen, Standard Formula Value
Dissolved Metals											
Arsenic, inorganic	**0.14**	69	69	69	36	36	36	**0.14**	**0.14**	0.098	18
Cadmium	8.8	42	40	42	9.3	**8.8**	9.3	NE	NE	NE	20
Chromium (total)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Copper	**2.4**	4.8	4.8	**2.4**	3.1	3.1	**2.4**	NE	NE	NE	2,700
Lead	8.1	210	210	210	8.1	8.1	8.1	NE	NE	NE	NE
Mercury (Total)	0.025	1.8	1.8	2.1	0.025	0.94	**0.025**	0.3	0.15	NE	NE
Nickel (as soluble salts)	**8.2**	74	74	74	**8.2**	**8.2**	**8.2**	4,600	4,600	NE	1,100
Zinc	**81**	90	90	90	**81**	**81**	**81**	26,000	NE	NE	NE
PCBs											
Total PCBs	**0.000064**	10	NE	NE	0.03	0.03	0.03	**0.000064**	0.00017	0.00011	NE
TPH											
TPH, diesel-range organics	**500[b]**	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
TPH, heavy oil-range organics	**500[b]**	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
TPH, mineral oil-range organics	500[b]	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
SVOCs											
2,3,3,6-Tetrachlorophenol	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
2-Chloronaphthalene (beta-chloronaphthalene)	1,600	NE	NE	NE	NE	NE	NE	1,600	NE	NE	1,000
2-Chlorophenol	97	NE	NE	NE	NE	NE	NE	NE	NE	NE	97
2-Methyl-4,6-dinitrophenol	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
2-methylnaphthalene	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
2-Methylphenol	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
2-Nitroaniline	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
2-Nitrophenol	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
3,3'-Dichlorobenzidine	0.028	NE	NE	NE	NE	NE	NE	0.028	0.077	0.046	NE
3-Methylphenol	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
3-Nitroaniline	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
4-Bromophenyl phenyl ether	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
4-Chloro-3-methylphenol	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
4-chloroaniline	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
4-Chlorophenyl phenyl ether	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
4-Methylphenol	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
4-Nitroaniline	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
4-Nitrophenol	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Acenaphthene	990	NE	NE	NE	NE	NE	NE	990	NE	NE	640

Table 4-2 - Preliminary Groundwater Cleanup Levels

Groundwater Constituent Key Indicator Hazardous Substances Identified in Bold	Cleanup Level[a]	Surface Water ARAR - Aquatic Life - Marine/Acute - Ch. 173-201A WAC	Surface Water ARAR - Aquatic Life Marine/Acute - Clean Water Act §304	Surface Water ARAR - Aquatic Life - Marine/Acute - National Toxics Rule, 40 CFR 131	Surface Water ARAR - Aquatic Life - Marine/Chronic - Ch. 173-201A WAC	Surface Water ARAR - Aquatic Life - Marine/Chronic - Clean Water Act §304	Surface Water ARAR - Aquatic Life - Marine/Chronic - National Toxics Rule, 40 CFR 131	Surface Water ARAR - Human Health – Marine – Clean Water Act §304	Surface Water ARAR - Human Health – Marine – National Toxics Rule, 40 CFR 131	Surface Water, Method B, Carcinogen, Standard Formula Value	Surface Water, Method B, Non-Carcinogen, Standard Formula Value
SVOCs (Continued)											
Acenaphthylene	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Aniline	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Anthracene	40,000	NE	NE	NE	NE	NE	NE	40,000	110,000	NE	26,000
Benzidine	0.0002	NE	NE	NE	NE	NE	NE	0.0002	0.00054	0.00032	89
Benzo(g,h,i)perylene	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Benzo[a]anthracene	**0.018**	NE	NE	NE	NE	NE	NE	0.018	0.031	NE	NE
Benzo[a]pyrene	**0.018**	NE	NE	NE	NE	NE	NE	0.018	0.031	0.03	NE
Benzo[b]fluoranthene	**0.018**	NE	NE	NE	NE	NE	NE	0.018	0.031	NE	NE
Benzo[k]fluoranthene	**0.018**	NE	NE	NE	NE	NE	NE	0.018	0.031	NE	NE
Benzyl alcohol	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
bis(2-Chloroethoxy) methane	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
bis(2-Chloroethyl) ether	0.53	NE	NE	NE	NE	NE	NE	0.53	1.4	0.85	NE
bis(2-Chloroisopropyl) ether	65,000	NE	NE	NE	NE	NE	NE	65,000	170,000	NE	42,000
bis(2-Ethylhexyl) adipate	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
bis(2-Ethylhexyl) phthalate	2.2	NE	NE	NE	NE	NE	NE	2.2	5.9	3.6	400
Butyl benzyl phthalate	1,900	NE	NE	NE	NE	NE	NE	1,900	NE	NE	1,300
Carbazole	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Chrysene	**0.018**	NE	NE	NE	NE	NE	NE	0.018	0.031	NE	NE
Dibenzo[a,h]anthracene	**0.018**	NE	NE	NE	NE	NE	NE	0.018	0.031	NE	NE
Dibenzofuran	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Dibutyl phthalate	4,500	NE	NE	NE	NE	NE	NE	4,500	12,000	NE	2,900
Diethyl phthalate	44,000	NE	NE	NE	NE	NE	NE	44,000	120,000	NE	28,000
Dimethyl phthalate	1,100,000	NE	NE	NE	NE	NE	NE	1,100,000	2,900,000	NE	72,000
Di-n-octyl phthalate	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Fluoranthene	140	NE	NE	NE	NE	NE	NE	140	370	NE	90
Fluorene	5,300	NE	NE	NE	NE	NE	NE	5,300	14,000	NE	3,500
Hexachlorobenzene	0.00029	NE	NE	NE	NE	NE	NE	0.00029	0.00077	0.00047	0.24
Hexachlorobutadiene	18	NE	NE	NE	NE	NE	NE	18	50	30	190
Hexachlorocyclopentadiene	1,100	NE	NE	NE	NE	NE	NE	1,100	17,000	NE	3,600
Hexachloroethane	3.3	NE	NE	NE	NE	NE	NE	3.3	8.9	5.3	30
Indeno[1,2,3-cd]pyrene	**0.018**	NE	NE	NE	NE	NE	NE	0.018	0.031	NE	NE
Isophorone	600	NE	NE	NE	NE	NE	NE	960	600	1,600	120,000
Nitrobenzene	450	NE	NE	NE	NE	NE	NE	690	1,900	NE	450
N-Nitrosodimethylamine	3	NE	NE	NE	NE	NE	NE	3	8.1	4.9	NE
N-Nitroso-di-n-propylamine	0.51	NE	NE	NE	NE	NE	NE	0.51	NE	0.82	NE
N-Nitrosodiphenylamine	16	NE	NE	NE	NE	NE	NE	NE	16	NE	9.7
Pentachlorophenol	3	13	13	13	7.9	7.9	7.9	3	8.2	4.9	7,100
Phenanthrene	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Phenol	1,700,000	NE	NE	NE	NE	NE	NE	1,700,000	4,600,000	NE	1,100,000
Pyrene	2,600	NE	NE	NE	NE	NE	NE	4,000	11,000	NE	2,600
Pyridine	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes

[a] Cleanup level may be adjusted based on laboratory practical quantitation limit (PQL)
[b] MTCA Method A value.

NE = Not established.
PCBs = polychlorinated biphenyls
SVOC = semivolatile organic compounds
TPH = total petroleum hydrocarbons

5.0 UPLAND AND MARINE REMEDIATION AREAS

This section describes upland and marine areas of concern at the Custom Plywood Site where exceedances of preliminary cleanup levels for COCs identified in Section 4.0 are located. The areas of concern were identified based on the known or inferred extent of contaminated media following review of historical and analytical data summarized in Section 2.0. Uncertainty remains regarding the overall depth and aerial limits of contamination in both the upland and marine areas. This uncertainty is due to the constraints on the number and locations of soil and sediment samples that have been collected and analyzed. Detailed historical information is not available that could more thoroughly describe contaminant sources and migration mechanisms.

For these reasons, a number of working assumptions were used to provide a practical means of delineated remediation areas for the purposes of this FS. These working assumptions are described for Upland areas of the Custom Plywood Site in Section 5.1, for groundwater in Section 5.2, and for marine areas in Section 5.3. The remediation areas developed in Section 5 provide the basis for developing and evaluating remedial alternatives presented in Section 8.0.

5.1 Upland Soils

Figure 5-1 identifies the areas of concern for upland soils at the Custom Plywood Site. The concentration of TPH-D , TPH-O, ,cPAHs, and metals present in upland soils was compared to the cleanup levels (most stringent regulatory screening levels) available for the protection of human health , ecological receptors, and of marine surface water (via the groundwater migration pathway) to establish these areas of concern. This process was summarized in Section 4.0 of this FS.

5.1.1 Criteria for Defining Soil Remediation Areas

Considerable uncertainty exists as to the boundaries of soil contamination. This is particularly the case for shallow areas within about 2 feet of ground surface, and deeper areas below about 8 feet below grade. Much of the existing soil sampling focused on the zone between about 2 and 6 feet below grade that was believed to be the most heavily contaminated based on historical information and previous field observations. Not all COCs are equally represented in all samples or at all locations and depths. For these reasons the areal extent, depths, and estimated volumes of contaminated soil requiring remediation were estimated as follows.

- Contaminant areas were defined by nominal 25-foot radius circles where adjacent sampling locations are farther away than 50 feet. Conversely, the midpoint between "clean" and "dirty" sample locations was used to define the extent of contamination where sampling locations were closer than 50 feet.

- Sampling locations are relatively sparse in the south-central portion of the site near the former press pit area (Figure 5-1). The press pits are a known source of TPH contamination and may have affected a significant area of adjacent soil. The areal extent of contaminated soil in this area is estimated on Figure 5-1, with the nominal depth of contamination estimated to be up to about 6 feet below grade.

- Areas of concern are further broken out on Figure 5-1 according to the maximum estimated depth of contamination. For volume estimation and development of remedial alternatives, these maximum depths are presented in approximate 2-foot-depth increments between 4 and 8 feet below grade on the figure.

- Sampling data for the 0- to 4-foot-depth interval are limited and may under represent the actual extent of contamination. The upper several feet of the soil profile also contain abundant concrete and brick debris in many portions of the Site. For volume estimation purposes the entire uppermost soil profile to 4 feet depth was assumed to require remediation as a worst case. Although this may overestimate the amount of contaminated soil, physical segregation or screening of such soils (once debris is removed) may be problematic during construction. Shallow soils aside from debris, therefore, are assumed to be handled and managed as "contaminated" soil for practicability.

- Limited soil quality data exist below about 8 feet depth. The available concentration data do not indicate limited exceedances of cleanup levels identified in Section 4.0. Although the human health POC for soils for the direct contact pathway is 15 feet bgs, the estimated soil volumes for remediation developed by this FS do not consider soil depths below 8 feet, as there is currently no basis for identifying deeper zones of contamination.

5.1.2 Estimated Soil Volumes for Remediation

Using the qualifications and assumptions listed above, estimated soil volumes for remediation are as follows:

0 to 4 feet depth (including debris): 13,000 cubic yards (cy)

4 to 6 feet depth:	4,200 cy
6 to 8 feet depth:	1,200 cy
Potential additional areas at 0 to 6 feet depth:	6,100 cy

These estimates represent in-place volumes for reference purposes. Note that the combined volume for 0 to 6 feet depth 23,300 (cy) represents the soil volume present above the ecological POC (6 feet bgs). The combined volume for 0 to 8 feet depth (24,500 cy) represents the currently estimated remediation volume for contaminated soil requiring removal. Note this is a target depth and depending on findings during excavation, additional soil may need to be excavated to satisfy the POC for soil for the protection of human health, which is 15 feet bgs. Also, the additional potential areas of soil contamination between 0 and 6 feet depth include locations near the former press pit areas and to the west, as shown on Figure 5-1. These areas were identified on Figure 32 of the RI, but limited sample testing data apparently exist to verify the actual nature and extent of soil contamination in this area.

Although the actual soil remediation volumes at the time of the work will vary from the estimated volumes (given current uncertainties on the nature and extent of contamination), the estimated volumes provide useful reference points for evaluating remedial alternatives. Using more conservative assumptions for areal and depth extent of contamination (i.e., using the midpoint between all “dirty” and “clean” samples) would increase the affected volume to well over 40,000 cy and does not appear to be warranted given current available information. (Conversely, using less conservative assumptions might significantly underestimate affected volumes given the current sampling density.

An adaptive approach to verify the extent of contamination during construction for alternatives involving soil excavation will be needed This adaptive approach would be guided by the use of routine field screening indicators and soil samples to further delineate the extent of contaminated soil during excavation.

5.2 Groundwater

Limited groundwater data were reported in the RI to establish TPH, cPAHs, and total metals (arsenic, copper, nickel, and zinc) as indicator hazardous constituents. The persistence and potential impacts of these constituents are not well established to confirm impacts to groundwater and identify specific areas requiring remediation. However, for the purpose of this FS these groundwater constituents are retained as COCs. The remediation of contaminated soils is expected to eliminate the soil to groundwater pathway and allow the concentration of these and other COCs in groundwater to return to background levels within a reasonable restoration time frame.

5.3 Marine Sediment Management Areas – Nearshore and Offshore

Wood waste and dioxin are the identified COCs for defining sediment management areas (SMAs) for marine cleanup at the Custom Plywood Site. Figure 5-2 identifies an overall interim action cleanup area determined by comparing dioxin concentrations in surface sediment to the dioxin screening level established by Ecology (10 ppt TEC), as discussed in Section 4.0 of this FS. Figure 5-2 further identifies two general SMAs defined within this interim action area based on wood waste accumulation thickness. These SMAs are intended to distinguish wood waste accumulations of either greater than or less than 1 foot in thickness below the existing marine sediment surface. Figure 5-2 identifies a western SMA with known or inferred wood waste thickness of greater than 1 foot. Inferred wood waste deposits of less than 1 foot are included in an eastern SMA. Additional rationale used to establish the aquatic SMAs based on dioxin and wood waste is summarized below.

5.3.1 Criteria for Defining Marine SMAs

As noted in Section 2.0 and Section 4.0, dioxin concentrations measured in sediments near the Custom Plywood Site exceed the 1.4 ppt Fidalgo Bay background concentration for some distance eastward into the bay (refer to Figure 2-2). This background concentration represents the MTCA-based cleanup level established for the Custom Plywood Site by Ecology. For the purposes of this FS an interim action cleanup criteria of 10 ppt dioxin TEC, was established as a threshold criteria to delineate marine SMA areas and to provide a practicable means to assess candidate remediation technologies, alternatives, and comparative costs. The overall SMA for the interim action is therefore defined to comprise within the 10 ppt dioxin TEC concentration contour shown on Figure 5-2.

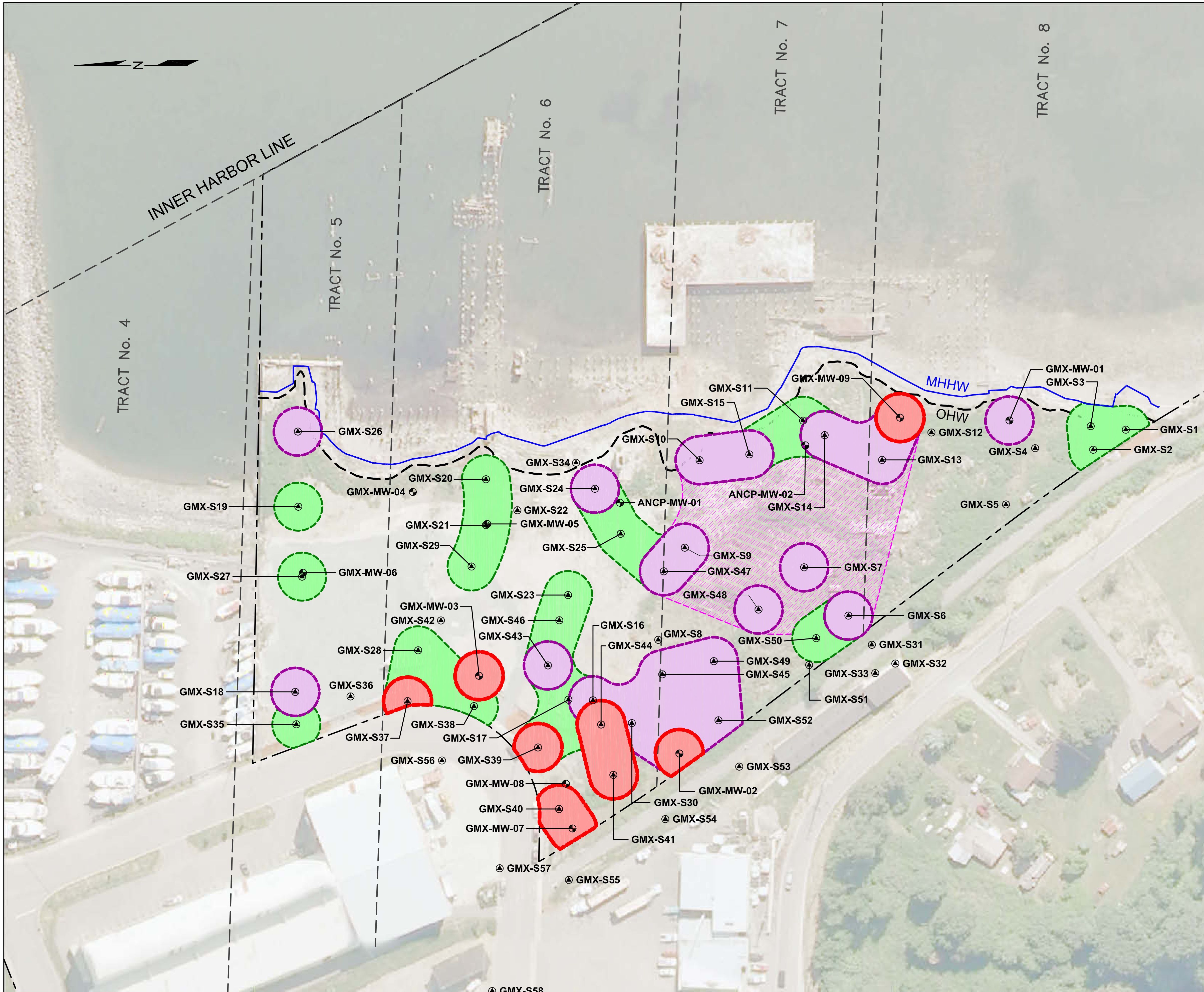
Wood waste occurrence can be conceptualized as defining a western and an eastern SMA where accumulation of woody material is either greater than 1 foot (nearer the shoreline) or less than one foot (away from the shoreline). Hatched areas on Figure 5-1 depict each of these SMAs. Although wood waste thickness contours (and associated parameters such as TOC and TVS) are not well established by existing data, Figure 5-2 shows general areas intended to define an east SMA and west SMA based on wood waste thickness criteria, and pending further field data that was acquired in December 2010 and presented in Appendix E's supplemental field investigation report (Hart Crowser 2011). The current delineation of these SMAs on Figure 5-2 is a rough estimate that assumes that wood waste may have accumulated to thicknesses of 1 foot or greater near the historical overwater operations once situated on the remnant deck and pier structures at Custom Plywood. The east and west SMAs include two areas with dioxin concentrations exceeding 25 ppt. The 10 ppt and 25 ppt concentrations represent low and high action levels for the remedial action (refer to Section 8.0). Areas seaward of the 10 ppt dioxin concentration contour that contain sediment with concentrations of dioxin exceeding the 1.4 ppt Fidalgo Bay background are also considered part of the Custom Plywood Site. However, these areas are planned to be addressed in the future Phase II interim action work plan.

5.3.2 Estimated Sediment Volumes for Remediation

Overall wood waste thicknesses and volumes in the marine environment are currently not well defined. Assuming a hypothetical average wood waste thickness of about 0.5 foot over the area of the East SMA, and a nominal thickness of up to possibly 6 feet over the area of the West SMA, the total in-water wood waste volume is estimated at up to about 50,000 cy. This estimate includes wood intermixed with near-surface debris in the uppermost 2 feet of the sediment profile.

The volume of dioxin-affected sediment is difficult to estimate given the limited number of surface sediment samples that have been analyzed and absence subsurface sediment dioxin data at the time of completion of this FS. Assuming that dioxin in the East SMA is restricted to near- surface sediments and relatively thin wood waste cover, the associated SMA volume exceeding 10 ppt but less than 25 ppt in the east SMA is comparable to that for wood waste (i.e., about 19,000 cy assuming an affected thickness of about 0.5 foot).

Higher concentration areas exceeding 25 ppt are depicted on Figure 5-2 using a nominal 50-foot radius circle for the purposes of this FS, although the actual size of these areas is unknown. If the higher concentration area extends through the entire wood waste profile (say averaging 5 feet in thickness) of the high concentration area located within the West SMA, the total affected volume of dioxin-affected sediment and wood waste could be up to about 1,400 cy). Additional sampling data from December 2010 field investigation are presented in the Appendix E report (Hart Crowser 2011) will be used to further refine these higher concentration areas and volumes in the Phase II aquatic area CAP to be prepared in late 2012 as part of the IAWP.



Inferred Areal and Depth Extent of COC Screening Level Exceedances in Soil
Depth Extent in Feet Below Ground Surface

0-4 Feet

0-6 Feet

0-8 Feet

Potential Exceedance to 6 Feet

Exploration Location and Number

GMX-MW-02 2008 and 2009 Monitoring Well (AMEC 2009)

GMX-S6 2008 and 2009 Soil Sample (AMEC 2009)

Notes:

1. Adapted from AMEC Geomatrix (2010) First Draft Remedial Investigation (RI) Report Figures 5 and 32.
2. Includes exceedance of screening levels for TPH, cPAHs, and metals in soil.
3. Boundary locations estimated based on nominal 25-ft minimum horizontal distance from point of detection. Assumed working scenario for FS evaluation.

0 100 200
Scale in Feet

Custom Plywood Site
Anacortes, Washington

Inferred Extent of COC Screening Level Exceedances in Soil

17330-27 (FS) 2/11

HARTCROWSER

Figure
5-1

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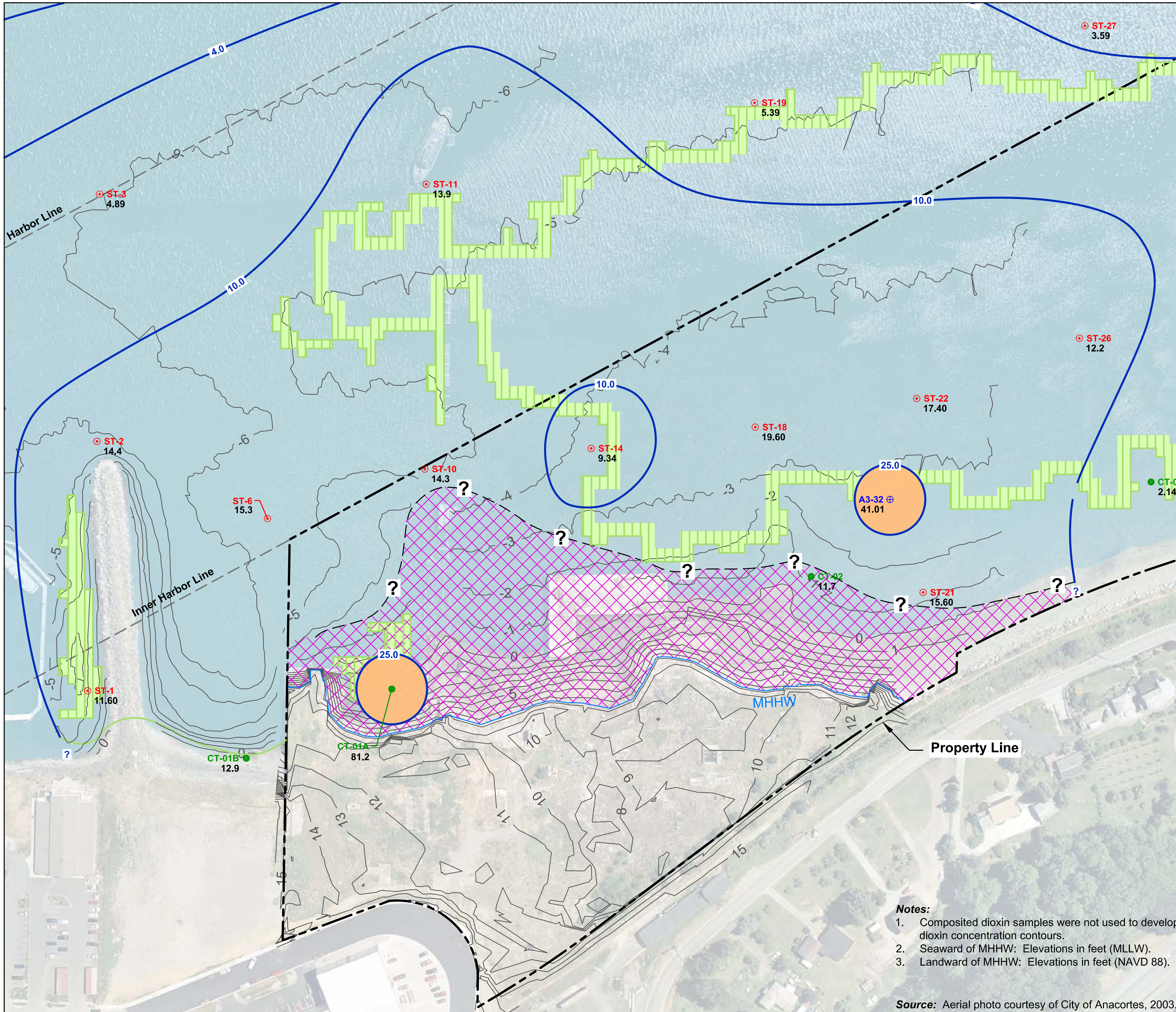

Inferred Extent of Wood Waste 6 Feet Thick or More

Inferred Area where Dioxin TEC >25 ppt

Sediment Dioxin Sample Location and Number

CT-01A ● SAIC, 2010

A3-23 ⊕ SAIC, 2008

ST-1 ⊙ Geomatrix, 2008

A3-23 ⊕ 8.99 Discrete dioxin analysis with result in parts per trillion (ppt) TEC (1/2 DL TEC)

2.5 Dioxin TEC Contour in ppt

Approximate Extent of Eelgrass Beds

N

0 150 300

Scale in Feet

Notes:

1. Composited dioxin samples were not used to develop dioxin concentration contours.
2. Seaward of MHHW: Elevations in feet (MLLW).
3. Landward of MHHW: Elevations in feet (NAVD 88).

Source: Aerial photo courtesy of City of Anacortes, 2003.

Custom Plywood Site
Anacortes, Washington

Total Dioxin Concentration Contours and Inferred Extent of Wood Waste in Site Aquatic Areas

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Figure
5-2

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6.0 REMEDIAL TECHNOLOGY SCREENING

Candidate remedial technologies were identified and screened to develop potential cleanup alternatives for further evaluation in this feasibility study (FS). This section presents results of the technology screening assessment for soil, groundwater, sediment, and removal of related debris, pilings, and other in-water structures. The remedial technologies considered include methodologies capable of achieving the remedial action objectives, including preliminary MTCA/SMS cleanup levels and other regulatory requirements.

Candidate technologies applicable to impacted groundwater and soil are identified in many sources, including compilations such those discussed in the web-based Federal Remediation Technology Roundtable (FRTR). Screening technologies for sediment include methods described in EPA's Assessment and Remediation of Contaminated Sediments Guidance Document (ARCS) (EPA 1994), Contaminated Sediment Remediation Guidance for Hazardous Waste Sites (EPA 2005), and the FRTR.

The screening of technologies applicable to impacted groundwater, soil, and groundwater remediation included consideration of available methodologies to address contaminants in the various media based on their expected implementability, reliability, and relative cost. Physical conditions at the site that limit or support particular technologies, and contaminant characteristics that limit the effectiveness or feasibility of a technology, were considered. Site conditions and COC characteristics that were considered in the screening are described in Sections 2 and 7, respectively. Screening was consistent with MTCA evaluation criteria described further below for the remedial alternatives evaluation. Screening also considered modifying criteria associated with upland and aquatic land uses, consideration of potential historic and archaeological resources, and avoidance of impacts to habitat resources.

The implementability (i.e., the relative ease of installation and the time required to achieve a given level of performance) of a technology is assessed based on site conditions. Implementability considers: (1) the technology's constructability (i.e., ability to build, construct, or implement the technology under actual site conditions); (2) the time required to achieve the required level of performance as defined by the cleanup levels and POCs; (3) the ability of the technology to be permitted; (4) the availability of the technology; and (5) other technology-specific factors.

To assess the reliability of prospective technologies, the EPA states that an evaluator should identify the level of technology development, its performance record, and the inherent construction, operation, and maintenance problems of each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated should be eliminated (EPA 1988).

The remedial technologies that were identified and screened for the Custom Plywood Site are summarized in Sections 6.1 through 6.3, along with the rationale for retaining or discarding technologies.

6.1 General Response Actions Applicable to All Site Media

The general response actions that are considered common to upland soil, groundwater, and aquatic sediment include monitoring, institutional controls, and a "no action" option. These general response actions are summarized below.

6.1.1 No Action

A "no action" option was considered as a baseline or null case for comparison; however, no action does not achieve remedial action objectives, including protection of the environment. The "no action" option does not address MTCA evaluation criteria and, therefore, was eliminated from further consideration for upland soil, groundwater, and aquatic sediment.

6.1.2 Compliance Monitoring

Monitoring is needed to assure compliance with screening levels, to assess performance of a remediation technology as it is operating, and to measure continued effectiveness of the remedial action over time. MTCA requires compliance monitoring for all cleanup actions and it may be required for interim and emergency actions unless otherwise directed by Ecology (WAC 173-340-410). Compliance monitoring, as defined in MTCA, includes protection, performance, and confirmational monitoring.

Protection monitoring is conducted to confirm that human health and the environment are adequately protected during construction, operation, and maintenance of a remedial action. The purpose of performance monitoring is to determine whether the cleanup action has attained applicable cleanup standards, remediation levels, or other performance standards. Confirmational monitoring is conducted to confirm the long-term effectiveness of an interim or cleanup action once cleanup or other performance standards have been attained.

Compliance monitoring would be applied in combination with other remedial technologies and is considered an integral part of each of the remedial alternatives developed in Section 8 of this FS. Compliance monitoring is retained for inclusion in the selected alternative(s).

6.1.3 Institutional Controls

Institutional controls (ICs) represent non-engineering measures designed to prevent or limit exposure to hazardous substances left in-place at a site, and/or assure the integrity, effectiveness, and long-term performance of the chosen remedy. Institutional controls are particularly effective if contaminants are not completely removed, such as in the case where contaminants would be contained beneath a surface cap.

In this context, ICs can be evaluated based on four general categories previously identified by the EPA (2004b):

- Governmental controls (e.g., zoning, local ordinances, and other governmental requirements restricting site uses). Controls use the regulatory authority of a governmental entity to impose restrictions on citizens or property under its jurisdiction.

- Proprietary controls (e.g., easements, restrictive covenants). Proprietary controls are based on property law to restrict land use to maintain the protectiveness of a remedy. Proprietary controls prohibit activities that may compromise the effectiveness of a remedy (for example, disturbing capped areas), or restrict future uses of resources that can result in risks to human health or the environment. Proprietary institutional controls are typically binding on subsequent purchasers of the property and run with the land.

- Enforcement and permit tools. Enforcement tools as an institutional control mechanism include administrative agreements such as agreed orders and consent decrees used to compel a party to engage in various site assessment and remediation activities, or to limit site activities that could impact the protectiveness of a remedy. Enforcement tools may include requirements to monitor and report on institutional control effectiveness at regular intervals (information tool), or require a party to establish a covenant (proprietary control) or post deed notices on a property (information tool), as necessary. Enforcement tools may have limited effectiveness if not coupled with proprietary or informational institutional controls.

- Informational tools include notices filed in the land records, advisories, and listings on state and federal site registers. Informational tools are common institutional controls that provide information on the performance of a remedy or notification that contamination remains on a site.

Applicable institutional controls for the Custom Plywood Site in the information tools category may include placing notices about the remedial actions on property records (including state aquatic properties), or notices for future leases, as applicable. Similar institutional controls include continued identification of the site on the Ecology hazardous site registry, and documenting completion of remedial actions for regulatory agency filing or permit purposes. Ecology administrative agreements constitute institutional controls under the enforcement or permit tools category. Permit review procedures, and related conditions and requirements for the remedial action are also included in this category. The need for restrictive environmental covenants, including a potential Uniform Environmental Covenants (UEC, Chapter 64.70 RCW) as proprietary controls, would need to be evaluated based on land use and the parties involved. Related institutional controls may also include planning documentation and reporting associated with long-term monitoring of the affected areas at the site.

Similar institutional controls have been effectively applied to many other cleanup projects at both the state and EPA levels in Puget Sound and elsewhere. For the Custom Plywood Site, institutional controls are intrinsically coupled with other remedial actions and provide effective, feasible, and cost-beneficial measures to protect and maintain implemented alternative(s). Institutional controls, therefore, are retained for inclusion with the selected alternative(s).

6.2 Upland Soil Remedial Technologies

The remedial technologies considered for impacted soil at the Custom Plywood Site include the following:

- Engineered capping;
- Removal and off-site disposal; and
- Other technologies.

6.2.1 Engineered Capping

An engineered cap is a surface containment technology consisting of a horizontal barrier used to physically isolate contaminated soil from direct human or terrestrial ecological contact, and to prevent the infiltration of rainfall and surface water that could potentially leach and transport contaminants from the impacted area. A wide variety of low-permeability capping materials is available. Asphalt, concrete, clay, and multi-layer caps (usually concrete or soil and a synthetic liner) are frequently used to isolate contaminants.

Although engineered capping is less effective than contaminant source removal, it is an applicable and potentially cost-effective technology for locations where contaminants may be left in-place after implementation of other remedial technologies. Engineered capping technology is retained for further evaluation.

Considerations for Capping

The design, construction, maintenance, and monitoring of an engineered cap generally depend on the nature of the contamination, site physical constraints, and biological considerations. Several criteria should be considered in selecting the type of cap to implement, which include:

- Expected loading and abrasion in the area to be capped;
- Degree of impermeability required;
- Topography of the impacted area (e.g., flat, level surface versus an uneven, sloped surface);
- Accessibility for cap construction and the presence of potential obstructions such as exposed wood pilings or industrial debris;
- Potential future use of the capped area; and
- Cost.

Generally, areas requiring greater load-bearing capacity and abrasion resistance (such as high-traffic areas) call for a concrete cap. Areas where less load-bearing capacity and less abrasion resistance are needed are suited for an asphalt cap. Areas that have an uneven geometry, as opposed to a flat and level geometry, and where the need for load-bearing capacity and abrasion resistance is minimal, are better suited for a multi-layer cap because of its greater flexibility as compared to concrete or asphalt caps. Multi-layer caps also provide added restorative benefit, in that their top layers, though designed for management of water drainage, typically consist of topsoil and vegetation, which help to return the capped area to the natural condition of its surroundings.

Engineered Cap Construction Methods

Caps for isolation of contaminated soil are typically designed to achieve low permeability (typically less than 10^{-6} centimeters per second). In areas that are to be paved, caps that satisfy performance standards generally consist of a suitable subgrade, a base course, an impervious layer, and protective surface layer(s). Generally, the imperviousness of the new pavement section is not the main concern; design needs to address adequacy of the subgrade and paving materials to resist pavement cracking over time. Another consideration during construction is the proper sealing of pavement edges around cap penetrations (such as catch basins, monitoring wells) and other site features in the cap location. In addition, construction quality control for containment caps is significantly more restrictive than for basic paving, and written monitoring and maintenance procedures are typically required. Institutional controls are typically implemented to protect the completed cap after construction. Subsurface caps present challenges for even placement of the cap structure and suitable bedding, subgrade preparation, potential loading and subsidence, and monitoring and maintenance.

The ability to monitor performance over time and provisions for maintenance to prevent increased permeability due to deterioration or changes in site use need to be established. Monitoring to assure performance of the cap typically needs to be based on a written plan that is consistent with monitoring requirements for other remedial components (EPA 2004a).

6.2.2 Soil Removal and Off-Site Disposal

Impacted soil is frequently removed using common excavation methods. Excavation is an effective technology applicable to the soil contamination at the Custom Plywood Site and is retained as a remedial technology for further evaluation.

Considerations for Soil Removal and Off-Site Disposal

Unique characteristics of the Custom Plywood Site, as described in Section 2, would require consideration for removal of impacted soils. Site features such as wood pilings and industrial debris would need to be removed or cleared from the excavation area prior to or as a part of soil removal. Geotechnical and hydrogeologic conditions would require consideration during design to assess the potential need for shoring excavation side walls and dewatering. Historical site data indicate that soil impacts at the site may potentially be widespread; however, there are areas at the site where the extent of soil impacts is less certain due to relatively sparse soil sampling and analytical data. Excavation contingency plans should include provisions for field observation and possible chemical testing of excavated impacted soil to assess the need for continued excavation.

Because of potential space limitations at the site, the available area for staging equipment and stockpiling excavated soil also require consideration. Additionally, if the bulk characteristics of excavated soil require modification as part of soil management (such as screening out debris or dewatering), additional space would be needed for these systems.

Management of Removed Soil

Impacted soil would require appropriate management after excavation. Options include off-site management and *ex situ* treatment for reuse of the removed soil. As summarized in Table 6-1, *ex situ* treatment technology options include bioremediation, thermal treatment, soil washing, chemical treatment, and solidification or stabilization. Although, many of these technologies might theoretically be effective for treatment of site COCs, their implementation would be difficult. These options may be difficult to implement because of site space limitations for the systems that would be needed, and because of potential material handling requirements such as the likely need for debris removal and potential difficulty of soil homogenization. Because of these difficulties and relatively high capital and operation and maintenance (O & M) costs, *ex situ* treatment is not retained for further evaluation.

Landfill disposal of impacted soil is a commonly used off-site management option. Landfill disposal is technically implementable and is an effective option for management of soil COCs at the site. Landfill disposal is retained for further evaluation as a remedial technology that would be used in conjunction with impacted soil removal. A likely scenario is off-site disposal of chemically impacted soils at a permitted RCRA Subtitle D facility. The degree of further characterization of impacted soils, if any, to meet land disposal requirements would need to be assessed. This scenario does not apply to soils designated as Dangerous Waste under state regulations (Chapter 173-303 WAC), or other unsuitable soils. No such soils are currently identified at the Custom Plywood Site. Non-contaminated overburden soils containing wood waste and debris may also require Subtitle D landfill disposal if other reuse or off-site disposal options are not available. Disposal in unlined facilities, or facilities not otherwise configured to handle waste soils, wood waste, and related degradation products is likely not feasible. However, local facilities would likely be able to accept concrete, brick, and asphalt debris considered to be "inert," as defined in state Solid Waste Handling Standards (Chapter 173-350 WAC).

6.2.3 Other Technologies

Other remedial technologies applicable to impacted soil include *in situ* treatment; however, these technologies were not retained for further evaluation. As summarized in Table 6-1, these *in situ* technology options include bioremediation, monitored natural attenuation (MNA), soil vapor extraction (SVE), thermal treatment, soil flushing, and chemical treatment.

In situ technologies that employ chemical injection-based delivery methods, such as *in situ* bioremediation, soil flushing, and chemical treatment, were not retained in the technology screening because of potentially difficult implementability and high relative cost. Regulatory concerns may exist over the injection of chemicals in the subsurface and controlling their migration. Some technologies may require saturation of the impacted vadose zone, necessitating the injection of a large quantity of water and treatment chemicals. Because of the nature of the soil contamination, multiple applications may be needed to achieve treatment goals.

SVE and thermal treatment technologies pose potentially problematic reliability and relatively high capital and O&M costs. Because of the low volatility of the soil contaminants, SVE would not be effective, which relies on the volatilization of target contaminants. Buried objects and naturally occurring organic matter in site soil may interfere with the operation and effectiveness of thermal treatment technologies for treatment of petroleum hydrocarbons and cPAHs. Thermal technologies are not applicable to treatment of metals.

Although MNA is an implementable treatment methodology, it is not effective for treatment of organic contaminants within a reasonable time frame and is not applicable to metals treatment. MNA is not retained for further evaluation.

6.3 Groundwater Remedial Technologies

The groundwater remedial technologies considered in the screening process include containment technologies, MNA, and other technologies, such as *in situ* and *ex situ* treatment. The screening of these technologies for potential application to impacted groundwater is summarized in Table 6-2.

6.3.1 Containment Technologies

The containment technologies applicable to impacted groundwater remediation include engineered caps, vertical barriers, subsurface horizontal barriers, and hydraulic containment technologies. Vertical and horizontal barriers installed in the subsurface provide containment and minimize contaminant migration by either retarding impacted groundwater flow (vertical barriers) or preventing surface water infiltration (horizontal barriers) that could leach and transport contaminants from vadose zone soil or could increase the water table gradient and promote contaminant plume migration. Hydraulic containment controls the migration of a contaminant plume by pumping groundwater downgradient of the plume through extraction wells or trenches with a capture zone designed to intercept the plume. Because of potentially difficult implementability and relatively high cost, vertical barriers, subsurface horizontal barriers, and hydraulic containment were not retained for further evaluation.

Engineered surface capping was retained in the technology screening as a potentially applicable, implementable, and reliable technology for remediation of impacted groundwater. The considerations associated with engineered capping in areas of impacted groundwater are the same as those for impacted soil, discussed in Section 6.2.

6.3.2 Monitored Natural Attenuation

Monitored natural attenuation (MNA) is a remediation methodology that employs naturally occurring physical, chemical, and biological processes that reduce the mobility and/or concentration of a contaminant. The purpose of monitoring is to verify that these processes are occurring. MNA is applicable in combination with other technologies in locations at the site where groundwater contamination would remain in place, and is a relatively low-cost remedial option. MNA is retained for further evaluation for remediation of impacted groundwater.

Considerations for MNA

The implementation and reliability of MNA depends on several factors:

- Contaminant characteristics;
- Site chemical and biological mechanisms;
- Site hydrogeologic conditions;
- Contaminant source control; and
- Restoration time frame.

Natural attenuation reduces the mobility and/or concentration of a contaminant through processes that destroy the contaminant or physically reduce contaminant concentration through hydrodynamic process such as advection and diffusion. For these attenuation processes to be effective, the contaminant should have characteristics that allow it to degrade chemically (for example, through natural reductive or oxidative processes) or biologically (such as by microbial degradation), and site groundwater conditions would need to be supportive of these processes.

Natural attenuation processes are typically slow, resulting in a long cleanup time frame. Thus, implementing MNA alone likely would not be sufficient to satisfy cleanup objectives. However, MNA would be applicable in combination with remedial technologies that provide reduction or elimination of the contaminant source but where residual contamination may remain in groundwater.

6.3.3 Other Technologies

Other remediation technologies applicable to groundwater cleanup include *in situ* and *ex situ* treatment options listed in Table 6-2. These technologies were not retained for further evaluation in this FS. *Ex situ* treatment technologies necessitate extraction of impacted groundwater for treatment in an above-ground system. Because of the long cleanup time frame associated with *ex situ* treatment and relatively high O&M cost, *ex situ* treatment was not retained for further evaluation.

In situ treatment technologies were also not retained for further evaluation. Enhanced bioremediation and chemical treatment would be difficult to implement at the Custom Plywood Site. *In situ* technologies that require chemical injections to support biological degradation processes or destroy contaminants are problematic to implement at a potentially high cost. Technologies designed to volatilize contaminants, such as air sparging and in-well aeration, would not be effective for site contaminants because of their low volatility. Passive treatment technologies, such as reactive barriers designed to intercept the contaminant plume and break down contaminants as groundwater travels through the barrier, were not retained in the technology screening because of potentially inadequate effectiveness and relatively high cost.

6.4 Sediment Remedial Technologies

The technologies considered for remediation of impacted sediment at the Custom Plywood Site include:

- Monitored natural recovery (MNR);
- Enhanced natural recovery (ENR);

- Engineering capping;
- Dredging/removal; and
- Other technologies.

These technologies are described and evaluated below.

6.4.1 Natural Recovery

Natural recovery of contaminated sediments can occur through sedimentation and mixing as physical processes, or through biological and chemical degradation. Chemical and biological processes are well documented at many sites for attenuation of various chemical constituents and commonly occur together with physical processes.

Monitored Natural Recovery (MNR)

MNR includes long-term monitoring as an essential component to assess sedimentation rates and reductions in biological toxicity over time. Long-term monitoring, coupled with the institutional controls noted above, distinguish MNR from the no action alternative. MNR has the benefit of negligible disruption to existing habitat features, biota, and possible cultural resources. On a bathymetric scale, changes to the seafloor from accumulated sediment are also minimal and occur over a relatively long time as a natural process.

Dioxin/furans are prevalent in aquatic portions of the Custom Plywood Site. These compounds are environmentally persistent and are resistant to chemical and biological natural recovery processes. Additionally, based on the current coastal engineering assessment summarized in Section 2, insufficient natural sediment accumulation occurs near the Custom Plywood Site to support natural recovery. For these reasons, MNR is judged not to be an implementable or reliable remedial technology for application at the Custom Plywood Site and is not retained for further evaluation as an FS alternative.

Enhanced Natural Recovery (ENR)

ENR or thin-layer capping (TLC) is commonly used at sediment remediation sites to augment natural physical, biological, and chemical processes promoting recovery. Placement of nominal 3- to 12-inch layer(s) of suitable substrate is typically done to enhance natural sedimentation and other processes. Although TLC is not intended to isolate and stabilize underlying contaminated sediments, layers of only 5 to 15 cm (approximately 2 to 6 inches) generally suffices to isolate the bulk of contaminants from the benthic macroinvertebrates that inhabit surface sediments (National Research Counsel 2003). This also shortens the time frame for restoration. ENR intrinsically includes long-term performance monitoring and application of appropriate institutional controls.

The effectiveness and feasibility of ENR using various application strategies has been demonstrated at numerous cleanup sites in Puget Sound and elsewhere. ENR represents a permanent, protective remediation method and is more cost-effective than engineered capping or dredging. ENR also minimizes impacts on habitat and biota, potential cultural resources, and aquatic land use. Environmental disruption is significantly less than for capping or dredging technologies. ENR is retained as an effective, feasible, and cost-effective technology for further evaluation as an FS alternative.

Considerations for ENR. Application of ENR technologies should consider several key factors including:

- Type and extent of contamination present (i.e., predominantly wood waste and dioxins up to 25 ppt TEC);
- Nature of the mudline substrate (i.e., relatively soft, muddy surface throughout much of the offshore portions of the site);
- Bottom slope angle (relatively shallow 10 horizontal to 1 vertical (10H:1V) over much of the aquatic area);
- Biota and eelgrass presence;
- Water depth and current conditions (intertidal and relatively shallow subtidal to about elevation -6 feet MLLW);
- Wave energy and erosion in intertidal and shallow subtidal zones;
- Type and source of TLC material placed; and
- Placement methods and potential water quality impacts.

The overall objective of TLC placement would be to apply a layer of fine-grained sandy capping material to reduce the influence and adverse effects of wood waste and dioxin/furan compounds in the upper 10 cm of the sediment profile at suitable locations. Such locations are characterized by low wave energy, limited thickness of wood waste, lower relative dioxin/furan concentrations, and cappable substrate. Coastal engineering conclusions summarized in Section 2 indicate that TLC layers would remain stable over much of the subtidal area and have little net sediment accretion or erosion. Other technologies, such as dredging and backfilling or backcapping, are more appropriate at other locations with higher erosive wave energy, higher relative dioxin/furan concentrations, and thicker wood waste profiles.

Constraints specific to the Custom Plywood Site for TLC placement are noted above. The impact of TLC remediation on eelgrass beds is a key additional consideration. Existing wood pilings, marine structures, and surface debris would need to be removed prior to TLC placement, and measures would be required to protect the extensive eelgrass beds from damage during cap placement. Best management practices (BMPs) to control cap placement and related water quality issues need to be considered before implementation of ENR.

As part of remedial design, pilot testing is recommended to assess the feasibility of thin-layer capping near eelgrass beds, and to further verify cap stability and marine hydrodynamic conditions.

Placement over Soft Sediment Substrate. Although much of the existing seafloor sediment within the Custom Plywood Site consists of soft, fine-grained material, experience at a number of sites with soft sediment demonstrates that sandy capping material can by placed over soft sediment in a coherent layer without subsidence, sinking, or chaotic intermixing of capping materials.

For example, 6 to 12 inches of sandy TLC material was placed over approximately 28 acres of the Ketchikan Pulp Company (KPC) site in Ketchikan, Alaska, in 2001 (Integral 2009, and Becker et al. 2009). KPC is an EPA Superfund site with several remedial actions, including ENR, to enhance recovery of sediment with wood waste contaminants. The KPC project and other sites demonstrate the feasibility of placing TLC material to bridge very soft sediments, provided that placement thickness and distribution can be controlled. Thin-layer placement was also determined to be more effective at KPC than mounding cap materials on the bottom for current winnowing and smoothing.

Placement Methods. There are a variety of methods for placing TLC material. From generally least technically complex to more complex, these include:

- Washing or blowing capping material from a vessel deck;
- Overwater pneumatic placement through a flexible line with entrained air;

- Overwater placement using a clamshell or other bucket type on a crane-suspended cable;

- Overwater or underwater placement through a screen "sifter" or other device;

- Underwater placement using a tremie pipe, spreader, or diffuser system; or

- Underwater placement of a pre-slurried capping mixture using a tremie system or other methods.

For example, sandy capping material can often be placed with a clamshell bucket and crane. Using this method, the clamshell bucket can be swung in regular arcs over the placement area, as controlled by the crane operator and recorded on an electronic log of the bucket arc swing areas. Good placement control can be achieved for establishing typical 6- to 12-inch TLC thicknesses with limited water column turbidity. Material placement rates of about 100 cubic yards per hour (cy/hr) or more are feasible with this method. A similar bucket and cable-arm crane placement method was used for the KPC project with good control and placement exceeding 1,000 cy/day. Experience at the KPC site demonstrates that the bucket and crane method can be scaled up to cap larger areas with good consistency and economy.

Another TLC method involves overwater pneumatic placement through an air line. Pneumatic placement of TLC material through an air line was successfully used for EPA Superfund remediation capping of an intertidal area of the Middle Waterway in Tacoma in 2005 (Hart Crowser 2005). Placement rates of about 50 cy/hr and up to about 200 cy/hr per daily tidal work shift were achieved. Placement equipment was staged on temporary platforms on the tideflat with a land-based supply line and capping source material. The pneumatic placement option may be a viable option for the Custom Plywood Site, but would require further pre-construction testing to demonstrate its feasibility and the cost-effectiveness of overwater placement from a vessel platform.

Other TLC placement methods may be feasible but may not provide comparable or greater value. Washing or blowing TLC material from a vessel deck may be a lower-cost option, but can be difficult to control and creates significant water column turbidity. Underwater tremie placement or similar systems have been used at other sites to provide greater control or for other specific applications, but such methods are not expected to be needed or provide additional value. Underwater placement costs are also generally higher than the bucket and crane method. These technology options, therefore, are not retained for further evaluation. Deck washing and tremie placement may also be more harmful to eelgrass.

6.4.2 Engineered Capping

Permanent or long-term capping and containment of contaminated sediments is a common and proven remediation method at many aquatic cleanup sites. Engineered caps in excess of about 1 foot in thickness are often placed when physical, chemical, and biological isolation are needed to mitigate potential toxic effects of the underlying sediments. Engineered caps are typically designed for several purposes:

- Provide a robust physical barrier to prevent contact with underlying contaminated sediments;
- Provide a chemical isolation barrier to attenuate concentrations of potentially mobile chemical constituents;
- Provide a biological barrier for burrowing benthic organisms; and
- Provide a surface armoring layer to prevent erosion of the cap by currents, wave action, and propeller wash.

Although feasible and effective engineered capping technologies are available for containment of impacted sediment at the Custom Plywood Site additional detrimental impacts to the environment would likely result. A major consideration is the loss of habitat associated with thick cap placement that would not occur with MNR or ENR, or at least not occur to the same degree. Damage to or destruction of existing eelgrass beds from engineered cap placement is a similar concern. Habitat loss would have significant adverse impacts on the local ecosystem and would likely require difficult and costly compensatory mitigation. Placement of thick caps can also create bathymetric changes adversely affecting habitat and navigation. Engineered capping and containment are also higher cost options than MNR and ENR that do not provide commensurate value for the additional cost. Despite these considerations, engineered capping and containment technology is retained for further evaluation based on its overall effectiveness and application to areas where ENR is not feasible.

Considerations for Thick Capping

Like ENR thin-capping, the design, placement, and maintenance/monitoring of thicker caps depends on the nature of the contamination, substrate bottom and aquatic conditions, biological considerations, material type, and construction methods. The capping thickness and materials used are determined by the type of contamination present and its mobility, the need for armoring or physical protection from erosion or other disruption, and habitat requirements. Thick caps are often composed of a habitat-friendly mixture of sand with minor gravel and finer-grained materials. Capping remedies are often coupled with institutional controls to protect the cap structure by warning people about its presence.

Key to placement of thicker cap sections is the ability for capping materials to successfully bridge the contaminated layer or otherwise form a protective barrier. Sites with soft bottom conditions often pose challenges for placing a continuous, intact cap without compromising the containment function of the cap caused by settling, buckling, or shearing of the capping materials. In such cases, maintenance to augment or restore capping materials may be needed over time. Protection from wave erosion in intertidal and shallow subtidal areas of the site is an additional key consideration.

As noted above, placement of capping materials typically creates greater disruption to the benthic community compared to MNR and ENR, resulting in commensurately higher impacts to the aquatic food chain. Capped areas become biologically inactive and require greater time periods to recover and recruit benthic organisms. Greater quantities of capping material placed in the aquatic environment can also have more adverse impacts on short-term water quality during placement. The design of a thick cap for containment requires measures to minimize cap erosion and to preserve eelgrass beds.

Engineered Capping Placement Methods

Similar to ENR thin-capping methods, thick caps can be placed using a variety of methods depending on capping objectives and area, bottom and water conditions, and related factors. Conventional sand caps are routinely placed using clamshell, tremie, and hydraulic methods for environmental projects, with placement thickness monitored using acoustic or manual surveys, or grade stakes. Placement quantities may also be controlled based on placement volume per unit area. Nearshore capping sections can be constructed using cranes staged from land or temporary platforms. The feasibility of capping using mechanical and hydraulic methods is well proven at numerous sites in the northwest and worldwide. Placement using other methods is less common for environmental projects but may be necessary to address soft bottom conditions, composite caps, or armoring needs. It may also be necessary to dredge or overexcavate the seafloor to provide sufficient vertical space for cap placement and avoid changes to the existing mudline elevation.

6.4.3 Dredging and Removal of Sediment

Dredging is a frequently used technology for removing contaminated sediments from the aquatic environment. Many proven dredging technologies exist and are generally categorized as either mechanical or hydraulic methods. The different methods and modifications have advantages, disadvantages, and varying levels of environmental impact.

Dredging is retained as a feasible technology for further evaluation, particularly where other technologies are not feasible or effective. Dredging provides some degree of additional permanence and protectiveness relative to other remediation technology options. However, significant environmental and habitat impacts are associated with dredging. On a comparative basis, dredging is also more expensive than the other screening technologies and requires management of dredged materials, which may include landfill or aquatic in-water disposal.

Considerations for Dredging

Dredging is often most effective for removing thicker sections of contaminated sediments over well-defined areas. At the Custom Plywood Site, dredging is suitable at locations with relatively higher dioxin/furan concentrations that warrant removal as current or future potential contaminant sources.

Adverse environmental, habitat, and potential cultural resources impacts are associated with dredging. Dredging disrupts the local ecosystem and poses significant challenges that may affect its effectiveness and feasibility. Eelgrass beds in or near dredging locations may be lost or damaged. Measures would be required to minimize eelgrass damage or loss.

In addition to habitat loss that could require extensive mitigation, another key concern about dredging is control and containment of water column turbidity. The fine-grained turbidity caused by dredging may be more difficult to control than turbidity caused by placement of sandier ENR materials and engineered capping options. Therefore, dredging will likely require construction BMPs such as silt curtains or sheet piling containment to control turbidity.

Resuspended particulate material (i.e., dredging residuals) also creates challenges for ensuring that contaminated material does not settle out on the dredge surface and negate the intent of dredging to remove such material. Sandy backfill cover or backcapping material will likely be needed to settle and contain residual dioxin/furan-impacted material after dredging. Backfill or backcapping material will be needed to restore dredged areas to the existing mudline elevation and encourage benthic recovery, even though dredging in and of itself would cause considerable damage to existing habitat.

Dredging Methods

A variety of clamshell and other mechanical dredging methods have been proven as successful technologies for many environmental projects in the northwest and worldwide. Hydraulic dredging has also been successfully employed but typically creates significant water handling, monitoring, and disposal challenges. From a practical standpoint, mechanical dredging is a preferred approach for the Custom Plywood Site, with hydraulic dredging either not needed or not providing additional benefit. Hydraulic dredging also generates significantly greater quantities of seawater and suspended particulates for management and potential treatment. For these reasons, only mechanical dredging is retained for further evaluation.

Management of Removed Sediment

Remediation technologies for management of removed sediment include the following, as described in Table 6-3:

- Upland landfill disposal;
- Beneficial reuse for engineering, landscaping, or other beneficial need;
- Aquatic disposal, including open-water disposal, confined disposal facility (CDF), and contained aquatic disposal (CAD); and
- *Ex situ* treatment.

Landfill disposal and open-water aquatic disposal are potentially implementable options for management of removed impacted sediment and are retained for further evaluation.

Upland Landfill Disposal

Landfill disposal at an off-site facility is a common disposal option for dredged sediment. Prior to disposal, removed sediment would require characterization to verify that land disposal requirements are met. Additional dioxin testing data from the supplemental sampling conducted in December 2010 will support further characterization. Most likely, wood waste and dioxin concentrations at the site may prohibit upland disposal options except at RCRA Subtitle D facilities (i.e., permitted lined landfills). Disposal at unlined facilities, or facilities not otherwise configured to handle wood waste and related degradation products, may not be allowable.

Aquatic Disposal

Although aquatic open-water disposal may be potential sediment management option, the presence of dioxins/furans and wood waste would likely limit the feasibility of this approach. Removed sediment would be subject to standard Dredged Material Management Program (DMMP) screening criteria and review by the Tribes and other stakeholders to determine appropriateness of open-water disposal, including recent guidelines for dioxin concentrations (DMMP Agencies 2010). Under these new guidelines, the maximum allowable total dioxin TEC concentration in any individual sample taken within a dredged material management unit (DMMU) is set at 10 ppt TEC, with an overall volume average not exceeding 4 ppt TEC.

Dredged material with a relatively high proportion of wood waste (i.e., typically exceeding about 25 percent total volatile solids (TVS)) would also not likely be suitable for open water DMMP disposal. The DMMP program establishes a review process to evaluate dredged material characterization data to determine acceptability for open water disposal. The DMMP agencies have recently accepted dredged material with wood waste for disposal at the Port Gardner open water disposal site near Everett.

Wood waste quantities and dioxin concentrations in aquatic areas of the Custom Plywood site are being further evaluated following the December 2010 supplemental field investigation. Further dredged material characterization will be required to evaluate the feasibility of open water disposal. In view of the regulatory challenges and stakeholder concerns, open water disposal of dredged materials from the Custom Plywood site appears problematic, and was not carried forward as a component of the FS alternatives evaluation. Reconsideration of potential open water disposal will require favorable results from additional site characterization, and agreement from the PSDDA agencies, affected Tribes, and other stakeholders that such disposal would not pose an unacceptable risk.

Even greater siting challenges, potential space limitations, permitting issues, and interference with aquatic land use are associated with in-water disposal options for dredged material involving CDF and CAD technologies. CDF and CAD disposal would be difficult to implement within the overall project time frame and would be problematic from a public acceptance standpoint. These options, therefore, are not retained for further evaluation. Considering the wood waste content and dioxin/furan concentrations in potential dredging areas, beneficial reuse of this sediment is unlikely, unless a practicable beneficial use is identified later.

Other Dredged Material Management Options

Biological, physical, and chemical treatment technologies exist for *ex situ* treatment of removed sediment. These technologies include bioremediation, thermal treatment, sediment washing, chemical treatment, and solidification and stabilization options. Although some may provide effective treatment, these technologies may potentially be difficult to implement at the Custom Plywood Site for reasons that include space limitations for the required treatment systems, physical and chemical characteristics of the sediment that reduce effectiveness, and potentially relatively high capital and operation and maintenance (O&M) costs. As summarized in Table 6-3, *ex situ* treatment technologies for removed sediment are not retained for further evaluation.

6.5 Physical Hazard Removal and Site Demolition

Remnants of the former Custom Plywood facility remain at the site in the form of concrete structures, foundations, surface debris, and wooden pilings. Demolition and removal of this material would be included as part of the interim action and are considered common to each of the upland and aquatic remediation alternatives. Demolition is intended to remove physical hazards and facilitate access for upland and in-water remediation. In-water debris also represents potential deleterious material under the state SMS.

6.5.1 Concrete Structure Demolition

Remaining above-ground concrete structures at the Custom Plywood site consist of miscellaneous concrete foundations and monolithic structures in the upland area of the GBH property. Remnant overwater structures include a dilapidated concrete bulkhead and L-shaped pier. Common construction demolition equipment such as wrecking excavators and balls could be used to break up the upland concrete structures, with on-site crushing and material sizing for recycling as excavation backfill material.

Demolition of concrete structures in the aquatic area would need to consider accessibility issues and mitigation of the potential surface water impacts of the demolition work. The concrete bulkhead could likely be accessed and demolished from land using long-reach equipment. During demolition, measures would be needed to prevent materials and turbidity from leaving the demolition area, such as debris booms and turbidity curtains.

Demolition of the L-shaped pier presents greater complexity than the other concrete structures on the site because of more difficult accessibility and its proximity to surface water in the intertidal and subtidal zones of the site. The demolition could likely be completed using a land-based long-reach crane. However, water-based equipment may also be needed to assist with pier decking removal and rubble/flotsam containment. Sawcutting of the decking may also be necessary to control the demolition process. The shallow surface water at the site makes water-based access from both the land side and water side challenging; thoughtful tide work demolition will be required. Similar to the bulkhead demolition work, containment controls would likely include debris booms and turbidity curtains, and additional catchment devices. Additional equipment would be needed for loading the concrete rubble for off-site disposal.

6.5.2 Surface Debris Removal

Surface debris covers much of the upland portion of the site and extends into the intertidal and subtidal areas. The debris consists of a variety of materials, such as old bricks and mortar, wood, concrete rubble, and typical rubbish associated with a marine beach area. Surface debris removal could be relatively simple, consisting of excavation or scraping using excavators or bulldozers with subsequent loading and hauling to an off-site disposal facility. However, wooden pilings that remain below ground surface may be encountered during debris removal. Measures would be needed to uncover and preserve the tops of the pilings for extraction.

6.5.3 Wooden Piling Removal

Wooden pilings remain in both the upland and aquatic portions of the Custom Plywood site. Many of the pilings extend above ground surface, but additional hidden pilings likely exist, which may have been broken off at or below ground surface. Piling removal would be conducted using a vibratory hammer attached to a crane or other long-reach equipment for overwater work. In-water pilings that are located beyond the reach of land-based equipment require removal using barge-based equipment, which presents similar accessibility issues in shallow water as for overwater concrete demolition.

The wooden pilings are known or suspected to have been treated with creosote as a wood preservative, necessitating measures to collect creosote-impacted material from the piling surface and from surrounding soil during piling removal, as practicable. Pilings extracted from in-water areas would likely need to be wrapped in plastic or other containment as the pilings are transferred to the upland area for off-site disposal shipment.

Table 6-1 - Remediation Technology Screening for Upland Soil

General Response Action	Remediation Technology	Process Option	Description	Physical/Chemical Criteria	Implementability	Reliability	Relative Cost	Screening Comments	Technology Retained?
Monitoring	Monitoring	Protection, performance, confirmation	Monitoring to assure compliance with cleanup/remediation levels, to assess performance of remedial technology during operation, and to measure continued effectiveness over time.	Some site features (debris, remaining wood piles) may limit accessibility for soil sampling in some areas.	Technically implementable.	Effective for assessing soil conditions at the site.	Negligible capital cost. Low O&M cost.	Applicable in combination with other technologies.	Yes
Institutional Controls	Governmental and proprietary controls; enforcement and permit tools; information devices	Fencing, signs, deed restrictions (environmental covenant), remedy maintenance agreement	Physical and administrative measures to control access or exposure to contaminated soil.	No physical or chemical constraints.	Technically implementable.	Reliable conventional technology.	Low capital and O&M cost.	Applicable and/or required in combination with other technologies.	Yes
Containment	Capping	Soil, clay, asphalt, concrete, synthetic liner, or multi-layer cap	Placement of a surface cap over impacted soil areas to minimize water infiltration and mobilization of contaminants, and to minimize direct contact risk for human and ecological receptors.	Cap construction may present exposure hazard to workers. Installation limited to accessible areas on site.	Technically implementable. However, asphalt and concrete caps not consistent with proposed future site use.	Effective for minimizing access, direct contact risk, and mobility of contaminants. Less effective than source removal.	Low to moderate capital and O&M cost.	Applicable in locations where contaminants remain in place.	Yes
	Solidification, stabilization	Cement- and lime-based processes, microencapsulation, sorption	Chemicals are introduced to physically bind or enclose contaminants, or to induce chemical reactions between the stabilizing agent and contaminants to reduce their mobility.	Limited to accessible areas at the site. May not be applicable in wetland areas. Buried piles may interfere with solidification/stabilization processes.	Technically implementable. Limited to accessible areas at the site.	Effective for reducing mobility of metals. May be less effective or ineffective for treatment of organic compounds.	Moderate to high capital cost. Low O&M cost.	Inadequate effectiveness for treatment of organic compounds.	No
Natural Recovery	Monitored natural attenuation (MNA)	Monitor natural processes occurring in site soil	Naturally occurring physical, chemical, and biological processes that reduce contaminant mobility or concentration.	Site COCs (metals, heavy-end petroleum hydrocarbons) generally not amenable to natural attenuation within a reasonable time frame. Natural attenuation processes in vadose zone soil are slow.	Technically implementable. Cleanup time frame longer than for other remedial options for soil.	Not effective for site contaminants in soil. Cleanup time frame is typically long.	Negligible capital cost. Low O&M cost.	Not effective for site soil contaminants.	No
***In situ* Treatment**	*In situ* bioremediation	Liquid-phase bioremediation, bioventing, enhanced bioremediation	Enhance biodegradation through addition of nutrients and electron acceptors to stimulate microbial growth. Moisture may need to be added to provide a medium where microbes can metabolize contaminants.	Limited to accessible areas at the site. May not be effective for PCBs, dioxin/furans, or metals.	Difficult to implement. Technology requires presence of moisture to be effective. Installation of infrastructure would be needed (e.g., injection wells for liquid-phase bioremediation or piping and blower for bioventing). Some process options may require saturation of vadose zone to be effective (i.e., liquid-phase bioremediation, enhanced bioremediation). Greater time required to implement than excavation or capping options.	Effective for treatment of compounds amenable to biological degradation. Less effective for treatment of heavy-end petroleum hydrocarbons. May not be effective for some metals and for some organic compounds, such as dioxin/furans and PCBs.	Moderate to high capital and O&M costs.	Difficult to implement and potentially not cost effective.	No
	Soil vapor extraction (SVE)	Horizontal vents, vertical vents	Removal of volatile contaminants through vacuum extraction in the vadose zone. Used in conjunction with steam injection or six-phase soil heating.	Low volatility of site organic contaminants not amenable to SVE. May be applicable to contaminants volatilized through steam injection or soil heating remedial options. Not applicable to metals.	Technically implementable. Involves installation of extraction wells, piping, and blowers.	Not effective for low-volatility or non-volatile compounds. Presence of naturally occurring organic content in soil may reduce effectiveness. Effectiveness may be improved if combined with steam injection or six-phase soil heating. Oxygen introduced through the induced air flow by SVE may promote biodegradation of organic compounds.	High capital and O&M costs.	Low volatility of site contaminants not conducive to SVE treatment. High cost.	No
	Thermal treatment	Steam injection, typically combined with SVE	Application of heat via steam injection enhances volatilization rate of semivolatile contaminants. Volatilized compounds captured and treated at surface.	Buried objects or debris, high moisture content, and high organic content in soil may interfere with operation and reduce effectiveness. Not applicable to metals.	Technically implementable. Requires off-gas capture and treatment.	Buried objects or debris and site soil characteristics may interfere with operation and effectiveness of steam injection. Not effective for metals treatment.	High capital and O&M costs.	Buried objects may interfere with treatment. Not effective for all site contaminants. High cost.	No

Table 6-1 - Remediation Technology Screening for Upland Soil

General Response Action	Remediation Technology	Process Option	Description	Physical/Chemical Criteria	Implementability	Reliability	Relative Cost	Screening Comments	Technology Retained?
		Six-phase soil heating, typically combined with SVE	Application of heat via subsurface electrodes enhances volatilization rate of semivolatile contaminants. Volatilized compounds captured and treated at surface.	Buried objects or debris and high organic content in soil may interfere with operation and reduce effectiveness. Not applicable to metals.	Technically implementable. Requires off-gas capture and treatment.	Buried objects or debris may interfere with operation and effectiveness of electrical resistance heating. Not applicable to metal treatment.	High capital and O&M costs.	Buried objects may interfere with treatment. Not effective for all site contaminants. High cost.	No
	Soil flushing	Water, surfactants, solvents	A surfactant or solvent solution is applied to soils in place to remove leachable contaminants. The solution and leached contaminants are recovered from the underlying aquifer and treated.	Presence of fine-grained soil may limit effectiveness.	Difficult to implement. May require different types of solvents or surfactants for different contaminants. Requires capture and treatment of injected solution and leached contaminants. Regulatory concerns over complete capture of leached contaminants, which may make permitting difficult.	Effective for recovery of metals and organic contaminants. Soil flushing is a developing technology, so evidence supporting effectiveness is limited.	High capital and O&M costs.	Difficult to implement. High cost.	No
	Chemical treatment	Peroxide, permanganate, ozone	Injection of chemicals to degrade contaminants in place.	May not be applicable to all site contaminants.	Difficult to implement. Presence of organics in soil may increase required chemical application rates. May require multiple applications of chemical. Regulatory concerns over injection of chemicals into subsurface, which may make permitting difficult. Requires handling of large quantities of hazardous chemicals.	Effective for aliphatic and aromatic organic site contaminants. May not be effective for metals treatment.	High capital and O&M costs.	Difficult to implement. High cost.	No
Soil Removal	Soil removal	Excavation	Removal of impacted soil using common excavation techniques. Excavated soil treated on site or sent off site for disposal.	Site soil characteristics may require shoring and dewatering. Removal of debris and buried pilings necessary prior to excavation or completed as part of excavation.	Technically implementable where accessibility allows for excavation.	Effective for all site soil contaminants.	Moderate to potentially high capital cost. Negligible O&M cost.	Commonly used established technology effective for all site soil contaminants.	Yes
Off-Site Management	Land disposal	Landfill	Disposal of impacted soil at an off-site, permitted landfill.	More highly impacted soil may require treatment prior to disposal.	Technically implementable. Impacted soil requires profiling and must meet land disposal requirements. Soil treatment may be required if disposal requirements are not met.	Effective for site soil contaminants.	Moderate to high capital cost, depending on type of contaminant. Negligible O&M cost.	Common disposal option for excavated soil.	Yes
***Ex situ* Treatment**	*Ex situ* bioremediation	Landfarming, slurry bioreactor, biopiles	Biodegradation of contaminants in excavated soil is enhanced through modification of soil conditions and provision of substrate necessary for microbial growth. Soil treatment is conducted in landfarm arrangement, aboveground reactor, or in treatment cells (biopiles).	Metals and some site organic COCs may not be amenable to treatment by landfarming or in biopiles. Treatment of some recalcitrant organics may be achievable in slurry bioreactor.	Difficult to implement. Landfarming option may require use of a large area, depending on quantity of excavated soil. Slurry and biopile treatment require reactor or treatment cell construction. Leachate and off-gas require collection and treatment. Additives may increase total bulk volume of treated soil.	Effective for treatment of petroleum hydrocarbons, wood preservatives, and other organic compounds.	Moderate to high capital and O&M costs.	Difficult to implement. Not effective for all site contaminants. Potential space limitations.	No
	Low- or high-temperature thermal desorption	Rotary dryer (indirect or direct fired), thermal screw (indirect heating)	Heat soil to 90 to 320 degrees Celsius (low temperature) or to 320 to 560 degrees Celsius (high temperature) to volatilize organic contaminants. Volatilized contaminants are recovered and treated.	Not applicable to treatment of metals.	Potentially difficult to implement. Limited space on site for treatment system siting and staging. Homogenization of heterogeneous soil and debris screening may be required. Soil dewatering to reduce moisture content may be required. Off-gas capture and treatment is required. Presence of metals may require stabilization of treated soil.	Effective for treatment of site organic COCs, but not effective for metals treatment.	High capital and O&M costs.	High cost relative to other *ex situ* treatment technologies. May not provide added incremental benefit.	No

General Response Action	Remediation Technology	Process Option	Description	Physical/Chemical Criteria	Implementability	Reliability	Relative Cost	Screening Comments	Technology Retained?
	Incineration	Rotary kiln, fluidized bed	Heat soil above 1,600 degrees Fahrenheit to volatilize and combust organic contaminants. Incinerator off-gas is treated in an air pollution control system.	Not applicable to treatment of metals.	Potentially difficult to implement. Limited space for on-site treatment system and staging. Specific feed size and material handling requirements may impact implementability. Incineration conducted at permitted off-site facility would require transport of hazardous material from the site.	Effective for treatment of site soil contaminants except metals.	High capital and O&M costs.	High cost relative to other *ex situ* treatment technologies. May not provide added incremental benefit.	No
	Soil washing	Water, surfactants, thermally enhanced	Removal of leachable contaminants from soil using water and surfactants in an aboveground reactor with subsequent treatment of residual fluids.	Applicable to site soil contaminants.	Difficult to implement. Complex mixtures of contaminants would make formulation of washing liquid difficult. Residuals that are difficult to extract from the soil matrix may require additional treatment. Limited space on site for treatment system siting and staging. Homogenization of heterogeneous soil and debris screening may be required.	Effective for site soil contaminants.	High capital and O&M costs.	Difficult to implement. High cost.	No
	Chemical treatment	Peroxide, permanganate, ozone	Treatment of impacted soil in aboveground reactor to degrade contaminants into nonhazardous or less toxic compounds.	May not be effective for treatment of metal-impacted soil.	Potentially difficult to implement. Limited space on site for treatment system siting and staging. Presence of organics in soil may increase required chemical application rates. Homogenization of heterogeneous soil and debris screening may be required.	Effective for aliphatic and aromatic organic site contaminants. May not be effective for metals treatment.	High capital and O&M costs.	High cost relative to other *ex situ* treatment technologies. May not provide added incremental benefit.	No
	Solidification, stabilization	Cement- and lime-based processes, microencapsulation, sorption	Reagents are introduced to physically bind or enclose contaminants, or to induce chemical reactions between the stabilizing agent and contaminants to reduce their mobility. Resultant materials are typically disposed of.	May not be effective for organic contaminants.	Potentially difficult to implement. Limited space on site for treatment system siting and staging. Homogenization of heterogeneous soil and debris screening may be required. Can result in significant increase in volume of treated material.	Effective for reducing mobility of metals. May be less effective or ineffective for treatment of organic compounds.	Moderate to high capital cost. Low O&M cost.	Not effective for site soil contaminants.	No

Table 6-2 - Remediation Technology Screening for Groundwater

General Response Action	Remediation Technology	Process Option	Description	Physical/Chemical Criteria	Implementability	Reliability	Relative Cost	Screening Comments	Technology Retained?
Monitoring	Monitoring	Protection, performance, confirmation	Monitoring to assure compliance with cleanup/remediation levels, to assess performance of remedial technology during operation, and to measure continued effectiveness over time.	Sampling may be limited to areas accessible for monitoring well installation.	Technically implementable.	Effective for assessing groundwater conditions at the site.	Negligible capital cost. Low O&M cost.	Applicable in combination with other technologies.	Yes
Institutional Controls	Governmental and proprietary controls; enforcement and permit tools; information devices	Fencing, signs, deed restrictions (environmental covenant), remedy maintenance	Physical and administrative measures to prevent access or exposure to contaminated groundwater.	No physical or chemical constraints.	Technically implementable.	Reliable conventional administrative measures.	Low capital and O&M cost.	Applicable in combination with other technologies.	Yes
Containment	Capping	Soil, clay, asphalt, concrete, synthetic liner, or multi-layer cap	Placement of a surface cap over impacted groundwater areas to minimize water infiltration and mobilization of contaminants.	Installation limited to accessible areas on site. Capping not applicable to designated wetland areas.	Technically implementable. However, asphalt and concrete capping not consistent with proposed future site use.	Established technology effective for reducing mobility of contaminants. However, does not provide treatment of contaminants.	Moderate to potentially high capital and O&M cost.	Applicable in locations where contaminants remain in place.	Yes
	Vertical barriers	Slurry wall, grout curtain, sheet piling	Placement of vertical, low-permeability barriers to minimize contaminant migration by retarding groundwater flow.	Installation limited to accessible areas on site. Buried debris and pilings may interfere with barrier installation.	Potentially difficult to implement. Buried debris and pilings may interfere with barrier installation and would require prior removal. Requires management of groundwater upgradient of barrier.	Established technology effective for reducing mobility of contaminants. However, does not provide treatment of contaminants.	Moderate to potentially high capital cost. High O&M cost.	Potentially difficult to implement and high cost. Does not provide treatment.	No
	Horizontal barriers	Block displacement, grout injection	Placement of subsurface, low-permeability barriers to minimize water infiltration and contaminant migration.	Installation limited to accessible areas on site. Buried debris and pilings may interfere with barrier installation. Close proximity of shallow water table beneath impacted soil source areas may make accurate grout injection difficult.	Difficult to implement. Buried debris and pilings may interfere with installation and would require prior removal.	Effectiveness of this developing technology not established. Difficult to ensure barrier continuity. Does not provide treatment of contaminants.	Moderate to potentially high capital cost. High O&M cost.	Difficult to implement and high cost. Questionable reliability. Does not provide treatment.	No
	Hydraulic containment	Extraction wells or trenches	Pumping of groundwater to control downgradient migration of contaminant plume. Groundwater can be pumped via extraction wells or trench installed to intercept the contaminant plume.	Extracted groundwater may require treatment before disposal or discharge. Permitting required for discharge of water.	Potentially difficult to implement. Buried debris and pilings may interfere with system installation. Requires management of extracted groundwater.	Established technology effective for controlling contaminant migration.	Moderate to high capital cost. High O&M cost.	High cost relative to other containment technologies. Potentially difficult to implement.	No
Natural Recovery	Monitored natural attenuation (MNA)	Monitor natural processes occurring in site groundwater	Naturally occurring physical, chemical, and biological processes that reduce contaminant mobility or concentration.	Dioxin/furans and PCBs not amenable to natural attenuation. Not all metals amenable to natural attenuation.	Technically implementable. Cleanup time frame longer than for other remedial options for groundwater.	Effective for contaminants amenable to natural attenuation processes.	Negligible capital cost. Low O&M cost.	Applicable in combination with other technologies where contaminants may remain in place.	Yes
***In situ* Treatment**	*In situ* bioremediation	Enhanced bioremediation	Enhance biodegradation through addition of nutrients and electron acceptors to stimulate microbial growth. Amendments may be injected directly into groundwater contaminant plume or may be introduced using a groundwater recirculation system.	Diesel- and oil-range petroleum hydrocarbons and cPAHs may biodegrade at slower rates and thus may take longer to achieve cleanup goals. Not all metals are amenable to bioremediation.	Difficult to implement. Permitting required for injection of amendments. Presence of subsurface debris and pilings may limit possible application areas. Soil heterogeneities may interfere with consistent distribution of injected amendments. May require more than one application to attain cleanup goals.	Established technology. Longer-chain and more complex organics may require longer time to biodegrade (e.g., diesels, oils, cPAHs).	Moderate to potentially high capital cost and O&M costs.	Potentially difficult to implement and high cost.	No
	Air sparging	Horizontal, vertical wells	Air is injected into the aquifer to remove volatile contaminants. Enhances bioremediation through addition of oxygen.	Not applicable to treatment of metals. Not conducive to recovery of low-volatility contaminants.	Technically implementable. Permitting required for injection.	Not effective for treatment of metals. Less effective for treatment of low-volatility organic compounds.	Moderate to potentially high capital cost. High O&M cost.	Questionable effectiveness for removal of site groundwater contaminants.	No

General Response Action	Remediation Technology	Process Option	Description	Physical/Chemical Criteria	Implementability	Reliability	Relative Cost	Screening Comments	Technology Retained?
	Passive/reactive treatment walls	Reactive barriers, adsorptive barriers	Vertical barrier installed across groundwater flow path to intercept contaminant plume. The barrier materials either degrade or immobilize contaminants as groundwater passes through the barrier.	Buried debris and pilings may interfere with barrier installation. May have lower effectiveness for some fuel hydrocarbons (for example, heavy-end petroleum hydrocarbons, cPAHs).	Technically implementable. Buried debris and pilings would require removal before barrier installation.	May have lower effectiveness for some fuel hydrocarbons. Barriers have limited life and may require replacement if treatment time frame exceeds barrier life. Chemical precipitation and biological activity may decrease permeability of barrier.	High capital cost. Low O&M cost. High barrier replacement cost.	High cost and potentially inadequate effectiveness for site groundwater contaminants.	No
	Chemical treatment	Oxidation	Injection of chemical oxidants to degrade contaminants in place.	May not be applicable to all site contaminants.	Difficult to implement. Presence of organics in soil may increase required chemical application rates. May require multiple applications of chemical. Regulatory concerns over injection of chemicals into subsurface, which may make permitting difficult. Requires handling of large quantities of hazardous chemicals.	Effective for aliphatic and aromatic organic site contaminants. May not be effective for metals treatment.	Moderate to high capital and O&M costs.	Difficult implementability. Not effective for metals treatment. Relatively high cost.	No
	In-well air stripping	In-well aeration; groundwater circulating wells	Air is injected into groundwater within a dual-screened well to volatilize aqueous contaminants and to provide oxygen for biodegradation. Volatilized contaminants are withdrawn from the well and treated. Aerated groundwater flow is induced along the outside of the well, via its two screens, to provide biotreatment of groundwater contaminants in its vicinity.	Not applicable to treatment of metals or to recovery of low-volatility contaminants. Organic contaminants may be treated *in situ* through provision of oxygen. Shallow aquifer may limit effectiveness.	Technically implementable. Treatment time frame may be long.	Not effective for treatment of metals. Less effective for recovery of low-volatility organic compounds. May stimulate aerobic biodegradation of organic contaminants. Range of influence may be limited to vicinity of well. Technology in development.	Moderate to high capital and O&M costs.	Long treatment time frame. Radius of influence potentially limited. Not an established treatment technology; reliability not shown in condtions similar to Custom Plywood site.	No
Extraction and On-Site Treatment	*Ex situ* aerobic bioremediation	Trickling filter, rotating biological contactor, aeration basin, sequencing batch reactor	Impacted groundwater is pumped from the subsurface via extraction wells and biologically treated in an aboveground system.	Metals not effectively treated via bioremediation. Aboveground system may interfere with planned future site use.	Technically implementable. Long treatment time frame. Permitting may be required for discharge of treated water. May need to be combined with pre- and post-treatment steps. Treatment byproducts (e.g., sludge) require management.	Established technology effective for treatment of petroleum hydrocarbons. Not effective for metals treatment.	Moderate to high capital cost. High O&M cost.	Long treatment time frame. Radius of influence potentially limited. Not effective for metals treatment. Questionable cost effectiveness.	No
	Adsorption	Granular activated carbon	Removal of contaminants from impacted groundwater is achieved as groundwater is pumped through vessels containing adsorbent material.	Aboveground system may interfere with planned future site use.	Technically implementable. Long treatment time frame. Permitting may be required for discharge of treated water. May need to be combined with pre- and post-treatment steps. Treatment byproducts (e.g., spent carbon) require management.	Established technology effective for treatment of site organic contaminants. Not effective for metals treatment.	Moderate to high capital cost. High O&M cost.	Long treatment time frame. Questionable cost effectiveness.	No
	Suspended solids removal	Precipitation, sedimentation, filtration	Physical/chemical treatment for removal of solids from extracted groundwater. May be used as a pretreatment step combined with other *ex situ* treatment technologies.	Aboveground system may interfere with planned future site use.	Technically implementable. Long treatment time frame. Permitting may be required for discharge of treated water. Treatment byproducts (e.g., settled solids) require management.	Effective for removal of metals and for organics adsorbed onto particulate matter. Not effective for treatment of aqueous organic compounds.	Moderate to high capital cost. High O&M cost.	Applied in combination with other *ex situ* treatment technologies.	No
	Ion exchange	Cationic, anionic	Removal of exchangeable ions by passing extracted impacted groundwater through resin bed.	Aboveground system may interfere with planned future site use. Suspended solids and oxidants in water may reduce effectiveness.	Technically implementable. Long treatment time frame. Permitting may be required for discharge of treated water. May need to be combined with pre- and post-treatment steps. Treatment byproducts (e.g., spent resin) require management.	Effect for metals treatment. Not effective for removal of organic compounds.	Moderate to high capital cost. High O&M cost.	Not effective for removal of organic compounds. Long treatment time frame for metals removal.	No
	Membranes	Reverse osmosis, ultrafiltration, membrane pervaporation	Porous membranes used to remove dissolved or colloidal material from extracted groundwater.	Aboveground system may interfere with planned future site use.	Technically implementable. Long treatment time frame. Permitting may be required for discharge of treated water. May need to be combined with pre- and post-treatment steps.	Effective for removal of colloidal metals and some organics.	High capital and O&M costs.	Limited effectiveness. Long treatment time frame. High cost.	No

Table 6-2 - Remediation Technology Screening for Groundwater

General Response Action	Remediation Technology	Process Option	Description	Physical/Chemical Criteria	Implementability	Reliability	Relative Cost	Screening Comments	Technology Retained?
	Advanced oxidation	Chemical/UV oxidation	Oxidation of aqueous contaminants in extracted groundwater through chemical addition (ozone or hydrogen peroxide) and/or exposure to UV light.	Higher concentrations of heavy metals (greater than 10 ppm) may foul the UV light cells.	Technically implementable. Long treatment time frame. Permitting may be required for discharge of treated water. May need to be combined with pre- and post-treatment steps. High energy requirements.	Effective for treatment of organic compounds. Not effective for metals treatment.	High capital and O&M costs.	Not effective for metals treatment. Dissolved metals may interfere with process. Long treatment time frame. High cost.	No

General Response Action	Remediation Technology	Process Option	Description	Physical/Chemical Criteria	Implementability	Reliability	Relative Cost	Screening Comments	Technology Retained?
Monitoring	Monitoring	Protection, performance, confirmation	Monitoring to assure compliance with interim action screening levels, to assess performance of remedial technology during operation, and to measure continued effectiveness over time.	No physical or chemical constraints.	Technically implementable.	Effective for assessing sediment conditions at the site.	Negligible capital cost. Low to moderate O&M cost.	Applicable in combination with other technologies.	Yes
Institutional Controls	Governmental and proprietary controls; enforcement and permit tools; information devices	Fish consumption advisories, commercial fishing bans, aquatic use restrictions, remedy maintenance agreement	Physical and administrative measures to prevent access or exposure to contaminated media.	No physical or chemical constraints.	Technically implementable.	Reliable conventional technology.	Low capital and O&M cost.	Applicable in combination with other technologies.	Yes
Natural Recovery	Monitored natural recovery (MNR)	Monitor natural processes occurring in sediment	Naturally occurring physical, chemical, and biological processes in sediment that reduce contaminant mobility or concentration.	Dioxin/furans are environmentally persistent contaminants that are resistant to chemical and biological MNR processes. Eelgrass beds may limit accessibility for monitoring in some areas.	Not technically implementable, based on current coastal engineering assessment. Insufficient natural sedimentation. Long treatment time frame.	Potentially limited effectiveness for dioxin/furans.	Negligible capital cost. Moderate to high O&M cost.	Potentially limited effectiveness for site sediment contaminants.	No
	Enhanced natural recovery (ENR)	Thin-layer surface cap	Placement of a thin layer of clean sediment over impacted sediment. Purpose is to accelerate natural recovery processes through engineered means.	Requires measures to preserve eelgrass beds in impacted sediment areas to be thin-capped. Existing wood pilings to be removed. Potential nearshore wave erosion issues for thin cap. BMP measures required to control placement of capping material and related water quality issues.	Technically implementable. Existing wood pilings to be removed. Will likely require pilot testing.	Design will require measures to preserve eelgrass beds. Not reliable in nearshore environment without additional protective measures. Effective if water quality issues controllable.	Moderate capital and O&M cost.	Potentially applicable technology.	Yes
Containment	Engineered Capping	Near-surface cap	Placement of an engineered cap designed to provide chemical isolation and physical protection, and to provide adequate biological protection and substrate.	Requires measures to preserve or mitigate damage to eelgrass beds in impacted sediment areas to be capped. Existing debris and wood pilings to be removed. May cause damage to or loss of eelgrass beds and other aquatic resources in containment areas. May change mudline elevations. BMP measures required to control placement of capping material and related water quality issues.	Technically implementable. Removal of existing wood pilings, marine structures, and debris would be required.	Developed technology. Design will require measures to minimize cap erosion and to preserve eelgrass beds. Effective if water quality issues controllable.	Moderate capital and O&M cost.	Potentially applicable technology.	Yes
Sediment Removal	Dredging, excavation	Mechanical, hydraulic	Impacted sediment removal using excavation, mechanical dredging, or hydraulic dredging methods. Removed sediment is managed in a staging area prior to disposal or beneficial reuse.	May cause damage to or loss of eelgrass beds and other aquatic resources in dredging/removal areas requiring mitigation. Recontamination from dredging residuals is significant issue. BMP measures required to control/settle resuspension of sediment.	Technically implementable.	Developed technology. Effective method for removal of sediment contaminants of dredging residuals controllable.	Moderate to high capital cost.	Potentially applicable technology. May need to be used in combination with other remedial technologies.	Yes
Management of Removed Sediment/Dredge Materials	Land disposal	Landfill	Disposal of impacted sediments at an off-site, permitted landfill (i.e., containment).	Impacted sediments require characterization to verify that land disposal requirements are met. Dioxin presence may affect disposal options.	Technically implementable. Dewatering may be required prior to disposal.	Developed technology effective for management of impacted sediments.	Moderate to high capital cost and associated long-term O&M cost.	Common disposal option for dredged sediments.	Yes
	Confined disposal facility (CDF)	Upland, nearshore, or in-water facility	Engineered structure enclosed by dikes to contain removed sediment, which may located upland, partially in water (nearshore facility), or completely in water.	Development of suitable local site, and associated aquatic impacts and permit issues is problematic. Dioxin presence may affect disposal options.	Difficult to implement due to lack of suitable local site and potential space limitations. May conflict with regulatory requirements and with use of affected aquatic areas.	Reliable for long-term containment and environmental protection, if constructable.	High capital cost. Moderate to high O&M cost.	Unlikely to be applicable for current project because of permitting and siting issues. Unlikely to provide additional benefit over other technologies.	No

General Response Action	Remediation Technology	Process Option	Description	Physical/Chemical Criteria	Implementability	Reliability	Relative Cost	Screening Comments	Technology Retained?
	Contained aquatic disposal (CAD)	In-water disposal and containment	Removed impacted sediment is placed in a natural or artificial in-water depression elsewhere in the water body and contained via capping.	Availability of suitable site, aquatic impacts, and associated permit issues may be problematic. Dioxin presence may affect disposal options.	Difficult to implement due to lack of suitable local site and potential space limitations. May conflict with regulatory requirements and with use of affected aquatic areas.	Reliable for long-term containment and environmental protection, if suitable site available.	Moderate capital and O&M cost.	Unlikely to be applicable for current project because of permitting and siting issues. Unlikely to provide additional benefit over other technologies.	No
	Aquatic open-water disposal	Open-water disposal at designated site	Barge disposal at non-dispersive site (i.e., DMMP)	Subject to DMMP/PSDDA screening criteria.	Technically implementable using available equipment and methods if suitable site(s) available.	Reliable for long-term containment and environmental protection, if suitable site available.	Moderate capital and O&M cost.	Implementable and potentially reliable. However, dioxin/furan concentrations may be problematic based on current DMMP Interim Guidelines for Dioxins and related open water disposal restrictions.	Yes
	Beneficial reuse	Placement in other upland or aquatic environment	Reuse for engineering purpose, landscaping, or other beneficial need.	General fine-grained nature and presence of dioxin/furans may limit options. Phasing of aquatic remediation precludes use as upland excavation fill. Dioxin presence may affect disposal options.	Uncertain implement ability. Suitable use not currently identified.	Uncertain because of presence of saltwater, wood waste, and dioxin/furans.	Low to high capital and O&M costs.	Expected dredge material wood waste content and dioxin/furan concentrations currently make beneficial use unlikely.	No, unless practicable beneficial use subsequently identified.
***Ex situ* Treatment**	*Ex situ* bioremediation	Landfarming, slurry bioreactor, biopiles	Biodegradation of contaminants in removed sediment is enhanced through modification of sediment conditions and provision of substrate necessary for microbial growth. Treatment is conducted in landfarm arrangement, aboveground reactor, or in treatment cells (biopiles).	Dioxin/furans may not be demonstrably amenable to biological treatment.	Difficult to implement. Landfarming option may require use of a large amount of space, depending on quantity of excavated soil. Slurry and biopile treatment require reactor or treatment cell construction. Leachate and off-gas require collection and treatment. Addition of additives may increase total bulk volume of treated sediment. Could generate state Dangerous Waste.	Likely ineffective for dioxin/furans. Current research projects re: fungal remediation, Nothing commercialized.	Moderate to high capital and O&M costs.	Likely not effective and difficult to implement.	No
	Low- or high-temperature thermal desorption	Rotary dryer (indirect or direct fired), thermal screw (indirect heating)	Removed sediments heated to approximately 90 to 320 degrees Celsius (low temperature) or to 320 to 560 degrees Celsius (high temperature) to volatilize organic contaminants. Volatilized contaminants are recovered and treated.	Sediment dewatering required. Debris screening may be required. Fine-grained nature of sediments may complicate.	Potentially difficult to implement. Limited space on site for treatment system siting and staging. Debris screening may be required. Dewatering required to reduce moisture content of sediment. Off-gas capture and treatment is required.	Temperatures expected to be too low to effectively treat dioxin/furans unless afterburner added.	High capital and O&M costs.	Expected high cost relative to other *ex situ* treatment technologies. Even if feasible, may not provided added incremental benefit.	No
	Incineration	Rotary kiln, fluidized bed	Heat removed sediment above about 1,600 degrees Fahrenheit to volatilize and combust organic contaminants. Incinerator off-gas is treated in an air pollution control system.	Sediment dewatering required. Debris screening may be required. Fine-grained nature of sediments may complicate.	Potentially difficult to implement. Limited space for on-site treatment system and staging. Specific feed size and material handling requirements may impact implement ability. Suitable off-site facility not currently identified. Could generate state Dangerous Waste.	Proven effective treatment, although afterburner likely needed to combust dioxins/furans.	High capital and O&M costs.	High cost relative to other *ex situ* treatment technologies. Even if feasible, may not provided added incremental benefit.	No
	Sediment washing	Water, surfactants, thermally enhanced	Removal of leachable contaminants from sediment using water and surfactants in an aboveground reactor with subsequent treatment of residual fluids.	Debris screening likely required. Fine grained fraction. High residual waste water volumes generated.	Difficult to implement. Residuals that are difficult to extract from the soil matrix may require additional treatment. Could generate state Dangerous Waste. Limited space on site for treatment system siting and staging. Debris screening may be required. Suitable off-site facility not currently identified.	May be ineffective for Custom Plywood site dredged materials containing dioxins/furans.	High capital and O&M costs.	Difficult to implement. High cost.	No

General Response Action	Remediation Technology	Process Option	Description	Physical/Chemical Criteria	Implementability	Reliability	Relative Cost	Screening Comments	Technology Retained?
	Chemical treatment	Peroxide, permanganate, ozone	Treatment of removed sediment in aboveground reactor to degrade contaminants into nonhazardous or less toxic compounds.	Debris screening required.	Potentially difficult to implement. Limited space on site for treatment system siting and staging. Presence of organics in sediment may increase required chemical application rates. Dioxin toxicity reduction may be challenging. Could generate state Dangerous Waste. Suitable off-site facility not currently identified.	Not well established for application to Custom Plywood site.	High capital and O&M costs.	High cost relative to other *ex situ* treatment technologies. May not provid added incremental benefit relative to other technologies.	No
	Solidification, stabilization	Cement- and lime-based processes, microencapsulation, sorption	Reagents are introduced to physically bind or enclose contaminants, or to induce chemical reactions between the stabilizing agent and contaminants to reduce their mobility. Resultant materials are typically disposed of.	Debris screening may be required. May not be effective for organic contaminants.	Likely not implementable. Limited space on site for treatment system siting and staging. Wood waste and debris screening may be required. Can result in significant increase in volume of treated material.	May be ineffective for treatment of organic compounds. Not well established for application to Custom Plywood site.	Moderate to high capital cost. Low O&M cost.	Likely inadequate effectiveness and reliabiity for organics. Potentially difficult to implement with high wood waste content.	No

7.0 MTCA AND SMS EVALUATION CRITERIA

Key guiding requirements for evaluating FS alternatives and cleanup action selection for the Custom Plywood Site are listed in the MTCA (WAC 173-340-360) and SMS (WAC 173-204-560) regulations. This section summarizes these requirements as applied to technology screening and alternatives evaluation.

7.1 MTCA Evaluation Criteria

MTCA criteria consist of threshold requirements and other criteria listed in WAC 173-340-360(2) Minimum Requirements for Cleanup Actions. Related criteria are also used for analysis of disproportionate costs.

7.1.1 MTCA Threshold Requirements – WAC 173-340-360(2)(a)

MTCA threshold requirements represent several basic compliance areas that cleanup alternatives must address to be considered as valid actions. Threshold requirements include:

- Protection of human health and the environment;
- Compliance with cleanup standards per WAC 173-340-700 through -760;
- Compliance with applicable state and federal laws per WAC 173-340-710; and
- Provision for compliance monitoring per WAC 173-340-720 through -760.

All MTCA cleanup actions must ensure protection of human health and the environment as fundamental requirements. As applied to the aquatic environment, compliance with cleanup standards must achieve a permanent remedy to the maximum extent practicable; be protective of human health; implement Institutional Controls; include compliance monitoring; and specify hazardous substances remaining on site along with measures to prevent migration and contact. Compliance with state and federal laws addresses legally applicable requirements and other applicable, relevant, and appropriate requirements (ARARs) determined by Ecology. Compliance monitoring must document remedy protectiveness, performance, and confirmation of long-term effectiveness.

7.1.2 Other MTCA Requirements – WAC 173-340-360(2)(b)

MTCA further specifies additional requirements when selecting from cleanup action alternatives that fulfill the threshold requirements. These other MTCA requirements include:

- Use of permanent solutions to the maximum extent practicable per WAC 173-340-360(3);
- Provide a reasonable restoration time frame per WAC 173-340-360(4); and
- Consider public concerns per WAC 173-340-600.

MTCA places preference on permanent solutions to the maximum extent practicable based on a disproportionate cost analysis (DCA). The benefits of the alternatives considered are balanced against relative costs for implementing each alternative. Preference is also placed on remedies that can be implemented in a shorter time period, based on potential environmental risks and effects on current site use and associated site and surrounding area resources. The third criterion, public concerns, is addressed during comment periods for the RI/FS documents, remedy selection decision, and subsequent CAP for remedy implementation.

7.1.3 MTCA DCA – WAC 173-340-360(3)(e) and (f)

As specified in WAC 173-340-360(3)(e), the DCA represents a test to determine whether incremental costs of a given alternative over a lower-cost option exceed the incremental degree of benefit achieved by the higher cost alternative. The most practicable permanent solution is identified as the baseline cleanup action alternative for FS evaluation. The referenced section of MTCA further specifies that where alternatives are equal in benefits, the least costly alternative will be selected provided the MTCA threshold and other requirements are met. Relative costs and benefits of the remedial alternatives are evaluated in the DCA based on specific criteria listed in WAC 173-340-360(3)(f):

- Protectiveness;
- Permanence;
- Cost;
- Effectiveness over the long term;

- Management of short-term risks;
- Technical and administrative implementability; and
- Consideration of public concerns.

Protectiveness considers the degree to which risks to human health and the environment are reduced; the time required for risk reduction and to attain cleanup standards; risks posed by implementing the alternative; and improvement of environmental quality. Costs include all items necessary to implement an alternative including construction, monitoring, operation and maintenance/repair, and agency oversight over the design life of the project.

Factors associated with the long-term effectiveness criterion include the level of certainty of remedy success and reliability, magnitude of residual risks, and effectiveness of controls needed to manage residual materials. DCA evaluation of short-term risks relates to human health and environmental risks that occur during construction and implementation, along with the effectiveness of risk management measures.

Alternatives are also evaluated in the DCA based on their technical feasibility, availability of supporting facilities and materials, administrative and regulatory requirements, scheduling, size, and complexity. Implementability considerations further include monitoring requirements, site access, and integration with facility operations and other remedial actions. Considerations for public concerns address the extent to which alternatives take such issues into account, including comments from individuals, community groups, local governments, tribes, state and federal agencies, and other organizations. Public involvement includes comment periods during the RI/FS and remedy selection process.

7.2 SMS Evaluation Criteria

Sediment management standards (SMS) requirements are applicable to in-water portions of the Custom Plywood FS and cleanup effort. SMS lists cleanup alternatives evaluation requirements comparable to MTCA requirements under SMS section WAC 173-204-560(4). These requirements closely mirror MTCA in requiring evaluation of cleanup actions that protect human health and the environment by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route. Additional SMS requirements listed in WAC 173-204-560(4)(f) through (k) for consideration include:

- The time period for sediment recovery;

- Confirmational monitoring;

- Current and potential future uses of affected areas or areas that may be affected by contaminant releases;

- Institutional controls;

- Phased approach for alternatives evaluation;

- Attainment of cleanup standards;

- Short-term and long-term effectiveness;

- Ability to be implemented;

- Cost;

- Community concerns;

- Degree to which recycling, reuse, and waste minimization are employed; and

- Environmental impacts pursuant to State Environmental Policy Act (SEPA) requirements (not a MTCA requirement).

Requirements for SMS cleanup action decisions are further described in SMS section WAC 173-204-580(2) through (4). Similar to MTCA requirements, SMS cleanup actions require achieving protection of human health and the environment, compliance with cleanup standards and ARARs, source control, consideration of public concerns, and monitoring. SMS cleanup action decisions must also address cleanup time frames, current and future site/vicinity use and impacts, effectiveness and reliability, contamination control, and natural recovery processes. In addition, SMS allows authorization of cleanup time frames that exceed 10 years where cleanup actions are not practicable in less time. Further net environmental effects of the alternatives, cost effectiveness, public participation, and land access are also to be considered.

8.0 REMEDIATION ALTERNATIVES DEVELOPMENT AND EVALUATION

Remediation alternatives applicable to impacted upland and aquatic media at the Custom Plywood Site were developed from the technologies retained through the screening process conducted in Section 6. Four upland remediation alternatives (U-1 through U-4) and five aquatic alternatives (A-1 through A-5) were developed from the retained technologies. These remedial technologies include methodologies capable of achieving remedial action objectives, including MTCA/SMS cleanup levels and other regulatory requirements applicable to the portions of the Custom Plywood Site addressed under this FS.

Preliminary cost estimates were developed for the various alternatives as presented in Appendix C. Appendix D presents the backup calculations for these preliminary cost estimates.

8.1 Development of Alternatives

The upland remediation alternatives combine components that are applicable to impacted soil and groundwater media. Remediation alternatives for soil and groundwater were not developed separately because the remediation technologies retained for soil and groundwater remediation through the technology screening process were similar. Excavation with off-site disposal of impacted soil was retained as an effective, well-established remediation methodology applicable to site soil contaminants. Soil excavation and disposal have the additional benefit of reducing or eliminating potential sources of groundwater contamination. Capping technology was retained as a measure that can minimize direct contact risk for human and ecological receptors, in addition to minimizing the potential migration of contaminants from impacted soil to groundwater that can be caused by water infiltrating from the ground surface. Natural attenuation processes are likely to reduce the concentration and/or mobility of residual contaminants that may remain in groundwater after implementation of the selected remediation alternative.

The aquatic remediation alternatives use various combinations of nearshore excavation and offshore dredging, which are common technologies known to remediate impacted sediment and wood waste effectively. Excavated and dredged areas would subsequently be backfilled or capped. Where extensive excavation or dredging are not desirable (such as in eelgrass beds), placement of a thin-layer cap (TLC) was retained as a methodology to facilitate enhanced natural recovery (ENR) of impacted sediment.

The upland and aquatic remediation alternatives each include demolition of concrete structures and foundations that remain on the GBH property, removal of surface debris and wooden pilings, post-construction compliance monitoring, and institutional controls. Measures are included in each alternative to integrate remediation activities with the mitigation and shoreline protection features considered for the Custom Plywood Site.

The following sections describe the application of the remediation alternatives developed for the Custom Plywood Site, and evaluate the relative benefits and concerns for each alternative based on MTCA evaluation criteria and disproportionate cost analysis (DCA) (WAC 173-340-369). Tables 8-1 and 8-2 summarize features of the upland and aquatic remediation alternatives, respectively, which are presented on Figures 8-1 through 8-10 and in cross section on Figures 8-11 through 8-15. Tables 8-3 and 8-4 present preliminary MTCA evaluation criteria (WAC 173-340-360(3)(f)) and cost comparisons for upland and aquatic remediation alternatives, respectively. Appendix B presents memos further detailing wetland mitigation and shoreline protection measures developed for this FS. These mitigation and shoreline protection components are common to all the alternatives evaluated by this FS.

8.2 Upland Remediation Alternative Descriptions

The upland remediation alternatives combine technologies retained for soil and groundwater from the screening process and consist of three excavation alternatives and one containment capping alternative (Figure 8-1). Compliance monitoring and institutional controls are included in each of the upland remediation alternatives summarized below:

- **Alternative U-1.** Excavate soil to the POC protective of human health in all affected property areas (up to 15 feet below ground surface).

- **Alternative U-2.** Excavate soil to the ecological POC in all affected property areas (up to 6 feet below ground surface).

- **Alternative U-3.** Excavate soil to the human health (POC) in the shoreline protection zone and to the ecological POC elsewhere on the property.

- **Alternative U-4.** Install an asphalt containment cap on the property, excluding the wetland mitigation and stormwater swale areas.

Alternatives U-2 and U-3 include a contingency for containment capping if compliance monitoring indicates that residual soil contamination continues to impact groundwater at the conditional POC (freshwater/saltwater interface at the shoreward edge of the property). However, contingency costs for potential future asphalt capping are not included with the excavation alternatives.

8.2.1 Excavation Alternatives U-1, U-2, and U-3

Alternatives U-1 through U-3 consider excavation approaches for remediation of the upland portion of the Custom Plywood Site. The same lateral excavation limits apply to each alternative (Figures 8-1 through 8-3), which are based on the inferred extent of soil contamination within the property boundary and landward of ordinary high water (OHW). Portions of the excavation areas that lie seaward of the OHW would be excavated in the later aquatic phase of work.

Excavation Depth

Maximum excavation depths vary between the alternatives, which are assumed to attain either the human health direct contact POC at 15-foot depth (Alternative U-1), the terrestrial ecological POC at a depth of 6 feet (Alternative U-2), or a combination of both (Alternative U-3), which considers maximum excavation depth to the human health POC in the shoreline protection zone and maximum excavation depth to the ecological POC elsewhere on the property. The shoreline protection zone is defined as the area that lies between the OHW line to a distance 75 feet landward of OHW.

For cost estimating purposes, depth of excavation is based on the inferred vertical extent of contaminated soil instead of the maximum depths defined above. Because of uncertainty in the extent of soil contamination below 8-feet depth (see Section 5.0), excavation below 8 feet is excluded from the excavation areas. If the actual extent of contaminated soil is determined to extend beyond 8 feet depth during construction, excavation would continue until such material is removed, or until the POC is reached. The extent of contamination during construction will be determined through field screening and sample testing. Because the deeper excavations could likely encounter groundwater, provisions for excavating and handling wet material and contingency for excavation dewatering are included with the soil excavation alternatives.

Soil Disposal and Excavation Backfilling

A key guiding assumption is that excavated surface debris and soil will be sent off site for disposal at a Subtitle D landfill facility. Surface debris is intermixed with soil and would be difficult to recycle either on- or off-site. Regional recycling facilities would not likely accept such material, and significant additional characterization sampling would be needed if on-site reuse was contemplated. For FS cost comparison purposes, off-site landfill disposal, therefore, is assumed for both near-surface debris and soil.

An additional assumption is that excavated material containing free water would be allowed to dewater directly to ground prior to loading and transport off site; material not requiring dewatering would be directly loaded into trucks for transport.

Based on the excavation areas depicted on Figures 8-1 through 8-3, which assume 1H:1V side wall slopes and include surface debris removal volume, approximately 27,000 cy of material would be excavated and disposed of in Alternative U-1, and about 26,000 cy in Alternatives U-2 and U-3. Thus, excavating to the inferred extent of soil contamination generates similar excavation volumes for these alternatives. However, if deeper excavation is needed to chase contamination during construction, significantly greater soil volumes would be generated. This would potentially result in greater excavation volume differences among the alternatives. For example, if excavation proceeded to the maximum depths for each alternative based on areas shown in Figures 8-1 through 8-3 and applicable POCs, an additional estimated 43,000 cy would be excavated in Alternative U-1, 2,500 cy in Alternative U-2, and 17,000 cy in Alternative U-3.

The excavation areas would be backfilled to grade using clean imported fill and crushed concrete debris generated from on-site aboveground structure and foundation demolition (refer to Section 8.4). Recycling the concrete debris material on site in this manner reduces the quantity of imported fill required and the amount of material sent off site for disposal, thus providing a reduction in cost. Erosion control, site stabilization, and temporary shoreline protection measures will be implemented in the last phase of construction that occurs outside of the stormwater management and wetland mitigation and buffer areas (refer to Section 8.5).

8.2.4 Capping Alternative U-4

Surface containment provided through asphalt cap installation is considered in Alternative U-4 for remediation of upland soil and groundwater. This alternative assumes installation of a continuous asphalt cap extending to the property line, OHW line, and the boundary of the wetland mitigation/buffer area in the southern portion of the property (see Figure 8-4).

The primary purpose of the asphalt cap is to eliminate the risk of direct contact with contaminated soil and debris for human and ecological receptors, and to prevent infiltration of water from the ground surface, which could potentially mobilize contaminants from impacted soil to the shallow aquifer. Because the asphalt cap is intended solely as a remedial measure and would be suitable for limited commercial or industrial use only, the conceptual design of the cap aims to provide an impermeable surface but is not meant to sustain heavy loading. Cap construction consisting of a 2-inch asphalt layer overlying a 6-inch base-course layer is considered sufficient for achieving the intended function of the cap.

Cap installation would be preceded by preparing the subgrade within the cap footprint. The subgrade would be a minimum 2 feet thick and prepared using clean imported fill material suitable for cap construction. Raising the surface elevation in this manner and limiting the eastern edge of the cap to the OHW line combined with protective measures along the shoreline, would reduce the potential for inundation of the cap along its seaward edge.

Asphalt capping would not be extended into the wetland mitigation/buffer and stormwater swale areas. To reduce direct contact risk and to remove potential sources of groundwater contamination, inferred soil exceedance locations would be excavated in the wetland mitigation/buffer area (refer to Figure 8-4). Excavation and backfilling would be conducted as described for the excavation alternatives presented above, except that the inferred impacted areas within the wetland mitigation/buffer area would be overexcavated and backfilled as dictated by the estuarine wetland design. Excavation within the shoreline protection zone would be competed to a maximum depth of 15 feet (human health POC), and to a maximum depth of 6 feet (ecological POC) elsewhere in the mitigation, buffer, and stormwater areas. Excavation of inferred impacted areas along the shoreline and beyond the extent of asphalt cap, which reside between the OHW and mean higher high water (MHHW) lines, would be excavated as part of the aquatic phase of remediation work.

Stormwater drainage control would be provided through installation of a catch basin collection and conveyance system following cap construction. The conveyance system would discharge in the wetland buffer area. See Appendix B-1 for further detail on integration of stormwater treatment into the wetland mitigation concept. Long-term monitoring would be implemented after cap construction to ensure proper function of the cap via groundwater sampling and analysis, and to assess the cap for necessary maintenance or repair. Institutional controls would stipulate measures to protect cap integrity and function.

8.3 Aquatic Remediation Alternative Descriptions

Five aquatic remediation alternatives have been developed from the technologies retained in the technology screening. These alternatives include various combinations of nearshore excavation, offshore dredging, backfilling and capping, and TLC to facilitate ENR. Demolition of remaining concrete structures, surface debris and wooden piling removal, long-term monitoring, and institutional controls are included in each of the aquatic remediation alternatives, in addition to shoreline protection measures. These alternatives are summarized as follows and are described in the subsequent subsections:

- **Alternative A-1.** Deep nearshore excavation, deep offshore dredging, and ENR in unexcavated/dredged areas;

- **Alternative A-2.** Shallow nearshore excavation, shallow offshore dredging, and ENR in unexcavated/dredged areas;

- **Alternative A-3.** Deep nearshore excavation, shallow offshore dredging, and ENR in unexcavated/dredged areas;

- **Alternative A-4.** Alternative A-1 with limited ENR and expanded dredging area; and

- **Alternative A-5.** Alternative A-2 with limited ENR and expanded dredging area.

The aquatic remediation alternatives are described in Table 8-2 and summarized in the following sections. Appendix B-2 presents further details on conceptual evaluation of shoreline protection measures developed for the FS. In the appendix a preferred shoreline protection concept is selected based on various criteria. This preferred shoreline protection concept is common to each of the aquatic FS alternatives evaluated for the project.

8.3.1 Alternatives A-1, A-2, and A-3

Alternatives A-1 through A-3 incorporate variations of excavation and dredging depth in the nearshore and offshore aquatic areas, and all include ENR through TLC placement in areas outside of the excavated and dredged locations. Excavation, dredging, and ENR locations for the three alternatives are shown on Figures 8-6 through 8-10, and cross sections are shown on Figures 8-11 through 8-15.

Enhanced Natural Recovery

ENR involves placement of a TLC of clean imported sandy material to help speed the natural recovery process. TLC material would be placed over non-dredging areas where dioxin/furan TEC is between 10 and 25 ppt and wood waste thickness is generally less than 1 foot. TLC placement would be designed to achieve a nominal 6-inch layer thickness. Additional placement and equipment feasibility issues would be evaluated during the design phase.

The size of the TLC area is the same for Alternatives A-1 through A-3 and includes eelgrass beds within the FS cleanup boundary. Based on the size of this area, ENR would require approximately 19,000 cy of clean sandy TLC material from an off-site source. Using conventional bucket and cable application, placement rates of upwards of 1,000 cy per day may be achievable. Clean dredge material from regional navigational dredging projects could be one potential source of material, but the viability of such sources would be subject to further evaluation as well as scheduling and permitting issues. The dredge material source option with barge transport to the Custom Plywood Site likely represents the lowest cost option for consideration. Alternatively, the ability of local sand and gravel pits to provide the needed quantities of TLC material would require further assessment. Shipment of TLC material from more distant upland sources would likely have a significant impact on project costs.

Placement of TLC could potentially be problematic in areas where eelgrass beds are located. As part of remedial design, pilot testing is recommended to assess the feasibility of thin-layer capping in locations where eelgrass beds exist, and to further verify cap stability and marine hydrodynamic conditions.

For planning purposes, it is assumed that long-term monitoring would be required to document ENR performance following cap placement, and that institutional controls will be implemented to protect the cap through administrative measures. The cost estimates for Alternatives A-1 through A-3 assume a 30-year operating time frame and include provisions for cap maintenance and repair during this period.

Excavation and Dredging

In the nearshore environment, wood waste and sediment would be excavated in a strip extending about 50 feet seaward of OHW as shown on Figures 8-6 through 8-10 using land-based equipment to reach the target excavation depth. To access the nearshore excavation locations and to limit the amount of wet soil work, excavation would be conducted during periods of low tide, working in successive plots sized so that they can be excavated and backfilled during the low-tide window, thus minimizing inundation of the open excavation and release of turbidity to surface water. Similar nearshore and tideflat excavations have been successfully completed elsewhere in Puget Sound, to control turbidity and without resulting in cross contamination. Placement of steel plates on the beach surface may be necessary to prevent heavy equipment from becoming mired in the soft sediment and wood waste material.

As a contingency, the FS considered using sheet pile shoring, if needed, to reduce water inflow and turbidity impacts during nearshore excavation. This shoring contingency was not carried forward for the aquatic alternatives analysis, under the assumption that direct excavation of smaller intertidal areas in the dry at low tide may be feasible. For Alternatives A-1, A-2, and A-4 with nearshore excavation up to 6 feet below grade, shoring costs could approach $1,000 or more per linear foot of shoring. If needed, a workable approach might be to construct shoring in nominal 100-foot excavation sections along the shoreline. This would require roughly 200 feet of running sheet pile length (including side containment) for each sheet pile section. If the shoring could be reused and "leapfrogged" to the next excavation segment, contingency shoring costs could be in the range of $250,000, assuming embedment of possibly up to 30 feet to protect the excavation and control water flow at even moderate tidal levels. For Alternatives A-3 and A-5 with nearshore excavation up to 2 feet below grade, shallower sheet pile embedment would require shorter sheet piles. The unit cost per lineal feet of sheet pile would decrease accordingly.

Offshore dredging would be performed using water-based equipment seaward of the nearshore excavation area described above and shown on Figures 8-6 through 8-10. Work would be limited to periods when the water depth is sufficient to accommodate the draft of the floating equipment. The FS assumed conventional clamshell dredging with an environmental bucket and barge dewatering for the purposes of alternatives analysis.

Excavation and Dredging Locations and Depths. Excavation and dredging locations and depths were determined based on dioxin TEC and wood waste thickness (see Section 5.0). Excavation and dredging areas avoid locations where eelgrass beds reside, except where dioxin TEC exceeds 25 ppt. The latter area would be excavated to a depth that reaches native material (assumed up to about 6 feet below grade). Two locations exist where dioxin TEC exceeds 25 ppt, as shown on Figures 8-6 through 8-11. Remaining locations would be excavated or dredged where dioxin TEC is greater than 10 ppt and wood waste is greater than 1 foot thick.

Excavation and dredging depths and resulting volumes vary between Alternatives A-1, A-2, and A-3. It should be noted that the estimated dredging volumes described below are based on the inferred lateral extent and depth extent of wood waste shown on Figure 5-1. This estimated extent is currently uncertain but was further evaluated during supplemental field sediment sampling and vibracore explorations (Hart Crowser 2011) completed in December 2010.

The estimated wood waste area and related target excavation volumes will be revised in the Phase II aquatic area CAP to be prepared in late 2012.

Alternative A-1 employs deep nearshore excavation and offshore dredging to a depth of 6 feet below the existing surface grade, which would provide removal of a greater quantity of wood waste and impacted sediment. This would involve nearshore excavation of approximately 14,000 cy of material (including surface debris) and offshore dredging approximately 36,000 cy.

Alternative A-2 considers shallow nearshore excavation and dredging to a depth of 2 feet, which would potentially leave more environmentally deleterious or impacted material on site than in Alternative A-1. However, this material would be contained beneath a cap to provide suitable containment. Excavation and dredging volumes achieved in Alternative A-2 are approximately 6,000 cy and 13,000 cy, respectively.

Alternative A-3 includes deep nearshore excavation to a depth of 6 feet and shallow offshore dredging to a depth of 2 feet. This approach would remove a greater quantity of wood waste where it potentially resides at greater thickness in the nearshore area, and provides savings by removing less material where it is potentially thinner offshore. Approximately 14,000 cy would be excavated, and approximately 14,000 cy dredged, in Alternative A-3.

Excavation/Dredge Material Disposal. For planning purposes, the FS assumes that excavated material from the nearshore area will be dewatered on site in a temporary holding cell for off-site disposal at a Subtitle D landfill. The wood waste content and anticipated levels of dioxin would likely preclude an open water disposal options. Water from the dewatering process would be captured for settling and other treatment as necessary prior to assumed return discharge to waters of Fidalgo Bay. Should additional treatment or alternative disposal options become necessary, cost impacts would be proportional to the estimated excavation volumes for each alternative.

Barge dewatering and upland Subtitle D landfill disposal of dredged material are assumed for offshore dredging and disposal associated with all aquatic remedial alternatives. Under favorable circumstances, in-water aquatic disposal at a non-dispersive site managed under the Dredged Material Management Program (DMMP) may be possible. Although aquatic disposal was retained from the technology screening as potential option, the presence of dioxins and wood waste in site sediment could make the dredged material unsuitable per current DMMP criteria. The future availability of an open-water disposal site is also subject to further assessment. If possible, aquatic disposal would substantially decrease disposal costs for all of the aquatic alternatives.

Backfilling and Capping. Excavated and dredged areas would be backfilled or capped following excavation and dredging. For the purposes of this FS, backfilling applies to areas with residual wood waste less than 1 foot thick (or less than some volume percentage or TVS/TOC to be determined) and dioxin concentrations less than the Fidalgo Bay background. Capping applies to areas not meeting the above criteria, as determined by field data and post-excavation/ dredging sample testing.

The type and grain size of backfilling and capping materials are dependant on proximity to the wave erosion zone. Areas within the wave erosion zone include placement of graded sandy material to within about 1 foot of the existing grade, which would be overlain by protective armor mix to existing grade. Figures 8-11 through 8-15 depict this approach, with 3-inch minus armor placed to protect the higher wave energy zone, and 1-inch minus armor placed in deeper areas with lower wave energy. The graded, sandy capping or backfill mix would be placed to existing grade in areas seaward of the wave erosion zone.

Backfill and capping materials would be placed using conventional land-based equipment in nearshore areas and water-based equipment in the offshore areas. The capping remedies would be coupled with institutional controls to protect the cap structure by warning site users about its presence.

8.3.2 Alternatives A-4 and A-5

Alternatives A-4 and A-5 are variations of Alternatives A-1 and A-2, respectively, in which implementation of ENR is confined to within affected eelgrass bed locations only, and dredging is expanded to include all areas where total dioxin TEC exceeds 10 ppt., excluding eelgrass bed areas. The other remedial elements remain the same as in Alternatives A-1 and A-2.

The expansion of the dredging area in Alternatives A-4 and A-5 allows for removal of a greater quantity of sediment with dioxin contamination and possibly wood waste from affected areas outside of the eelgrass beds. To protect existing eelgrass beds that are located within affected areas, TLC would be implemented as a lower-impact measure that would provide remedial benefit and minimize eelgrass impacts.

The change in dredging and ENR areas results in an increased total dredging volume of approximately 75,000 cy in Alternative A-4 (approximately twice the volume generated in Alternative A-1) and 52,000 cy in Alternative A-5 (approximately four times the volume generated in Alternative A-2). However, limiting ENR implementation to only affected eelgrass bed locations reduces the necessary volume of TLC material to approximately 9,100 cy (about half of the material volume needed in Alternatives A-1 through A-3).

8.4 Upland and Aquatic Demolition and Removal of Debris and Pilings

Each of the upland and aquatic remediation alternatives include measures to demolish remaining concrete structures and for removal of surface debris and wooden pilings. It is assumed that a nominal 2-foot-thick layer of debris will be removed from the surface of the upland and nearshore excavation areas (approximately 9,300 cy and 4,700 cy, respectively), which would be disposed of off site along with excavated soil.

In the upland remediation area, aboveground concrete and foundation structures would be demolished, crushed, and recycled on site as excavation backfill material. This would contribute approximately 1,750 cy of crushed concrete material to the backfill volume, resulting in a reduction of the quantity of backfill material that would need to be imported to the site from off-site sources.

The L-shaped concrete pier and bulkhead that remain at the site would be demolished using land-based equipment as part of the aquatic remediation work. Because the L-shaped pier is an over-water structure, measures would be used to limit the distribution of demolition debris during completion of this work, such as using debris booms, turbidity curtains, and containment systems to prevent concrete from falling into the water. Because the aquatic remediation work is to be conducted after the upland work has been completed, concrete waste materials resulting from demolition in aquatic area (about 650 cy) will require off-site disposal and would not be incorporated as part of upland excavation backfill material.

Wooden pilings would be removed from the upland excavation areas and from the intertidal and subtidal aquatic remediation areas. In the upland area, it is assumed that pilings would be removed only from excavation locations but would be left in place elsewhere. Similarly, in the intertidal and subtidal areas, wooden pilings would be removed from excavation and dredging locations, where accessible, but would be left in place elsewhere. Land-based equipment would be used for piling removal in the upland and aquatic areas, where the pilings are accessible, and water-based equipment would be used to remove pilings in the aquatic area that are outside of the range of the land-based equipment. Work scheduling would likely need to consider periods of low and high tide to remove pilings in more distant offshore locations, where water-based equipment is employed.

An estimated 970 pilings would be removed from the upland excavation areas in Alternatives U-1 through U-3, and 170 pilings from the reduced excavation footprint in Alternative U-4. Approximately 770 and 350 pilings, respectively, would be removed from the intertidal and subtidal excavation and dredging areas in Alternatives A-1 through A-5.

To reach the intertidal and subtidal wooden pilings, the FS assumes that an access road would be constructed through the upland area to the shoreline, where multiple temporary crane pads would be constructed as foundations for placement of long-reach cranes to pull piles. For cost estimating purposes, it is assumed that the entire piling would be pulled; however, greater cost effectiveness could potentially be achieved by cutting the upper portion of the piling at a specified length from ground surface and leaving the remainder in place, which would result in a decreased quantity requiring disposal.

The FS further assumes that after piles have been pulled, and when nearshore aquatic excavations require backfilling, the temporary access road and crane pad materials (quarry spalls) will be recycled on site as backfill material in the nearshore excavations. This is a beneficial reuse of the road and crane pad material and eliminates the need for off-site disposal of this material and reduces the quantity of backfill material that would need to be imported to the site.

8.5 Shoreline Protection Measures, Mitigation, and Stormwater Management

Shoreline protection features and mitigation measures for wetland and forage fish spawning habitat are integrated into the FS alternatives. Shoreline protection and mitigation measures were extensively evaluated, with continued input and review by the Ecology Shorelands and Environmental Assistance (SEA) Program, Washington State Department of Fish and Wildlife, NOAA Fisheries Service, US Fish and Wildlife Service, the USACE, the City of Anacortes, Tribes, and other parties. The following sections summarize select shoreline protection and mitigation measures evaluated for implementation. Following review of several alternate approaches the most relevant components are briefly described below with a determination of selection. These selected measures are common to all upland and aquatic remedial alternatives for the FS, and are described in further detail in memos presented in Appendix B-2. The Appendix B memos also include a chronology of discussions and correspondence between Ecology and other reviewing agencies – Refer to Appendix B-3, as well as the other shoreline protection and mitigation measures not retained or summarized below.

As part of Custom Plywood Site restoration, a wetland mitigation area and buffer zone would be constructed in the southern portion of the GBH property uplands (see Figures 8-1 through 8-5). The mitigation area includes estuarine wetland encompassed by a buffer zone. A stormwater conveyance and management system would be constructed along the western property boundary and through the mitigation area and buffer zone, connecting to the City of Anacortes stormwater discharge pipe where it enters the property at existing Wetland D (see Figure 1-2). Wetland mitigation and stormwater enhancements are planned to be completed with the initial upland phase of work to address loss of existing Site wetlands and manage City of Anacortes stormwater discharges. The newly created estuarine wetland would not be connected to surface waters of Fidalgo Bay until the aquatic remediation phase.

Measures to protect the shoreline from erosion caused through hydrodynamic processes would be implemented in each of the aquatic alternatives. These measures (summarized below) serve the primary function of shielding the shoreline in this location from erosive wave action (see Figures 8-6 through 8-10) to assure permanence of upland remediation actions. Shoreline protection components and related shoreline habitat enhancement would be constructed as part of the aquatic remediation phase. These protective measures were evaluated by hydrodynamic modeling efforts presented in two detailed Technical Memoranda included as attachments to Appendix B-2 and described briefly below.

8.5.1 City Jetty Breakwater Extension

An extension of the existing jetty north of the GBH property positioned perpendicular to the predominant wave energy would allow for placement of protective armoring material of a smaller particle size while shielding the remediation area from wind and wave erosion along the northern shoreline of the GBH property (Figures 8-6 through 8-10). In addition to protecting the remediation area, the jetty extension will include habitat enhancement features, such as placement of sandy, habitat-friendly substrate along the shoreward face of the existing jetty and the extension to create forage fish spawning habitat and support foraging juvenile salmonids. A breach or notch between the existing jetty and the extension will provide a migratory corridor for juvenile salmon while still maintaining the protective nature of the feature. The jetty extension features are more fully detailed in Conceptual Habitat Mitigation Alternatives Upland and In-Water (Appendix B-2). This protection measure was evaluated as being optimally consistent with both remediation and habitat enhancement goals for the interim action and will be included as part of the preferred shoreline protection concept for the selected aquatic remediation alternative.

8.5.2 New Aquatic Spit Protection

The shoreline protective spit is optimally configured to maximize protection of the shoreline from erosive wave action for the southern half of the GBH property (Figures 8-6 through 8-10). The jetty extension introduced above will only provide shoreline protection for the northern portion of the shoreline. This second in-water protective feature is needed to protect the remainder of the shoreline. Configuration of the spit was based on modeled wave and wind energy along the Site's shoreline before and after in-water structure removal to gain a better understanding of the forces influencing the cleanup activities. Hydrodynamic modeling indicated that the already eroding southern portion of shoreline will be subject to increased wave energy once the existing in-water structures are removed. The spit offers an adequate level of protection while also protecting capped contaminated intertidal substrate. The structure has been designed to include habitat enhancement features, such as forage fish spawning habitat and support habitat for juvenile salmonids along the shoreward extent.

The outer seaward face of the spit will be at a 9H:1V slope to dissipate wave energy and minimize the size of material to construct the protective feature. The shoreward face will be constructed at a 5H:1V slope. The protective spit will consist of a gravelly sand core material with a layer of habitat-friendly substrate over the top, which is suitable for forage fish spawning habitat. In addition, the spit will feature an 8-foot-wide bench at an elevation suitable for natural colonization of emergent estuarine wetland vegetation.

The protective spit would also, as a secondary consideration, protect the new wetland and buffer mitigation area located within the southern portion of the GBH property, as shown on Figures 8-1 through 8-5. The mitigation area includes a 12,000-square-foot estuarine wetland bench created landward of the existing shoreline edge or ordinary high water line and an associated upland buffer that will be planted with native vegetation. Stormwater from an existing City of Anacortes stormwater conveyance pipe on the upland portion of the GBH property will be routed through a vegetated stormwater swale located outside of the upland buffer for treatment and a conveyance corridor located in the buffer for additional treatment and infiltration before entering the estuarine wetland complex (see Section 8.5.3). The wetland mitigation area is discussed in Section 8.5.4 and in detail in the Revised Conceptual Wetland Mitigation Plan memorandum (Appendix B-1). The shoreline protective spit concept is discussed in further detail in the Conceptual Habitat Mitigation Alternatives Upland and In-Water memorandum (Appendix B-2). This protection measure was evaluated as being optimally consistent with both remediation and habitat enhancement goals for the interim action and would be included as part of the overall preferred shoreline protection concept for the selected aquatic remediation alternative.

8.5.3 Soft Armor Shoreline Protection Concept

A soft armor aquatic protection concept was also evaluated as an alternative to the shoreline protective spit and jetty extension at the Custom Plywood Site. When feasible, soft armoring is a desirable approach to optimize habitat value and minimize the need for larger in-water protective features. Soft armoring at the Custom Plywood site would consist of placing a surface layer of graded sand and rounded gravel habitat material 3 inches in size and smaller in intertidal and shallow subtidal areas. Soft armor material would be spread to form a shallow slope beach face placed from OHW down to approximately -2.0 feet MLLW across the Site.

The soft armoring concept was developed in some detail to support further discussions with the Ecology's Shorelands and Environmental Assistance Program as well as federal and other state resource agencies and Tribes. The following summary highlights pertinent points and costing information related to the soft armoring concept, with further information and figures presented in Appendix B-2 and in Appendix C. Based on this evaluation, the soft armor option was not retained as a viable approach for shoreline protection and habitat enhancement. Primary concerns with the concept focused on the erodability of the soft armor material and disproportionate material replacement and maintenance costs compared to the jetty extension and spit construction shoreline protection features.

Soft Armoring Concept Summary and Concerns

Habitat enhancement potential can be assessed based on the effort to establish and maintain relatively suitable habitat mix material to optimize conditions for juvenile salmonid foraging and forage fish spawning habitats. The jetty extension and spit features create sheltered areas on their shoreward aspects where material of a size consistent with habitat mix would remain stable over the long term. Similarly, the seaward side of the spit would be dressed with habitat mix, but may have to be replenished periodically. In contrast, soft armoring would need to be placed over a sufficiently wide and shallow slope to effectively dissipate wave energy currently causing nearshore erosion. The seaward extent of the soft armor apron would extend a considerable distance (as much as 250 feet) into low-gradient subtidal habitat associated with the site to provide a sufficiently flat slope for wave attenuation (i.e., slope of greater than about 9H:1V).

Several significant concerns were identified from this analysis:

- Erosive wave energy would mobilize the soft armoring material on the beach face, based on preliminary coastal engineering modeling conducted to determine stable particle size;

- Downslope loss of soft armor material from wave erosion would likely encroach upon and adversely impact existing functional eelgrass habitat and other adjacent habitat types;

- Longshore drift would likely transport the displaced armor material southward, and could adversely affect current mudline elevations and existing high quality habitats including shellfish and eelgrass areas;

- Reducing the soft armor apron slope to a sufficiently low angle would be difficult to achieve to counteract erosive wave forces resulting from the relatively long northeastern fetch across Fidalgo Bay; and

- Soft armoring material would require frequent replacement to compensate for erosive loss. Preliminary coastal modeling indicates that a substantial portion of the near-shore soft armor volume could require replacement every two years, or even more frequently to maintain the protective function and habitat benefits. The biology of the system would essentially be reset each time, prevent the habitat succession from progressing toward the highest enhancement potential.

Soft Armoring Maintenance Costs

Costs for continually maintaining and replacing a soft armored apron compare unfavorably to the jetty extension and spit concept. The latter features require proportionally less maintenance over the long term, compared with soft armoring. Long-term costs were further evaluated for the soft armoring concept in comparison with jetty extension and spit maintenance. This analysis considered a long-term time frame over an operating period of 200 years, and used both Net Present Value (NPV) and a non-discounted assumptions. Supporting cost tables C-A3-1b and C-A3-1c, and Figure C-A3-1 are presented in Appendix C.

Initially, capital expenditure is less for the soft armoring option than for the jetty extension and spit ($10.3 million versus $11.6 million). Long-term maintenance costs for the soft armoring option, however, exceed costs for the jetty extension/spit by Year 6 using the non-discounted assumption, and by Year 7 using the NPV assumption (see Appendix C Figure C-A3-1). By Year 20, the soft armoring option has become $3.5 million (non-discounted comparison) to $5.2 million (NPV) more expensive based on maintenance costs depending on underlying assumptions. Costs differences escalate quickly after Year 20 and are presented in Appendix C. Considering that the soft armoring concept presented less net habitat enhancement potential (based on the impacts to existing high quality habitat from sediment movement detailed above) and the added expense of maintaining the necessary protective function, the protection measure was evaluated as being less than optimal for both remediation and habitat enhancement goals for the interim action. For this reason the soft armoring concept was not further considered as part of the overall preferred shoreline protection concept.

8.5.4 Hydrodynamic Modeling

Detailed hydrodynamic modeling was conducted to support the City Jetty Breakwater Extension, New Aquatic Spit Protection, and Soft Armor Shoreline Protection Concepts presented above. The results of wave modeling and sediment stability analysis conducted by Coast and Harbor Engineering (CHE) are presented in Appendix B-2, Technical Memorandum Attachments 1 and 2. The criteria developed in Technical Memorandum 1 (November 2010) were confirmed in Technical Memorandum 2 (May 2011) after an additional source for meteorological data was identified near the Custom Plywood Site.

CHE re-evaluated and confirmed that the wave statistical analysis and modeling shows that the largest wave storm (wave height and wave period) at the project site is from the northeast direction, not from the southeast direction. It does not conflict with the statement that most winds blow from the southeast direction. Therefore to assure stability of coastal elements of the project (those subjected to wave impact), the design storm for the project was determined to be those approaching from the northeast direction.

8.5.5 Stormwater Management

A stormwater swale is planned to manage and treat stormwater currently routed onto the property through a City of Anacortes conveyance. The swale is designed and sized per Ecology's 2005 Stormwater Management Manual (SWMM) for Western Washington to provide water quality treatment. No infiltration is assumed as a conservative assumption based on subsurface soil and groundwater conditions. Infiltration that does occur provides additional stormwater management control. Stormwater from the existing 18-inch-diameter City of Anacortes conveyance pipe to Wetland D will be routed through a control box structure to control flow and provide settling in a 48-inch catch basin. Flow from the control box will discharge through a higher elevation outlet in the box to provide necessary elevation and gradient for downstream flow management. The swale and conveyance corridor will be vegetated with a standard grass seed mix to filter and remove sediment and particulates from the stormwater. The swale will provide basic treatment prior to entering a vegetated conveyance corridor that will route the treated stormwater from the swale into the restored wetland area. The conveyance corridor will be designed to meander through the restored buffer area in order to provide additional treatment and infiltration as well as a more natural channel configuration. The swale will also be protected with a low berm and backflow preventer at the outlet to avoid inundation during high tides. Appendix B-1 provides additional information on proposed stormwater management measures.

8.5.6 Upland and Aquatic Mitigation

Regardless of the remediation alternative considered, unavoidable impacts to existing natural resources from remediation are expected in both the upland and in-water phases of the project. Specifically for the upland, existing fresh and saltwater wetlands will be displaced by excavation and backfilling planned for upland Alternatives U-1 through U-3, and pavement capping Alternative U-4. In the nearshore area, much of the existing shoreline will need to be replaced because of dioxin contamination and thick accumulations of wood waste. This will displace documented forage fish (surf smelt and herring) spawning habitat and juvenile salmonid foraging habitat. In the subtidal area, large portions of the shallow subtidal area will require either thin capping or targeted dredging to remediate dioxin contamination. This would likely affect acres of existing eelgrass habitat. For the purposes of the FS, a summary of each mitigation action is provided below with specific details provided in Appendix B.

Planned Upland Mitigation

In the uplands, wetlands are spread throughout the upland portion of the GBH property because of the property's relatively low elevation (regular tidal inundation) and flat slope (retention of stormwater). Together, these wetlands have a combined areal coverage of nearly 12,000 sf. To mitigate for unavoidable loss of these wetlands, a consolidated wetland concept in the southern portion of the GBH property is proposed as the preferred action. The consolidated wetland mitigation area includes a 12,000-SF estuarine wetland bench created landward of OHWL with an associated upland buffer that will be planted with native vegetation. Stormwater from an existing City of Anacortes stormwater conveyance pipe on the GBH property will be routed through a vegetated stormwater swale located outside of the upland buffer for treatment and a conveyance corridor located in the buffer for additional treatment and infiltration before entering the estuarine wetland complex (see Section 8.5.3). The buffer for this wetland mitigation area ranges from 50 to 75 feet in width and will be fenced to limit access until vegetation can fully mature and establish. The wetland mitigation area is discussed in detail in the Revised Conceptual Wetland Mitigation Plan memorandum (Appendix B-1).

Planned Aquatic Mitigation

Forage Fish Spawning Habitat Enhancement. For impacts on fish habitat in the nearshore, enhancement of the protective structures is planned as a desirable mitigation measure. The protective spit can be enhanced to provide suitable environment on its shoreward side to support forage fish spawning habitat. The spit also supports the additional ecological functions of improved juvenile salmon rearing habitat and a migration corridor. As noted above, the shoreward face would be constructed with sandy substrate suitable for forage fish spawning habitat as well as for epibenthic crustaceans, which are beneficial to foraging juvenile salmonids.

The suggested extension off the existing jetty north of the GBH property will also be enhanced to provide similar habitat functions as the spit. The shoreward side of the jetty extension and the southern side of the existing jetty would be enhanced with sandy substrate suitable for forage fish spawning habitat and for epibenthic crustaceans and other fauna, which are beneficial to foraging juvenile salmonids. An added habitat feature would be provided by the intended function of the jetty extension. The extension as proposed would allow for habitat mix to be placed along the northern portion of the shoreline, which would support foraging habitat for migrating juvenile salmon. An in-water passage between the existing jetty and the extension would maintain the existing salmonid migration pathway. Appendix B-2 provides additional details on forage fish spawning habitat restoration.

Eelgrass Habitat Mitigation. For shallow subtidal habitat, identified remediation alternatives involve either TLC or dredging to remediate dioxin-contaminated sediment. Both of these remedies will impact existing eelgrass habitat associated with interim remediation action. Much of the acreage identified for TLC is covered by eelgrass, which could be impacted. A pilot study examining TLC methods and impacts is recommended prior to proposed remediation to determine the tolerance of eelgrass to various capping procedures. Impacts to eelgrass within the TLC area are expected to be minimal and short in duration. Impacted eelgrass areas should recover quickly through recruitment from nearby meadows. Further detailed discussion of this is presented in Appendix B-2.

In areas designated to be dredged (generally where total dioxin TEC is greater than 25 ppt), impacts on existing eelgrass are unavoidable. It is estimated that approximately 4,300 sf of eelgrass will be displaced by dredging activities. A combination of advanced and restoration plantings are recommended as mitigation for this displacement. As other subtidal areas exist that could support eelgrass, but do not presently, are remediated within the project area, they could be planted with donor stock from the areas that is to be dredged to serve as advanced mitigation plots. Further detailed discussion of this is presented in Appendix B-2.

Once the subtidal areas containing elevated dioxin levels have been remediated (dredged and backfilled with clean material), targeted planting can occur using donor eelgrass from surrounding areas within the project area (while not reducing standing stock density more than 5 percent). These plantings will help facilitate recovery of the dredged areas that once supported eelgrass, reducing recruitment time by an order of magnitude. These targeted plantings, as well as the advanced mitigation plots, should help produce a final areal coverage of eelgrass that is 1.5 times greater than the original impacted area by year ten after remediation (approximately 6,500 sf). By creating more habitat than was displaced originally, the combined mitigation action should make up for temporal losses of productivity during the recovery phase. Appendix B-2 provides additional conceptual details on planting areas and procedures. A formal mitigation plan along with a developed 10-year monitoring plan, would be developed in concert with natural resource agencies to address mitigation action design, timeline, performance criteria, and adaptive management procedures in detail.

8.5.7 City of Anacortes Public Access to Shoreline Areas

Public shoreline access requirements pursuant to the City of Anacortes (COA) Shorelines Master Program (SMP, September 2010) will be addressed by making provisions for beach access at the southern landward tip of the Site. The general location of beach access is identified in Appendix B-1 on Figure 2. The final configuration of these features has not yet been determined and is ultimately subject to an agreement between COA and the property owner. A conceptual design is planned concurrently with the design for the Phase II in-water remediation. The final aquatic permitting required for the beach access component will also be included with Phase II. Final design and field construction are currently planned to be completed in coordination with the COA and the property owner. Access to the public beach area may require, at a minimum, completion of the Phase II aquatic cleanup.

8.6 Evaluation of Remediation Alternatives

Remediation alternatives for the upland and aquatic areas were evaluated based on MTCA regulatory criteria and disproportionate cost analysis (DCA). The FS alternatives were evaluated to assess compliance with minimum regulatory requirements, including consistency with provisions of MTCA, SMS and other ARARs. DCA criteria were evaluated based on a relative numeric ranking system from 1 to 5, with 1 as the lowest (least favorable) ranking, and 5 as the highest (most favorable) ranking. The DCA criteria were further weighted on a proportional basis to emphasize the protectiveness, permanence, and long-term effectiveness as the primary drivers for ranking.

This DCA ranking approach is consistent with the relative numeric ranking system used for other Puget Sound aquatic cleanup sites. The DCA scores were then totaled and compared to determine overall ranking and cost benefit. Estimated project costs for upland and aquatic alternatives are presented in Table 8-3. Appendix C presents a further breakdown of these estimated costs.

Tables 8-4 and 8-5 present results of the remedial alternatives evaluation and DCA for the upland and aquatic alternatives.

8.6.1 Upland Remediation Alternatives

MTCA Threshold Criteria – Protectiveness, Compliance with Standards and ARARs, and Provisions for Compliance Monitoring

Alternatives U-1 through U-3 are intended to provide protectiveness through the removal and off-site disposal of impacted soil from the GBH property uplands. Varying degrees of protectiveness are attained in the three alternatives because of the different maximum quantities of soil removed and the POC that each alternative is meant to reach. Alternative U-1, which involves excavation to reach the human health direct contact POC (15 feet bgs), provides the most protectiveness of the four upland remediation alternatives. Alternative U-2 is somewhat less protective of human health than Alternative U-1 but meets the terrestrial ecological POC (6 feet bgs). Alternative U-3 provides human health and ecological protectiveness in the shoreline protection zone, but is somewhat less protective of human health elsewhere on the property, where it meets only the ecological POC. Alternative U-2 is inherently less protective because of shallower contaminant removal in the shoreline protection zone relative to Alternatives U-1 and U-3. In the event that additional contamination is encountered during excavation, Alternative U-1 provides relatively limited additional protectiveness over Alternative U-3. This is because both alternatives provide for deeper excavation in the shoreline protection zone, but deeper excavation afforded by Alternative U-1 elsewhere on the site results in only marginal additional benefit.

Of the remedial excavation alternatives, Alternative U-1 achieves compliance with cleanup standards throughout the site. Alternative U-2 achieves compliance to the ecological POC but not to the human health POC. Alternative U-3 achieves compliance to the human health POC in the shoreline protection zone (75 feet landward of MHHW) but not elsewhere on the property. Alternatives U-2 and U-3 would also achieve cleanup standards considering a conditional POC at the property boundary.

Alternative U-4 involves containing impacted soil in place via surface capping and impacted soil removal in the wetland mitigation and stormwater management areas. This alternative generally provides less protectiveness than the soil removal alternatives. By capping the surface of the site, potential for direct contact to humans and terrestrial species is eliminated, along with the soil to groundwater pathway. However, impacted material remains on site, including the shoreline protection zone. This could potentially create greater risk because of the proximity of impacted soil to aquatic receptors in the event of cap failure. Additionally, Alternative U-4 does not achieve compliance with standards for soil throughout the site, but could achieve standards at the property boundary pending confirmation determined through long-term cap (physical) and groundwater monitoring.

Compliance monitoring is a key element of each of the upland remediation alternatives.

Other MTCA Criteria – Permanence, Restoration Time Frame, and Public Concerns

Alternatives U-1 through U-3 involve removal of impacted soil and represent permanent remedial actions that can be achieved in short restoration time frames. Alternatives U-2 and U-3 were scored as slightly less permanent than U-1, should deeper contaminated soils left in place with Alternatives U-2 and U-3 persist as a potential source of groundwater contamination. Alternative U-4 includes limited soil removal but contains remaining impacted material on site beneath a surface asphalt cap. This alternative may provide less permanence than Alternatives U-1 through U-3, although it should be noted that excavated soil from Alternatives U-1 and U-3 would be shipped for off-site disposal and landfills requiring management and monitoring in perpetuity.

The installation of the surface cap for Alternative U-4 could be completed in a relatively short period, which would eliminate the human health direct contact exposure pathway, but the reduction of the soil to groundwater exposure pathway would depend on the slow process of natural attenuation to reduce groundwater contaminant concentrations below cleanup levels, resulting in a longer restoration time frame.

While excavation and capping are intended to address public concerns responsibly, it is acknowledged that potential concerns may be raised that site contaminants would not be completely removed from the environment. Alternatives U-2 and U-4 leaving a greater volume of potentially contaminated soil in the shoreline protection zone were therefore ranked slightly lower. A comparable concern is that capping or excavation are invasive technologies that could result in more detrimental impacts that are not commensurate with their potential benefits. Aesthetic concerns could also conceivably be raised regarding the installation of an asphalt cap over the majority of the property, although capping is compatible with future commercial use of the property. Conversely, excavation and backfilling alternatives would allow for surface restoration to a more natural-looking state.

Permanence, restoration time frame, and public concerns are further addressed as part of the DCA ranking below.

DCA Evaluation and Alternatives Ranking

As summarized in Table 8-4, excavation Alternative U-1 was ranked highest based on scores for protectiveness, permanence, and long-term effectiveness. Excavation Alternative U-2 ranked as the lowest based on lower scores in these same categories because of less aggressive removal of contaminated soil in place within the shoreline protection zone, in comparison with Alternatives U-1 and U-3. The other alternatives provided incremental benefits ranging from 7 to 29 percent higher because of the DCA scoring.

Total estimated costs for the upland alternatives ranged from a low of about $4.6 million for the U-4 capping alternative, to a high of $7.3 for the U-1 excavation alternative. None of the upland alternatives is disproportional relative to the lowest ranking Alternative U-2 base case. Of these alternatives, the capping Alternative U-4 nominally represents the best cost-benefit based on substantially lower cost, but provides only 1 percent additional benefit over the U-2 base case. Excavation Alternative U-1 provides the next best benefit, quantified as a relative difference of 22 percent between the increased benefit (131 percent) and cost (9 percent) over the U-2 base case. The comparative cost-benefit percentages for excavation Alternative U-3 calculated in this manner was 18 percent, respectively.

Although U-1 is the least expensive of these excavation alternatives, actual construction costs could increase substantially should additional contaminated soils be encountered at depth. Excavation of additional deeper soils for the U-1 alternative would provide limited additional risk reduction or other benefit. For this reason, U-3 represents the most cost-effective alternative given current uncertainty regarding the depth extent of contaminated soil. The calculated cost-benefit of 18 percent for U-3 over the U-2 base case is generally comparable to the U-1 (22 percent) and would still achieve deeper contaminant removal in the shoreline protection zone, if necessary. Given uncertainties associated with potential additional contaminated soil excavation, U-3 provides greater value by limiting excavation of deeper and lower-risk soils to the shoreline protection zone.

Overall costs for Alternative U-3 as a representative excavation case are estimated at about $6.8 million. This includes projected construction costs of $4.8 million (incorporating 30% contingency), and estimated non-construction, mitigation, and long-term monitoring and maintenance costs of about $2.0 million. Excluding contingencies and long-term monitoring, estimated capital costs for construction, related engineering support, and mitigation are in the $5.5 million range for Alternative U-3.

8.6.2 Aquatic Remediation Alternatives

MTCA Threshold Criteria – Protectiveness, Compliance with Standards and ARARs, and Provisions for Compliance Monitoring

Aquatic remediation alternatives for the Custom Plywood Site incorporate excavation, dredging, backfilling and capping and ENR technologies in various combinations to optimize remedy effectiveness and feasibility. These alternatives are designated as A-1 through A-5 in Table 8-2. The aquatic remediation alternatives and were developed to achieve MTCA/SMS cleanup levels within the FS project area in a reasonable time frame, and to address other project remedial objectives and applicable regulatory criteria. Remediation technologies are intended to be protective of the aquatic environment, help restore benthic habitat, and reduce biological toxicity. Post-construction compliance monitoring and institutional controls are additional elements of each of the aquatic remediation alternatives.

Alternatives A-1, A-3, and A-4 provide a high degree of protectiveness by removing wood waste to a depth of up to 6 feet below mudline and backfilling with sandy material and near-surface soft rock armor for wave protection. This provides a significant "safety factor" to remove wood debris that could potentially generate ammonia, sulfide, and other degradation products. Such degradation products represent potential contaminant sources for the near-surface marine environment, depending on potential migration pathways and other risk/exposure considerations. The other alternatives provide some degree of protectiveness by excavating or dredging wood waste to 2 feet below grade and capping.

All alternatives include ENR to address dioxin contamination in near-surface sediments. ENR would be completed within the eelgrass beds for all the aquatic alternatives, and in other non-dredged areas for Alternatives A-1, A-2, and A-3. ENR has a reasonable degree of protectiveness, assuming favorable stable hydrodynamic conditions in the marine environment as indicated by coastal engineering analysis supporting this FS. Subsequent sediment quality monitoring is planned to confirm the degree of protectiveness afforded by ENR with regard to dioxin attenuation and wood waste cover (where wood waste is present in relatively thin layers or low-volume).

Alternatives A-4 and A-5 feature more extensive dredging to remediate dioxin-contaminated surface sediments outside of the eelgrass beds rather than ENR. Although dredging is intended to remove contamination in the upper 1 to 2 feet of the sediment profile, controlling residual dredging particulates and resuspended material may be challenging. For this reason, dredging requires careful oversight and management of BMPs as practicable during construction, but may not provide further protectiveness or benefits over ENR.

Other MTCA Criteria – Permanence, Restoration Time Frame, and Public Concerns

Similar to protectiveness criteria, Alternatives A-1, A-3, and A-4 provide permanent and effective measures to maximize wood waste (and dioxin) removal from the marine environment through deeper excavation and dredging. Shallower excavation and dredging associated with Alternatives A-2 and A-5 may also result in permanent, manageable cleanup actions over the long term, but s more uncertainty exists given larger volumes of wood waste left in place compared with deeper excavation for Alternatives A-1, A-3, and A-4. Off-site disposal of dredged materials containing abundant wood waste contributes to permanent and effective long-term risk reduction for all alternatives.

Removal of impacted sediment and wood waste via excavation and dredging and subsequent backfilling and capping provide rapid reduction of wood waste exposure. Although excavation and dredging impact existing marine habitat, much of the affected habitat is not optimal substrate because of the presence of wood waste and surficial debris. Backfilling and capping materials with soft armor surface protection provide a permanent habitat enhancement measure that can be readily implemented as part of the site remediation.

ENR also likely represents an effective and permanent cleanup measure for more seaward areas with less near-surface wood waste. Long-term effectiveness depends on the ability of ENR to attenuate dioxin concentrations as well as potential adverse effects of more-finely divided wood waste. Although ENR would have some short-term impacts on existing biota, remediation benefits are expected to occur rapidly as ENR helps speed recovery by providing fresh substrate. The ENR restoration time frame is therefore expected to be less than 10 years, and most likely shorter.

The aquatic remediation alternatives are expected to be technically and administratively implementable, although alternatives removing less wood waste could be more closely scrutinized. Based on this level of impact, a comparable concern is that more aggressive offshore dredging associated with Alternatives A-4 and A-5 are invasive technologies resulting in more detrimental impacts that are not commensurate with their potential benefits.

DCA Evaluation and Alternatives Ranking

As summarized in Table 8-5, aquatic Alternative A-1 ranked highest based on higher scores for protectiveness, permanence, and long-term effectiveness associated with deeper wood waste removal. Alternative A-5 is a variant of A-2 and ranked as the lowest based on lower scores in these same categories and management of short-term risks. The lower scores for Alternative A-5 (and A-4 variant of A-1) reflect concerns over resuspension of dioxin-contaminated material and control of dredging residuals. Alternatives A-2 and A-3 were ranked 3 and 2, respectively, because of the differences in the depth of wood waste removal accomplished by each alternative. In comparison to the lowest ranked Alternative A-5 base case, the other alternatives provided incremental benefits ranging from 5 to 25 percent higher because of the DCA scoring. Alternative A-1 provides the maximum amount of wood waste removal of the aquatic alternatives and commensurately greatest benefit (25 percent).

Total estimated costs for the aquatic alternatives ranged from a low of about $10.5 million for the A-2 involving shallow wood waste removal, to a high of $23.9 million for A-4 involving more aggressive offshore dredging. Alternative A-4 costs are disproportionate relative to the incremental benefit (5 percent) achieved over the other aggressive dredging Alternative A-5 base case. Alternative A-4 also provided less benefit than the other alternatives and was considerably more expensive.

None of the remaining alternatives was disproportionate to the lowest-ranked A-5 base case. Of these alternatives, Alternative A-3 represents the best cost-benefit. This can be quantified as a relative difference of 54 percent between the increased benefit (123 percent) and decreased cost (-31 percent) of Alternative A-3 over the A-5 base case. Comparative cost-benefit percentages for Alternative A-1 and A-2 calculated in this manner are 39 and 48 percent, respectively. Although Alternative A-1 may provide greater protection than A-3, the cost is more than $4 million higher. The cost for Alternative A-2 is nearly $2 million less than A-3, but the incremental benefit is less because of shallower wood waste excavation in the nearshore environment.

Overall costs for Alternative A-3 are estimated at about $12.3 million. This includes projected construction costs of $9.3 million (incorporating 30% contingency), and estimated non-construction, mitigation, shoreline protection feature construction, and long-term monitoring and maintenance costs of about $3.0 million. Excluding contingencies and long-term monitoring, estimated capital costs for construction, related engineering support, and eelgrass mitigation are in the $7.3 million range for Alternative A-3. The shoreline protection feature component (separate from construction) is estimated at $1.3 million to construct the jetty extension and spit. Should some fraction of the dredge material be acceptable for in-water disposal, construction costs could be substantially decreased.

Table 8-1 - Upland Remediation Alternatives Summary

Upland Remediation Components	Upland Remediation Alternative			
	U-1	U-2	U-3	U-4
	Excavate Soil To Human Health (HH) POC Long-Term Monitoring	**Excavate Soil to Ecological POC Long-Term Monitoring and Institutional Controls**	**Excavate Soil to HH POC in Shoreline Protection Zone[b] and to Ecological POC Elsewhere on Property Long-Term Monitoring and Institutional Controls**	**Asphalt Pavement Cap Long-Term Monitoring and Institutional Controls**
Remove Near-Surface Debris and Subsurface Foundations[a]	Yes	Yes	Yes	Yes
Excavate Soil with COCs Exceeding Cleanup/Remediation Screening Criteria				
Excavate Up To 15 Feet BGS - All Affected Property Areas (Human Health Direct Contact POC)	Yes	No	No	No
Excavate Up To 6 Feet BGS - All Affected Property Areas (Ecological POC)	Included	Yes	Included	No
Excavate Up To 6 Feet BGS in Shoreline Protection Zone[b] and Press Pits Area, and 4 Feet BGS Elsewhere on Property	Included	Included	Included	No
Excavate Up To 15 Feet BGS in Shoreline Protection Zone[b] and Press Pits Area, and 6 Feet BGS Elsewhere on Property	Included	No	Yes	No
In Wetland Mitigation/Buffer Area and Stormwater Swale Area Only: Excavate Up To 15 Feet BGS in Shoreline Protection Zone[b] and Press Pits Area, and 6 Feet BGS Elsewhere	Included	No	Included	Yes
Containment Capping				
2-Inch-Thick Asphalt Surface Pavement and Stormwater Drainage Control[c]	Not Needed	Contingency[d]	Contingency[d]	Yes
Points of Compliance				
Soil - Upland Locations Within Property Boundary	Achieves Compliance	Achieves Compliance to Ecological POC but Not Attained Below Ecological POC	May Achieve Compliance/Contingency	Not Attained
Groundwater - Freshwater/Saltwater Interface at Shoreward Edge of Property	Yes	Yes	Yes	To Be Determined During Long-Term Monitoring
Monitoring				
Post-Construction Soil Confirmation Monitoring	Yes	Yes[e]	Yes	Yes[e]
Long-Term Cap Performance/Protection Monitoring (Physical Integrity)	Not Needed	Yes	Contingency	Yes
Long-Term Groundwater Performance/Protection Monitoring	Yes	Yes	Yes	Yes
Institutional Controls				
MTCA Administrative Order Conditions	Yes	Yes	Yes	Yes
MTCA Site Listing	Yes	Yes	Yes	Yes
Potential City Administrative/Land Use Restrictions	To Be Determined	To Be Determined	To Be Determined	To Be Determined
Long-Term Monitoring Requirements	Groundwater	Groundwater and Potential Cap Integrity	Groundwater	Groundwater and Cap Integrity
Access and Deed Restrictions	May Not Be Needed	Yes Includes Physical Indicator at Ecological POC	May Not Be Needed	Yes

Notes:
(a) Includes near-surface debris removal to approximately 2 feet bgs, and piling and subsurface foundation removal where needed to facilitate soil excavation.
(b) Includes 75-foot-wide zone landward of MHHW.
(c) Includes nominal 2-foot-thick soil subgrade.
(d) Cap to be placed if warranted based on long-term groundwater monitoring results following excavation.
(e) Surface samples collected from final excavation surface to document residual chemical concentrations in soil.

Table 8-2 - Aquatic Remediation Alternatives Summary

	Aquatic Remediation Alternative				
	A-1	A-2	A-3	A-4	A-5
Aquatic Remediation Components	**Deep Nearshore and Offshore Excavation/Dredging ENR in Non-Excavated/Dredged Areas Monitoring and Institutional Controls**	**Shallow Nearshore and Offshore Excavation/Dredging[b] ENR in Non-Excavated/Dredged Areas Monitoring and Institutional Controls**	**Deep Nearshore and Shallow Offshore Excavation/Dredging[b] ENR in Non-Excavated/Dredged Areas Monitoring and Institutional Controls**	**Alternative A-1 Except: Dredge All Dioxin-Affected Areas > 10 ppt ENR in Eelgrass Beds**	**Alternative A-2 Except: Dredge All Dioxin-Affected Areas > 10 ppt ENR in Eelgrass Beds**
Nearshore Surface Debris and Marine Structure Removal[a]	Yes	Yes	Yes	Yes	Yes
Shoreline Protective Features (To Be Confirmed)	Yes	Yes	Yes	Yes	Yes
Wood Waste and Sediment Removal					
Nearshore: MHHW to 50 Feet Seaward Land-Based Equipment					
Excavate All Areas > 25 ppt Dioxin TEC	Yes	Yes	Yes	Yes	Yes
Excavate Remaining Wood Waste and Dioxin TEC > 10 ppt up to 6 Feet Below Surface Grade	Yes	No	Yes	Yes	Yes
Excavate Remaining Wood Waste and Dioxin TEC > 10 ppt up to 2 Feet Below Surface Grade	Included	Yes	Included	Included	Included
Offshore: Seaward of 50 Feet Beyond MHHW Barge-Based Equipment					
Dredge All Areas Where Dioxin TEC > 25 ppt	Yes	Yes	Yes	Yes	Yes
Dredge up to 6 Feet Below Grade Where Wood Waste > 1 Foot Thick	Yes Excludes Eelgrass Beds	No	No	Yes Excludes Eelgrass Beds	No
Dredge up to 2 Feet Below Grade Where Wood Waste > 1 Foot Thick	Included Excludes Eelgrass Beds	Yes Excludes Eelgrass Beds	Yes Excludes Eelgrass Beds	Included Excludes Eelgrass Beds	Yes Excludes Eelgrass Beds
Dredge All Areas Where Dioxin TEC > 10 ppt and < 25 ppt	Included Where Wood Waste > 1 Foot Thick Except Eelgrass Beds	Included Where Wood Waste > 1 Foot Thick Except Eelgrass Beds	Included Where Wood Waste > 1 Foot Thick Except Eelgrass Beds	All Affected Areas Except Eelgrass Beds	All Affected Areas Except Eelgrass Beds
Backfilling and Capping[c]					
Wave Erosion Zone Excavation and Dredging Areas					
Place Habitat Mix to Within 1 Foot of Existing Grade	Yes	Yes	Yes	Yes	Yes
Place Beach Armor Mix from Top of Habitat Mix to Existing Grade	Yes	Yes	Yes	Yes	Yes
Seaward of Wave Erosion Zone					
Place Habitat Mix to Existing Grade in Dredging Areas	Yes	Yes	Yes	Yes	Yes
Place ENR Thin-Layer Cap In Non-Dredging Areas					
Includes Wood Waste Areas Generally < 1 Foot Thick and Dioxin TEC < 25 ppt Includes Affected Eelgrass Beds	Yes	Yes	Yes	In Affected Eelgrass Bed Areas Only	In Affected Eelgrass Bed Areas Only
Points of Compliance	Upper 10 cm of Sediment Surface	Upper 10 cm of Sediment Surface	Upper 10 cm of Sediment Surface	Upper 10 cm of Sediment Surface	Upper 10 cm of Sediment Surface
Monitoring					
Post-Construction Sediment Confirmation Monitoring: Excavation/Dredge Cut Bottoms and Sidewalls	Yes	Yes	Yes	Yes	Yes
Long-Term Cap Performance/Protection Monitoring (Physical Integrity)	ENR Areas Only	Capped Excavation/Dredge and ENR Areas	Capped Excavation/Dredge and ENR Areas	Not Expected to Be Needed if Dioxin Removed to < Background Concentration	Capped Excavation/Dredge Areas
Institutional Controls					
MTCA Administrative Order Conditions	Yes	Yes	Yes	Yes	Yes
MTCA Site Listing	Yes	Yes	Yes	Yes	Yes
Potential City Administrative Restrictions?	ENR Areas Only?	Yes	Yes	No?	Yes
Long-Term Monitoring Requirements	Yes	Yes	Yes	Yes	Yes
Access and Deed Restrictions	ENR Areas Only?	Yes	Yes	Possibly Not Needed if Dioxin Removed to < Background Concentration	Possibly Not Needed if Dioxin Removed to < Background Concentration

Notes:
(a) Includes nearshore debris removal to approximately 2 feet below grade, and piling and other marine structures removal.
(b) Includes potential deeper excavation/dredging to remove sediments with dioxin/furan concentrations > 25 ppt.
(c) Backfilling applies to areas with residual wood waste < 1 foot thick and dioxin/furan concentrations less than background. Capping applies to areas with residual wood waste > 1 foot thick and dioxin/furan concentrations greater than background.

Table 8-3 - Upland and Aquatic Remediation Alternatives Estimated Cost Summary

	Upland Remediation Alternative				
	U-1	**U-2**	**U-3**	**U-4**	
Description	Excavate Soil To Human Health (HH) POC Long-Term Monitoring	Excavate Soil to Ecological POC Long-Term Monitoring and Institutional Controls	Excavate Soil to HH POC in Shoreline Protection Zonea and to Ecological POC Elsewhere on Property Long-Term Monitoring and Institutional Controls	Asphalt Pavement Cap Long-Term Monitoring and Institutional Controls	
Appendix C Cost Table Reference	C-U1	C-U2	C-U3	C-U4	
Construction Subtotal (Including 30% Contingency)	$5,261,000	$4,761,000	$4,794,000	$2,541,500	
Non-Construction Costs	$1,100,000	$1,005,000	$1,012,000	$582,000	
Mitigation	$704,000	$704,000	$704,000	$704,000	
Long-Term Monitoring and Maintenance (Annual and Periodic Costs)	$261,000	$261,000	$261,000	$819,000	
Estimated Total	**$7,326,000**	**$6,731,000**	**$6,771,000**	**$4,647,000**	
	Aquatic Remediation Alternative				
	A-1	**A-2**	**A-3**	**A-4**	**A-5**
Description	Deep Nearshore and Offshore Excavation/Dredging ENR in Non-Excavated/Dredged Areas Monitoring and Institutional Controls	Shallow Nearshore and Offshore Excavation/Dredgingb ENR in Non-Excavated/Dredged Areas Monitoring and Institutional Controls	Deep Nearshore and Shallow Offshore Excavation/Dredgingb ENR in Non-Excavated/Dredged Areas Monitoring and Institutional Controls	Alternative A-1 Except: Dredge All Dioxin-Affected Areas > 10 ppt ENR in Eelgrass Beds	Alternative A-2 Except: Dredge All Dioxin-Affected Areas > 10 ppt ENR in Eelgrass Beds
Appendix C Cost Table Reference	C-A1	C-A2	C-A3	C-A4	C-A5
Construction Subtotal (Including Shoreline Protection and 30% Contingency)	$13,236,600	$7,898,800	$9,375,600	$19,454,500	$14,176,500
Non-Construction Costs	$2,648,000	$1,924,000	$2,205,000	$3,730,000	$2,834,000
Long-Term Monitoring and Maintenance (Annual and Periodic Costs)	$695,000	$695,000	$695,000	$695,000	$695,000
Estimated Total					
	$16,579,600	$10,517,800	$12,275,600	$23,879,500	$17,705,500
Estimated Total	**16,580,000**	**10,518,000**	**12,276,000**	**23,880,000**	**17,706,000**

Estimated cost assumes an accuracy range of -30 to +50 percent.

Table 8-4 - Summary of MTCA Evaluation Criteria for Upland Remediation Alternatives

Criteria	Alternative			
	U-1	U-2	U-3	U-4
Criteria	**Excavate Soil To Human Health (HH) POC Long-Term Monitoring**	**Excavate Soil to Ecological POC Long-Term Monitoring and Institutional Controls**	**Excavate Soil to HH POC in Shoreline Protection Zone[a] and to Ecological POC Elsewhere on Property Long-Term Monitoring and Institutional Controls**	**Asphalt Pavement Cap Long-Term Monitoring and Institutional Controls**
MTCA Threshold Criteria WAC 173-340-360(2)(a)				
Protection of Human Health and the Environment	Yes	Yes (HH addressed to 6 feet depth)	Yes (HH addressed 6 feet depth landward of Shoreline Protection Zone)	Yes
Compliance with Cleanup Standards	Yes	Yes (Relative to conditional property boundary POC)	Yes (Relative to conditional property boundary POC)	Yes (Relative to conditional property boundary POC)
Compliance with ARARs	Yes	Yes	Yes	Yes
Provision for Compliance Monitoring	Yes	Yes	Yes	Yes
Other MTCA Evaluation Criteria WAC 173-340-360(2)(b)				
Permanence	Yes	Yes	Yes	Yes
Restoration Time Frame	<1 Year[b]	<1 Year[b]	<1 Year[b]	> 1 Year[c]
Consideration of Public Concerns	Yes	Yes	Yes	Yes
MTCA Disproportionate Cost Analysis DCA - WAC 173-340-360(3)(f)[d]				
Protectiveness (30%)	1.5	1.1	1.4	1.1
Permanence (20%)	0.9	0.7	0.8	0.7
Long-Term Effectiveness (20%)	1	0.7	0.9	0.7
Management of Short-Term Risks (10%)	0.45	0.4	0.4	0.5
Technical and Administrative Implementability (10%)	0.5	0.5	0.5	0.4
Consideration of Public Concerns (10%)	0.5	0.35	0.5	0.4
Total Scores	4.9	3.7	4.4	3.8
Estimated Cost (+50% -30%)	**$7,326,000**	**$6,731,000**	**$6,771,000**	**$4,647,000**
Overall Alternative Ranking	1	4	2	3
% Benefit Compared with Lowest Ranking Alternative U-4	131%	100%	119%	1%
% Cost Difference Compared with Lowest Ranking Alternative	109%	100%	101%	-31%
Overall Cost Benefit (% Benefit - % Cost Difference from Base Case)	22%	0%	18%	32%
Cost Disproportionate?	No	Not Applicable	No	No

Table 8-5 - Summary of MTCA Evaluation Criteria for Aquatic Remediation Alternatives

Criteria	Alternative				
	A-1	A-2	A-3	A-4	A-5
Criteria	**Deep Nearshore and Offshore Excavation/Dredging ENR in Non-Excavated/Dredged Areas Monitoring and Institutional Controls**	**Shallow Nearshore and Offshore Excavation/Dredging[b] ENR in Non-Excavated/Dredged Areas Monitoring and Institutional Controls**	**Deep Nearshore and Shallow Offshore Excavation/Dredging[b] ENR in Non-Excavated/Dredged Areas Monitoring and Institutional Controls**	**Alternative A-1 Except: Dredge All Dioxin-Affected Areas > 10 ppt ENR in Eelgrass Beds**	**Alternative A-2 Except: Dredge All Dioxin-Affected Areas > 10 ppt ENR in Eelgrass Beds**
MTCA Threshold Criteria WAC 173-340-360(2)(a)					
Protection of Human Health and the Environment	Yes	Yes	Yes	Yes	Yes
Compliance with Cleanup Standards	Yes	Yes	Yes	Yes	Yes
Compliance with ARARs	Yes	Yes	Yes	Yes	Yes
Provision for Compliance Monitoring	Yes	Yes	Yes	Yes	Yes
Other MTCA Evaluation Criteria WAC 173-340-360(2)(b)					
Permanence	Yes	Yes	Yes	Yes	Yes
Restoration Time Frame	<1 Year[a]	<1 Year[a]	<1 Year[a]	<1 Year[a]	<1 Year[a]
Consideration of Public Concerns	Yes	Yes	Yes	Yes	Yes
MTCA Disproportionate Cost Analysis DCA - WAC 173-340-360(3)(f)[b]					
Protectiveness (30%)	1.4	0.9	1.2	1.1	0.9
Permanence (20%)	0.9	0.6	0.8	0.6	0.6
Long-Term Effectiveness (20%)	0.8	0.6	0.7	0.6	0.6
Management of Short-Term Risks (10%)	0.3	0.4	0.4	0.3	0.3
Technical and Administrative Implementability (10%)	0.4	0.4	0.4	0.3	0.3
Consideration of Public Concerns (10%)	0.3	0.3	0.3	0.3	0.3
Total Scores	4.0	3.2	3.7	3.2	3.0
Estimated Cost (+50% -30%)	**$16,580,000**	**$10,518,000**	**$12,276,000**	**$23,880,000**	**$17,706,000**
Overall Alternative Ranking	1	3	2	3	4
% Benefit Compared with Lowest Ranking Alternative A-5	133%	107%	123%	105%	100%
% Cost Difference Compared with Lowest Ranking Alternative	-6%	-41%	-31%	135%	100%
Overall Cost Benefit (% Benefit - % Cost Difference from Base Case)	39%	48%	54%	-30%	0%
Cost Disproportionate?	No	Not Applicable	No	**Yes**	**Yes**

Target Excavation Area and Depth in Feet Below Grade

4 Feet

6 Feet

8 Feet

MHHW Mean Higher High Water

OHW Ordinary High Water

5 Ground Surface Elevation Contour in Feet (NAVD 88)

B B' Cross Section Location and Designation

Notes:

1. Excavate up to 15 feet depth (Human Health Direct Contact Point of Compliance)
2. Excavations include nominal 1H:1V side walls from base of contaminated area and property boundaries
3. Target excavation areas located seaward of OHW to be excavated as part of aquatic remediation alternatives.
4. See Figure 5-1 for exploration locations and inferred extent of contamination.
5. Extent of contamination below 8 feet depth is generally uncertain and not included with excavation areas.
6. See Appendix B for stormwater swale and wetland mitigation/buffer element details.

0 100 200

Scale in Feet

Custom Plywood Site
Anacortes, Washington

Upland Remediation Alternative U-1

17330-27 (FS) 2/11

HARTCROWSER

Figure

8-1

JAB 01/31/11 1733027-FS-011.dwg

Target Excavation Area and Depth in Feet Below Grade

4 Feet

6 Feet

MHHW Mean Higher High Water

OHW Ordinary High Water

5 Ground Surface Elevation Contour in Feet (NAVD 88)

B B' Cross Section Location and Designation

Notes:

1. Excavate up to 6 feet depth (Ecological Point of Compliance).
2. Excavations include nominal 1H:1V side walls from base of contaminated area and property boundaries.
3. Target excavation areas located seaward of OHW to be excavated as part of aquatic remediation alternatives.
4. See Figure 5-1 for exploration locations and inferred extent of contamination.
5. See Appendix B for stormwater swale and wetland mitigation/buffer element details.

0 100 200

Scale in Feet

Custom Plywood Site
Anacortes, Washington

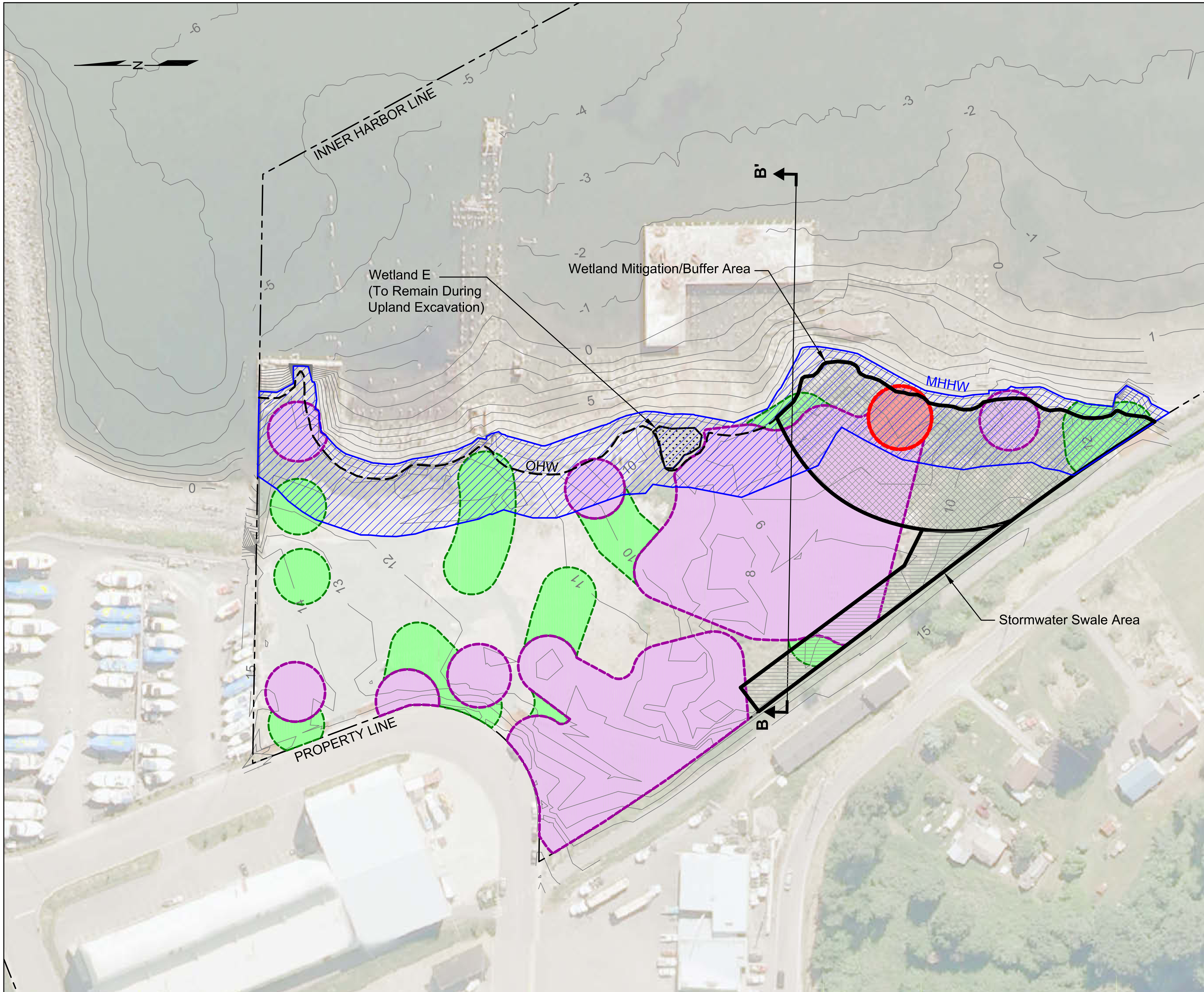
Upland Remediation Alternative U-2

17330-27 (FS) 2/11

HARTCROWSER

Figure **8-2**

JAB 01/31/11 1733027-FS-012.dwg



Target Excavation Area and Depth in Feet Below Grade

- 4 Feet
- 6 Feet
- 8 Feet

Shoreline Protection Zone (75 Feet Landward of MHHW)

MHHW Mean Higher High Water

OHW Ordinary High Water

—5— Ground Surface Elevation Contour in Feet (NAVD 88)

B B' Cross Section Location and Designation

Notes:

1. Excavate up to 15 feet depth (Human Health Point of Compliance) in shoreline protection zone and up to 6-feet depth (Ecological POC) elsewhere.
2. Excavations include nominal 1H:1V side walls from base of contaminated area and property boundaries.
3. Target excavation areas located seaward of OHW to be excavated as part of aquatic remediation alternatives.
4. See Figure 5-1 for exploration locations and inferred extent of contamination.
5. Extent of contamination below 8 feet depth is generally uncertain and not included with excavation areas.
6. See Appendix B for stormwater swale and wetland mitigation/buffer element details.

0 100 200
Scale in Feet

Custom Plywood Site
Anacortes, Washington

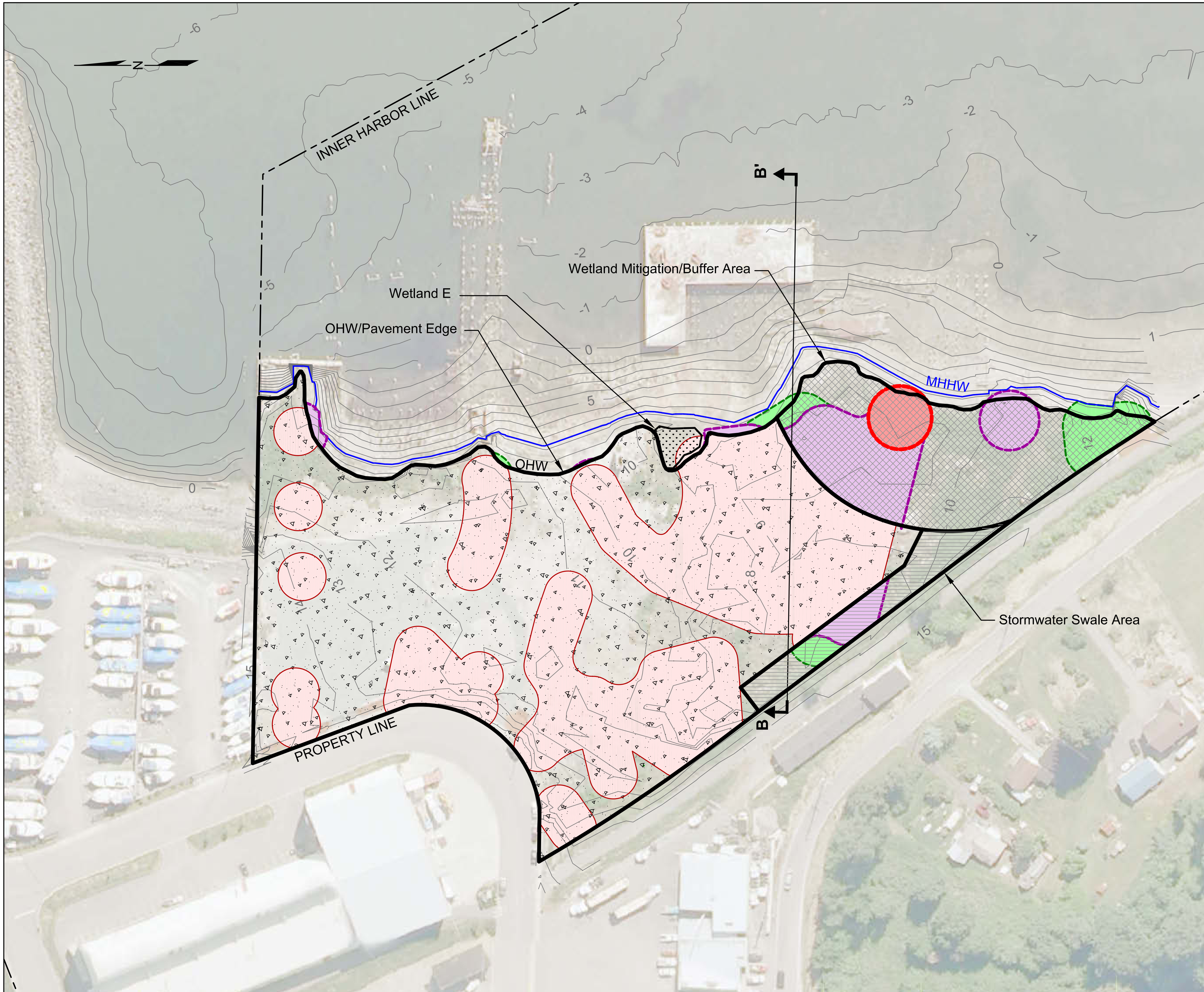
Upland Remediation Alternative U-3

17330-27 (FS) 2/11

HARTCROWSER

Figure
8-3

JAB 01/31/11 1733027-FS-013.dwg



Target Excavation Area and Depth in Feet Below Grade

- 4 Feet
- 6 Feet
- 8 Feet
- COC Sceening Level Exceedance in Soil (Up to 8 Feet Deep)
- 2-Inch-Thick Asphalt Pavement Cap Over Minimum 2-Foot-Thick Prepared Subgrade
- MHHW Mean Higher High Water
- OHW Ordinary High Water
- B B' Cross Section Location and Designation

Notes:

1. In stormwater swale and wetland mitigation/buffer areas only: excavate up to 15 feet depth (Human Health Point of Compliance) in shoreline protection zone and press pits area, and up to 6 feet depth (Ecological POC) elsewhere.
2. Excavations include nominal 1H:1V side walls from base of contaminated area and property boundaries.
3. Target excavation areas located seaward of OHW to be excavated as part of aquatic remediation alternatives.
4. See Figure 5-1 for exploration locations and inferred extent of contamination.
5. Extent of contamination below 8 feet depth is generally uncertain and not included with excavation areas.
6. See Appendix B for stormwater swale and wetland mitigation/buffer element details.

0 100 200
Scale in Feet

Custom Plywood Site
Anacortes, Washington

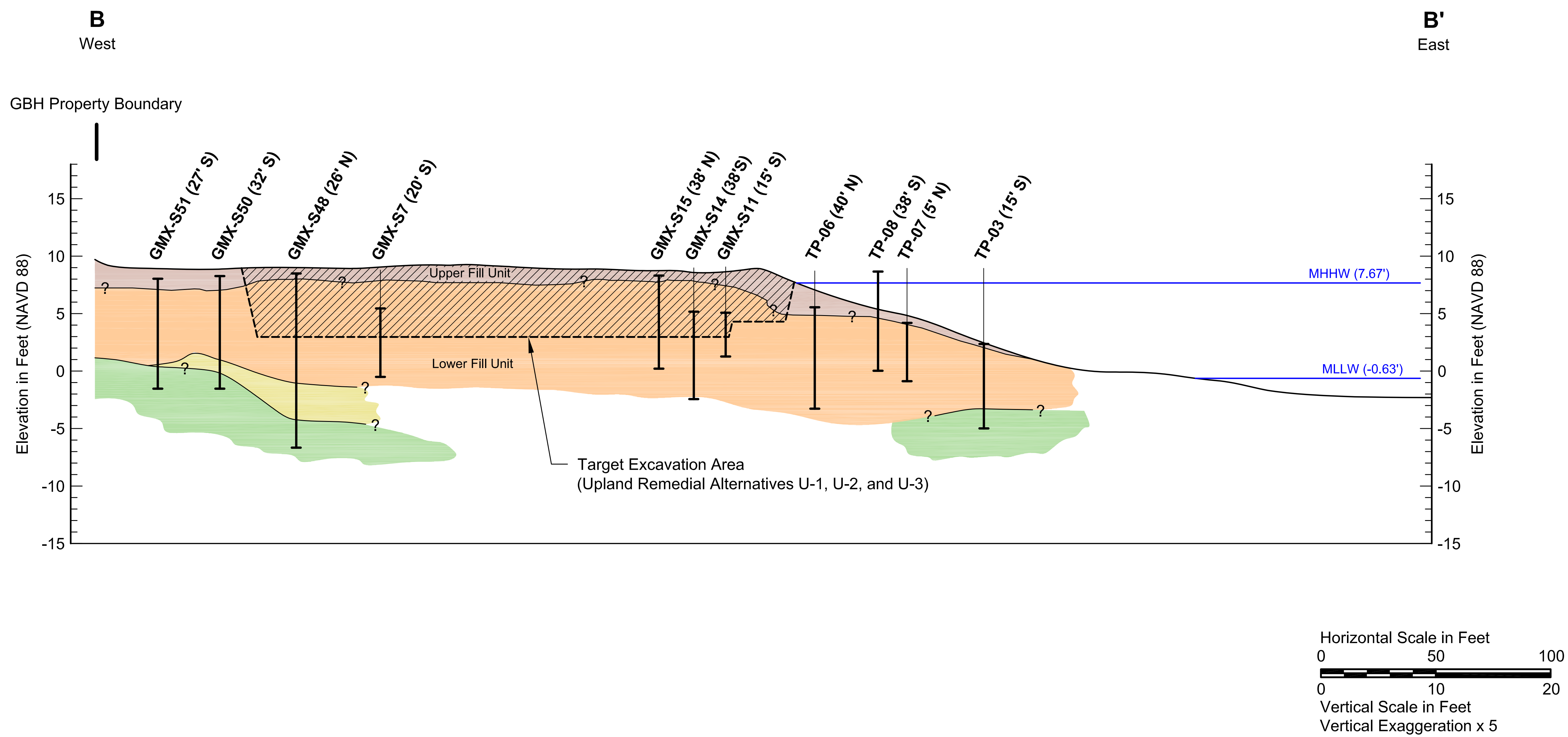
Upland Remediation Alternative U-4

17330-27 (FS) 2/11

HARTCROWSER

Figure
8-4

JAB 01/31/11 1733027-FS-014.dwg



Upper Fill Unit	Sandy and Gravelly Fill
Lower Fill Unit	Fine-Grained Wood (Sawdust to Bark Chip Sized) with Scattered Logs
	Sandy Silt and Silty Sand
	Native Clay

GMX-S51 (27' S) Exploration Name and Offset Distance and Direction

Exploration Location

MHHW Mean Higher High Water

MLLW Mean Lower Low Water

Note: Subsurface units modified slightly from Figures presented in AMEC Geomatrix 2010.

Custom Plywood Site
Anacortes, Washington

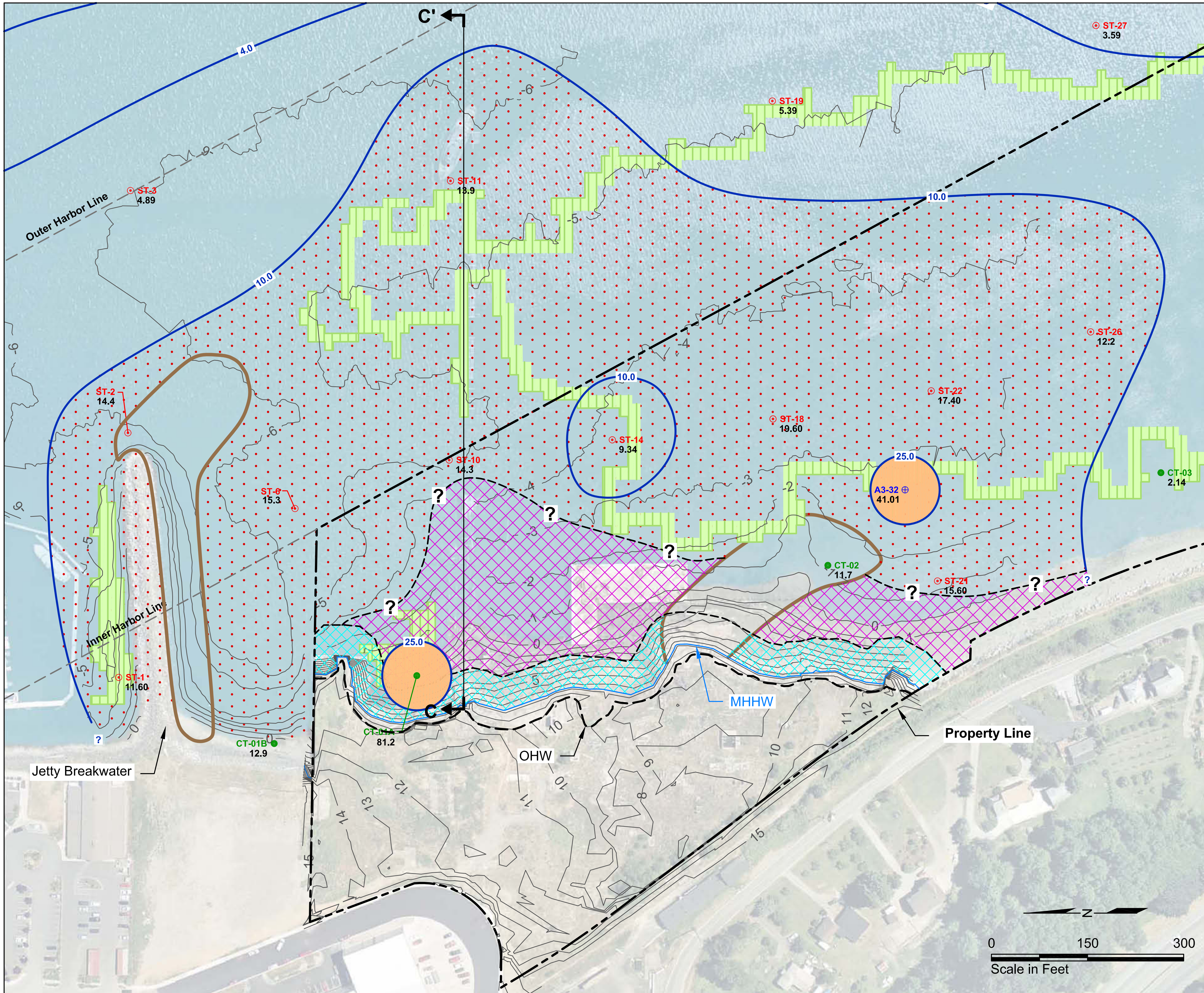
Cross Section B-B'
(Upland Soil Remedial Alternatives)

17330-27 (FS) 2/11

HARTCROWSER

Figure
8-5

JAB 02/1/11 1733027-FS-010.dwg



Excavate/dredge wood waste to contact with native sediments area where Dioxin TEC > 25 ppt

Excavate wood waste up to 6 feet below surface grade where Dioxin TEC > 10 ppt and < 25 ppt

Dredge wood waste up to 6 feet below surface grade where wood waste > 1-foot thick

Place ENR thin cap where wood waste generally > 1-foot thick and Dioxin TEC < 25 ppt

Sediment Dioxin Sample Location and Number

CT-01A ● SAIC, 2010

A3-23 ⊕ SAIC, 2008

ST-1 ⊙ Geomatrix, 2008

A3-23 ⊕ 8.99 Discrete dioxin analysis with result in parts per trillion (ppt) TEC

2.5 Dioxin TEC Contour in ppt

Approximate Extent of Eelgrass Beds

Shoreline Protection Features In-Water Fill Footprint

C C' Cross Section Location and Designation

Notes:

1. Composited dioxin samples were not used to develop dioxin concentration contours.
2. See Figure 8-11 for capping and backfilling details.
3. Seaward of MHHW: Elevations in feet (MLLW).
4. Landward of MHHW: Elevations in feet (NAVD 88).

Source: Aerial photo courtesy of City of Anacortes, 2003.

Custom Plywood Site
Anacortes, Washington

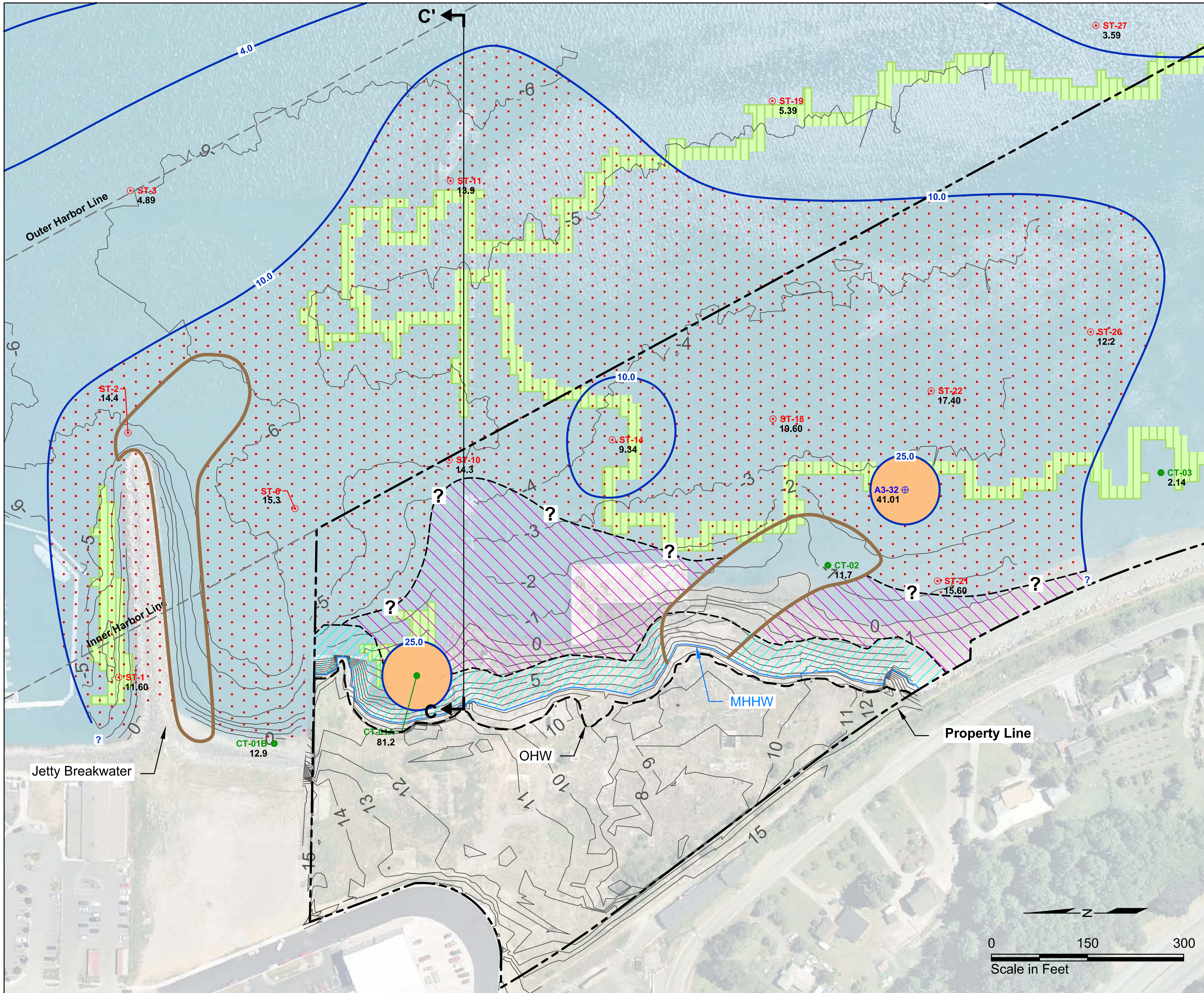
Aquatic Remediation Alternative A-1

17330-27 (FS) 2/11

HARTCROWSER

Figure
8-6

EAL 02/1/11 1733027-FS-015.dwg



Excavate/dredge wood waste to contact with native sediments area where Dioxin TEC > 25 ppt

Excavate wood waste up to 2 feet below surface grade where Dioxin TEC > 10 ppt and < 25 ppt

Dredge wood waste up to 2 feet below surface grade where wood waste > 1-foot thick

Place ENR thin cap where wood waste generally > 1-foot thick and Dioxin TEC < 25 ppt

Bolded items are same for Aquatic Remediation Alternative A-1 (Figure 8-6)

Sediment Dioxin Sample Location and Number

CT-01A ● SAIC, 2010

A3-23 ⊕ SAIC, 2008

ST-1 ⊙ Geomatrix, 2008

A3-23 ⊕ 8.99 Discrete dioxin analysis with result in parts per trillion (ppt) TEC

2.5 Dioxin TEC Contour in ppt

Approximate Extent of Eelgrass Beds

Shoreline Protection Features In-Water Fill Footprint

C C' Cross Section Location and Designation

Notes:

1. Composited dioxin samples were not used to develop dioxin concentration contours.
2. See Figure 8-12 for capping and backfilling details.
3. Seaward of MHHW: Elevations in feet (MLLW).
4. Landward of MHHW: Elevations in feet (NAVD 88).

Source: Aerial photo courtesy of City of Anacortes, 2003.

0 150 300
Scale in Feet

Custom Plywood Site
Anacortes, Washington

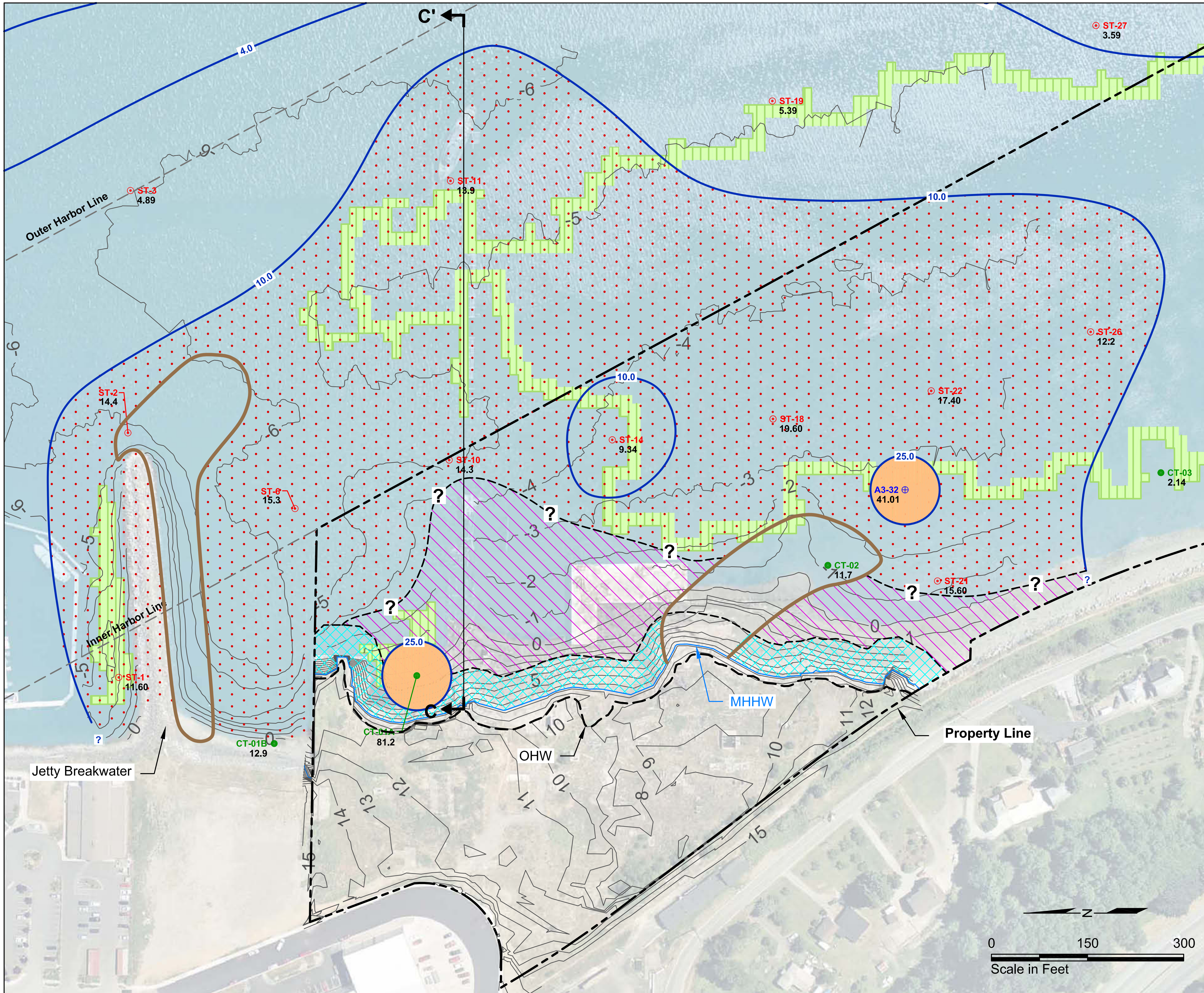
Aquatic Remediation Alternative A-2

17330-27 (FS) 2/11

HARTCROWSER

Figure
8-7

EAL 02/1/11 1733027-FS-016.dwg



Excavate/dredge wood waste to contact with native sediments area where Dioxin TEC > 25 ppt

Excavate wood waste up to 6 feet below surface grade where Dioxin TEC > 10 ppt and < 25 ppt

Dredge wood waste up to 2 feet below surface grade where wood waste > 1-foot thick

Place ENR thin cap where wood waste generally > 1-foot thick and Dioxin TEC < 25 ppt

Bolded items are same for Aquatic Remediation Alternative A-1 (Figure 8-6)

Sediment Dioxin Sample Location and Number

CT-01A ● SAIC, 2010

A3-23 ⊕ SAIC, 2008

ST-1 ⊙ Geomatrix, 2008

A3-23 ⊕ 8.99 Discrete dioxin analysis with result in parts per trillion (ppt) TEC

2.5 Dioxin TEC Contour in ppt

Approximate Extent of Eelgrass Beds

Shoreline Protection Features In-Water Fill Footprint

C C' Cross Section Location and Designation

Notes:

1. Composited dioxin samples were not used to develop dioxin concentration contours.
2. See Figure 8-13 for capping and backfilling details.
3. Seaward of MHHW: Elevations in feet (MLLW).
4. Landward of MHHW: Elevations in feet (NAVD 88).

Source: Aerial photo courtesy of City of Anacortes, 2003.

Custom Plywood Site
Anacortes, Washington

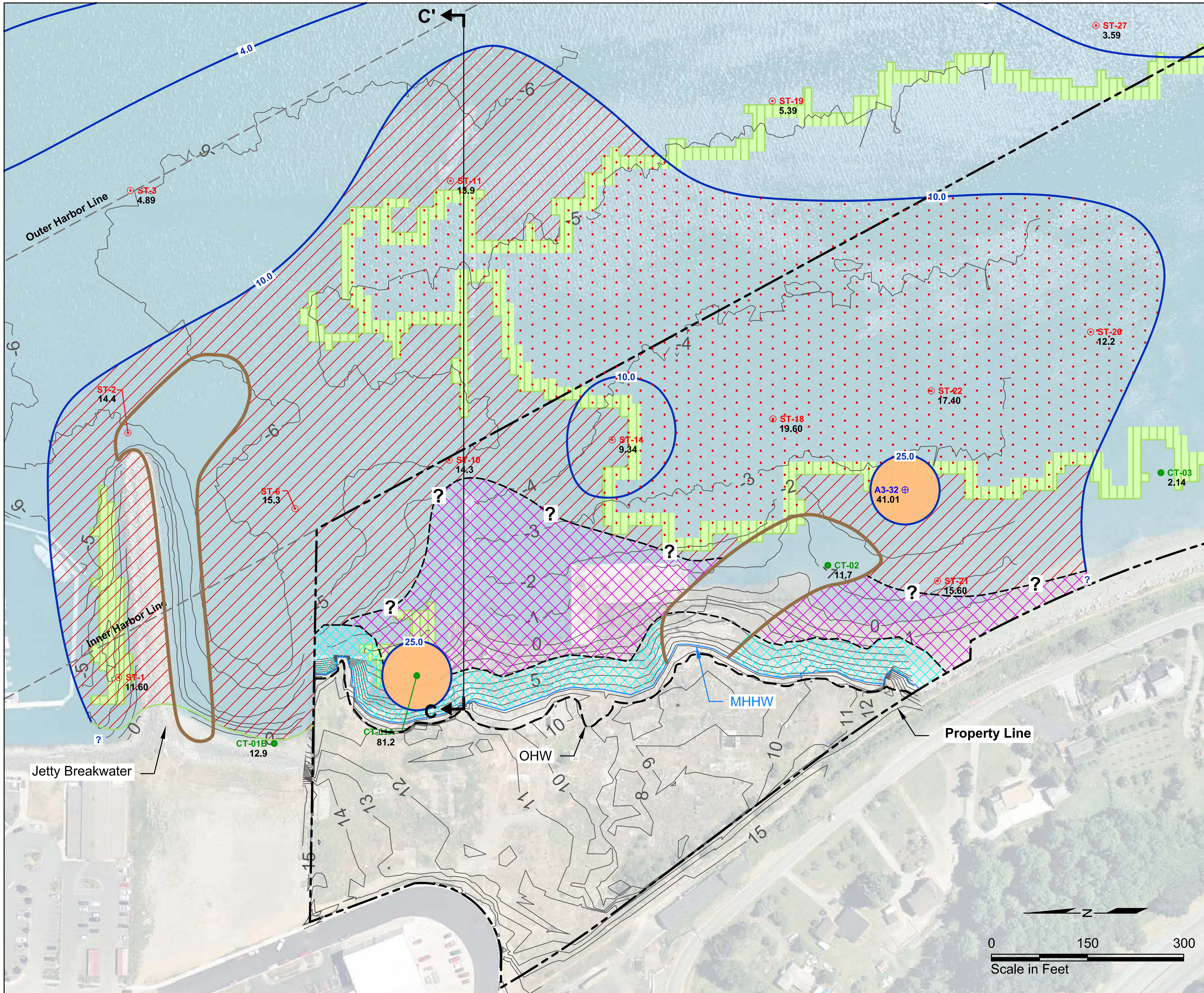
Aquatic Remediation Alternative A-3

17330-27 (FS) 2/11

HARTCROWSER

Figure **8-8**

EAL 02/1/11 1733027-FS-017.dwg



Excavate/dredge wood waste to contact with native sediments area where Dioxin TEC > 25 ppt

Excavate wood waste up to 6 feet below surface grade where Dioxin TEC > 10 ppt and < 25 ppt

Dredge wood waste up to 6 feet below surface grade where wood waste > 1-foot thick

Dredge to 2 feet below surface grade where Dioxin TEC > 10 ppt

Place ENR thin cap where wood waste generally > 1-foot thick and Dioxin TEC < 25 ppt

Bolded items are same for Aquatic Remediation Alternative A-1 (Figure 8-6)

Sediment Dioxin Sample Location and Number

CT-01A SAIC, 2010

A3-23 SAIC, 2008

ST-1 Geomatrix, 2008

A3-23 8.99 Discrete dioxin analysis with result in parts per trillion (ppt) TEC

2.5 Dioxin TEC Contour in ppt

Approximate Extent of Eelgrass Beds

Shoreline Protection Features In-Water Fill Footprint

C C' Cross Section Location and Designation

Notes:

1. Composited dioxin samples were not used to develop dioxin concentration contours.
2. See Figure 8-14 for capping and backfilling details.
3. Seaward of MHHW: Elevations in feet (MLLW).
4. Landward of MHHW: Elevations in feet (NAVD 88).

Source: Aerial photo courtesy of City of Anacortes, 2003.

Custom Plywood Site
Anacortes, Washington

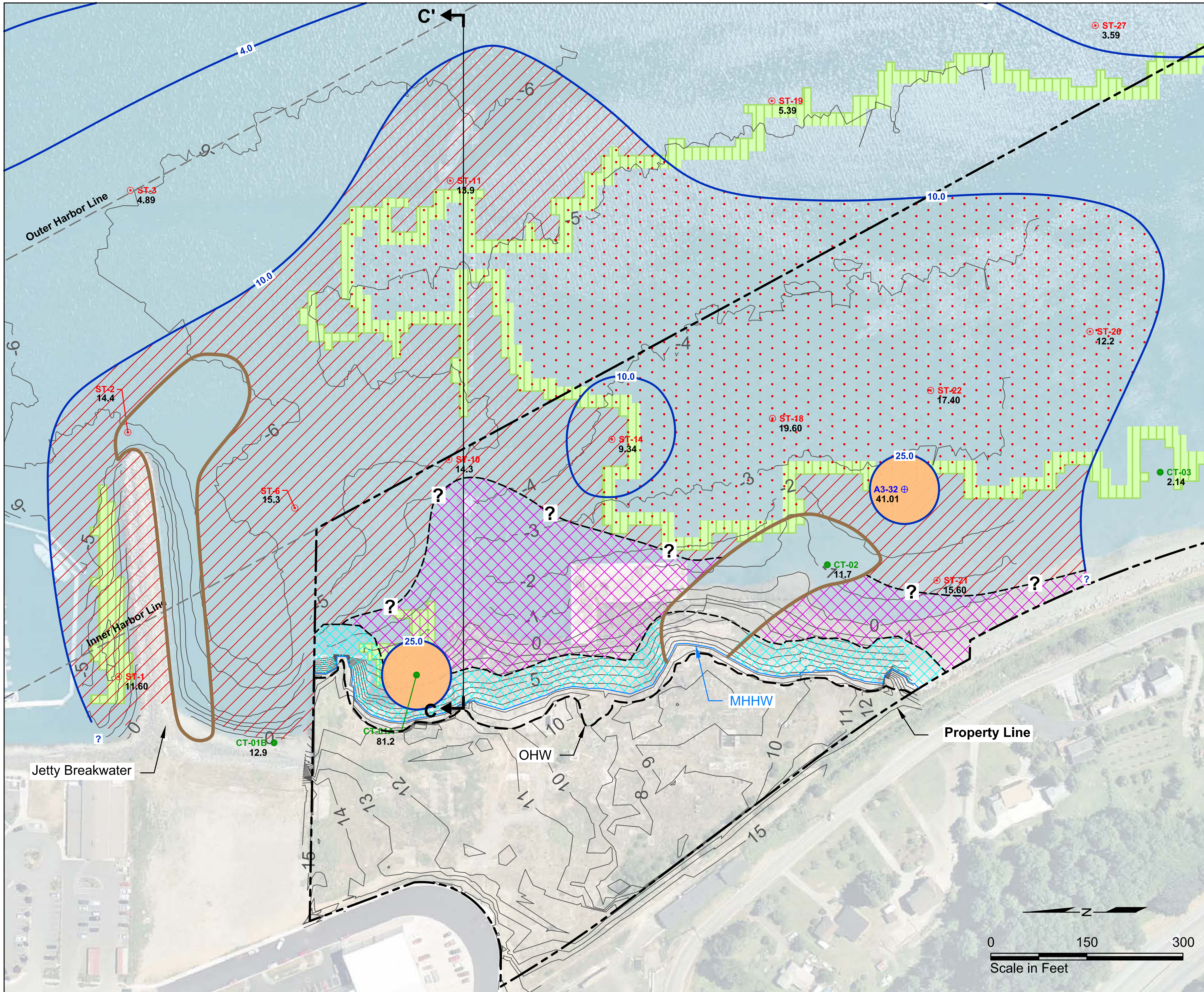
Aquatic Remediation Alternative A-4

17330-27 (FS) 2/11

HARTCROWSER

Figure **8-9**

EAL 02/1/11 1733027-FS-018.dwg



Excavate/dredge wood waste to contact with native sediments area where Dioxin TEC > 25 ppt

Excavate wood waste up to 2 feet below surface grade where Dioxin TEC > 10 ppt and < 25 ppt

Dredge wood waste up to 2 feet below surface grade where wood waste > 1-foot thick

Dredge to 2 feet below surface grade where Dioxin TEC > 10 ppt

Place ENR thin cap where wood waste generally > 1-foot thick and Dioxin TEC < 25 ppt

Bolded items are same for Aquatic Remediation Alternative A-1 (Figure 8-6)

Sediment Dioxin Sample Location and Number

CT-01A ● SAIC, 2010

A3-23 ⊕ SAIC, 2008

ST-1 ⊙ Geomatrix, 2008

A3-23 ⊕ 8.99 Discrete dioxin analysis with result in parts per trillion (ppt) TEC

2.5 Dioxin TEC Contour in ppt

Approximate Extent of Eelgrass Beds

Shoreline Protection Features In-Water Fill Footprint

C C' Cross Section Location and Designation

Notes:

1. Composited dioxin samples were not used to develop dioxin concentration contours.
2. See Figure 8-14 for capping and backfilling details.
3. Seaward of MHHW: Elevations in feet (MLLW).
4. Landward of MHHW: Elevations in feet (NAVD 88).

Source: Aerial photo courtesy of City of Anacortes, 2003.

Custom Plywood Site
Anacortes, Washington

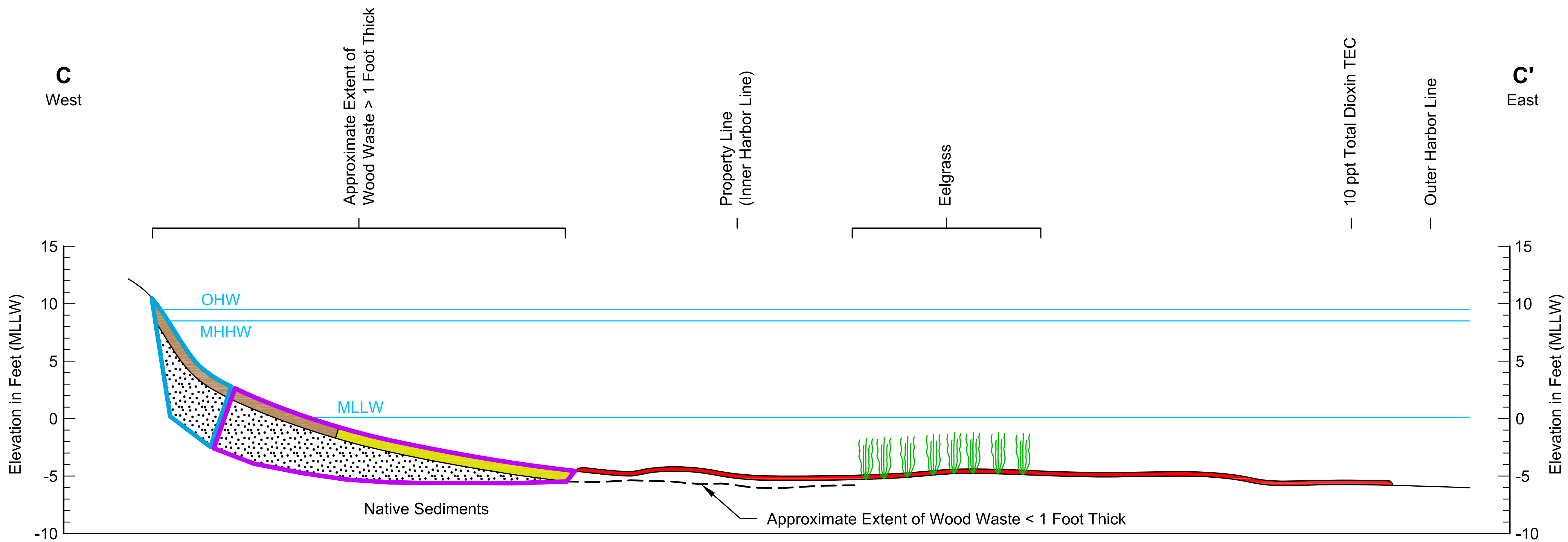
Aquatic Remediation Alternative A-5

17330-27 (FS) 2/11

HARTCROWSER

Figure **8-10**

EAL 02/1/11 1733027-FS-019.dwg



Excavate wood waste up to 6 feet below surface grade where Dioxin TEC > 10 ppt and < 25 ppt

Dredge wood waste up to 6 feet below surface grade where wood waste > 1-foot thick

Place ENR thin cap where wood waste generally > 1-foot thick and Dioxin TEC < 25 ppt

Excavation Backfill/Capping Materials

Gravelly Sand Over Quarry Spalls*

3-Inch Minus Gravel Surface Soft Armor

1-Inch Minus Sandy Gravel Soft Armor

* Reused ballast from temporary roads and crane pads.

MHHW Mean Higher High Water

MLLW Mean Lower Low Water

OHW Ordinary High Water

Horizontal Scale in Feet
0 100 200

0 10 20
Vertical Scale in Feet
Vertical Exaggeration x 10

Note: Alternative A-1 includes deep nearshore and offshore excavation/dredging, and ENR in unexcavated/dredged areas.

Custom Plywood Site
Anacortes, Washington

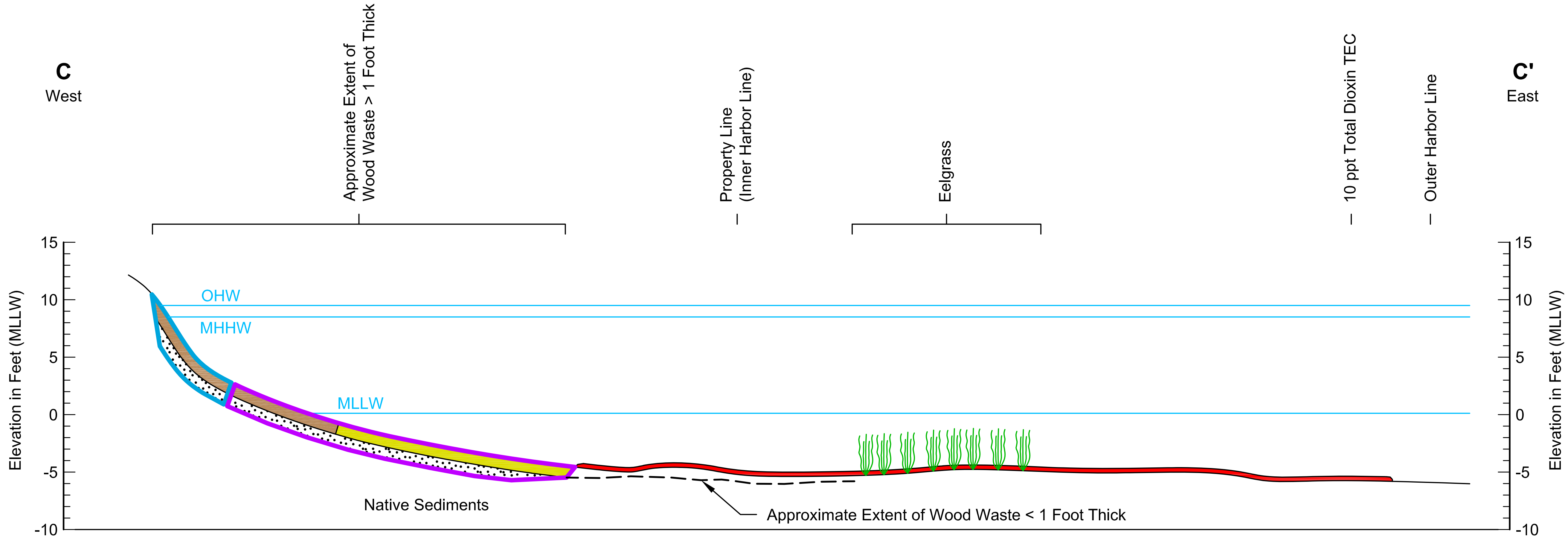
Cross Section C-C'
Aquatic Remediation Alternative A-1

17330-27 (FS) 2/11

HARTCROWSER

Figure
8-11

EAL 02/1/11 1733027-FS-020.dwg



Excavate wood waste up to 2 feet below surface grade where Dioxin TEC > 10 ppt and < 25 ppt

Dredge wood waste up to 2 feet below surface grade where wood waste > 1-foot thick

Place ENR thin cap where wood waste generally > 1-foot thick and Dioxin TEC < 25 ppt

Note: Alternative A-2 includes shallow nearshore and offshore excavation/dredging, and ENR in unexcavated/dredged areas.

Excavation Backfill/Capping Materials

Gravelly Sand Over Quarry Spalls*

3-Inch Minus Gravel Surface Soft Armor

1-Inch Minus Sandy Gravel Soft Armor

* Reused ballast from temporary roads and crane pads.

MHHW Mean Higher High Water

MLLW Mean Lower Low Water

OHW Ordinary High Water

Horizontal Scale in Feet: 0, 100, 200

Vertical Scale in Feet: 0, 10, 20

Vertical Exaggeration x 10

Custom Plywood Site
Anacortes, Washington

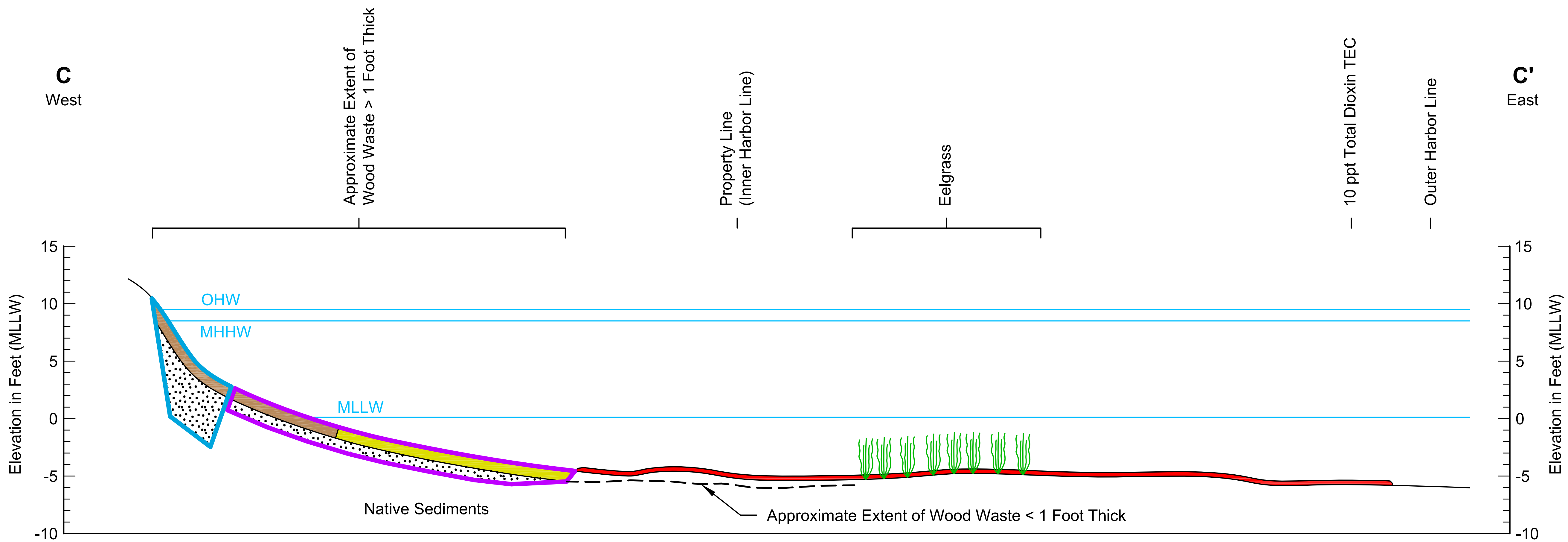
Cross Section C-C'
Aquatic Remediation Alternative A-2

17330-27 (FS) 2/11

HARTCROWSER

Figure **8-12**

EAL 02/1/11 1733027-FS-021.dwg



Excavate wood waste up to 6 feet below surface grade where Dioxin TEC > 10 ppt and < 25 ppt

Dredge wood waste up to 2 feet below surface grade where wood waste > 1-foot thick

Place ENR thin cap where wood waste generally > 1-foot thick and Dioxin TEC < 25 ppt

Excavation Backfill/Capping Materials

Gravelly Sand Over Quarry Spalls*

3-Inch Minus Gravel Surface Soft Armor

1-Inch Minus Sandy Gravel Soft Armor

* Reused ballast from temporary roads and crane pads.

MHHW Mean Higher High Water

MLLW Mean Lower Low Water

OHW Ordinary High Water

Horizontal Scale in Feet
0 100 200

0 10 20
Vertical Scale in Feet
Vertical Exaggeration x 10

Note: Alternative A-3 includes deep nearshore and shallow offshore excavation/dredging, and ENR in unexcavated/dredged areas.

Custom Plywood Site
Anacortes, Washington

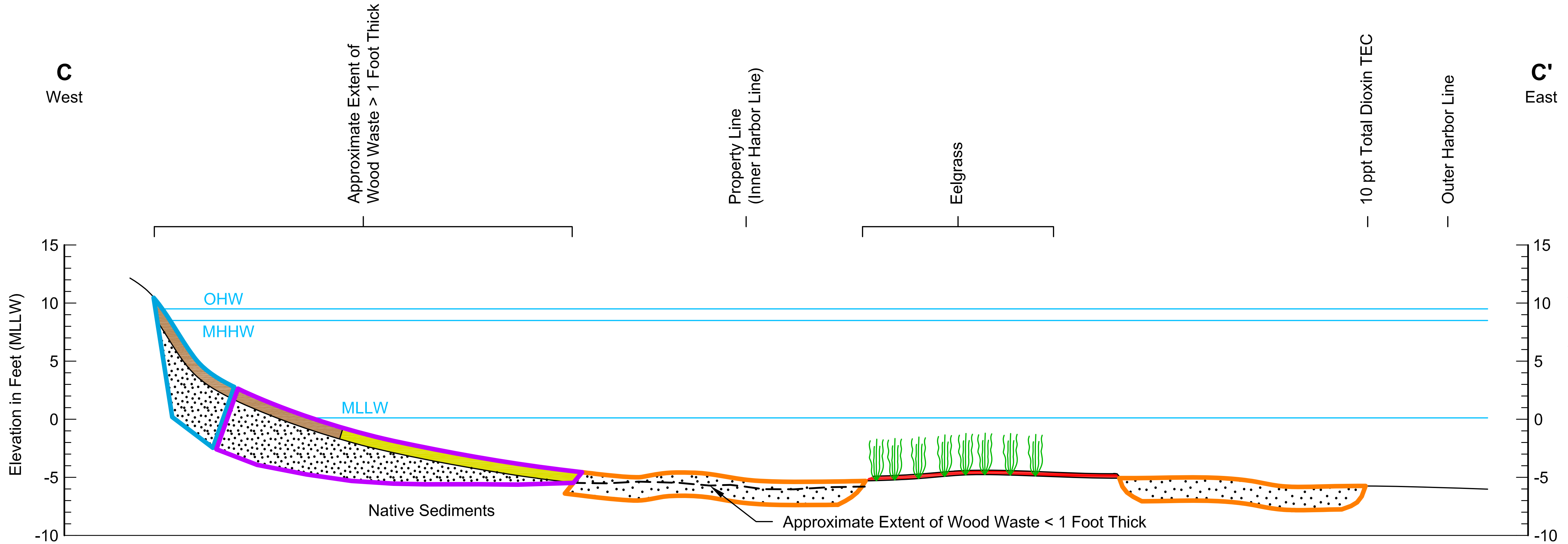
Cross Section C-C'
Aquatic Remediation Alternative A-3

17330-27 (FS) 2/11

HARTCROWSER

Figure
8-13

EAL 02/1/11 1733027-FS-022.dwg



Excavate wood waste up to 6 feet below surface grade where Dioxin TEC > 10 ppt and < 25 ppt

Dredge wood waste up to 6 feet below surface grade where wood waste > 1-foot thick

Dredge areas where Dioxin TEC > 10 ppt and < 25 ppt

Place ENR thin cap where wood waste generally > 1-foot thick and Dioxin TEC < 25 ppt

Note: Alternative A-4 is the same as Alternative A-1 except all dioxin-affected areas > 10 ppt dredged, and ENR limited to eelgrass beds.

Excavation Backfill/Capping Materials

Gravelly Sand Over Quarry Spalls*

Gravelly Sand (No Quarry Spalls)

3-Inch Minus Gravel Surface Soft Armor

1-Inch Minus Sandy Gravel Soft Armor

* Reused ballast from temporary roads and crane pads.

MHHW Mean Higher High Water

MLLW Mean Lower Low Water

OHW Ordinary High Water

Horizontal Scale in Feet
0 100 200

0 10 20
Vertical Scale in Feet
Vertical Exaggeration x 10

Custom Plywood Site
Anacortes, Washington

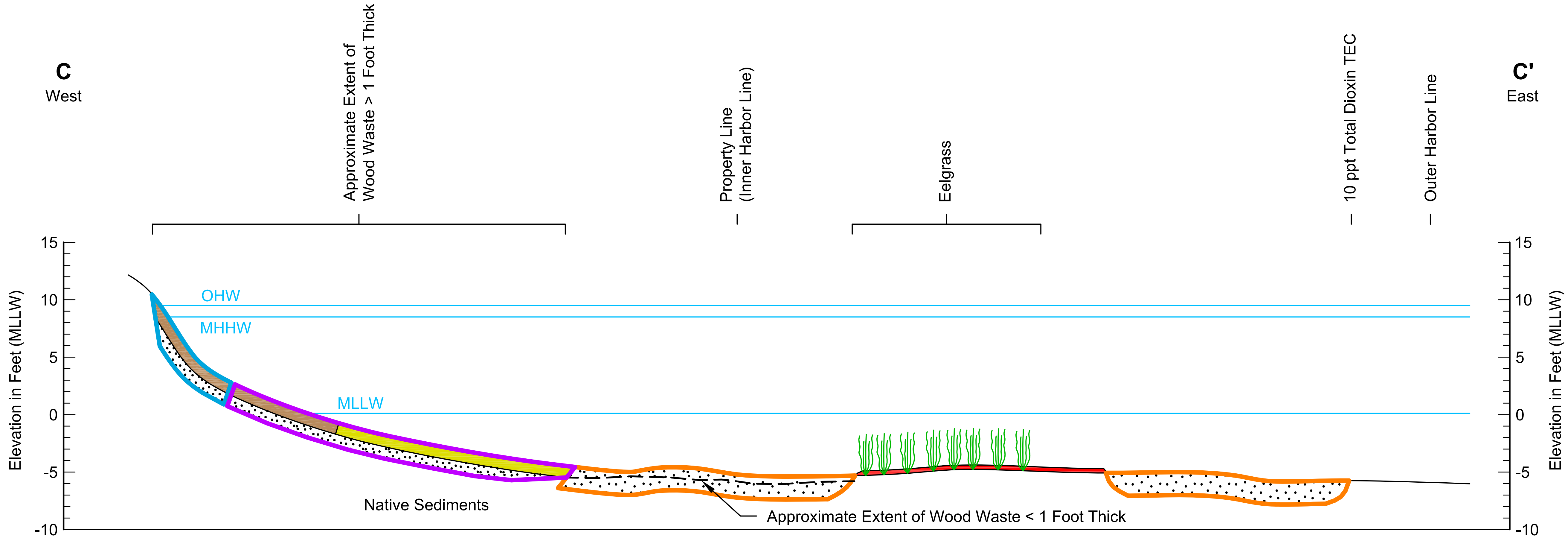
Cross Section C-C'
Aquatic Remediation Alternative A-4

17330-27 (FS) 2/11

HARTCROWSER

Figure
8-14

EAL 02/1/11 1733027-FS-023.dwg



Excavate wood waste up to 2 feet below surface grade where Dioxin TEC > 10 ppt and < 25 ppt

Dredge wood waste up to 2 feet below surface grade where wood waste > 1-foot thick

Dredge areas where Dioxin TEC > 10 ppt and < 25 ppt

Place ENR thin cap where wood waste generally > 1-foot thick and Dioxin TEC < 25 ppt

Excavation Backfill/Capping Materials

Gravelly Sand Over Quarry Spalls*

Gravelly Sand (No Quarry Spalls)

3-Inch Minus Gravel Surface Soft Armor

1-Inch Minus Sandy Gravel Soft Armor

* Reused ballast from temporary roads and crane pads.

MHHW Mean Higher High Water

MLLW Mean Lower Low Water

OHW Ordinary High Water

Horizontal Scale in Feet
0 100 200
0 10 20
Vertical Scale in Feet
Vertical Exaggeration x 10

Note: Alternative A-5 is the same as Alternative A-2 except all dioxin-affected areas > 10 ppt dredged, and ENR limited to eelgrass beds.

Custom Plywood Site
Anacortes, Washington

Cross Section C-C'
Aquatic Remediation Alternative A-5

17330-27 (FS) 2/11

HARTCROWSER

Figure
8-15

EAL 02/1/11 1733027-FS-024.dwg

9.0 PREFERRED ALTERNATIVE RECOMMENDATIONS

This section identifies the preferred remedial alternatives for the upland and aquatic components of the Custom Plywood FS, and provides recommendations for the implementation of interim remedial action. Remedy selection is discussed in the context of MTCA and SMS cleanup decision criteria described in Section 7.0 and alternatives evaluation presented in Section 8.0. Remedy implementation and estimated costs are further evaluated and in the CAP, EDR, and supporting documents. The cleanup action alternative will be selected following public review of the Interim Action Work Plan.

Upland remediation (or construction) is scheduled to be completed in the summer of 2011 as Phase I of interim remedy implementation at the Custom Plywood site. Upland remediation will extend seaward to OHW, with subsequent aquatic remediation envisioned as occurring in Phase II, beginning in 2013 and continuing through 2015. Aquatic remediation will be conducted for a prolonged period as a cost/budgeting management measure.

9.1 Upland Remediation (Phase I) – Preferred Alternative U-3

Alternative U-3 is identified as the preferred upland remediation alternative for the GBH property portion of the Custom Plywood Site (Figure 8-3). As a robust source control action, implementing Alternative U-3 will remove soil in the Shoreline Protection Zone where contaminant concentrations exceed preliminary cleanup levels to a depth of up to 15 feet bgs. This alternative not only addresses protection of the human health direct contact exposure pathway, but removes soils as a secondary source of contamination via the groundwater to surface water and soil erosion pathways. Implementing Alternative U-3 adequately addresses MTCA and SMS evaluation criteria for cleanup decisions, and completes remediation with a high degree of protection, permanence, and long-term effectiveness in a reasonable time frame. Contaminant sources in soil are removed concurrently with excavation, which in turn, provides long-term protection for the groundwater to surface water pathway.

Although none of the other upland alternatives evaluated were cost disproportionate relative to Alternative U-3, they did provide commensurate protectiveness, permanence, long-term effectiveness, and other benefits.

Alternative U-3 will be implemented with appropriate institutional controls including a periodic monitoring of site groundwater quality to evaluate long-term remedy performance. At a minimum, groundwater will be monitored quarterly for at least two years following completion of Phase II in-water construction, and annually for five years thereafter. Monitoring results and frequency will be closely evaluated to determine the adequacy of this approach. Ecology will evaluate longer-term monitoring requirements as part of planned 5-year reviews. Monitoring will continue for a nominal duration of about 30 years, or until monitoring results indicate stable water quality conditions with concentrations of chemical constituents below cleanup levels. An Operations, Maintenance, and Monitoring Plan will be prepared to further detail scheduling of specific monitoring events and long-term performance criteria.

9.1.1 Considerations for Upland Remedy Implementation

Upland remediation includes wetland mitigation measures to create a new pocket estuarine wetland complex and associated buffer area to compensate for loss of existing site wetland during upland soil removal. Wetland mitigation will occur concurrently with upland remediation; however, the berm separating the estuarine complex with waters of Fidalgo Bay constitutes an in-water work action with additional permitting requirements beyond those contemplated for upland remediation Phase I. For this reason, the berm will not be breached until aquatic remediation Phase II is completed. Although berm breaching is not planned until this time, the estuarine wetland will be fully functional in 2011 because of tidal seepage through the berm. In addition, stormwater management improvements including the construction of the bioswale and other conveyance structures will be completed in 2011 as part of the overall upland remediation.

Post-construction monitoring will commence in late 2012 or early 2013 to assess the efficacy of remediation. Although exceedances of groundwater cleanup levels are not anticipated after construction on a persistent basis, other actions as necessary, will be considered, including potential site capping as described for Alternative U-4, should monitoring identify such exceedances.

9.2 Aquatic Remediation and Hazard Removal (Phase II) – Preferred Alternative A-3

Alternative A-3 is identified as the preferred aquatic remediation alternative for the portion of the Custom Plywood Site bounded by the 10 ppt total dioxin TEC contour (Figures 8-8 and 8-13). Implementing Alternative A-3 will remove near-surface debris and relatively thick accumulations of wood waste in the nearshore zone to a depth of 6 feet below the existing mudline. Seaward accumulations of wood waste will be removed to a depth of up to 2 feet below mudline where wood waste is more than 1 foot thick. Wood waste excavation areas will be capped and/or backfilled (depending on whether residual wood waste remains at depth following excavation and dredging) with sandy material and soft surficial rock armoring as needed in the wave erosion zone. Areas with dioxin concentrations in excess of 25 ppt TEC will be removed to the base of wood waste fill, and other areas with dioxin concentrations between 10 and 25 ppt will be remediated using TLC methods as to achieve ENR.

Although none of the FS aquatic alternatives address other portions of the Custom Plywood Site with dioxin concentrations above the Fidalgo Bay background concentration, Alternative A-3 focuses on excavating, dredging, or capping areas with greatest accumulations of wood waste and the highest concentrations of dioxin as an Interim Action. Alternative A-3 provides the most cost-effective interim action strategy to reduce potential human health and ecological risks in the aquatic environment. Excavation, dredging, and capping measures for Alternative A- 3 achieve MTCA and SMS evaluation criteria for protectiveness, permanence, and long-term effectiveness. Alternative A-3 provides further value by minimizing short-term risks and related disruption to the aquatic environment. This alternative can be readily implemented in a reasonable time frame and should be able to be permitted given similar in-water cleanup projects in Puget Sound.

The other aquatic alternatives evaluated did not provide commensurate protectiveness, permanence, long-term effectiveness, and other benefits relative to Alternative A-3. Alternatives A-4 and A-5 involved more extensive dredging and were determined to cost disproportionate for the benefit achieved. Greater short-term risks may also potentially be associated with Alternatives A-4 and A-5 because of particulate resuspension during dredging.

Alternative A-3 will be implemented with appropriate institutional controls including a periodic monitoring of surface sediment quality to evaluate long-term remedy performance. Monitoring events would occur in 5-year increments following construction and continue over a nominal duration of about 30 years, or until monitoring results indicate stable sediment quality conditions based on SMS biological testing criteria and dioxin concentrations below a target interim action cleanup level equivalent to Fidalgo Bay background. The CAP and related planning documents further address scheduling of specific monitoring events and long-term performance criteria.

Considerations for Aquatic Remedy Implementation

Aquatic remediation includes mitigation measures to remove near-surface debris and overwater structures, and enhance and restore shoreline and nearshore habitat for forage fish spawning. Through construction of shoreline protection measures, relatively small-diameter rock (3-inch minus or smaller) can be placed as soft armoring to provide suitable habitat-friendly substrate. Shoreline protection measures include extending the City of Anacortes rock jetty located north of the GBH property and constructing a new spit with sandy material to shield shoreward areas from erosion and create protected leeward areas for habitat enhancement.

A further mitigation consideration is transplanting and/or replacing eelgrass affected by local dioxin hot spot dredging. Mitigation is planned to sustain no net loss of eelgrass, with transplanting occurring within the project boundaries prior to dredging.

Phase II also will include excavation and dredging of the thick wood waste accumulation and high concentrations dioxin areas. The later part of second phase of Alternative A-3 involving TLC placement for remaining portions of the interim action area is planned for 2013 or later.

Post-construction monitoring will commence in late 2013 or early 2014 following the first phase of in-water remediation, and in late 2015 or early 2016 following completion of the final in-water remediation. Performance monitoring is expected to rely on bioassay and dioxin chemical testing to assess the effectiveness of the interim remedial action. Any possible additional actions would be evaluated if performance monitoring reveals adverse toxicity and/or possible recontamination.

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APPENDIX A
SUPPLEMENTARY FIDALGO BAY AND CUSTOM PLYWOOD MILL SEDIMENT DIOXIN STUDY, ANACORTES, WA
SAIC DATA REPORT

APPENDIX A
SUPPLEMENTARY FIDALGO BAY AND CUSTOM PLYWOOD MILL SEDIMENT DIOXIN STUDY, ANACORTES, WA
SAIC DATA REPORT

Supplementary Fidalgo Bay and Custom Plywood Mill Sediment Dioxin Study Anacortes, WA

Data Report

Prepared for

Washington State Department of Ecology
Toxics Cleanup Program
300 Desmond Drive
Lacey, WA 98504

Prepared by

Science Applications International Corporation
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

October 14, 2010

Table of Contents

Appendices

Figures

Tables

List of Acronyms

BSAF	Biota Sediment Accumulation Factor
CSL	Contaminant Screening Level
dw	dry weight
Ecology	Washington State Department of Ecology
GBH	GBH Investments LLC
IDW	inverse distance weighted
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
pg/g	picograms per gram
PSEP	Puget Sound Estuary Program
QAPP	Quality Assurance Project Plan
RI/FS	Remedial Investigation/Feasibility Study
RL	reporting limit
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SDG	sample delivery group
SMS	Sediment Management Standards
SQS	Sediment Quality Standard
TBT	tributyltin
TCP	Toxics Cleanup Program
TEF	toxic equivalency factor
TEC	toxic equivalent concentration (per WAC 173-340-708(8) (d) (MTCA 2007)
TOC	total organic carbon
UCL	upper confidence limit
USACE	U.S. Army Corp of Engineers
USEPA	U.S. Environmental Protection Agency
WAC	Washington Administrative Code
WDNR	Washington State Department of Natural Resources
WHO	World Health Organization
ww	wet weight

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1.0 Introduction

Fidalgo Bay has been identified by the Washington State Department of Ecology (Ecology) under the Toxics Cleanup Program's (TCP) Puget Sound Initiative for focused sediment cleanup and source control. Previous sediment quality investigations have indicated that contaminants have exceeded the Washington State Sediment Management Standards (SMS) Chapter 173-204 Washington Administrative Code (WAC) (Ecology 1995). One site of interest which may have contributed to sediment contamination is the former Custom Plywood Mill site located along the western shoreline of Fidalgo Bay. A Remedial Investigation/Feasibility Study (RI/FS) was conducted by Amec Geomatrix Inc., on behalf of GBH Investments LLC (GBH), who purchased the site in 2007, 15 years after industrial activities ceased (Geomatrix 2008). Based on the findings of the Amec Geomatrix RI/FS, Ecology determined additional sampling was warranted to determine the potential source of toxicity observed in site-related samples and to further delineate the extent of dioxin/furan contamination in surface sediments and clam tissue. The purpose of this supplementary sediment investigation was to further characterize the sediment quality relative to dioxin and dioxin in clam tissues near the Custom Plywood Mill site, as well as background dioxin concentrations in Fidalgo Bay and Padilla Bay sediments.

1.1 Site Description

Fidalgo Bay is a generally shallow embayment, bounded to the west by the City of Anacortes and to the east by March Point (Figure 1–1). Tideland filling, shoreline armoring, and overwater structures are present throughout the bay. An abandoned railroad trestle runs across the southern part of the bay. Southern Fidalgo Bay has been proposed as an Aquatic Reserve to be managed by the Washington State Department of Natural Resources (WDNR 2007). It contains expanses of eelgrass and extensive tide flats that support spawning and rearing of forage fish (e.g., Pacific herring, surf smelt, and sand lance) and juvenile salmonid migration. Other species that use the bay include bald eagles, peregrine falcons, migratory waterfowl, wading birds (e.g., great blue heron and least sandpiper), and abundant marine life. Water quality monitoring indicates the bay is generally well mixed vertically and has levels of dissolved oxygen, fecal coliform, and nutrients within state guidelines (WDNR 2007).

Fidalgo Bay has been used by a number of industries including saw mills and plywood manufacturing, paper production, oil refining, and boat building. Across the bay from Anacortes are two oil refineries that produce gasoline, diesel fuel, and propane. There have been a number of accidental releases from these sites as well as a multi-year release from the Cap Sante Marina fueling station. The bay has been included in a nationwide monitoring program for the antifouling agent tributyltin (TBT) due to the presence of the marina, boat yards, and oil tankers (Ecology 1997).

The former Custom Plywood Mill was originally developed as a sawmill and plywood plant sometime around 1900, and it operated under numerous owners until destroyed by fire in November 1992. Ecology added the site to the Confirmed and Suspected Contaminated Site List in March 1993. The site was listed as having suspected contamination of soil, groundwater, surface water, and sediments of polychlorinated biphenyls (PCBs), metals, phenolic compounds, and polycyclic aromatic hydrocarbons (PAHs). A portion of the site was purchased by GBH in December 2007 (Geomatrix 2008). Initial results from the RI indicated elevated concentrations of dioxin with the toxic equivalent concentration (TEC) ranging from 2.74 to 19.6 in sediments located offshore of the former Custom Plywood Mill, and toxicity exceeding the sediment quality standards (SQS) and cleanup screening levels (CSL) in several locations (Geomatrix 2010).

1.2 Study Objectives

The scope of this Sediment Investigation was limited geographically to the aquatic areas of Fidalgo and Padilla Bays. The study area consists of two components: the Fidalgo Bay and Padilla Bay bay-wide study area and the former Custom Plywood Mill nearshore study area, as shown in Figure 1–1. The collection of sediment and tissue samples in the nearshore study area was to further evaluate potential impacts from former site industrial activities/releases, and the collection of sediment samples in the bay-wide study area was to determine the relative background concentrations of dioxin/furan congeners in both Fidalgo and Padilla Bays.

The results of the supplemental data collection will be used to determine whether potential cleanup action(s) are warranted to minimize the potential for adverse impacts to the biotic community from site-related dioxins.

The study objectives for this investigation include the following:

- Determine bay-wide background concentrations of dioxin in Fidalgo and Padilla Bays.
- Determine the site boundary of dioxin contamination in former Custom Plywood Mill nearshore sediments relative to Puget Sound background concentrations determined above.
- Determine the biota sediment accumulation factor (BSAF) for dioxin in clam tissue collected from the former Custom Plywood Mill nearshore study area.

2.0 Data Collection and Analytical Methods

This section describes the study design for each data type to be collected for the *Supplementary Fidalgo Bay and Custom Plywood Mill Sediment Dioxin Study*. The samples collected by Science Applications International Corporation (SAIC) included surface sediment and clam tissue samples for chemical analysis. This report also contains chemistry results for sediment samples collected by Geomatrix (2008). Actual sampling locations for each data type are presented in Tables 2–1 and 2–2 and Figures 2–1, 2–2, 2–3, and 2–4. The data collection methods are summarized here and described in detail in the combined Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) (SAIC 2010). Surface sediment and tissue collection logs are provided in Appendix A.

2.1 Sampling Platforms

The R/V *Growler*, owned and operated by SAIC, was used to collect surface sediment, as well as assist in the collection of clam tissue. Clams and co-located nearshore sediment samples were collected by personnel on foot during low tide conditions. Geographic coordinates for all sampling locations are provided in Tables 2–1 and 2–2.

2.2 Surface Sediment Sampling

Collection of surface sediment (0 to 10 cm) samples was conducted using a 0.1 m^2 modified Young van Veen grab sampler. Sampling procedures followed Puget Sound Estuary Program (PSEP) protocols. If accessible during low tide events, surface sediment samples from intertidal areas (i.e., clam sampling locations) were collected by hand with stainless steel spoons.

Surface sediment samples were collected at 10 locations each in Fidalgo and Padilla Bays to determine the average background concentration of dioxins (Figures 2–1 and 2–2, respectively). The bay-wide locations were selected to represent depositional areas and provide spatial coverage of the bays. Surface sediment was also collected at 21 locations (Figure 2–3) in the former Custom Plywood Mill nearshore area to determine the site boundary relative to dioxin contamination. These locations are in the proximity of those collected and archived as a part of the former Custom Plywood Mill RI/FS (Geomatrix 2008). Six sediment composites were co-located with clams collected for tissue analysis in the intertidal zone in the vicinity of the former Custom Plywood Mill (Figure 2–4) (Section 2.3).

2.2.1 Sediment Chemical Analysis

Table 2–3 lists the surface sediment samples selected for analysis. The chemical analysis of the surface sediment samples collected in Fidalgo and Padilla Bays included sediment conventionals (grain size distribution, total organic carbon (TOC), total solids, total sulfides) and dioxin/furan congeners.

Of the 21 locations sampled from the former Custom Plywood Mill nearshore area, all samples were analyzed for sediment conventionals and 9 of the samples were analyzed for dioxin/furan congeners. All six sediment composites co-located with tissue samples were submitted for sediment conventional and dioxin/furan congener analysis. An additional 12 samples that were collected by Geomatrix in 2008 and archived were also analyzed for dioxin/furan congeners. The Custom Plywood Mill nearshore samples that were submitted for analysis are displayed in Figure 2–5.

2.3 Clam Collection

Clam tissue composite samples were collected from the former Custom Plywood Mill nearshore intertidal areas accessible at low tide (Figure 2–4). Small shovels were used to collect littleneck clams (*Protothaca staminea*) and bentnose clams (*Macoma nasuta*) at low tide from six designated nearshore locations in the vicinity of the former Custom Plywood Mill site. All samples at a given location were collected within approximately 30 feet of one another. Surface sediment samples were collected and composited at the time of the shellfish collection so that tissue residue results can be compared directly to co-located sediment quality conditions.

2.3.1 Tissue Chemical Analysis

A total of six clam tissue composite samples were submitted for analysis of dioxin/furan congeners and lipids. Littleneck clam tissue was submitted for analysis at all locations except CT-01A due to their absence. Bentnose clams were deemed a suitable surrogate for analysis at location CT-01A.

3.0 Results

This section presents the analytical results for surface sediment and clam tissue samples. Complete analytical results are provided in Appendix B. Laboratory reports and chain-of-custody forms are provided in Appendix C. Data validation results are summarized in Section 4.0 and are presented in full in Appendix D.

3.1 Surface Sediments

Forty-seven surface sediment samples were submitted for sediment conventionals analysis. Further analysis of dioxin/furan congeners was carried out on 35 of the samples collected by SAIC and an additional 12 surface sediment samples collected by Geomatrix (2008). This section describes the sediment conventional parameter and dioxin/furan concentration results. For ease of discussion, data are grouped by location: Fidalgo Bay Background Area, Padilla Bay Background Area, and Custom Plywood Mill Nearshore Area. The six sediment composite samples collected in association with clam tissue samples are included in the discussion of the Custom Plywood Mill nearshore samples. The results are discussed in terms of relative spatial distributions within each of the study areas (Sections 3.1.1 and 3.1.2) and among the study areas (Section 3.1.3).

3.1.1 Sediment Conventional Parameters

Conventional parameters for all study areas are presented in Table 3–1 and are summarized in Table 3–2.

Fidalgo Bay Background Area

Locations sampled within the Fidalgo Bay background area had a wide range of particle size distributions, averaging 34 percent total fines (silt + clay). Central Fidalgo Bay was dominated by silts and clays, while the northern bay was composed primarily of sands (Figure 3–1). The TOC content of the Fidalgo Bay background area ranged from 0.31 to 1.35 percent, with greater concentrations associated with finer grained sediment (Figure 3–2). Sedimentary sulfides also behaved in a similar manner, with greater sulfide concentrations associated with finer particles and a greater TOC content.

Padilla Bay Background Area

Overall, the Padilla Bay background area was composed of coarser-grained sediment than the Fidalgo Bay background area, averaging 21 percent fines (Table 3–2). Eastern Padilla Bay was composed almost entirely of sands (Figure 3–3). Locations in the vicinity of the federal navigation channel and outer Padilla Bay contained a maximum of 68 percent fines. Padilla Bay locations had a similar TOC range (0.17 to 1.2 percent) and average (0.55 percent) as Fidalgo Bay background locations, again with higher TOC content associated with finer particles (Figure 3–4).

Custom Plywood Mill Nearshore Area

Of the study areas, the nearshore area in the vicinity of the former Custom Plywood Mill had the greatest range in sediment grain size distribution (6.0 to 92 percent fines) (Table 3–2). The fines content was lowest at the six intertidal locations where clam tissue samples were collected (6.0 to 24 percent fines) (Figure 3–5). All offshore samples were dominantly composed of silt-sized sediments in the narrow range of 74 to 92 percent fines. Intertidal locations had their greatest TOC content in the closest proximity to the former mill site, with a maximum of 5.6 percent (Figure 3–6). Despite the similar grain size distribution for all offshore locations, the TOC content of these sites is most enriched close to shore (Figure 3–6).

3.1.2 Dioxin/Furan Congeners

Dioxin/furan congener results for all study areas are presented in Appendix B. For each sample, a TEC was calculated using the most recent mammalian toxic equivalency factor (TEF) values from the World Health Organization (WHO) (Van den Berg et al. 2006). Dioxin/furan TEC results for all samples are presented in Table 3–1 using different treatments for undetected congeners. Further discussion of TECs in the following sections employ TEC values calculated using one-half the detection limit for undetected congeners. Dioxin/furan TEC results are summarized in Table 3–3.

Fidalgo Bay Background Area

Surface sediment TECs in the Fidalgo Bay background area ranged from 0.31 to 2.2 pg/g, with an average of 0.86 pg/g (Table 3–3). The greatest TEC values were observed in samples collected from central Fidalgo Bay, in closest proximity to the former Custom Plywood Mill site (Figure 3–7).

Padilla Bay Background Area

Overall the Padilla Bay background area had lower TEC values than the Fidalgo Bay background area, ranging from 0.073 to 1.8 pg/g and averaging 0.43 pg/g (Table 3–3). The greatest TEC values were observed in samples collected in outer Padilla Bay, in closest proximity to Fidalgo Bay (Figure 3–8). All samples collected along eastern Padilla Bay had TEC values less than 0.25 pg/g.

Custom Plywood Mill Nearshore Area

Sediment samples collected within the Custom Plywood Mill nearshore area covered an expansive range of TEC values from 1.2 to 81 pg/g, averaging 8.9 pg/g (Table 3–3). The greatest TEC values occurred in intertidal and subtidal locations in closest proximity to the former mill site (Figure 3–9). The lowest TEC concentrations are found both in central Fidalgo Bay and in the intertidal area south of the former mill site.

3.1.3 Comparison of Custom Plywood Mill Nearshore Area to Background Areas

One of the primary objectives of this study was to determine the bay-wide background dioxin/furan TEC value for Fidalgo/Padilla Bay. Once a regional background TEC value is established, sediment dioxin/furan data can be screened to identify contamination and evaluate potential sources. Dioxin/furan TEC data for the background areas are summarized in Table 3–4. The 20 surface sediment samples collected and analyzed in these bays had TEC values ranging from 0.11 to 2.2 pg/g, with an average of 0.64 ± 0.59 pg/g (Table 3–4). An appropriate manner for determining a regional sediment background dioxin concentration is to calculate the 95% upper confidence limit (UCL) for the combined Fidalgo/Padilla Bay background dataset. The 95% UCL is the value that equals or exceeds the true mean 95 percent of the time. Before determination of the 95% UCL, data that are not normally distributed are typically transformed using either a log-normal or gamma transformation. In the case of the Fidalgo/Padilla Bay background data, the gamma transformation was deemed more suitable. Using the software package ProUCL 4.0, developed by the U.S. Environmental Protection Agency as a tool to support risk assessments (USEPA 2010), the 95% UCL for Fidalgo/Padilla Bay dioxin/furan congener TEC background is 0.93 pg/g after applying the gamma transformation (Table 3–4).

Prior to comparing sediment dioxin/furan congener data in the Custom Plywood Mill nearshore area to the background value, it is prudent to determine whether or not sediment grain size is a driving factor in measured dioxin/furan concentrations. An inverse distance weighted (IDW) algorithm was used to spatially extrapolate measured surface sediment parameters across the Fidalgo/Padilla Bay region (Figures 3–10, 3–11, and 3–12A). Generally, the sampled background areas consist of coarser sediment than the Custom Plywood Mill nearshore area (Figure 3–10). There is also a transition from sandy intertidal sediment to silty subtidal sediment offshore from the former mill. Because organic matter is often preferentially associated with fine-grained particles, similar spatial patterns in TOC and dioxin/furan TEC values would suggest that sediment grain size controls their concentrations. However, this does not appear to be the case. Both TOC (Figure 3–11) and dioxin/furan TEC values (Figure 3–12A) display distinct plumes emanating from the northern extent of the former Custom Plywood Mill property boundary, suggesting that the property is a source of elevated sediment concentrations.

Using the 95% UCL Fidalgo/Padilla Bay dioxin/furan congener TEC background value of 0.93 pg/g as a sediment contamination screening tool, all surface sediments analyzed in the Custom Plywood Mill nearshore area exceed regional background. The apparent boundary of dioxin/furan contamination extends beyond the Custom Plywood Mill nearshore area into locations sampled as part of Fidalgo Bay background. Using the spatial extent of the modeling results presented in Figure 3–12A, approximately 590 acres of surface sediment in Fidalgo Bay have dioxin/furan congener TEC values greater than background (Table 3–5). Additionally, spatial modeling of the analyzed sediment samples suggest the northern extent of the former Custom Plywood Mill property as the potential source of regional sediment dioxin/furan contamination (Figure 3–12B).

3.2 Clam Tissue

A total of six composite clam tissue samples were analyzed for dioxin/furan congeners and lipids (Appendix B). While littleneck clams (*Protothaca staminea*) were the target species, their absence at location CT-01A resulted in the analysis of bentnose clams (*Macoma nasuta*) for this location. Lipid concentrations of the composite tissue samples were generally consistent (1.0 to 1.3%), with the exception of location CT-05 where lipids constituted 3.2% of the sample.

Dioxin/furan TEC values ranged from 0.12 to 0.89 pg/g, with high tissue TECs associated with the greatest sediment TECs (Table 3–6, Figure 3–13).

3.3 Biota Sediment Accumulation Factors

The Biota Sediment Accumulation Factor (BSAF) is a parameter that quantifies bioaccumulation of sediment-associated organic compounds into tissues of ecological receptors. BSAF is the ratio of the lipid normalized concentration of each dioxin/furan congener divided by the TOC normalized concentration of that congener in the co-located sediment (Equation 1).

$$BSAF = \frac{C_t / f_l}{C_s / f_{oc}} \qquad \text{(Equation 1)}$$

C_t is the tissue concentration (pg/g ww), f_l is the fraction by weight lipid concentration, C_s is the sediment concentration (pg/g dw), and f_{oc} is the fraction of TOC in the sediment (USEPA 2000).

The BSAF is based on the assumption of equilibrium partitioning between the organic carbon in the tissue and sediment. However, deviations from equilibrium may be caused by metabolism or dechlorination of dioxin/furan congeners by the organism, mass transfer resistance from the sediment, differential biotic uptake, or uptake from an unquantified source (Wong 2000).

Site-specific BSAF values were calculated for paired sediment/tissue samples at six intertidal locations in the vicinity of the former Custom Plywood Mill (Figure 2–4). If a congener was undetected in either the tissue or sediment sample, a BSAF value was not calculated.

BSAF values for clam tissue are presented in Table 3–7. Frequent non-detects in the clam tissue samples make BSAF comparisons between samples and congeners difficult. When comparing BSAF values between the sample with the highest sediment TEC value (CT-01A) and the lowest TEC values (CT-03, CT-04, and CT-05), all BSAFs are greater for sample CT-01A. This may indicate an enhanced rate of dioxin/furan bioaccumulation with increasing sediment concentrations. However, this may also be due to differential biotic uptake since CT-01A was the only sample to consist of bentnose clam rather than littleneck clam tissue. BSAF values are of the same order of magnitude (0.01 to 0.09) among the different dioxin/furan congeners, with the exception of 2,3,4,7,8-PECDF in a single sample (Table 3–7). These results suggest the fairly indiscriminant uptake of dioxin/furan congeners.

In general, the low BSAF values observed in the former Custom Plywood Mill intertidal region indicate the limited biological uptake of sedimentary dioxin/furan congeners by clams. Average dioxin/furan BSAFs for this study are of the same order of magnitude or less than BSAFs calculated for clam tissue in Port Gardner, WA (SAIC 2009) and mollusc tissue present in the U.S. Army Corps of Engineers BSAF database (USACE 2010) (Table 3–7).

4.0 Quality Assurance/Quality Control

Independent quality assurance review and data validation was performed by EcoChem, Inc. of Seattle, WA, on all analytical results. A Stage 4 full-level data validation was performed on the dioxin/furan congener results (USEPA 2009, 2005) and a QA2 full-level data validation was performed on the conventionals results (PTI 1989a, b). All results were considered acceptable, as qualified. No results were rejected as a result of data validation. The full data validation report with a list of all qualified results is provided in Appendix D. Issues resulting in data qualification are summarized below.

Specific dioxin/furan congeners were detected in the method blanks at low concentrations, resulting in the requalification of 35 associated detected sample results as non-detect (U-qualified) at their reported concentrations. Consequently, four results have reporting limits (RLs) above the DMMP specified target RL of 1.00 pg/g for 2,3,7,8-TCDF, ranging from 1.04 to 1.46 pg/g. To assess the impact of non-detect results on the TECs, TECs were calculated using the full value of the detection limit for undetected congeners, using one-half the detection limit for undetected congeners, and by using zero for undetected congeners, as presented in Appendix B. The impact of the method blank contamination on the TECs is insignificant.

Some specific dioxin/furan congener results were J/UJ-qualified as estimated because of low recoveries for labeled compound standards, high recoveries of standard reference material, high relative percent difference between the laboratory replicate or field duplicate sample, and because of lock mass interferences.

Matrix spike percent recoveries were above acceptance limits for sulfides in sample delivery group (SDG) RA23 and below acceptance limits in SDG RA31. All associated results were J-qualified as estimated.

There was insufficient sample to perform the hydrometer portion of the grain size analysis for samples SDS-PB02, SDS-PB04, SDS-PB06, and SDS-PB09. All fractions with phi scale greater than 4 were reported as total fines (silt/clay) by the laboratory.

5.0 Summary

Previous sediment quality investigations in Fidalgo Bay have identified sediment contamination in the vicinity of the former Custom Plywood Mill. This supplementary sediment study was focused on the collection and analysis of both (1) sediment and tissue samples in the former Custom Plywood Mill nearshore to further evaluate potential impacts from former site industrial activities/releases, and (2) sediment samples in the bay-wide study area to determine the regional background concentrations of dioxin/furan congeners in both Fidalgo and Padilla Bays.

The 20 samples collected to determine the bay-wide Fidalgo/Padilla Bay background dioxin concentration had an average TEC of 0.64 pg/g. The 95% UCL TEC value of 0.93 pg/g was used for the purpose of screening Fidalgo/Padilla Bay sediment samples to identify dioxin/furan contamination above regional background. Surface sediment dioxin/furan TEC values greater than the 95% UCL value are consistently found throughout western Fidalgo Bay, up to approximately one mile away from the former Custom Plywood Mill site. Dioxin/furan contamination appears to extend into the region where a number of Fidalgo Bay background sediment samples were collected.

Spatial modeling of the analytical results suggests that the former Custom Plywood Mill site is a likely source of sediment dioxin/furan contamination throughout Fidalgo Bay. Distinct decreasing trends in both sedimentary TOC (Figure 3–11) and dioxin/furan TEC values (Figure 3–12A) are apparent with increasing distance from the former mill site. The dissimilar spatial gradient for sedimentary fines implies that sediment grain size is not the driving factor for the observed dioxin/furan distribution and that a contaminant point source is likely (Figure 3–10).

Generally, dioxin/furan TEC values for clam tissue varied directly with co-located sediment TEC values. Frequent dioxin/furan congener non-detects for clam tissue samples allowed for minimal BSAF comparisons between samples and congeners. The greatest BSAF values for all congeners occurred at the location with the greatest sediment dioxin/furan TEC value. BSAF values for the different congeners at the Custom Plywood Mill nearshore site were generally of similar magnitude to each other and comparable to those determined for Port Gardner, WA.

6.0 References

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Figures

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Figure 1–1. Study Location: Fidalgo and Padilla Bay Bay-wide Study Areas and Custom Plywood Mill Nearshore Study Area

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Figure 2–1. Sediment Sampling Locations for Fidalgo Bay Background Dioxin

0 1,000 2,000 4,000 Feet

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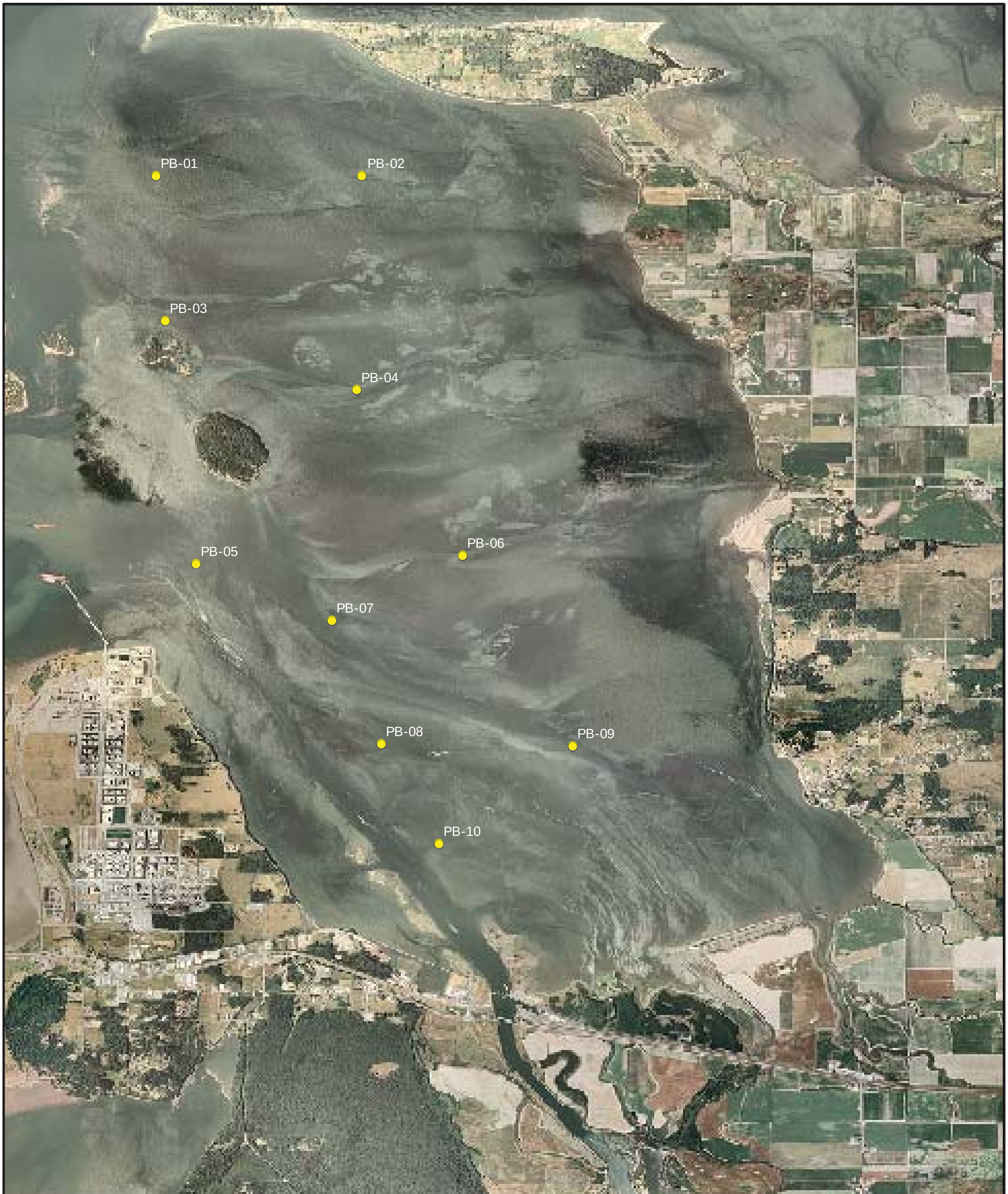

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Figure 2–2. Sediment Sampling Locations for Padilla Bay Background Dioxin

0 2,500 5,000 10,000 Feet

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Figure 2–3. Sediment Sampling Locations for the Former Custom Plywood Mill Nearshore Study Area

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Figure 2–4. Sampling Locations for Co-Located Clam Tissue and Sediment

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Figure 2–5. Sediment and Clam Tissue Analyses for the Former Custom Plywood Mill Nearshore Study Area

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Figure 3–1. Sediment Grain Size Distribution for Fidalgo Bay Background Locations

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Figure 3–2. Total Organic Carbon of Fidalgo Bay Background Locations

0 1,000 2,000 4,000 Feet

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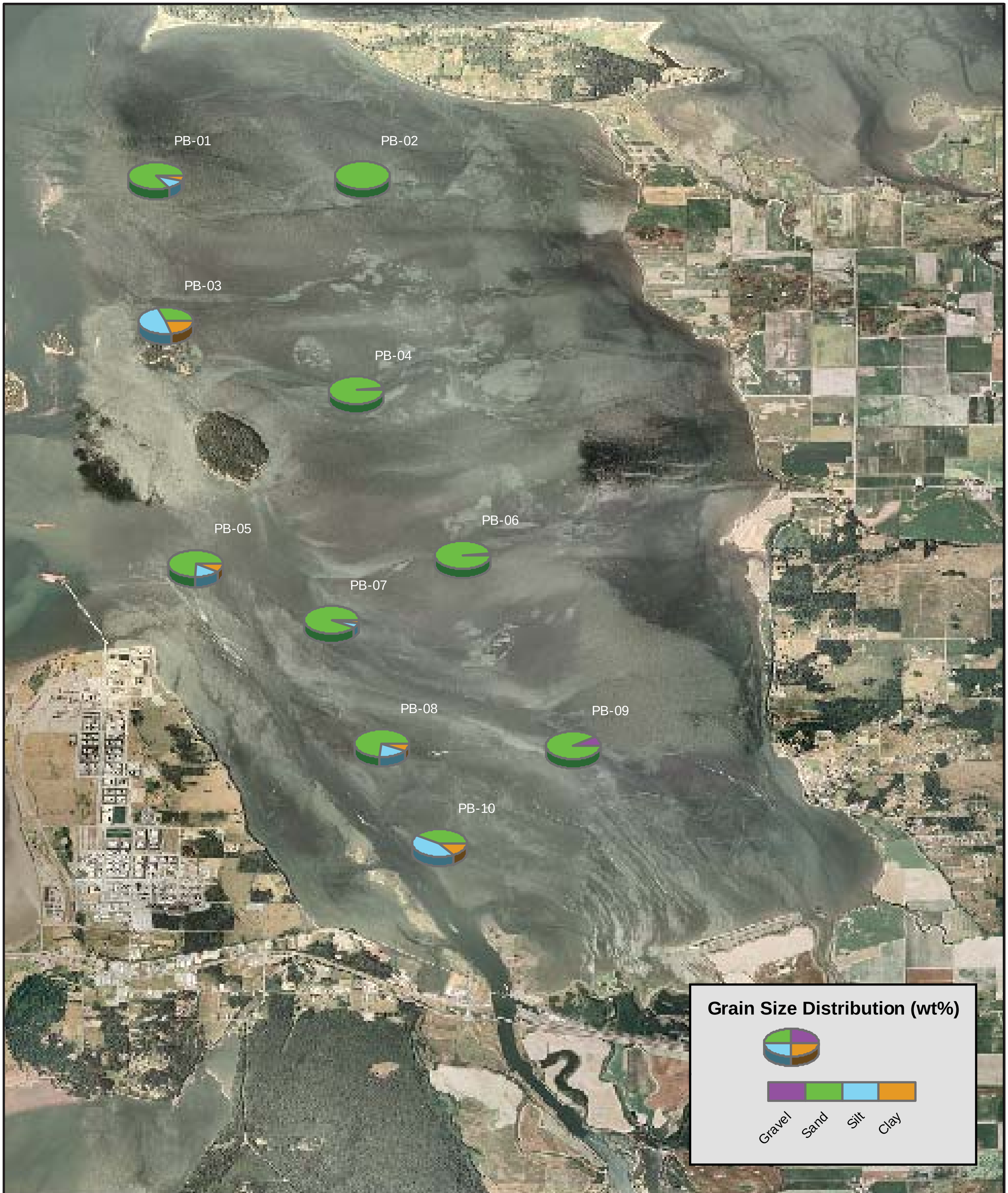

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Figure 3–3. Sediment Grain Size Distribution for Padilla Bay Background Locations

0 2,550 5,100 10,200 Feet

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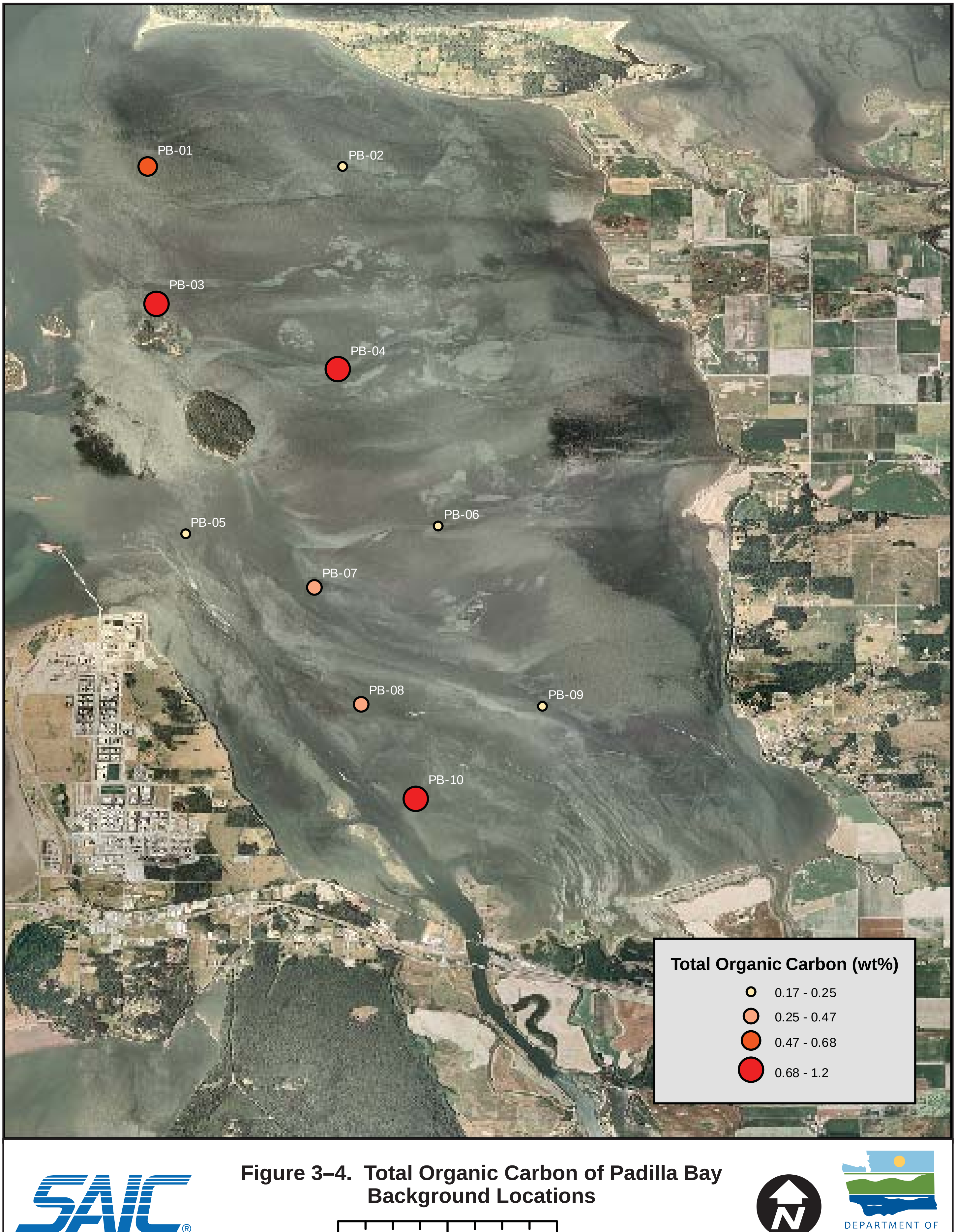

Figure 3–4. Total Organic Carbon of Padilla Bay Background Locations

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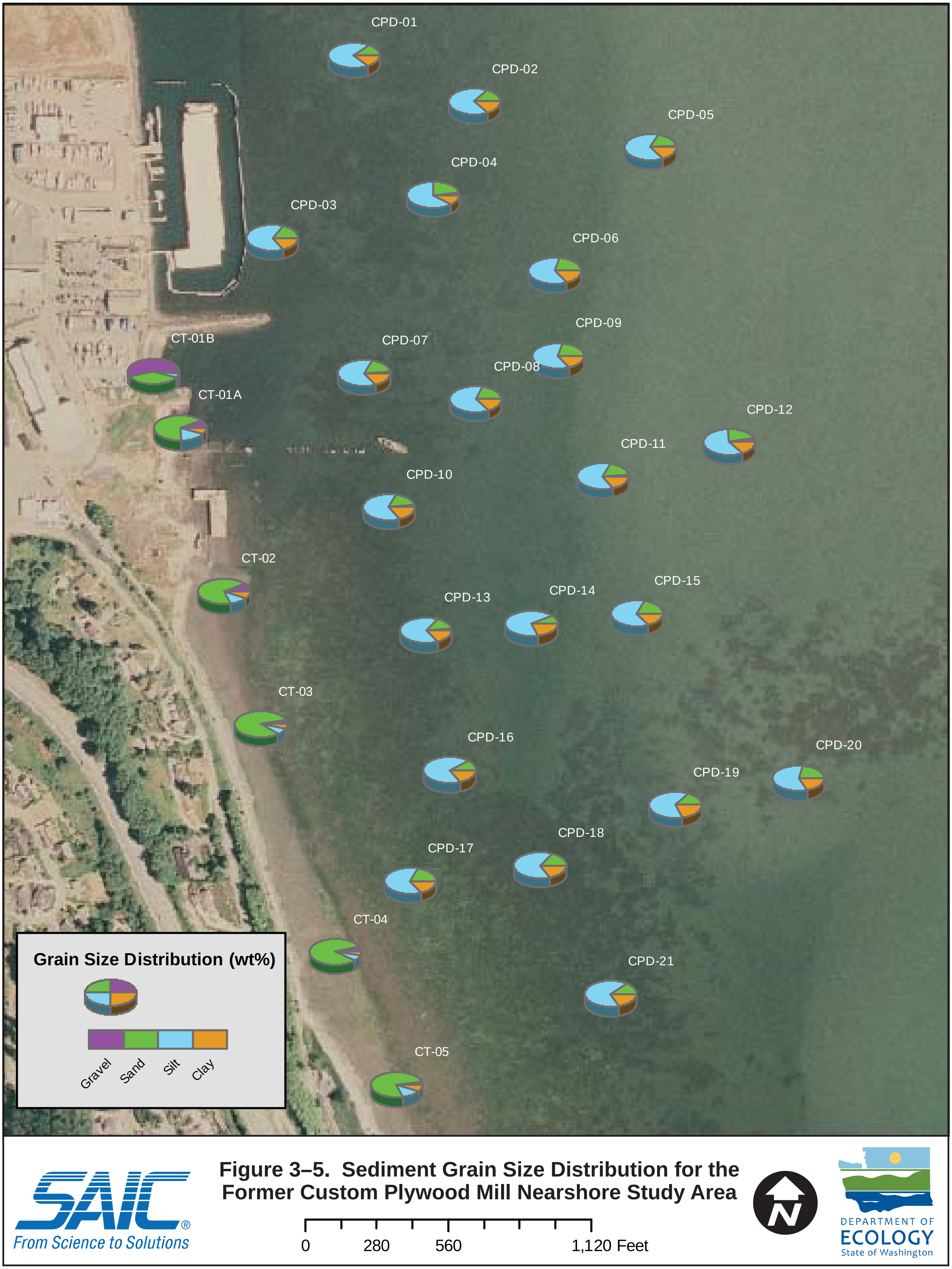

Figure 3–5. Sediment Grain Size Distribution for the Former Custom Plywood Mill Nearshore Study Area

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Figure 3–6. Total Organic Carbon of Former Custom Plywood Mill Nearshore Locations

0 280 560 1,120 Feet

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Figure 3–7. Dioxan/Furan TECs of Fidalgo Bay Background Locations

0 1,000 2,000 4,000 Feet

N

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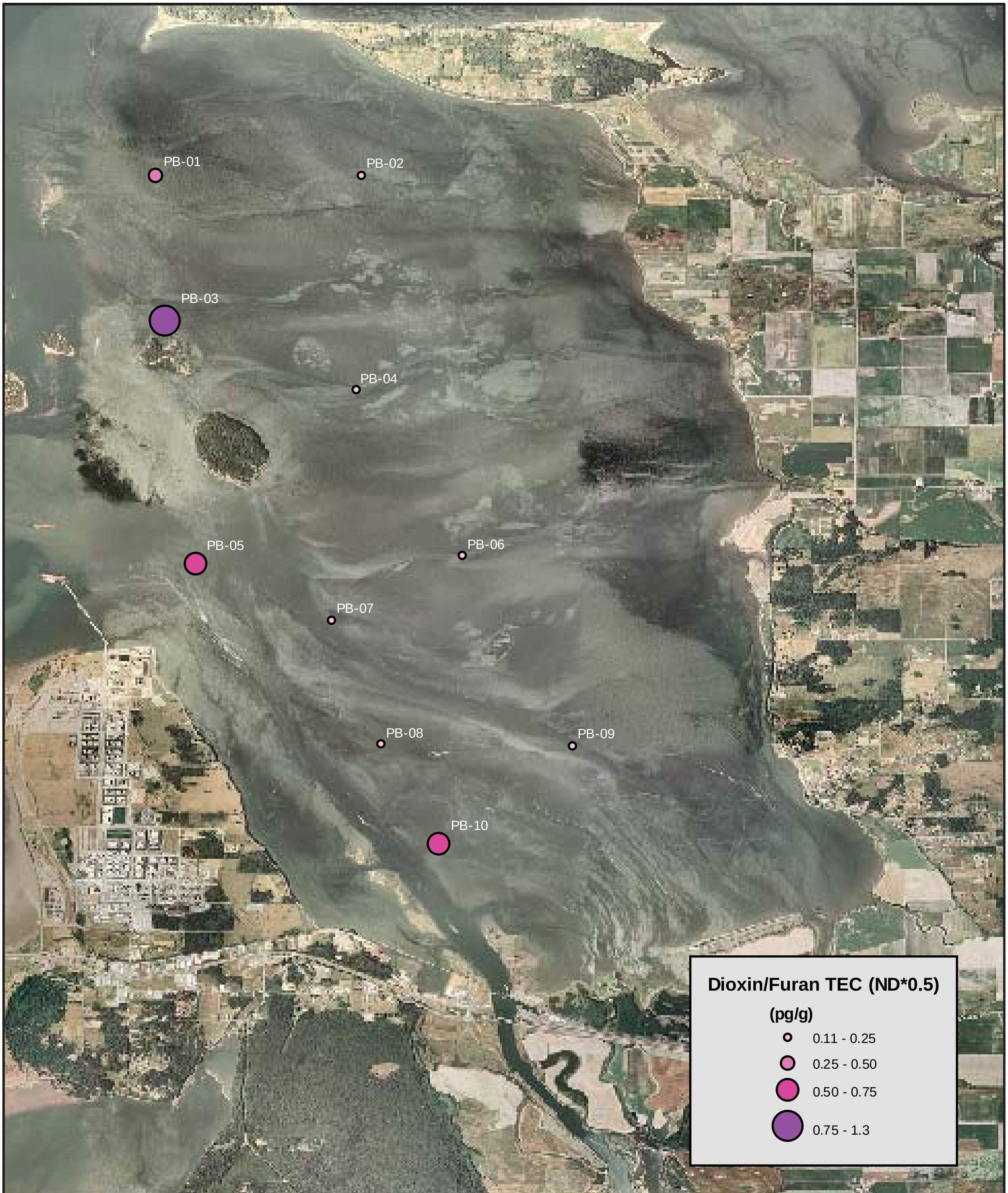

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Figure 3–8. Dioxan/Furan TECs of Padilla Bay Background Locations

0 2,500 5,000 10,000 Feet

N

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Figure 3–9. Dioxan/Furan TECs of Former Custom Plywood Mill Nearshore Locations

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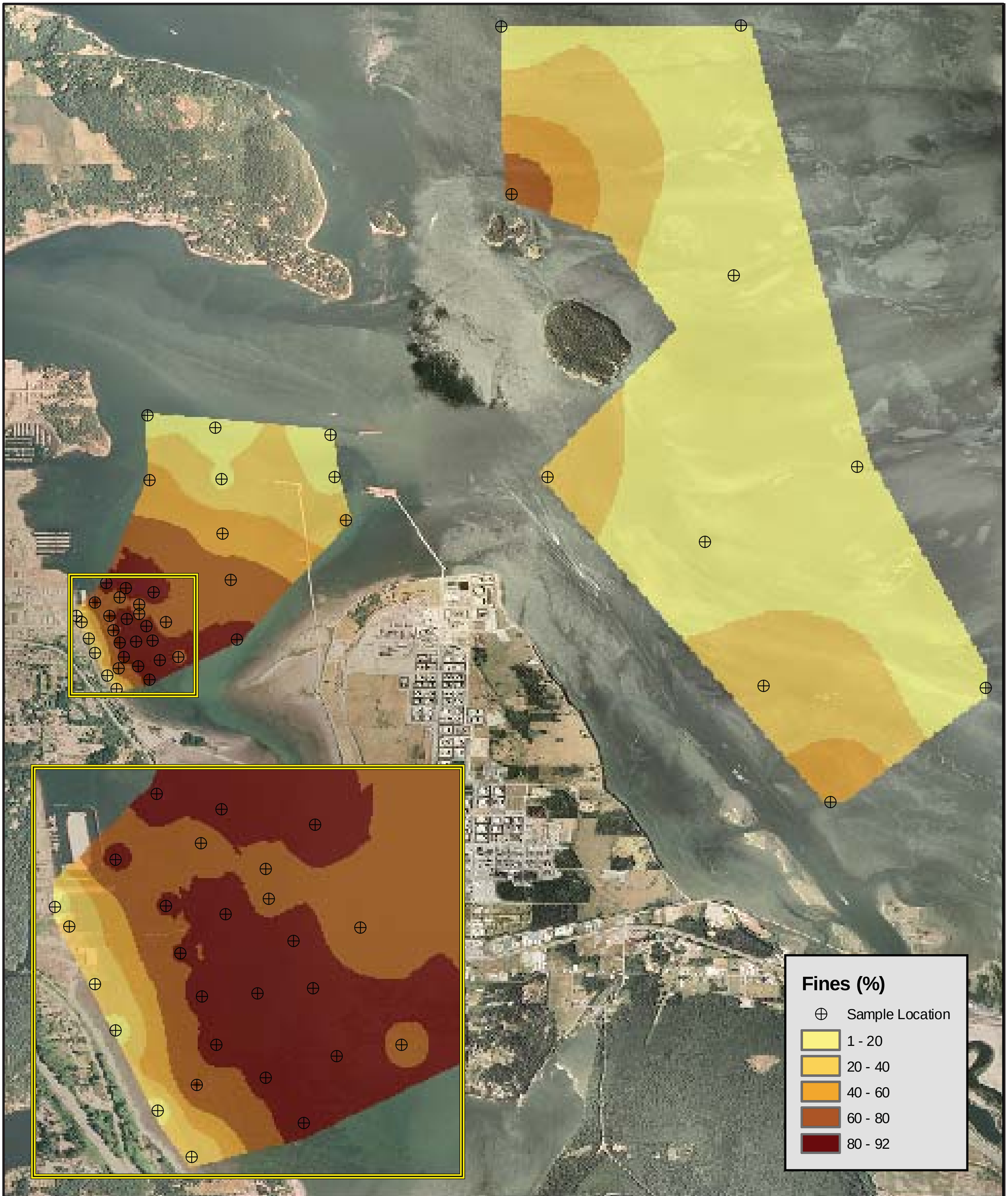

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Figure 3–10. Interpolated Sedimentary Fines of Fidalgo/Padilla Bay Study Area

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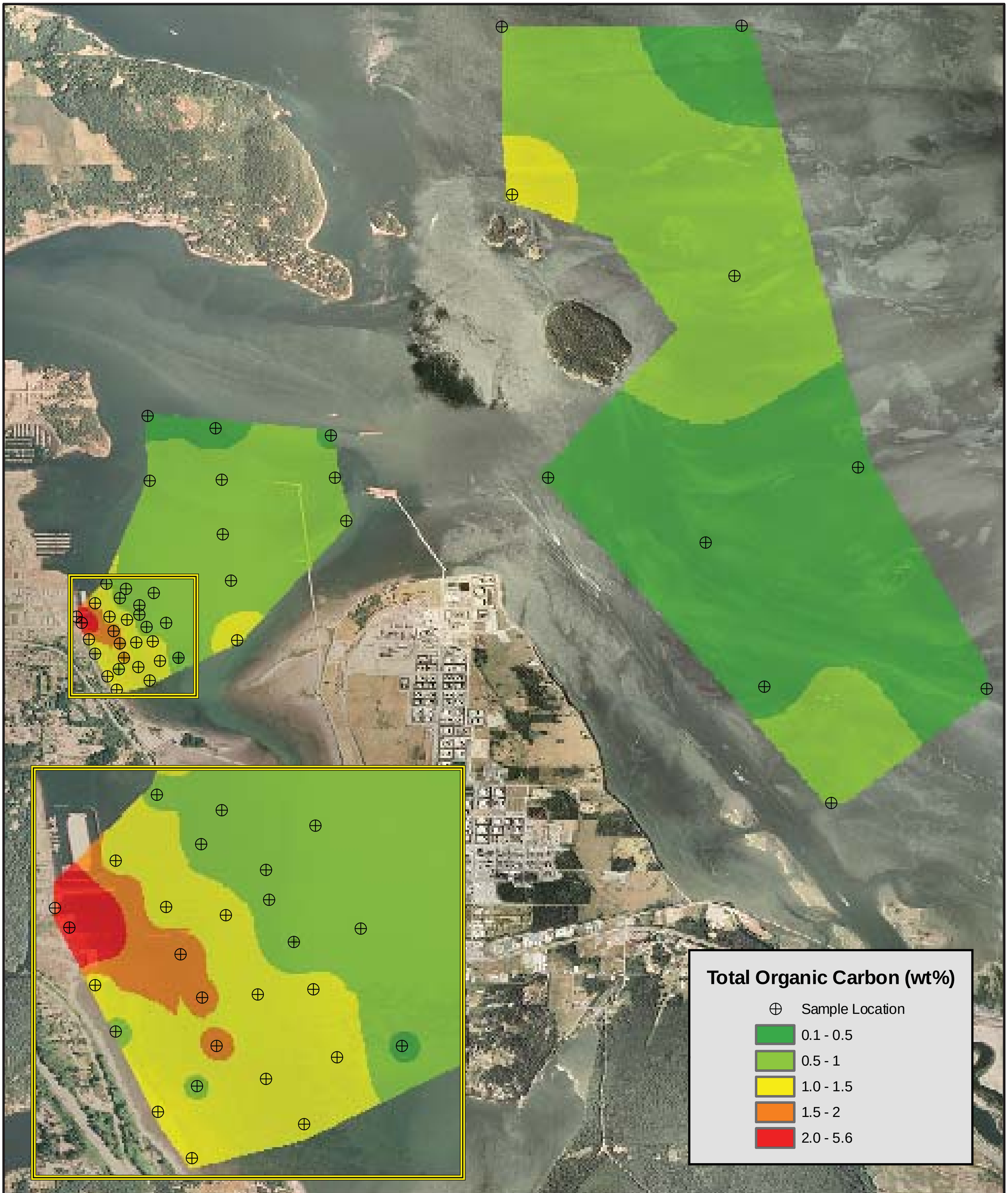

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Figure 3–11. Interpolated Total Organic Carbon of Fidalgo/Padilla Bay Study Area

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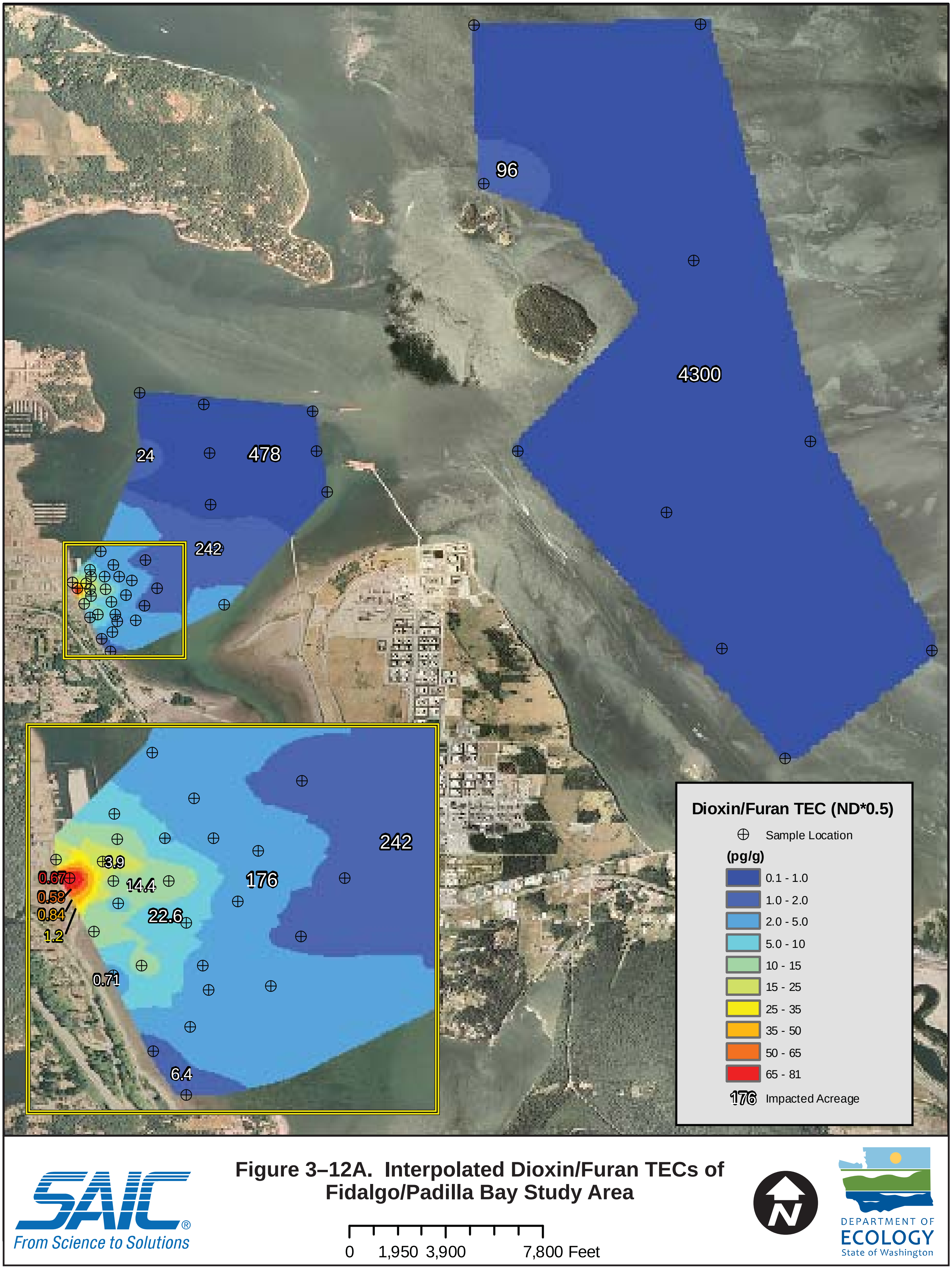

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Figure 3–12A. Interpolated Dioxin/Furan TECs of Fidalgo/Padilla Bay Study Area

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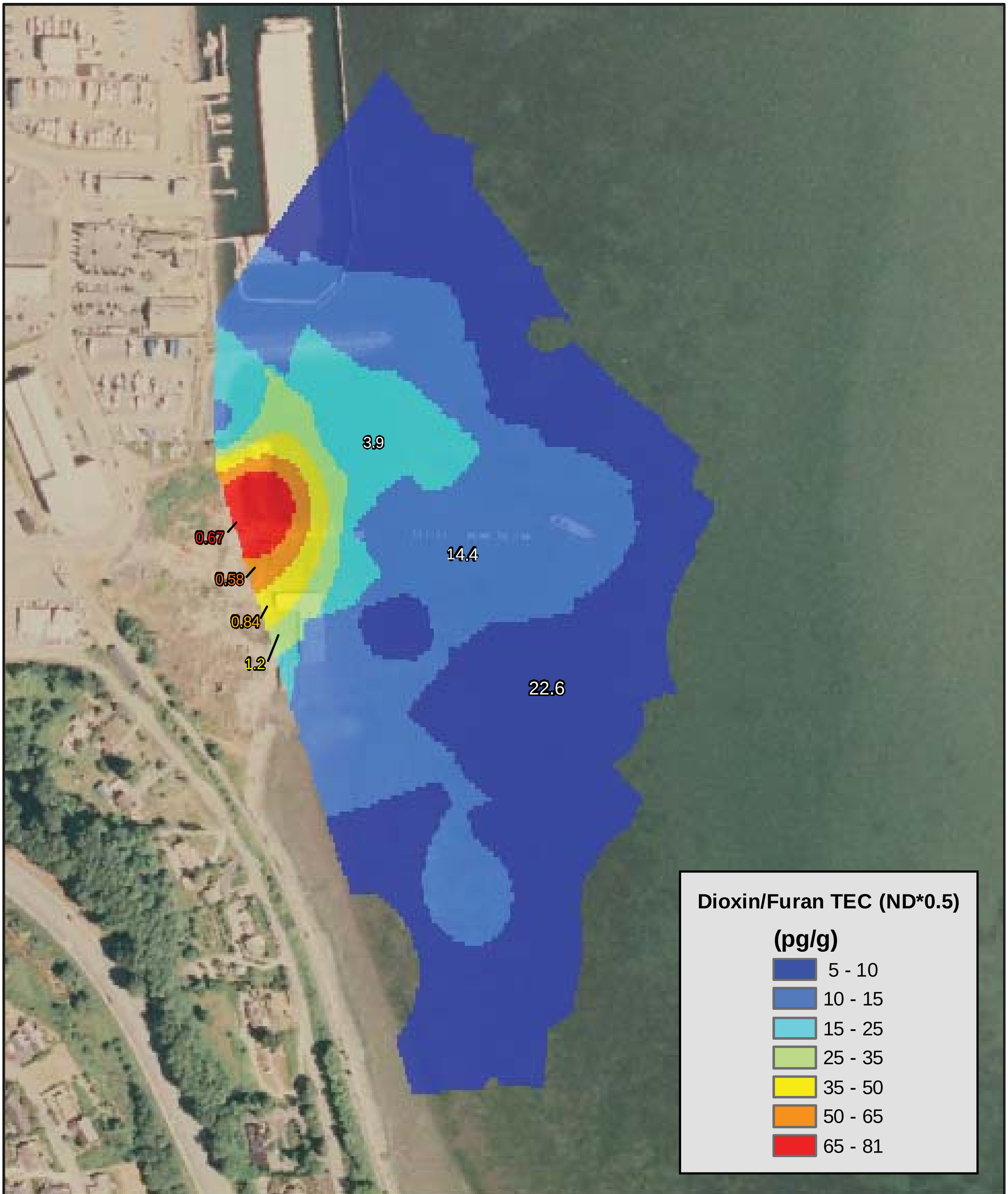

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Figure 3–12B. Interpolated Dioxin/Furan TECs of the Former Custom Plywood Mill Nearshore Area

0 200 400 800 Feet

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Figure 3–13. Dioxin/Furan TECs for Clam Tissue

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Tables

Table 2–1. SAIC Sampled Locations and Coordinates

Location ID	Latitude (N)	Longitude (W)	State Plane (Northing)	State Plane (Easting)
Fidalgo Bay Bay-Wide Background				
FB-01	48° 30.9980'	122° 35.6230'	558114.4	1213788.4
FB-02	48° 30.9170'	122° 35.1970'	557582.7	1215497.6
FB-03	48° 30.8740'	122° 34.4780'	557255.4	1218395.4
FB-04	48° 30.5870'	122° 35.6110'	555614.9	1213779.8
FB-05	48° 30.5950'	122° 35.1580'	555621.8	1215610.5
FB-06	48° 30.6110'	122° 34.4550'	555654.6	1218452.2
FB-07	48° 30.2540'	122° 35.1520'	553548.4	1215587.5
FB-08	48° 30.3390'	122° 34.3830'	553994.6	1218705.6
FB-09	48° 29.9640'	122° 35.1060'	551781.4	1215733.2
FB-10	48° 29.5890'	122° 35.0630'	549499.0	1215854.0
Padilla Bay Bay-Wide Background				
PB-01	48° 33.4300'	122° 33.4130'	572696.0	1223044.6
PB-02	48° 33.4340'	122° 31.9120'	572585.6	1229102.2
PB-03	48° 32.3770'	122° 33.3430'	566288.7	1223183.8
PB-04	48° 31.8720'	122° 31.9550'	563094.3	1228719.0
PB-05	48° 30.6100'	122° 33.1230'	555527.6	1223832.0
PB-06	48° 30.6720'	122° 31.1820'	555731.0	1231680.0
PB-07	48° 30.2020'	122° 32.1340'	552958.6	1227771.7
PB-08	48° 29.3030'	122° 31.7700'	547461.3	1229121.6
PB-09	48° 29.2890'	122° 30.3780'	547253.1	1234744.5
PB-10	48° 28.5770'	122° 31.3520'	543011.0	1230713.8
Custom Plywood Mill Study Area				
CPD-01	48° 29.9440'	122° 35.8790'	551731.1	1212607.7
CPD-02	48° 29.9160'	122° 35.7610'	551550.0	1213080.5
CPD-03	48° 29.8250'	122° 35.9540'	551014.7	1212288.1
CPD-04	48° 29.8550'	122° 35.7990'	551182.7	1212918.5
CPD-05	48° 29.8890'	122° 35.5890'	551370.0	1213771.6
CPD-06	48° 29.8080'	122° 35.6790'	550885.9	1213396.7
CPD-07	48° 29.7390'	122° 35.8620'	550483.4	1212647.8
CPD-08	48° 29.7240'	122° 35.7530'	550382.2	1213086.1
CPD-09	48° 29.7530'	122° 35.6740'	550551.1	1213409.2
CPD-10	48° 29.6530'	122° 35.8350'	549958.2	1212744.9
CPD-11	48° 29.6760'	122° 35.6380'	550078.8	1213584.4
CPD-12	48° 29.7000'	122° 35.5060'	550213.4	1214080.6
CPD-13	48° 29.5740'	122° 35.7960'	549474.3	1212891.4
CPD-14	48° 29.5800'	122° 35.6940'	549501.4	1213304.4
CPD-15	48° 29.5880'	122° 35.5920'	549540.6	1213717.6
CPD-16	48° 29.4840'	122° 35.7700'	548924.9	1212983.9
CPD-17	48° 29.4120'	122° 35.8060'	548490.5	1212828.5
CPD-18	48° 29.4240'	122° 35.6800'	548551.8	1213339.2
CPD-19	48° 29.4650'	122° 35.5500'	548789.0	1213870.2
CPD-20	48° 29.4840'	122° 35.4310'	548893.5	1214353.7
CPD-21	48° 29.3420'	122° 35.6090'	548046.8	1213614.7

Table 2–1. SAIC Sampled Locations and Coordinates

Location ID	Latitude (N)	Longitude (W)	State Plane (Northing)	State Plane (Easting)
Intertidal Clam Tissue and Sediment Collection Sites				
CT-01A	48° 29.7008'	122° 36.0393'	550267.9	1211926.1
CT-01B	48° 29.7370'	122° 36.0668'	550490.4	1211820.2
CT-02	48° 29.5960'	122° 35.9931'	549626.5	1212098.2
CT-03	48° 29.5111'	122° 35.9544'	549106.8	1212242.7
CT-04	48° 29.3651'	122° 35.8771'	548212.3	1212534.8
CT-05	48° 29.2802'	122° 35.8147'	547690.4	1212775.1

Table 2–2. Geomatrix Sampled Locations and Coordinates

Sample ID	Location ID	Latitude (N)	Longitude (W)	State Plane (Northing)	State Plane (Easting)
10654001	ST-2	48° 29.7764'	122° 35.9481'	550718.7	1212304.9
10654002	ST-3	48° 29.7771'	122° 35.8546'	550714.7	1212682.9
10654003	ST-4	48° 29.7777'	122° 35.7609'	550709.4	1213061.5
10654004	ST-6	48° 29.7331'	122° 35.9759'	550458.0	1212186.8
10654008	ST-10	48° 29.6938'	122° 35.9558'	550217.2	1212262.5
10654009	ST-11	48° 29.6951'	122° 35.8480'	550215.3	1212698.0
10654011	ST-14	48° 29.6521'	122° 35.9465'	549962.9	1212294.0
10654013	ST-16	48° 29.6560'	122° 35.7136'	549965.1	1213235.5
10654015	ST-19	48° 29.6129'	122° 35.8144'	549713.1	1212822.6
10654021	ST-26	48° 29.5300'	122° 35.9006'	549216.4	1212462.4
10654022	ST-27	48° 29.5304'	122° 35.7824'	549208.1	1212940.3
10654026	ST-32	48° 29.4919'	122° 35.6501'	548962.2	1213469.2

Table 2–3. Chemical Analysis of Surface Sediment and Clam Tissue Samples

Location ID	Collector	Conventionals[1]	Sediment Dioxin Furan Congeners	Clam Tissue Dioxin Furan Congeners
Fidalgo Bay Bay-Wide Background				
FB-01	SAIC 2010	X	X	
FB-02	SAIC 2010	X	X	
FB-03	SAIC 2010	X	X	
FB-04	SAIC 2010	X	X	
FB-05	SAIC 2010	X	X	
FB-06	SAIC 2010	X	X	
FB-07	SAIC 2010	X	X	
FB-07-D	SAIC 2010	X	X	
FB-07-T	SAIC 2010	X		
FB-08	SAIC 2010	X	X	
FB-09	SAIC 2010	X	X	
FB-10	SAIC 2010	X	X	
Padilla Bay Bay-Wide Background				
PB-01	SAIC 2010	X	X	
PB-02	SAIC 2010	X	X	
PB-03	SAIC 2010	X	X	
PB-04	SAIC 2010	X	X	
PB-05	SAIC 2010	X	X	
PB-05-D	SAIC 2010	X	X	
PB-05-T	SAIC 2010	X		
PB-06	SAIC 2010	X	X	
PB-07	SAIC 2010	X	X	
PB-08	SAIC 2010	X	X	
PB-09	SAIC 2010	X	X	
PB-10	SAIC 2010	X	X	
Custom Plywood Mill Dioxin/Furan Study Area				
CPD-01	SAIC 2010	X	X	
CPD-02	SAIC 2010	X		
CPD-03	SAIC 2010	X	X	
CPD-04	SAIC 2010	X	X	
CPD-05	SAIC 2010	X	X	
CPD-06	SAIC 2010	X		
CPD-07	SAIC 2010	X		
CPD-08	SAIC 2010	X		
CPD-08-D	SAIC 2010	X		
CPD-08-T	SAIC 2010	X		
CPD-09	SAIC 2010	X	X	
CPD-10	SAIC 2010	X		
CPD-11	SAIC 2010	X		
CPD-12	SAIC 2010	X	X	
CPD-13	SAIC 2010	X		
CPD-14	SAIC 2010	X		
CPD-15	SAIC 2010	X	X	
CPD-16	SAIC 2010	X	X	
CPD-17	SAIC 2010	X	X	
CPD-18	SAIC 2010	X		
CPD-19	SAIC 2010	X		

Table 2–3. Chemical Analysis of Surface Sediment and Clam Tissue Samples

CPD-20	SAIC 2010	X		
CPD-21	SAIC 2010	X		
ST-2	Geomatrix 2008		X	
ST-3	Geomatrix 2008		X	
ST-4	Geomatrix 2008		X	
ST-6	Geomatrix 2008		X	
ST-10	Geomatrix 2008		X	
ST-11	Geomatrix 2008		X	
ST-14	Geomatrix 2008		X	
ST-16	Geomatrix 2008		X	
ST-19	Geomatrix 2008		X	
ST-26	Geomatrix 2008		X	
ST-27	Geomatrix 2008		X	
ST-32	Geomatrix 2008		X	
Intertidal Clam Tissue and Co-located Sediment Collection Sites				
CT-01A	SAIC 2010	X	X	X
CT-01B	SAIC 2010	X	X	X
CT-02	SAIC 2010	X	X	X
CT-03	SAIC 2010	X	X	X
CT-04	SAIC 2010	X	X	X
CT-05	SAIC 2010	X	X	X

Notes:

1. Sediment conventionals include grain size distribution, total organic carbon, total solids, and total sulfides.
Tissue conventionals include lipids.

Table 3–1. Sediment and Tissue Analytical Results

Sample ID	Fines (%)	TOC (%)	TEC (full DL) (pg/g dw)	TEC (1/2 DL) (pg/g dw)	TEC (zero DL) (pg/g dw)
Fidalgo Bay Bay-Wide Background					
FB-01	7.2	0.35	0.504	0.311	0.118
FB-02	6	0.31	0.666	0.518	0.370
FB-03	9.8	0.48	0.586	0.490	0.394
FB-04	42.9	0.65	1.36	1.14	0.926
FB-05	17.2	0.84	0.640	0.456	0.273
FB-06	10.8	0.53	0.640	0.456	0.273
FB-07	53.2	0.91	1.26	0.876	0.493
FB-08	40.9	0.74	1.02	0.731	0.443
FB-09	62.6	0.82	1.50	1.37	1.24
FB-10	85.5	1.35	2.33	2.22	2.12
Padilla Bay Bay-Wide Background					
PB-01	14.3	0.68	0.401	0.271	0.142
PB-02	1.8	0.17	0.306	0.158	0.0104
PB-03	68	1.20	2.03	1.84	1.65
PB-04	2	0.98	0.219	0.110	0.00153
PB-05	25.7	0.19	0.770	0.602	0.435
PB-06	1.4	0.22	0.241	0.129	0.0179
PB-07	7.5	0.42	0.353	0.219	0.0847
PB-08	26.8	0.47	0.439	0.245	0.0511
PB-09	3.9	0.25	0.187	0.0730	0.0638
PB-10	57.1	0.94	0.897	0.680	0.463
Custom Plywood Mill Study Area					
CPD-01	87.3	0.94	4.02	3.74	3.46
CPD-02	85.3	0.75	--	--	--
CPD-03	84	1.38	5.92	5.57	5.22
CPD-04	75	0.85	2.68	2.18	1.69
CPD-05	81.3	0.55	2.25	1.65	1.05
CPD-06	78.8	0.57	--	--	--
CPD-07	81.7	1.24	--	--	--
CPD-08	81	1.12	--	--	--
CPD-09	78.9	0.99	2.70	2.42	2.15
CPD-10	81.2	1.91	--	--	--
CPD-11	81.5	0.49	--	--	--
CPD-12	73.9	0.86	2.08	1.86	1.64
CPD-13	84.9	1.60	--	--	--
CPD-14	91.7	1.15	--	--	--
CPD-15	81.3	1.10	2.08	1.88	1.68
CPD-16	89.6	1.66	3.82	3.56	3.31
CPD-17	80.5	0.89	4.30	4.15	4.00
CPD-18	84.3	1.36	--	--	--
CPD-19	84.5	1.29	--	--	--
CPD-20	78.8	0.39	--	--	--
CPD-21	87.7	1.24	--	--	--
Custom Plywood Mill Study Area - Collected by GeoMatrix					
ST-2	--	--	14.4	14.4	14.4
ST-3	--	--	5.13	4.89	4.65
ST-4	--	--	3.16	2.45	1.75
ST-6	--	--	17.6	17.6	17.6

Table 3–1. Sediment and Tissue Analytical Results

Sample ID	Fines	TOC	TEC (full DL)	TEC (1/2 DL)	TEC (zero DL)
ST-10	--	--	14.3	14.3	14.3
ST-11	--	--	13.9	13.9	13.8
ST-14	--	--	9.66	9.34	9.01
ST-16	--	--	2.53	2.19	1.85
ST-19	--	--	5.54	5.39	5.24
ST-26	--	--	13.0	12.2	11.4
ST-27	--	--	4.06	3.59	3.12
ST-32	--	--	2.54	2.37	2.20
Intertidal Clam Tissue and Sediment Collection Site - Sediment					
CT-01A	24.4	5.56	81.3	81.2	81.2
CT-01B	6.0	1.89	13.1	12.9	12.7
CT-02	19.2	1.30	12.0	11.7	11.4
CT-03	11.3	0.82	2.51	2.14	1.77
CT-04	8.8	1.05	1.29	1.20	1.11
CT-05	19.4	1.44	1.71	1.55	1.39
Intertidal Clam Tissue and Sediment Collection Site - Tissue (pg/g ww)					
CT-01A	--	--	1.11	0.894	0.681
CT-01B	--	--	0.595	0.302	0.008
CT-02	--	--	0.216	0.126	0.036
CT-03	--	--	0.241	0.158	0.075
CT-04	--	--	0.186	0.131	0.0759
CT-05	--	--	0.192	0.117	0.0412

TOC - total organic carbon

TEC - toxic equivalency concentration

DL - detection limit

dw - dry weight

ww - wet weight

Table 3–2. Summary of Surface Sediment Conventional Parameters

Study Area	Summary Statistic	# of Samples	Fines (%)	Station ID	TOC (%)	Station ID	Sulfides (mg/kg)	Station ID	Total Solids (%)	Station ID
Fidalgo Bay Background	Min		6.0	FB-02	0.305	FB-02	1.61	FB-06	50.30	FB-10
	Max		85.5	FB-10	1.35	FB-10	713	FB-10	72.00	FB-02
	Average	10	33.6		0.697		207		62.25	
Padilla Bay Background	Min		1.4	PB-06	0.171	PB-02	1.60	PB-09	46.90	PB-03
	Max		68.0	PB-03	1.20	PB-03	1150	PB-10	78.90	PB-06
	Average	10	20.9		0.552		229		66.34	
Custom Plywood Mill Nearshore	Min		6.0	CT-01B	0.391	CPD-20	24.6	CPD-09	41.20	CPD-16
	Max		91.7	CPD-14	5.56	CT-01A	2480	CT-01A	75.00	CT-01B
	Average	27	67.5		1.27		477		53.77	

Min - minimum detected concentration

Max - maximum detected concentration

Average - average of detected concentrations only

Table 3–3. Summary of Surface Sediment Dioxin/Furan Congener Results

Study Area	Summary Statistic	# of Samples	Dioxin/Furan TEC* (pg/g)	Station ID
Fidalgo Bay Background	Min	10	0.31	FB-01
	Max		2.22	FB-10
	Average		0.86	
Padilla Bay Background	Min	10	0.07	PB-04
	Max		1.84	PB-03
	Average		0.43	
Custom Plywood Mill Nearshore	Min	27	1.20	CT-04
	Max		81.2	CT-01A
	Average		8.90	

Notes:

* Half detection limits used for non-detected congeners.

Table 3–4. Summary of Dioxin/Furan TEC Statistics of Background Areas

Study Area	# of Samples	Summary Statistic		TEC (pg/g dw) Full DL	TEC (pg/g dw) 1/2 DL	TEC (pg/g dw) Zero DL
Fidalgo Bay Bay-Wide Background	10	Minimum		0.50	0.31	0.12
		Maximum		2.33	2.22	2.12
		Average		1.05	0.86	0.67
		Median		0.84	0.62	0.42
		95% UCL on the mean	Log-normal Distribution	1.54	1.40	1.48
			Gamma Distribution	1.45	1.27	1.14
		90th Percentile	Log-normal Distribution	1.78	1.56	1.40
			Gamma Distribution	1.85	1.64	1.45
Padilla Bay Bay-Wide Background	10	Minimum		0.19	0.07	0.00
		Maximum		2.03	1.84	1.65
		Average		0.58	0.43	0.29
		Median		0.38	0.23	0.07
		95% UCL on the mean	Log-normal Distribution	1.10	1.16	1.45
			Gamma Distribution	0.97	0.84	1.07
		90th Percentile	Log-normal Distribution	1.13	0.93	0.99
			Gamma Distribution	1.24	1.03	0.83
Combined Fidalgo and Padilla Bay Background	20	Minimum		0.19	0.07	0.00
		Maximum		2.33	2.22	2.12
		Average		0.82	0.65	0.48
		Median		0.64	0.47	0.32
		95% UCL on the mean	Log-normal Distribution	1.22	1.18	2.51
			Gamma Distribution	1.09	0.93	0.84
		90th Percentile	Log-normal Distribution	1.62	1.46	1.89
			Gamma Distribution	1.61	1.41	1.25

DL - detection limit

TEC - toxic equivalent concentrations

UCL - upper confidence limit

Table 3–5. Approximate Acreage of Impacted Sediment

TEC Interval (pg/g dw)	Impacted Area (acres)*
0.1 - 1.0	4780
1.0 - 2.0	368
2.0 - 5.0	177
5.0 - 10	22.6
10 -15	14.4
15 - 25	3.9
25 - 35	1.2
35 - 50	0.84
50 - 65	0.58
65 - 81	0.67
Total	**5370**

Notes:

* Based on the spatial extent of modeled results in Figure 3-12A

Table 3–6. Dioxin/Furan TEC Results for Co-located Clam Tissue and Sediment Samples

Location ID	Tissue Dioxin/Furan TEC* (pg/g ww)	Sediment Dioxin/Furan TEC* (pg/g dw)
SDS-CT-01A	0.894	81.2
SDS-CT-01B	0.302	12.9
SDS-CT-02	0.126	11.7
SDS-CT-03	0.158	2.14
SDS-CT-04	0.131	1.20
SDS-CT-05	0.117	1.55

Notes:

* Half detection limits used for non-detected congeners.

ww - wet weight

dw - dry weight

Table 3–7. BSAF Values for Co-located Clam Tissue and Sediment Samples

Dioxin/Furan Congener	CT-01A	CT-01B	CT-02	CT-03	CT-04	CT-05	Fidalgo Bay Average	Port Gardner Average*	USACE Database Average (Molluscs)♦
1,2,3,4,7,8-HXCDD	0.08			0.06			0.07		0.308
1,2,3,6,7,8-HXCDD	0.07		0.01	0.04	0.07		0.05	0.08	0.209
1,2,3,7,8,9-HXCDD	0.08						0.08	0.09	0.161
1,2,3,4,6,7,8-HPCDD	0.06		0.01	0.03	0.05	0.01	0.03	0.15	0.058
OCDD	0.06	0.02	0.01	0.02	0.03	0.01	0.02	0.12	0.04
2,3,4,7,8-PECDF				0.20			0.20		0.286
1,2,3,4,7,8-HXCDF	0.06						0.06		0.105
2,3,4,6,7,8-HXCDF	0.09						0.09		0.3
1,2,3,4,6,7,8-HPCDF	0.06						0.06	0.18	0.202
1,2,3,4,7,8,9-HPCDF	0.06						0.06		
OCDF	0.05		0.01	0.01	0.02	0.01	0.02	0.17	0.042

Notes:

* Values from SAIC (2009).

♦ Values from USACE (2010).

APPENDIX A
BORING AND TEST PIT LOGS,
WELL CONSTRUCTION DIAGRAMS

(APPENDIX ON DVD ATTACHED TO
INSIDE OF REPORT COVER)

Appendix A
Surface Sediment and Tissue Collection Logs

SURFACE SEDIMENT
FIELD COLLECTION LOGBOOK

SUPPLEMENTARY FIDALGO BAY AND CUSTOM PLYWOOD MILL SEDIMENT DIOXIN STUDY ANACORTES, WA

June 2010

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Fidalgo Bay
Crew: TH, WH, JW

Station: FB-01
Date: 6.8.10

Grab #: 1	Depth Interval: 59.5	Penetration Depth: 4cm	Time: 1003
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48° 30.998 N
Woody debris	Other:	H2S	122° 35.623 W
Shell debris		Petroleum	
Grab #: 2	**Depth Interval:** 59.2	**Penetration Depth:** 5cm	**Time:** 1008
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48° 30.990 N
Woody debris	Other:	H2S	122° 35.609 W
Shell debris		Petroleum	
Grab #:	**Depth Interval:**	**Penetration Depth:**	**Time:**
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	**Depth Interval:**	**Penetration Depth:**	**Time:**
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Station: FB-02
Sampling Event: Fidalgo Bay
Date: 6.8.10
Crew: TH, WH, JW

Grab #: 1	Depth Interval: 56.1	Penetration Depth: 5 cm	Time: 1021
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	polychaete
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48 30.917 N
Woody debris	Other:	H2S	122 35.197W
Shell debris		Petroleum	

Grab #: 2	Depth Interval: 55.6	Penetration Depth: 5cm	Time: 1033
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48°30.913
Woody debris	Other:	H2S	122° 35.183
~~Shell debris~~		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: [signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Fidalgo Bay
Crew: T.H, WH, JW

Station: FB-03
Date: 6.8.10

Grab #: 1	Depth Interval: 61.8	Penetration Depth: 5cm	Time: 1052
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48°30.874N
Woody debris	Other:	H2S	122° 34.478W
Shell debris		Petroleum	

Grab #: 2	Depth Interval: 69.8	Penetration Depth: 5cm	Time: 1100
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48°30.872N
Woody debris	Other:	H2S	122° 34.474W
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: T.H.

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Station: FB-06
Sampling Event: Fidalgo Bay
Date: 6.8.10
Crew: T.H. WH J.W.

Grab #: 1	Depth Interval: 59.2	Penetration Depth: 4cm	Time: 1114
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48° 30.611N 122° 34.455
Grab #: 2	Depth Interval: 59.2	Penetration Depth: 4cm	Time: 1118
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48° 30.612 122° 34'446
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Fidalgo Bay
Crew: TH WH JW

Station: FB-08
Date: 6-8-10

Grab #: 1	Depth Interval: 220	Penetration Depth: ~~T.H.Z~~ 8cm	Time: 1133
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:*** polychaetes
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	48° 30.339 N
Shell debris		Petroleum	122° 34.383 W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By:____________________

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Station: FB-04
Sampling Event: Fidalgo Bay
Date: 6.8.10
Crew: TH, WH, JW

Grab #: 1	Depth Interval: 17'	Penetration Depth: 8cm	Time: 1152
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°30.587 N 122° 35.611 W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Padilla Bay
Crew: T.H., W.H., C.H.

Station: PB-01
Date: 6/7/01

Grab #: 1	Depth Interval: 11.5	Penetration Depth: —	Time: 1300
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	eel grass
Gravel	Brown	Slight	reject
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	Youngs Grab
Grab #: 2	Depth Interval: 11.5	Penetration Depth: 6cm	Time: 1307
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	eel grass
Gravel	Brown	Slight	Brown algae
Sand C M F	Brown surface	Moderate	crangon 48°33.430W
Silt/clay	Gray	Strong	122° 33.413N
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	Young Grab
Grab #: 3	Depth Interval: 11.0	Penetration Depth: —	Time: 1320
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	Reject
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	Petit Ponar
Grab #: 4	Depth Interval: 11.0	Penetration Depth: 5cm	Time: 1324
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	48°33.432N
Sand C M F	Brown surface	Moderate	122° 33.414W
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	Petit Ponar

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study

Station: PB02

Sampling Event: Padilla Bay

Date: 6/7/10

Crew: T.H., W.H., C/H

Grab #: 1	Depth Interval: 10.0	Penetration Depth: 5cm	Time: 1345
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:*** polychaete
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #: 2	**Depth Interval:** 10.0	**Penetration Depth:** 6cm	**Time:** 1349
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	48° 33.434N
Organic matter	Black	Overwhelming	122° 31.912W
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	**Depth Interval:**	**Penetration Depth:**	**Time:**
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	**Depth Interval:**	**Penetration Depth:**	**Time:**
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Padilla Bay
Crew: TH, WH, CH

Station: PB-03
Date:

Grab #: 1	Depth Interval: 10.9	Penetration Depth: 11cm	Time: 1407
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	brittle star ~~malpadia~~ Sea pen 48° 32.377N 122° 33.343W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study

Sampling Event: Padilla Bay

Crew: TH, WH, CH

Station: ~~PPT~~ PB-04 TH

Date:

Grab #: 1	Depth Interval: 12.2	Penetration Depth: 5cm	Time: 1429
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°31.872N 122° 31.955W
Grab #: 2	Depth Interval: 11.4	Penetration Depth: 6cm	Time: 1434
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48° 31.874N 122° 31.959W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

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From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study

Station: PB-05

Sampling Event: Padilla Bay

Date: 6-7-10

Crew: TH, WH, CH

Grab #: 1	Depth Interval: 28.8	Penetration Depth: 9 cm	Time: 1450
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48° 30.610 N
Woody debris	Other:	H2S	122° 33.123 W
Shell debris		Petroleum	

Grab #: 2	Depth Interval: 28.8	Penetration Depth: 9 cm	Time: 1458
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	Collected
Gravel	Brown	Slight	Field replicates
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48° 30.609N
Woody debris	Other:	H2S	122° 33.125W
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: [signature]

duplicates & triplicates

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Padilla Bay
Station: PB-06
Date: 6.7.10
Crew: TH, WH, CH

Grab #: 1	Depth Interval: 16.2	Penetration Depth: 5cm	Time: 1524
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F ~~Silt/clay~~ Organic matter Woody debris Shell debris	Drab olive ~~Brown~~ ~~Brown~~ surface Gray Black Other:	None ~~Slight~~ Moderate Strong Overwhelming H2S Petroleum	48° 30.672 N 122° 31.182 W
Grab #: 2	Depth Interval: 16.2	Penetration Depth: 4cm	Time: 1529
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	~~Drab olive~~ Brown Brown surface Gray Black Other:	None ~~Slight~~ Moderate Strong Overwhelming H2S Petroleum	48° 30.673 N 122° 31.184 W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Padilla Bay
Station: PB07
Date: 6-7-10
Crew: TH, WH, CH

Grab #: 1	Depth Interval: 17.2	Penetration Depth: 7cm	Time: 1547
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48° 30.202 N 122° 32.134 W
Grab #: 2	Depth Interval: 19.2	Penetration Depth:	Time: 1550
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48° 30.199 N 122° 32.134 W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Fidalgo Bay
Crew: YH, WH, JW

Station: FB-05
Date: 6/8/10

Grab #: 1	Depth Interval: 22.5'	Penetration Depth:	Time: 1345
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject - stick
Grab #: 2	**Depth Interval:** 26.5	**Penetration Depth:** 6cm	**Time:** 1348
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48 30.593N 122 35.158W
Grab #: 3	**Depth Interval:** 26.1	**Penetration Depth:** 6cm	**Time:** 1358
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48 30.594 122 35.172
Grab #:	**Depth Interval:**	**Penetration Depth:**	**Time:**
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Fidalgo Bay
Station: FB-07
Date: 6.8.10
Crew: TH WH JW

Grab #: 1	Depth Interval: 11.5	Penetration Depth: 7cm	Time: 1405
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Kelp 48° 30.254 N 122° 35.152 W
Grab #: 2	Depth Interval: 11.	Penetration Depth: 6cm	Time: 1410
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°30,267 N 122 35.157 W
Grab #: 3	Depth Interval: 11.3	Penetration Depth: 7cm	Time: 1415
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Kelp 48°30.261 N 122° 35.152 W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

QA/QC duplicate + triplicate

Recorded By: T. H[illegible]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Fidalgo Bay
Station: FB09
Date: 6.8.10
Crew: TH, WH, JW

Grab #: 1	Depth Interval: 14.2	Penetration Depth: 6cm	Time: 1435
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.964N 122° 35.106W
Grab #: 2	Depth Interval: 13.9	Penetration Depth: 6cm	Time: 1440
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.962N 122°35'.109W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Fidalgo Bay
Station: FB-10
Date: 6.8.10
Crew: TH, WH, JW

Grab #: 1	Depth Interval: 19.2	Penetration Depth: 10cm	Time: 1453
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Padilla Bay
Crew: TH, WH, JW

Station: PB-08
Date: 6.8.10

Grab #: 1	Depth Interval: 7.0	Penetration Depth: 4	Time: 1521
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.303N 122°31.77 W
Grab #: 2	Depth Interval: 7.0	Penetration Depth: 4	Time: 1525
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.306N 122°31.783W
Grab #: 3	Depth Interval: 15.1	Penetration Depth: 5	Time: 1533
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.297N 122° 31.748 W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: T. H[signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Padilla Bay
Crew: TH, WH, JW

Station: PB-09
Date: 6.8.10

Grab #: 1	Depth Interval: 17.0	Penetration Depth: Empty	Time: 1348
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject 48°29,337 N 122 30.440 W
Grab #: 2	Depth Interval: 19.0	Penetration Depth:	Time: 1555
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject 48°29,314 N 122° 30,399 W
Grab #: 3	Depth Interval: 18.5	Penetration Depth:	Time: 1556
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject 48°29.335 N 122° 30.416 W
Grab #: 4	Depth Interval: 19.7	Penetration Depth: 4cm	Time: 1558
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.289 N 122° 30.378 W

Recorded By: T. Hunt

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Padilla Bay
Crew: TH, WH, JW

Station: PB-09 (cont.)
Date: 6.8.10

Grab #: 5	Depth Interval: 20.0	Penetration Depth: —	Time: 1602
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48 29.299 N 122 30.350 W
Grab #: 6	Depth Interval: 19.6	Penetration Depth: —	Time: 1604
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject
Grab #: 7	Depth Interval: 18.3	Penetration Depth: 6	Time: 1606
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48 29.261 N 122 30.377 W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: T. Hunt

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study

Sampling Event: Padilla Bay

Crew: TH, WH, JW

Station: PB-10

Date: 6.8.10

Grab #: 1	Depth Interval: 13.7	Penetration Depth: 10cm	Time: 1620
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°28.588N 122° 31.352W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom Plywood

Station: CPD-01
Date: 6.9.10

Crew: TH, WH, CH

Grab #: 1	Depth Interval: 6.7	Penetration Depth: 5cm	Time: 940
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	eelgrass
Gravel	Brown	Slight	Brown algae
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48°29'.944N
Woody debris	Other:	H2S	122° 35'.879W
Shell debris		Petroleum	
Grab #: 2	**Depth Interval:** 6.5	**Penetration Depth:** 7cm	**Time:** 944
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	polychaetes
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48°29.941 N
Woody debris	Other:	H2S	122°35.884W
Shell debris		Petroleum	
Grab #:	**Depth Interval:**	**Penetration Depth:**	**Time:**
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	**Depth Interval:**	**Penetration Depth:**	**Time:**
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: [signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom Plywood
Crew: TH, CH, WH
Station: CPD-02
Date: 6.9.10

Grab #: 1	Depth Interval: 7.2	Penetration Depth:	Time: 1000
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject brown alone
Grab #: 2	Depth Interval: 7.2	Penetration Depth: 6cm	Time: 1001
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.916 N 122° 35.761 W
Grab #: 3	Depth Interval: 7.4	Penetration Depth: —	Time: 1025
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject 48° 29.911 N 122° 35.749 W
Grab #: 4	Depth Interval: 7.2	Penetration Depth: 5cm	Time: 1030
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand ~~C~~ M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.910N 122° 35.750W

Recorded By: [signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom Plywood
Crew: TH, WH, CH

Station: CPD-03
Date: 6.9.10

Grab #: 1	Depth Interval: 6	Penetration Depth:	Time: 1045
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	Brown Algae
Gravel	Brown	Slight	Eel
Sand C M F	Brown surface	Moderate	Reject
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #: 2	Depth Interval: 5.8	Penetration Depth: 11cm	Time: 1046
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	Brown Algae
Gravel	Brown	Slight	eelgrass
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	48°29.825 N
Organic matter	Black	Overwhelming	122°35.954 W
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: T. Hunt

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom Plywood
Crew: TH, WH, OH

Station: CPD-04
Date: 6.9.10

Grab #: 1	Depth Interval: 7.4	Penetration Depth:	Time: 1100
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Crab in jaw Reject
Grab #: 2	Depth Interval: 7.4	Penetration Depth:	Time: 1102
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	brown algae eelgrass Reject
Grab #: 3	Depth Interval: 7.4	Penetration Depth:	Time: 1105
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject
Grab #: 4	Depth Interval: 6.9	Penetration Depth:	Time: 1107
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject

Recorded By: [signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study

Station: CPB-04 (cont)

Sampling Event: Custom Plywood

Date: 6.9.10

Crew: TH, WH, CH

Grab #: 5	Depth Interval: 7.4	Penetration Depth: 4cm	Time: 1107
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	Small amount of sediment under brown algae
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48°29.855 N
Woody debris	Other:	H2S	122°35.799W
Shell debris		Petroleum	
Grab #: 6	**Depth Interval:** 7.5	**Penetration Depth:**	**Time:** 1111
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	Reject
Gravel	Brown	Slight	brown algae
Sand C M F	Brown surface	Moderate	eel grass
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #: 7	**Depth Interval:** 7.6	**Penetration Depth:** 4cm	**Time:** 1115
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	brown algae
Gravel	Brown	Slight	eel grass
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	48° 29.857 N
Organic matter	Black	Overwhelming	122° 35.791 W
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #: 8	**Depth Interval:** 7.7	**Penetration Depth:** 6cm	**Time:** 1119
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	brown algae
Gravel	Brown	Slight	eel grass
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: T. Hunt

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom Plywood
Station: CPD-07
Date: 6.9.10
Crew: TH, WH, CH

Grab #: 1	Depth Interval: 6.6	Penetration Depth:	Time: 1134
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject
Grab #: 2	Depth Interval: 6.6	Penetration Depth: 5cm	Time: 1135
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	brown algae 48° 29.739 N 122° 35.862 W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom Plywood
Crew: TH, WH, CH
Station: CPD-08
Date: 6.9.10

Grab #: 1	Depth Interval: 8.2	Penetration Depth: 8cm	Time: 1148
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48°29.724 N
Woody debris	Other:	H2S	122°35.753 W
Shell debris		Petroleum	
Grab #: 2	**Depth Interval:** 8.2	**Penetration Depth:** 4	**Time:** 1153
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	Brown Algae
Gravel	Brown	Slight	eelgrass
Sand C M F	Brown surface	Moderate	poly chetes
Silt/clay	Gray	Strong	48°29.722 N
Organic matter	Black	Overwhelming	122° 35.757 W
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #: 3	**Depth Interval:** 8.3	**Penetration Depth:** 6cm	**Time:** 1158
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	48°29.725N
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	122° 35.745W
Shell debris		Petroleum	
Grab #:	**Depth Interval:**	**Penetration Depth:**	**Time:**
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

QA/QC Replicates

Recorded By: [signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study

Sampling Event: Custom Plywood

Station: CPV-10

Date: 6.9.10

Crew: TH, WH, CH

Grab #: 1	Depth Interval: 8.6	Penetration Depth: 10	Time: 1312
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	eelgrass
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate to	
Silt/clay	Gray	Strong	48°29.653 N
Organic matter	Black	Overwhelming	122° 35.835W
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: [signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom Plywood
Crew: TH, WH, CH

Station: CPD-13
Date: 6.9.10

Grab #: 1	Depth Interval: 1.5	Penetration Depth: 10cm	Time: 1320
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	~~Drab olive~~	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48° 29.574 N
Woody debris	Other:	H2S	122° 35.796 W
Shell debris		Petroleum	
Grab #:	**Depth Interval:**	**Penetration Depth:**	**Time:**
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	**Depth Interval:**	**Penetration Depth:**	**Time:**
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	**Depth Interval:**	**Penetration Depth:**	**Time:**
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: [signature]

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom Plywood
Station: CPD-16
Date: 6-9-10
Crew: TH, CH, WH

Grab #: 1	Depth Interval: 8.0	Penetration Depth: 10cm	Time: 1331
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48°29'.484
~~Woody debris~~	Other:	H2S	122° 35.77
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: T. Hunt

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom plywood
Crew: TH, CH, WH

Station: CPD-17
Date: 6.9.10

Grab #: 1	Depth Interval: 8.7	Penetration Depth: 10cm	Time: 1343
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48° 29.412N 122° 35'.806W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom Plywood
Crew: PH, CH, WH

Station: CPD-18
Date: 6-9-10

Grab #: 1	Depth Interval: 9.7	Penetration Depth: 8cm	Time: 1400
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.424N 122° 35.680 W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Station: CPD-19
Sampling Event: Custom plywood
Date: 6.9.10
Crew: TH, CH, WH

Grab #: 1	Depth Interval: 11.0	Penetration Depth: 9cm	Time: 1411
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:*** eel grass
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48° 29.465 N
Woody debris	Other: layered	H2S	122° 35.550 W
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: custom plywood
Crew: TH, WH, CH

Station: CPP-20
Date: 6.9.10

Grab #: 1	Depth Interval: 11.0	Penetration Depth: 8cm	Time: 1425
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:*** polychaetes
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.484N 122° 35.431W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom Plywood
Crew: TH, CH, WH

Station: CPD-21
Date: 6·9·10

Grab #: 1	Depth Interval: 9.0	Penetration Depth: 8cm	Time: 1440
Sediment type:	*Sediment color:*	*Sediment Odor:*	*Comments:*
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	eelgrass 48° 29.342N 122° 35.609W
Grab #: 2	Depth Interval: 8.9	Penetration Depth: 10cm	Time: 1444
Sediment type:	*Sediment color:*	*Sediment Odor:*	*Comments:*
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	eelgrass 48° 29.346N 122° 35.607W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	*Sediment color:*	*Sediment Odor:*	*Comments:*
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	*Sediment color:*	*Sediment Odor:*	*Comments:*
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study

Sampling Event: Custom plywood

Station: CPD-5

Date: 6-10-10

Crew: TH, WH, JW

Grab #: 1	Depth Interval: 6.6	Penetration Depth: 8cm	Time: 1057
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48° 29.889 N
Woody debris	Other:	H2S	122° 35.589 W
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom Plywood
Crew: TH, WH, JW

Station: CPD-6
Date: 6.10.10

Grab #: 1	Depth Interval: 6.6	Penetration Depth: 7cm	Time: 1111
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject 48° 29.810 N
Grab #: 2	Depth Interval: 6.0	Penetration Depth:	Time: 1114
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Reject 48° 29.809 N 122° 35.684 W
Grab #: 3	Depth Interval: 6.3	Penetration Depth: 7cm	Time: 1116
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48° 29.808 N 122° 35.679W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Station: CPD-09
Sampling Event: custom plywood
Date: 6.10.10
Crew: TH, WH, JW

Grab #: 1	Depth Interval: 6.7	Penetration Depth: 7cm	Time: 1130
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.753 N 122° 35.674W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Station: CPD-11
Sampling Event: Custom plywood
Date: 6·10·10
Crew: TH, WH, JW

Grab #: 1	Depth Interval: 6.9	Penetration Depth: 9	Time: 1144
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive? Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	48°29.676 N 122° 35.628W

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study

Station: CPD-12

Sampling Event: Custom plywood

Date: 6·10·10

Crew: TH, WH, JW

Grab #: 1	Depth Interval: 6.2	Penetration Depth:	Time: 1158
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:*** Reject
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #: 2	Depth Interval: 6.4	Penetration Depth: 8cm	Time: 1200
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48° 29.700N
Woody debris	Other:	H2S	122° 35.506 W
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Custom plywood
Crew: TH, WH, JW

Station: CPD-14
Date: 6.10.10

Grab #: 1	Depth Interval: 7.8	Penetration Depth: 8	Time: 1212
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	Polychaete crab 48° 29.580N 122° 35.694W
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: [signature]

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From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: custom plywood
Crew: TH, WH, JW

Station: CPD-15
Date: 6.10.10

Grab #: 1	Depth Interval: 7.4	Penetration Depth: 8cm	Time: 1223
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:*** polychaete
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	48° 29.588N
Woody debris	Other:	H2S	122° 35.592W
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: [signature]

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Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Fidalgo Bay Clams
Station: CT-01A
Date: 6/14/10
Crew: AW WH CH JW OK

Grab #:	Depth Interval:	Penetration Depth:	Time: 1047
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	lots of woody debris Area substrate is fairly consistent
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

1 picture

Recorded By: Will Holan

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From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Station: CT-01B
Sampling Event: Fidalgo Bay Clams
Date: 6/14/10
Crew: JW AW WH CH OK

Grab #:	Depth Interval:	Penetration Depth:	Time: 1115
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	Rocky area w/
Gravel	Brown	Slight	lots of cobble
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	- break on N end
Organic matter	Black	Overwhelming	of old pier
Woody debris	Other:	H2S	
Shell debris		Petroleum	

1 picture

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble	Drab olive	None	
Gravel	Brown	Slight	
Sand C M F	Brown surface	Moderate	
Silt/clay	Gray	Strong	
Organic matter	Black	Overwhelming	
Woody debris	Other:	H2S	
Shell debris		Petroleum	

Recorded By: Will Hah

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From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: ~~FB~~ Fidalgo Bay Clams
Station: CT-02
Date: 6/14/10
Crew: DK JW AW CH WH

Grab #:	Depth Interval:	Penetration Depth:	Time: 1147
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	lots of fine woody debris ~ 5-10 cm below surface large pieces of wood on surface
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

2 pictures

Recorded By: Will Hall

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From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Station: CT-03
Sampling Event: Fidalgo Bay Clams
Date: 6/14/10
Crew: WH JW AW CH DK

Grab #:	Depth Interval:	Penetration Depth:	Time: 1230
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	lots of shell debris
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

2 pictures

Recorded By: Will Hafner

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Station: CT-05
Sampling Event: Fidalgo Bay Clams
Date: ~~1306~~ 6/14/10
Crew: AW JW DK CH WH

Grab #:	Depth Interval:	Penetration Depth:	Time: 1306
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	
Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

3 pictures

Recorded By: Will Hafner

SAIC
From Science to Solutions

Sediment Collection Form

Project: 2010 Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Sampling Event: Fidalgo Bay Clams
Station: CT-04
Date: 6/14/10
Crew: JW AW WH CH DK

Grab #:	Depth Interval:	Penetration Depth:	Time: 1331
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	used last pre-decontaminated bowl at CT-05 wiped bowl w/ paper towels and site water for re-use

2 pictures

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Grab #:	Depth Interval:	Penetration Depth:	Time:
Sediment type:	***Sediment color:***	***Sediment Odor:***	***Comments:***
Cobble Gravel Sand C M F Silt/clay Organic matter Woody debris Shell debris	Drab olive Brown Brown surface Gray Black Other:	None Slight Moderate Strong Overwhelming H2S Petroleum	

Recorded By: Will Hafner

SAMPLE CONTAINER LOGBOOK

2010 SUPPLEMENTARY FIDALGO BAY AND CUSTOM PLYWOOD MILL SEDIMENT DIOXIN STUDY

June 2010

SAIC®

From Science to Solutions

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1307
Crew: WH CH TH	**Date:** 6/7/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
10980	SDS-PB-01	Dioxin/furan	Axys
10981	SDS-PB-01	Grain size	ARI
10982	SDS-PB-01	Total sulfides	ARI
10983	SDS-PB-01	TOC/Total solids	ARI
10984	SDS-PB-01	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1345
Crew: WH CH TH	**Date:** 6/7/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
10985	SDS-PB-02	Dioxin/Furan	Axys
10986	SDS-PB-02	Grain size	ARI
10987	SDS-PB-02	Total Sulfides	ARI
10988	SDS-PB-02	TOC/Total Solids	ARI
10989	SDS-PB-02	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1407
Crew: WH CH TH	**Date:** 6/7/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
10990	SDS-PB-03-	Dioxin/Furan	Axys
10991	SDS-PB-03	Grain Size	ARI
10992	SDS-PB-03	TOC/Total Solids	ARI
10993	SDS-PB-03	Total Sulfides	ARI
10994	SDS-PB-03	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1429
Crew: WH CH TH	**Date:** 6/7/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
10995	SDS-PB-04	Dioxin/Furan	Axys
10996	SDS-PB-04	Grain Size	ARI
10997	SDS-PB-04	TOC/Total Solids	ARI
10998	SDS-PB-04	Total Sulfides	ARI
10999	SDS-PB-04	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1450
Crew: WH CH TH	**Date:** 6/7/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11000	SDS-PB-05	Dioxin/Furan	Axys
11002	SDS-PB-05	Grain size	ARI
11005	SDS-PB-05	Total Sulfides	ARI
11006	SDS-PB-05	TOC/Total solids	ARI
11013	SDS-PB-05	Archive	ARI
11001	SDS-PB-05-D	Dioxin/Furan	Axys
11003	SDS-PB-05-D	Grain size	ARI
11006	SDS-PB-05-D	Total Sulfides	ARI
11009	SDS-PB-05-D	TOC/Total solids	ARI
11004	SDS-PB-05-T	Grain size	ARI
11007	SDS-PB-05-T	Total Sulfides	ARI
11010	SDS-PB-05-T	TOC/Total solids	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1524
Crew: WH CH TH	**Date:** 6/7/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11011	SDS-PB-06	Dioxin/Furan	Axys
11012	SDS-PB-06	Grain Size	ARI
11014	SDS-PB-06	Total Sulfides	ARI
11015	SDS-PB-06	TOC/Total Solids	ARI
11016	SDS-PB-06	Archive	ARI

Notes

Completed by: Will Hafner

Sample Container Logbook

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1547
Crew: WH TH CH	**Date:** 6/7/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11017	SDS-PB-07	Dioxin/Furan	Axys
11018	SDS-PB-07	Grain Size	ARI
11019	SDS-PB-07	Total Sulfides	ARI
11020	SDS-PB-07	TOC/Total Solids	ARI
11021	SDS-PB-07	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1003
Crew: WH JW TH	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
90980	SDS-FB-01	Dioxin/Furan	Axys
90981	SDS-FB-01	Grain Size	ARI
90982	SDS-FB-01	TOC/Total Solids	ARI
90983	SDS-FB-01	Total Sulfides	ARI
90984	SDS-FB-01	Archive	ARI

Notes

Completed by: Will [signature]

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1021
Crew: WH TH JW	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
90985	SDS-FB-02	Dioxin/Furan	Axys
90986	SDS-FB-02	Grain Size	ARI
90987	SDS-FB-02	TOC/Total solids	ARI
90988	SDS-FB-02	Total Sulfides	ARI
90989	SDS-FB-02	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1052
Crew: WH JW TH	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
90990	SDS-FB-03	Dioxin/Furan	Axys
90991	SDS-FB-03	Grain Size	ARI
90992	SDS-FB-03	TOC/Total Solids	ARI
90993	SDS-FB-03	Total Sulfides	ARI
90994	SDS-FB-03	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1133
Crew: WH JW TH	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91000	SDS-FB-08	Dioxin/Furan	Axys
91001	SDS-FB-08	Grain Size	ARI
91002	SDS-FB-08	TOC Total Solids	ARI
91003	SDS-FB-08	Total Sulfides	ARI
91004	SDS-FB-08	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1114
Crew: WH JW TH	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
90995	SDS-FB-06	Dioxin/Furan	Axys
90996	SDS-FB-06	Grain Size	ARI
90997	SDS-FB-06	TOC/Total Solids	ARI
90998	SDS-FB-06	Total sulfides	ARI
90999	SDS-FB-06	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1152
Crew: WH TH JW	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91005	SDS-FB-04	Dioxin/Furan	Axys
91006	SDS-FB-04	Grain size	ARI
91007	SDS-FB-04	TOC/Total Solids	ARI
91008	SDS-FB-04	Total Solids	ARI
91009	SDS-FB-04	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1155
Crew: WH JW TH	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91010	SDS-FB-RB	Dioxin/Furan	Axys
~~91011~~			

Notes

Completed by: Will Maher

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1200
Crew: WH JW TH	**Date:**
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91011	SDS-FB-ER	Dioxin/Furan	Axys

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1348
Crew: WH TH JW	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91012	SDS-FB-05	Dioxin/Furan	Axys
91013	SDS-FB-05	Grain Size	ARI
91014	SDS-FB-05	TOC/Total Solids	ARI
91015	SDS-FB-05	Total sulfides	ARI
91016	SDS-FB-05	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1045
Crew: WH TH JW	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91017	SDS-FB-07-	Dioxin/Furan	Axys
91018	SDS-FB-07-D	Dioxin/Furan	Axys
91019	SDS-FB-07	Grain Size	ARI
91020	SDS-FB-07-D	Grain Size	ARI
91021	SDS-FB-07-T	Grain Size	ARI
91022	SDS-FB-07	TOC/Total Solids	ARI
91023	SDS-FB-07-D	TOC/Total Solids	ARI
91024	SDS-FB-07-T	TOC/Total Solids	ARI
91025	SDS-FB-07	Total Sulfides	ARI
91026	SDS-FB-07-D	Total Sulfides	ARI
91027	SDS-FB-07-T	Total Sulfides	ARI
91028	SDS-FB-07	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1435
Crew: WH JW TH	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91029	SDS-FB-09	Dioxin/Furan	Axys
91030	SDS-FB-09	Grain Size	ARI
91031	SDS-FB-09	TOC/Total Solids	ARI
91032	SDS-FB-09	Total sulfides	ARI
91033	SDS-FB-09	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1453
Crew: WH JW TH	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91034	SDS-FB-10	Dioxin/Furan	Axys
91035	SDS-FB-10	Grain Size	ARI
91036	SDS-FB-10	TOC/Total Solids	ARI
91037	SDS-FB-10	Total Solids	ARI
91038	SDS-FB-10	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1521
Crew: WH TH JW	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11022	SDS-PB-08	Dioxin/Furan	Axys
11023	SDS-PB-08	Grain Size	ARI
11024	SDS-PB-08	TOC/Total Solids	ARI
11025	SDS-PB-08	Total Sulfides	ARI
11026	SDS-PB-08	Archive	ARI

Notes

Completed by: Will Hafer

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1558
Crew: WH JW TH	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11027	SDS-PB-09	Dioxin/Furan	Axys
11028	SDS-PB-09	Grain Size	ARI
11029	SDS-PB-09	TOC/Total Solids	ARI
11030	SDS-PB-09	Total Sulfides	ARI
11031	SDS-PB-09	Archive	ARI

Notes

Completed by: Will Hafer

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1620
Crew: WH JW TH	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11032	SDS-PB-10	Dioxin/Furan	Axys
11033	SDS-PB-10	Grain size	ARI
11034	SDS-PB-10	TOC/Total Solids	ARI
11035	SDS-PB-10	Total sulfides	ARI
11036	SDS-PB-10	Archive	ARI

Notes

Completed by: Will Mafnar

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1620
Crew: WH JW TH	**Date:** 6/8/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
1Y037	SDS-PB-ER	Dioxin/Furan	Axys

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 940
Crew: WH CH TH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11038	~~GPD~~-SDS-CPD-01	Dioxin/Furan	Axys
11039	SDS-CPD-01	Grain Size	ARI
11040	SDS-CPD-01	TOC/Total solids	ARI
11041	SDS-CPD-01	Total Sulfides	ARI
11042	SDS-CPD-01	Archive	ARI

Notes

Completed by: Will Hah

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1001
Crew: WH TH CH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11043	SDS-CPD-02	Dioxin/Furan	Axys
11044	SDS-CPD-02	Grain Size	ARI
11045	SDS-CPD-02	TOC/Total Solids	ARI
11046	SDS-CPD-02	Total sulfides	ARI
~~11047~~	~~SDS-CPD-02~~	~~SDS-CPD-02~~	
11047	SDS-CPD-02	Archive	ARI

Notes

Completed by: Will Hahn

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1046
Crew: WH TH CH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11048	SDS-CPD-03	Dioxin/furan	Axys
11049	SDS-CPD-03	Grain size	ARI
11050	SDS-CPD-03	TOC/total solids	ARI
11051	SDS-CPD-03	Total sulfides	ARI
11052	SDS-CPD-03	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1107
Crew: WH CH TH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11053	SDS-CPD-04	Dioxin/Furan	Axys
11054	SDS-CPD-04	Grain size	ARI
11055	SDS-CPD-04	TOC/Total sulfides	ARI
11056	SDS-CPD-04	Total sulfides	ARI
11057	SDS-CPD-04	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1135
Crew: WH CH TH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11060	SDS-CPD-07	Dioxin/Furan	Axys
11061	SDS-CPD-07	Grain Size	ARI
11062	SDSCPD-07	TOC/Total solids	ARI
~~11063~~ 11063	SDS-CPD-07	Total sulfides	ARI
11064	SDS-CPD-07	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1148
Crew: WH TH CH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11065	SDS-CPD-08	Dioxin/Furan	Axys
11066	SDS-CPD-08-D	Dioxin/Furan	Axys
11067	SDS-CPD-08	Grain Size	ARI
11068	SDS-CPD-08-D	Grain size	ARI
11069	SDS-CPD-08-T	Grain size	ARI
11070	SDS-CPD-08	TOC/Total solids	ARI
11071	SDS-CPD-08-D	TOC/Total solids	ARI
11072	SDS-CPD-08-T	TOC/Total solids	ARI
11073	SDS-CPD-08	Total Sulfides	ARI
11074	SDS-CPD-08-D	Total Sulfides	ARI
11075	SDS-CPD-08-T	Total Sulfides	ARI
11076	SDS-CPD-08	Archive	ARI

Notes

Completed by: Will Hafner

Sample Container Logbook

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1208
Crew: WH CH TH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11077	SDS-CPD-ER	Dioxin/Furan	Axys

Notes

Completed by: Will Hafer

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1312
Crew: WH CH TH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11078	SDS-CPD-10	Dioxin/Furan	Axys
11079	SDS-CPD-10	Grain Size	ARI
11080	SDS-CPD-10	TOC/Total solids	ARI
11081	SDS-CPD-10	Total Sulfides	ARI
11082	SDS-CPD-10	Archive	ARI

Notes

Completed by: WH

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1320
Crew: WH CH TH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11083	SOS-CPD-13	Dioxin/Furans	Axys
11084	SOS-CPD-13	Grainsize	ARI
11085	SOS-CPD-13	TOC/Total solids	ARI
11086	SOS-CPD-13	Total sulfides	ARI
11087	SOS-CPD-13	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1331
Crew: WH CH TH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11088	SDS-CPD-16	Dioxin/Furan	Axys
11089	SDS-CPD-16	Grain Size	ARI
11090	SDS-CPD-16	TOC/Total Solids	ARI
11091	SDS-CPD-16	Total Sulfides	ARI
11092	SDS-CPD-16	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1343
Crew: WH CH TH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11093	SDS-CPD-17	Dioxin/Furan	Axys
11094	SDS-CPD-17	Grain size	ARI
11095	SDS-CPD-17	TOC/Total solids	ARI
11096	SDS-CPD-17	Total Sulfides	ARI
11097	SDS-CPD-17	Archive	ARI

Notes

Completed by: Will Hbh

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1400
Crew: WH CH TH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11098	SDS-CPD-18	Dioxin/Furan	Axys
11099	SDS-CPD-18	Grain size	ARI
11100	SDS-CPD-18	TOC/Total Solids	ARI
11101	SDS-CPD-18	Total Sulfides	ARI
11102	SDS-CPD-18	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1411
Crew: WH CH TH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11103	SDS-CPD-19	Dioxin/Furan	Axys
11104	SDS-CPD-19	Grain Size	ARI
11105	SDS-CPD-19	TOC/Total Solids	ARI
11106	SDS-CPD-19	Total Sulfides	ARI
11107	SDS-CPD-19	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1425
Crew: WH TH CH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11108	SDS-CPD-20	Dioxin/Furan	Axys
11109	SDS-CPD-20	Grain Size	ARI
11110	SDS-CPD-20	TOC/Total Solids	ARI
11111	SDS-CPD-20	Total ~~Solids~~ Sulfides	ARI
11112	SDS-CPD-20	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1440
Crew: WH TH CH	**Date:** 6/9/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11113	SDS-CPD-21	Dioxin/Furan	Axys
11114	SDS-CPD-21	Grain Size	ARI
11115	SDS-CPD-21	TOC/Total Solids	ARI
11116	SDS-CPD-21	Total Sulfides	ARI
11117	SDS-CPD-21	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:**
Crew:	**Date:**
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory

Notes

Completed by:____________________

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1057
Crew: WH TH JW	**Date:** 6/10/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11118	SDS-CPD-05	Dioxin/Furan	Axys
11119	SDS-CPD-05	Grain size	ARI
11120	SDS-CPD-05	TOC/Total Solids	ARI
11121	SDS-CPD-05	Total sulfides	ARI
11122	SDS-CPD-05	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:**
Crew:	**Date:**
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory

Notes

Completed by:____________________

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1116
Crew: WH JW TH	**Date:** 6/10/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11123	SDS-CPD-06	Dioxin/Furan	Axys
11124	SDS-CPD-06	Grain size	ARI
11125	SDS-CPD-06	TOC/Total solids	ARI
11126	SDS-CPD-06	Total sulfides	ARI
11127	SDS-CPD-06	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1130
Crew: WH TH JW	**Date:** 6/10/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11128	SDS-CPD-09	Dioxin/Furan	Axys
11129	SDS-CPD-09	Grain size	ARI
11130	SDS-CPD-09	TOC/Total solids	ARI
11131	SDS-CPD-09	Total Sulfides	ARI
11132	SDS-CPD-09	Archive	ARI

Notes

Completed by: Will Hahn

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study
Anacortes, WA

Project Number: 191427.00.000.03.00.000	**Time Collected:** 1144
Crew: WH TH JW	**Date:** 6/10/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
11133	SDS-CPD-11	Dioxin/Furan	Axys
11134	SDS-CPD-11	Grain size	ARI
11135	SDS-CPD-11	TOC/Total Solids	ARI
11136	SDS-CPD-11	Total sulfides	ARI
11137	SDS-CPD-11	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1200
Crew: WH JW TH	**Date:** 6/10/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91216	SDS-CPD-12	Dioxin/Furan	Axys
91217	SDS-CPD-12	Grain Size	ARI
91218	SDS-CPD-12	TOC/Total Sulfides	ARI
91219	SDS-CPD-12	Total Sulfides	ARI
91220	SDS-CPD-12	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1212
Crew: WH JW TH	**Date:** 6/10/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91221	SDS-CPD-14	Dioxin/Furan	Axys
91222	SDS-CPD-14	Grain Size	ARI
91223	SDS-CPD-14	TOC/Total Solids	ARI
91224	SDS-CPD-14	Total Sulfides	ARI
91225	SDS-CPD-14	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1223
Crew: WH JW TH	**Date:** 6/10/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91226	SDS-CPD-15	Dioxin/Furan	Axys
91227	SDS-CPD-15	Grain size	ARI
91228	SDS-CPD-15	TOC/Total Solids	ARI
91229	SDS-CPD-15	Total sulfides	ARI
91230	SDS-CPD-15	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1047
Crew: JW AW WH DK CH	**Date:** 6/14/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91231	SDS-CT-01A	Dioxin/Furan	Axys
91232	SDS-CT-01A	Grain Size	ARI
91233	SDS-CT-01A	Sulfides	ARI
91234	SDS-CT-01A	TOC/Total solids	ARI
91235	SDS-CT-01A	Archive	ARI

Notes

Completed by: WillHch

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1115
Crew: WH JW AW DK CH	**Date:** 6/14/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91236	SDS-CT-01B	Dioxin/Furan	Axys
91237	SDS-CT-01B	Grain Size	ARI
91238	SDS-CT-01B	Sulfides	ARI
91239	SDS-CT-01B	Toc/Total Solids	ARI
~~9123~~ 91240	SDS-CT-01B	Archive	ARI

Notes

Completed by: Will Hahn

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1147
Crew: JW AW WH OK CH	**Date:** 6/14/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91241	SDS-CT-02	Dioxin/Furan	Axys
91242	SDS-CT-02	Grain size	ARI
91243	SDS-CT-02	Total sulfides	ARI
91244	SDS-CT-02	TOC / Total solids	ARI
91245	SDS-CT-02	Archive	ARI

Notes

Completed by: Will Hafer

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1230
Crew: JW AW WH DK CH	**Date:** 6/14/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91246	SDS-CT-03	Dioxin/Furan	Axys
91247	SDS-CT-03	Grain Size	ARI
91248	SDS-CT-03	Total Sulfides	ARI
91249	SDS-CT-03	TOC / Total Solids	ARI
91250	SDS-CT-03	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1331
Crew: WH JW AW CH DK	**Date:** 6/14/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91251	SDS-CT-04	Dioxin/Furan	Axys
91252	SDS-CT-04	Grain Size	ARI
91253	SDS-CT-04	Total Sulfides	ARI
91254	SDS-CT-04	TOC/Total Solids	ARI
~~91254~~ 91255	SDS-CT-04	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1306
Crew: WH JW AW CH DK	**Date:** 6/14/10
Comments:	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
91256	SDS-CT-05	Dioxin/Furan	Axys
91257	SDS-CT-05	Grain Size	ARI
91258	SDS-CT-05	Sulfides	ARI
91259	SDS-CT-05	TOC/Total Solids	ARI
91120	SDS-CT-05	Archive	ARI

Notes

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1047
Crew: WH JW AW CH DK	**Date:** 6/14/10
Comments: Shipped in Ziploc bag	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
SDS-	CT-01A	Dioxin/Furan	Axys

Notes Clam tissue: Bent nose (macoma)

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1115
Crew: WH JW AW CH DK	**Date:** 6/14/10
Comments: shipped in Ziploc bag	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
505-	CT-01B	Dioxin/Furan	Axys

Notes Clam tissue: Littleneck (Protothaca)

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1147
Crew: WH JW AW CH DK	**Date:** 6/14/10
Comments: shipped in Ziploc Bag	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
505-	CT-02	Dioxin/Furan	Axys

Notes Clam tissue: Little neck (Protothaca)

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1230
Crew: WH JW AW CH DK	**Date:** 6/14/10
Comments: Shipped in Ziploc bag	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
SDS-	CT-03	Dioxin/Furan	Axys

Notes Clam Tissue: Little neck (Protothaca)

Completed by: Will Hafner

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1331
Crew: WH JW AW CH DK	**Date:** 6/14/10
Comments: shipped in ziploc bag	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
	SDS-CT-04	Dioxin/Furan	Axys

Notes Clam tissue: Littleneck (Protothaca)

Completed by: Will Hafer

2010 Supplementary Fidalgo Bay & Custom Plywood Mill Sediment Dioxin Study Anacortes, WA	
Project Number: 191427.00.000.03.00.000	**Time Collected:** 1306
Crew: WH JW AW CH DK	**Date:** 6/14/10
Comments: shipped in ziploc bag	

Sample Container Tag Number	Sample ID	Analysis	Laboratory
	SDS-CT-05	Dioxin / Furan	Axys

Notes clam tissue: Little neck (Protothaca)

Completed by: Will Hafner

APPENDIX B
ANALYTICAL LAB SHEETS, INCLUDING DATA VALIDATION

(APPENDIX ON DVD ATTACHED TO INSIDE OF REPORT COVER)

Appendix B
Analytical Chemistry Results

Table B–1. Dioxin/Furan Results for Custom Plywood Sediment Samples Collected by GeoMatrix (pg/g dw)

Analyte	10654001	LQ	VQ	10654002	LQ	VQ	10654003	LQ	VQ	10654004	LQ	VQ	10654008	LQ	VQ	10654009	LQ	VQ	10654011	LQ	VQ
2,3,7,8-TCDD	0.608	J	J	0.276	K J	U	0.197	K J	U	0.662	B J	J	0.626	J	J	0.529	J	J	0.392	K J	U
1,2,3,7,8-PECDD	2.74	J		1.06	J		0.890	K J	U	2.92	J		2.60	J		2.51	J		1.69	B J	
1,2,3,4,7,8-HXCDD	3.66	J		1.49	J		0.837	K J	U	3.9	J	J	3.47	J		3.08	J		2.65	J	
1,2,3,6,7,8-HXCDD	19.4			6.69			3.42	J		22.7		J	18.8			16.2			13.5		
1,2,3,7,8,9-HXCDD	10.8	B	J	4.24	B J	J	2.15	B J	J	11.9		J	9.90	B	J	8.89	B J	J	6.60		
1,2,3,4,6,7,8-HPCDD	376	B		118	B		57.1	B		524		J	384	B		458	B		262	B	
OCDD	2710	B		859	B		440	B		3960	B	J	2930	B		3510	B		1950	B	
2,3,7,8-TCDF	2.39	B		1.41	B		1.26	B		1.86	B		1.64	B		2.00	B		1.28		
1,2,3,7,8-PECDF	0.953	K J	U	0.434	K J	U	0.337	J		1.25	B J		0.939	J		0.520	K J	U	0.777	K J	U
2,3,4,7,8-PECDF	1.97	B J		0.745	B J		0.525	K B J	U	2.24	B J		1.86	B J		1.70	B J		1.13	J	
1,2,3,4,7,8-HXCDF	4.64	B J		1.64	K B J	U	0.970	B J		5.8	B		4.70	B		3.45	B J		3.11	J	
1,2,3,6,7,8-HXCDF	2.55	J		0.875	J		0.527	J		2.74	B J		2.42	J		1.69	J		1.75	K J	U
1,2,3,7,8,9-HXCDF	0.26	B J		0.112	K B J	U	0.109	U		0.247	J		0.218	K B J	U	0.190	K B J	U	0.132	U	
2,3,4,6,7,8-HXCDF	2.64	B J		1.11	B J		0.567	K B J	U	3.14	B J		2.45	B J		2.17	B J		2.13	B J	
1,2,3,4,6,7,8-HPCDF	104	B		31.5	B		17.6	B		142		J	117	B		81.3	B		75.0	B	
1,2,3,4,7,8,9-HPCDF	5.70			1.78	K J	U	1.18	K J	U	7.14		J	7.15			4.58	K J	U	4.36	K B J	U
OCDF	411	B		112	B		93.4	B		675		J	481	B		305	B		344	B	
TEQ (full DL)	14.4			5.13			3.16			17.6			14.3			13.9			9.66		
TEQ (1/2 DL)	14.4			4.89			2.45			17.6			14.3			13.9			9.34		
TEQ (zero DL)	14.4			4.65			1.75			17.6			14.3			13.8			9.01		
TOTAL TETRA-FURANS	33.4	B		16.1	B		15.2	B		30.1	B		28.1	B		31.8	B		14.5		
TOTAL TETRA-DIOXINS	62.6			19.5			15.9			30			29.1			21.0			23.3		
TOTAL PENTA-FURANS	32.9	B		11.5	B		7.20	B		40.8	B		31.8	B		25.5	B		21.0		
TOTAL PENTA-DIOXINS	38.9			19.5			7.83			43.2			29.1			26.4			20.0		
TOTAL HEXA-FURANS	110	B		28.5	B		15.5	B		153	B		119	B		79.0	B		82.8		
TOTAL HEXA-DIOXINS	200			72.7			38.3			206			175			159			119		
TOTAL HEPTA-FURANS	368	B		95.6	B		58.2	B		583			449	B		276	B		269	B	
TOTAL HEPTA-DIOXINS	1010			392			251			1190			1020			1300			562		

B - chemical was found in the method blank
DL - detection limit
G - The lock mass signal in the vicinity of native and labeled 1,2,3,7,8-PeCDD was observed in the lab blank, OPR, sample duplicate, and CRM. This congener and its surrogate are flagged "G" accordingly.
The data are not considered significantly affected by these fluctuations.
K - A peak was detected that did not meet all the criteria for identification as the target analyte; the reported value is the estimated maximum possible concentration of the analyte present.
K-qualified results are treated as non-detects for TEQ calculations at the reported value (i.e., half the reported value or zero).
LQ - lab qualifier
TEQ (full DL) - Toxic equivalent quotient (TEQ) calculated using the full value of the detection limit for undetected congener concentrations and mammalian toxic equivalency factor (TEF) values from Van den Berg et al., 2006.
TEQ (1/2 DL) - TEQ calculated using one-half the detection limit for undetected congener concentrations and mammalian TEF values.
TEQ (zero DL) - TEQ calculated using mammalian TEF values and excluding undetected congeners.
U - not detected
VQ - validation qualifier

Table B–1. Dioxin/Furan Results for Custom Plywood Sediment Samples Collected by GeoMatrix (pg/g dw)

Analyte	10654013	LQ	VQ	10654015	LQ	VQ	10654021	LQ	VQ	10654022	LQ	VQ	10654026	LQ	VQ
2,3,7,8-TCDD	0.237	K J	U	0.500	J		1.60	D J		0.301	U D		0.194	K J	U
1,2,3,7,8-PECDD	0.616	J		1.21	B J		3.47	B D J		0.913	B D J		0.706	J	
1,2,3,4,7,8-HXCDD	0.686	J		1.73	J	J	3.69	D J		1.80	D J		0.720	J	
1,2,3,6,7,8-HXCDD	2.87	J		5.91			14.0	D		4.68	K D J	U	2.96	J	
1,2,3,7,8,9-HXCDD	2.25	B J	J	4.83	J		6.19	D J		3.83	D J		2.34	B J	J
1,2,3,4,6,7,8-HPCDD	39.2	B		95.9	B		238	B D		73.3	B D		33.7	B	
OCDD	271	B		651	B		1590	B D		482	B D		230	B	
2,3,7,8-TCDF	0.946	B J	U	1.09		J	1.62			1.16	K	U	1.19	B	
1,2,3,7,8-PECDF	0.378	J		0.925	J		1.54	U D		0.347	U D		0.267	K J	U
2,3,4,7,8-PECDF	0.704	K B J	U	1.67	J		1.54	U D		0.847	D J		0.591	B J	
1,2,3,4,7,8-HXCDF	0.852	K B J	U	1.92	J		4.25	K D J	U	1.12	D J		0.815	K B J	U
1,2,3,6,7,8-HXCDF	0.477	K J	U	0.836	K J	U	2.03	U D		0.929	D J		0.552	K J	U
1,2,3,7,8,9-HXCDF	0.0620	K B J	U	0.830	U	UJ	2.03	U D		0.216	U D		0.106	U	
2,3,4,6,7,8-HXCDF	0.551	B J		1.32	K B J	U	2.90	K B D J	U	0.684	B D J		0.761	B J	
1,2,3,4,6,7,8-HPCDF	9.84	B		25.7	B		78.1	B D		21.5	B D		9.44	B	
1,2,3,4,7,8,9-HPCDF	0.586	J		1.48	B J		4.66	B D J		2.18	K B D J	U	0.672	J	
OCDF	29.4	B		81.7	B		278	B D		69.3	B D		26.3	B	
TEQ (full DL)	2.53			5.54			13.0			4.06			2.54		
TEQ (1/2 DL)	2.19			5.39			12.2			3.59			2.37		
TEQ (zero DL)	1.85			5.24			11.4			3.12			2.20		
TOTAL TETRA-FURANS	11.4	B		29.4			20.3	D		11.6	D		11.4	B	
TOTAL TETRA-DIOXINS	8.39			11.6			33.4	D		15.8	D		7.84		
TOTAL PENTA-FURANS	5.52	B		15.7			23.4	D		8.14	D		6.14	B	
TOTAL PENTA-DIOXINS	8.39			13.1			31.7	D		16.1	D		9.1		
TOTAL HEXA-FURANS	10.1	B		29.3			60.3	D		16.4	D		9.36	B	
TOTAL HEXA-DIOXINS	37.5			61.3			127	D		52.8	D		35.1		
TOTAL HEPTA-FURANS	27.8	B		82.8	B		226	B D		63.1	B D		25	B	
TOTAL HEPTA-DIOXINS	224			234			517	D		176	D		192		

B - chemical was found in the method blank

DL - detection limit

G - The lock mass signal in the vicinity of native and labeled 1,2,3,7,8-PeCDD was observed in the lab blank, OPR, sample duplicate, and CRM. This congener and its surrogate are flagged “G” accordingly. The data are not considered significantly affected by these fluctuations.

K - A peak was detected that did not meet all the criteria for identification as the target analyte; the reported value is the estimated maximum possible concentration of the analyte present. K-qualified results are treated as non-detects for TEQ calculations at the reported value (i.e., half the reported value or zero).

LQ - lab qualifier

TEQ (full DL) - Toxic equivalent quotient (TEQ) calculated using the full value of the detection limit for undetected congener concentrations and mammalian toxic equivalency factor (TEF) values from Van den Berg et al., 2006.

TEQ (1/2 DL) - TEQ calculated using one-half the detection limit for undetected congener concentrations and mammalian TEF values.

TEQ (zero DL) - TEQ calculated using mammalian TEF values and excluding undetected congeners.

U - not detected

VQ - validation qualifier

Table B–2. Dioxin/Furan Results for Custom Plywood Sediment Samples (pg/g dw)

Analyte	SDS-CPD-01	LQ	VQ	SDS-CPD-03	LQ	VQ	SDS-CPD-04	LQ	VQ	SDS-CPD-05	LQ	VQ	SDS-CPD-09	LQ	VQ	SDS-CPD-12	LQ	VQ	SDS-CPD-15	LQ	VQ	SDS-CPD-16	LQ	VQ	SDS-CPD-17	LQ	VQ
2,3,7,8-TCDD	0.238	K B J	U	0.306	K B J	U	0.220	K B J	U	0.253	K B J	U	0.225	K B J	U	0.169	K B J	U	0.194	K B J	U	0.282	K B J	U	0.281	K J	U
1,2,3,7,8-PECDD	1.12	B J		1.20	B J		0.714	K J	U	0.761	K J	U	0.814	B J		0.623	B J		0.599	J		1.02	B J		1.09	J	
1,2,3,4,7,8-HXCDD	1.46	J		1.72	J		0.936	J		0.731	K J	U	1.11	J		0.667	J		0.688	J		1.10	J		1.48	J	
1,2,3,6,7,8-HXCDD	5.27	B		7.77	B		3.44	J		2.30	J		3.22	B J		2.48	B J		2.71	J		4.64	B J		5.73		
1,2,3,7,8,9-HXCDD	3.82	B J		4.48	B J		2.52	J	J	1.90	J	J	2.45	B J		1.96	B J		2.20	J	J	3.35	B J		3.80	J	
1,2,3,4,6,7,8-HPCDD	70.8	B		139	B		41.4	B		19.7	B		32.8	B		24.2	B		27.1	B		64.8	B		74.7	B	
OCDD	452	B		1000	B		274	B		126	B		186	B		143	B		171	B		421	B		504	B	
2,3,7,8-TCDF	1.19	B	U	1.04	B	U	0.791	J		0.980	K J	U	1.13	B	U	0.957	B J	U	0.908	K J	UJ	1.34	B		1.18		
1,2,3,7,8-PECDF	0.382	B J		0.539	B J		0.328	J		0.511	J		0.380	B J		0.369	B J		0.336	K J	U	0.460	B J		0.442	J	
2,3,4,7,8-PECDF	0.660	B J	U	0.991	B J	U	0.515	B J		0.633	B J		0.692	K B J	U	0.563	B J	U	0.243	B J		0.703	B J	U	0.694	B J	
1,2,3,4,7,8-HXCDF	1.02	B J		1.83	B J		0.678	J		0.612	J		0.681	B J		0.603	B J		0.607	K J	U	1.05	B J		1.23	J	
1,2,3,6,7,8-HXCDF	0.594	J		1.10	J		0.471	K J	U	0.399	J		0.488	J		0.403	J		0.320	K J	U	0.676	J		0.732	J	
1,2,3,7,8,9-HXCDF	0.086	J		0.139	J		0.0942	U		0.0893	U		0.0530	K J	U	0.0502	U		0.0722	U		0.081	J		0.103	U	
2,3,4,6,7,8-HXCDF	0.641	B J		1.27	B J		0.572	J		0.318	J		0.507	B J		0.435	B J		0.457	J		0.773	B J		1.03	J	
1,2,3,4,6,7,8-HPCDF	16.8			41.0			11.3			5.19	J		7.93			6.04			7.62			18.2			24.0		
1,2,3,4,7,8,9-HPCDF	1.10	J		2.23	J		0.757	J		0.418	K J	U	0.645	J		0.421	J		0.454	K J	U	1.15	K J	U	1.38	J	
OCDF	59.7	B		154	B		39.6			13.3			21.4	B		14.5	B		19.9			71.8	B		76.1	B	
TEQ (full DL)	4.02			5.92			2.68			2.25			2.70			2.08			2.08			3.82			4.30		
TEQ (1/2 DL)	3.74			5.57			2.18			1.65			2.42			1.86			1.88			3.56			4.15		
TEQ (zero DL)	3.46			5.22			1.69			1.05			2.15			1.64			1.68			3.31			4.00		
TOTAL TETRA-FURANS	14.7	B		15.4	B		11.4			15.0			14.6	B		13.0	B		8.10			13.9	B		15.1		
TOTAL TETRA-DIOXINS	57.7			15.2			21.1	B		21.6	B		113			10.4			7.85	B		18.1			15.2		
TOTAL PENTA-FURANS	10.2	B		16.4	B		7.49			5.76			7.08	B		5.94	B		4.04			10.3	B		13.1	B	
TOTAL PENTA-DIOXINS	63.5	B		16.3	B		17.1			15.4			71.2	B		12.1	B		7.70			17.8	B		16.7		
TOTAL HEXA-FURANS	20.8	B		45.5	B		13.4			7.21			11.5	B		8.65	B		8.08			21.2	B		29.1		
TOTAL HEXA-DIOXINS	94.6			74.1			55.0			21.0			65.6			33.8			28.1			56.1			51.5		
TOTAL HEPTA-FURANS	58.5			154			34.3			13.9			24.5			18.3			19.3			59.0			70.5		
TOTAL HEPTA-DIOXINS	166	B		327	B		100	B		54.9	B		87.5	B		74.2	B		70.7	B		155	B		174		

B - chemical was found in the method blank

DL - detection limit

G - The lock mass signal in the vicinity of native and labeled 1,2,3,7,8-PeCDD was observed in the lab blank, OPR, sample duplicate, and CRM. This congener and its surrogate are flagged “G” accordingly. The data are not considered significantly affected by these fluctuations.

K - A peak was detected that did not meet all the criteria for identification as the target analyte; the reported value is the estimated maximum possible concentration of the analyte present.

K-qualified results are treated as non-detects for TEQ calculations at the reported value (i.e., half the reported value or zero).

LQ - lab qualifier

TEQ (full DL) - Toxic equivalent quotient (TEQ) calculated using the full value of the detection limit for undetected congener concentrations and mammalian toxic equivalency factor (TEF) values from Van den Berg et al., 2006.

TEQ (1/2 DL) - TEQ calculated using one-half the detection limit for undetected congener concentrations and mammalian TEF values.

TEQ (zero DL) - TEQ calculated using mammalian TEF values and excluding undetected congeners.

U - not detected

VQ - validation qualifier

Table B–3. Dioxin/Furan Results for Fidalgo Bay Sediment Samples (pg/g dw)

Analyte	SDS-FB-01	LQ	VQ	SDS-FB-02	LQ	VQ	SDS-FB-03	LQ	VQ	SDS-FB-04	LQ	VQ	SDS-FB-05	LQ	VQ	SDS-FB-06	LQ	VQ	SDS-FB-07	LQ	VQ	SDS-FB-07-D	LQ	VQ
2,3,7,8-TCDD	0.0810	K J	U	0.0870	K J	U	0.066	K J	U	0.190	K J	U	0.0860	K J	U	0.120	K J	U	0.113	K J	U	0.130	J	J
1,2,3,7,8-PECDD	0.144	K J	U	0.107	K J G	UJ	0.127	J		0.344	J		0.135	K J	U	0.157	K J	U	0.337	K J	U	0.303	J	
1,2,3,4,7,8-HXCDD	0.129	K J	U	0.129	K J	U	0.196	K J	U	0.278	J		0.156	K J	U	0.144	J		0.355	J		0.269	K J	U
1,2,3,6,7,8-HXCDD	0.691	K J	U	0.488	J		0.747	J		1.69	J		0.811	J		0.594	J		1.51	K J	U	1.36	K J	U
1,2,3,7,8,9-HXCDD	0.477	J		0.273	J		0.469	B J	J	1.27	B J	J	0.710	B J	J	0.365	K J	U	1.33	B J	J	0.998	B J	J
1,2,3,4,6,7,8-HPCDD	4.23	B J		4.49	B J		4.41	B		13.3	B		6.99	B		3.68	B J		13.4	B		11.0	B	
OCDD	23.5	B		33.7	B		26.3	B		88.3	B		44.8	B		22.9	B		99.5	B		75.6	B	
2,3,7,8-TCDF	0.201	K J	U	0.835	J		0.547	B J	U	0.923	B J	U	0.493	B J	UJ	0.244	U		0.785	B J	U	0.969	B	U
1,2,3,7,8-PECDF	0.0630	K J	U	0.221	K J	U	0.102	K J	U	0.199	J		0.107	K J	U	0.0570	J		0.0930	K J	U	0.175	K J	U
2,3,4,7,8-PECDF	0.120	B J	U	0.518	B J		0.282	B J		0.381	K B J	U	0.201	K B J	U	0.127	K B J	U	0.421	B J		0.413	K B J	U
1,2,3,4,7,8-HXCDF	0.103	J		0.174	K J	U	0.186	B J	U	0.364	B J		0.102	K B J	U	0.0930	K J	U	0.368	K B J	U	0.291	K B J	U
1,2,3,6,7,8-HXCDF	0.0710	K J	U	0.171	U		0.111	K J	U	0.265	K J	U	0.0850	J		0.0940	J		0.222	K J	U	0.121	K J	U
1,2,3,7,8,9-HXCDF	0.0464	U		0.171	U		0.0443	U		0.0842	U		0.0649	U		0.0507	U		0.0451	U		0.0544	U	
2,3,4,6,7,8-HXCDF	0.081	K J	U	0.171	U		0.134	K B J	U	0.253	B J		0.126	B J		0.0510	K J	U	0.207	K B J	U	0.246	K B J	U
1,2,3,4,6,7,8-HPCDF	1.02	J		1.05	K J	U	0.869	B J		2.93	B J		1.53	B J		0.863	J		3.01	B J		2.50	B J	
1,2,3,4,7,8,9-HPCDF	0.0890	K J	U	0.208	K J	U	0.056	K J	U	0.234	K J	U	0.105	K J	U	0.0960	K J	U	0.185	J		0.188	K J	U
OCDF	1.58	B J		3.89	K B J	U	1.59	B J		5.69	B J		2.33	B J		1.71	B J		6.67	B J		5.26	B J	
TEQ (full DL)	0.504			0.666			0.586			1.36			0.640			0.534			1.26			1.15		
TEQ (1/2 DL)	0.311			0.518			0.490			1.14			0.456			0.336			0.876			0.923		
TEQ (zero DL)	0.118			0.370			0.394			0.926			0.273			0.138			0.493			0.692		
TOTAL TETRA-FURANS	1.57			3.64			3.54	B		7.85	B		3.18	B		1.22			6.50	B		7.08	B	
TOTAL TETRA-DIOXINS	0.362			0.143	J		0.579			7.08			0.795			0.646			4.21			2.67		
TOTAL PENTA-FURANS	1.09	B		2.24	B J		0.802	B		2.66	B		1.31	B		0.426	B		2.00	B		0.510	B	
TOTAL PENTA-DIOXINS	0.670			0.102	J		0.481			4.24			0.906			0.614			2.93			1.34		
TOTAL HEXA-FURANS	1.12			0.646	J		0.75	B		3.50	B		1.80	B		0.936			3.11	B		2.85	B	
TOTAL HEXA-DIOXINS	4.63			2.25	J		6.02			20.9			7.90			4.39			9.03			14.8		
TOTAL HEPTA-FURANS	2.39			2.09	J		2.10	B		2.93	B		3.60	B		1.91			7.56	B		6.48	B	
TOTAL HEPTA-DIOXINS	9.95			10.4			96.8			157			22.6			8.62			148			144		

B - chemical was found in the method blank

DL - detection limit

G - The lock mass signal in the vicinity of native and labeled 1,2,3,7,8-PeCDD was observed in the lab blank, OPR, sample duplicate, and CRM. This congener and its surrogate are flagged "G" accordingly.
The data are not considered significantly affected by these fluctuations.

K - A peak was detected that did not meet all the criteria for identification as the target analyte; the reported value is the estimated maximum possible concentration of the analyte present.
K-qualified results are treated as non-detects for TEQ calculations at the reported value (i.e., half the reported value or zero).

LQ - lab qualifier

TEQ (full DL) - Toxic equivalent quotient (TEQ) calculated using the full value of the detection limit for undetected congener concentrations and mammalian toxic equivalency factor (TEF) values from Van den Berg et al., 2006.

TEQ (1/2 DL) - TEQ calculated using one-half the detection limit for undetected congener concentrations and mammalian TEF values.

TEQ (zero DL) - TEQ calculated using mammalian TEF values and excluding undetected congeners.

U - not detected

VQ - validation qualifier

Table B–3. Dioxin/Furan Results for Fidalgo Bay Sediment Samples (pg/g dw)

Analyte	SDS-FB-08	LQ	VQ	SDS-FB-09	LQ	VQ	SDS-FB-10	LQ	VQ
2,3,7,8-TCDD	0.132	K J	U	0.155	K J	U	0.269	J	
1,2,3,7,8-PECDD	0.248	J		0.440	J		0.720	B J	
1,2,3,4,7,8-HXCDD	0.284	K J	U	0.417	J		0.649	K J	U
1,2,3,6,7,8-HXCDD	1.27	K J	U	1.68	J		2.83	J	
1,2,3,7,8,9-HXCDD	0.879	K B J	U	1.34	B J	J	2.18	J	
1,2,3,4,6,7,8-HPCDD	10.6	B		14.6	B		29.8	B	
OCDD	82.5	B		101	B		205	B	
2,3,7,8-TCDF	0.706	B J	U	0.973	B	U	0.840	K J	U
1,2,3,7,8-PECDF	0.110	K J	U	0.231	J		0.205	K J	U
2,3,4,7,8-PECDF	0.316	K B J	U	0.501	B J		0.470	J	
1,2,3,4,7,8-HXCDF	0.254	K B J	U	0.406	B J		0.243	J	
1,2,3,6,7,8-HXCDF	0.169	J		0.231	J		0.344	K J	U
1,2,3,7,8,9-HXCDF	0.0652	U		0.0741	U		0.115	U	
2,3,4,6,7,8-HXCDF	0.219	B J		0.258	B J		0.371	B J	
1,2,3,4,6,7,8-HPCDF	2.24	B J		3.04	B J		6.33	B	
1,2,3,4,7,8,9-HPCDF	0.200	J		0.259	K J	U	0.475	K B J	U
OCDF	4.22	B J		7.07	B J		16.5	B	
TEQ (full DL)	1.02			1.50			2.33		
TEQ (1/2 DL)	0.731			1.37			2.22		
TEQ (zero DL)	0.443			1.24			2.12		
TOTAL TETRA-FURANS	4.66	B		7.36	B		7.50		
TOTAL TETRA-DIOXINS	2.07			7.64			8.39		
TOTAL PENTA-FURANS	1.13	B		2.29	B		3.83		
TOTAL PENTA-DIOXINS	2.09			4.96			7.76		
TOTAL HEXA-FURANS	1.69	B		4.57	B		4.56		
TOTAL HEXA-DIOXINS	10.7			21.1			33.8		
TOTAL HEPTA-FURANS	2.57	B		7.75	B		16.8	B	
TOTAL HEPTA-DIOXINS	141			160			116		

B - chemical was found in the method blank

DL - detection limit

G - The lock mass signal in the vicinity of native and labeled 1,2,3,7,8-PeCDD was observed in the lab blank, OPR, sample duplicate, and CRM. This congener and its surrogate are flagged “G” accordingly. The data are not considered significantly affected by these fluctuations.

K - A peak was detected that did not meet all the criteria for identification as the target analyte; the reported value is the estimated maximum possible concentration of the analyte present. K-qualified results are treated as non-detects for TEQ calculations at the reported value (i.e., half the reported value or zero).

LQ - lab qualifier

TEQ (full DL) - Toxic equivalent quotient (TEQ) calculated using the full value of the detection limit for undetected congener concentrations and mammalian toxic equivalency factor (TEF) values from Van den Berg et al., 2006.

TEQ (1/2 DL) - TEQ calculated using one-half the detection limit for undetected congener concentrations and mammalian TEF values.

TEQ (zero DL) - TEQ calculated using mammalian TEF values and excluding undetected congeners.

U - not detected

VQ - validation qualifier

Table B–4. Dioxin/Furan Results for Padilla Bay Sediment Samples (pg/g dw)

Analyte	SDS-PB-01	LQ	VQ	SDS-PB-02	LQ	VQ	SDS-PB-03	LQ	VQ	SDS-PB-04	LQ	VQ	SDS-PB-05	LQ	VQ	SDS-PB-05-D	LQ	VQ	SDS-PB-06	LQ	VQ	SDS-PB-07	LQ	VQ
2,3,7,8-TCDD	0.0740	K B J	U	0.0540	K B J	U	0.257	B J	J	0.0690	K B J	U	0.157	K B J	U	0.0890	K B J	U	0.0760	K B J	U	0.0920	K B J	U
1,2,3,7,8-PECDD	0.0890	K J	U	0.0489	U		0.57	J		0.0486	U		0.214	J		0.162	K B J	U	0.0730	K J	U	0.114	K J	U
1,2,3,4,7,8-HXCDD	0.0960	K J	U	0.0490	K J	U	0.465	J	J	0.0607	U		0.164	J		0.197	J		0.0753	U		0.0610	K J	U
1,2,3,6,7,8-HXCDD	0.576	J		0.0880	K B J	U	2.71	J	J	0.117	K J	U	0.853	K J	U	0.940	B J		0.0753	U		0.280	J	
1,2,3,7,8,9-HXCDD	0.423	K J	U	0.0810	K B J	U	2.07	J	J	0.0607	U		0.582	J	J	0.677	B J		0.0753	U		0.217	J	J
1,2,3,4,6,7,8-HPCDD	3.55	B J		0.369	B J	U	17.8			0.428	K B J	U	6.03	B		7.04	B		0.463	K B J	U	1.80	K B J	U
OCDD	20.4	B		1.49	B J		97.4	B		2.07	K B J	U	38.7	B		41.2	B		2.44	B J		9.92	B	
2,3,7,8-TCDF	0.201	U		0.615	K B J	U	1.25	B	U	0.247	U		0.450	J	J	0.647	B J	UJ	0.239	U		0.149	U	
1,2,3,7,8-PECDF	0.0563	U		0.135	B J		0.315	K B J	U	0.0530	K J	U	0.0780	K J	U	0.168	K B J	U	0.0493	U		0.0610	K J	U
2,3,4,7,8-PECDF	0.0820	B J		0.298	B J	U	0.611	B J	U	0.0800	K B J	U	0.181	K B J	UJ	0.331	B J	UJ	0.0570	B J		0.0930	B J	
1,2,3,4,7,8-HXCDF	0.0910	J		0.0520	B J	U	0.464	B J		0.0486	U		0.152	K J	U	0.194	B J	U	0.0493	U		0.0560	K J	U
1,2,3,6,7,8-HXCDF	0.0840	K J	U	0.0490	J		0.289	B J	U	0.0490	K J	U	0.0800	J		0.117	K J	U	0.0493	U		0.0489	U	
1,2,3,7,8,9-HXCDF	0.0504	U		0.0489	U		0.0565	U		0.0486	U		0.0605	U		0.0479	U		0.0493	U		0.0489	U	
2,3,4,6,7,8-HXCDF	0.0830	J		0.0550	B J	U	0.324	K B J	U	0.0500	K J	U	0.134	K J	U	0.151	B J	U	0.0493	U		0.0550	K J	U
1,2,3,4,6,7,8-HPCDF	0.821	K J	U	0.0970	J		4.04	J		0.153	J		2.07	J	J	1.46	J	J	0.105	K J	U	0.387	J	
1,2,3,4,7,8,9-HPCDF	0.0506	U		0.0489	U		0.235	J		0.0689	U		0.0740	K J	U	0.119	J		0.0507	U	UJ	0.0601	U	
OCDF	1.70	J		0.150	K B J	U	7.16	J		0.150	K J	U	3.65	J		2.81	B J		0.256	J		0.722	J	
TEQ (full DL)	0.401			0.306			2.03			0.219			0.770			0.752			0.241			0.353		
TEQ (1/2 DL)	0.271			0.158			1.84			0.110			0.602			0.516			0.129			0.219		
TEQ (zero DL)	0.142			0.0104			1.65			0.00153			0.435			0.281			0.0179			0.0847		
TOTAL TETRA-FURANS	1.47			2.86	B	U	11.4	B		0.0486	U		1.68			4.65	B	U	0.0493	U		0.169		
TOTAL TETRA-DIOXINS	0.261	B		0.058			6.96			0.0504	U		0.297	B		1.99			0.0591	U		0.0655	U	
TOTAL PENTA-FURANS	0.384			1.26	B	U	5.2	B		0.0486	U		1.35			2.29	B		0.0570			0.211		
TOTAL PENTA-DIOXINS	0.731			0.0740	B	U	8.89			0.0486	U		0.907			1.85	B		0.0493	U		0.104		
TOTAL HEXA-FURANS	1.09			0.155	B	U	6.58	B		0.157			0.967			2.22	B		0.088			0.468		
TOTAL HEXA-DIOXINS	4.18			0.141			25.2			0.533			6.39			7.86			0.584			2.14		
TOTAL HEPTA-FURANS	1.20			0.0970			10.6			0.332			4.81			4.00			0.163			0.866		
TOTAL HEPTA-DIOXINS	8.45	B		0.840	B		45.5			0.0486	U		16.1	B		18.6	B		0.694	B		2.27	B	

B - chemical was found in the method blank

DL - detection limit

G - The lock mass signal in the vicinity of native and labeled 1,2,3,7,8-PeCDD was observed in the lab blank, OPR, sample duplicate, and CRM. This congener and its surrogate are flagged "G" accordingly.
The data are not considered significantly affected by these fluctuations.

K - A peak was detected that did not meet all the criteria for identification as the target analyte; the reported value is the estimated maximum possible concentration of the analyte present.
K-qualified results are treated as non-detects for TEQ calculations at the reported value (i.e., half the reported value or zero).

LQ - lab qualifier

TEQ (full DL) - Toxic equivalent quotient (TEQ) calculated using the full value of the detection limit for undetected congener concentrations and mammalian toxic equivalency factor (TEF) values from Van den Berg et al., 2006.

TEQ (1/2 DL) - TEQ calculated using one-half the detection limit for undetected congener concentrations and mammalian TEF values.

TEQ (zero DL) - TEQ calculated using mammalian TEF values and excluding undetected congeners.

U - not detected

VQ - validation qualifier

Table B–4. Dioxin/Furan Results for Padilla Bay Sediment Samples (pg/g dw)

Analyte	SDS-PB-08	LQ	VQ	SDS-PB-09	LQ	VQ	SDS-PB-10	LQ	VQ
2,3,7,8-TCDD	0.0830	K J	U	0.0466	U		0.052	K J	U
1,2,3,7,8-PECDD	0.118	K J	U	0.0540	J		0.152	K J	U
1,2,3,4,7,8-HXCDD	0.143	K J	U	0.0466	U		0.267	J	
1,2,3,6,7,8-HXCDD	0.427	K J	U	0.103	K J	U	1.08	J	
1,2,3,7,8,9-HXCDD	0.378	K J	U	0.102	K J	U	0.859	K B J	U
1,2,3,4,6,7,8-HPCDD	3.52	B J		0.636	B J		17.4	B	
OCDD	22.7	B		3.51	B J		196	B	
2,3,7,8-TCDF	0.198	K J	U	0.134	U		0.626	B J	U
1,2,3,7,8-PECDF	0.0770	K J	U	0.0466	U		0.0630	K J	U
2,3,4,7,8-PECDF	0.126	K B J	U	0.0560	B J	U	0.315	B J	
1,2,3,4,7,8-HXCDF	0.112	K J	U	0.0466	U		0.208	B J	U
1,2,3,6,7,8-HXCDF	0.0680	K J	U	0.0466	U		0.133	K J	U
1,2,3,7,8,9-HXCDF	0.0478	U		0.0466	U		0.0534	U	
2,3,4,6,7,8-HXCDF	0.0870	K J	U	0.0570	K J	U	0.189	K B J	U
1,2,3,4,6,7,8-HPCDF	0.855	J		0.225	J		1.92	K B J	U
1,2,3,4,7,8,9-HPCDF	0.0900	K J	U	0.0466	U		0.201	K J	U
OCDF	1.79	B J		0.378	B J		4.71	B J	
TEQ (full DL)	0.439			0.187			0.897		
TEQ (1/2 DL)	0.245			0.0730			0.680		
TEQ (zero DL)	0.0511			0.0638			0.463		
TOTAL TETRA-FURANS	0.995			0.0466	U		4.61	B	
TOTAL TETRA-DIOXINS	0.799			0.0466	U		1.26		
TOTAL PENTA-FURANS	0.768	B		0.132	B		1.41	B	
TOTAL PENTA-DIOXINS	0.654			0.0540			0.613		
TOTAL HEXA-FURANS	0.805			0.185			1.42	B	
TOTAL HEXA-DIOXINS	3.43			0.553			11.3		
TOTAL HEPTA-FURANS	2.10			0.429			3.30	B	
TOTAL HEPTA-DIOXINS	9.95			1.49			201		

B - chemical was found in the method blank

DL - detection limit

G - The lock mass signal in the vicinity of native and labeled 1,2,3,7,8-PeCDD was observed in the lab blank, OPR, sample duplicate, and CRM. This congener and its surrogate are flagged “G” accordingly.
The data are not considered significantly affected by these fluctuations.

K - A peak was detected that did not meet all the criteria for identification as the target analyte; the reported value is the estimated maximum possible concentration of the analyte present.
K-qualified results are treated as non-detects for TEQ calculations at the reported value (i.e., half the reported value or zero).

LQ - lab qualifier

TEQ (full DL) - Toxic equivalent quotient (TEQ) calculated using the full value of the detection limit for undetected congener concentrations and mammalian toxic equivalency factor (TEF) values from Van den Berg et al., 2006.

TEQ (1/2 DL) - TEQ calculated using one-half the detection limit for undetected congener concentrations and mammalian TEF values.

TEQ (zero DL) - TEQ calculated using mammalian TEF values and excluding undetected congeners.

U - not detected

VQ - validation qualifier

Table B–5. Dioxin/Furan Results for Co-located Intertidal Sediment Samples (pg/g dw)

Analyte	SDS-CT-01A	LQ	VQ	SDS-CT-01B	LQ	VQ	SDS-CT-02	LQ	VQ	SDS-CT-03	LQ	VQ	SDS-CT-04	LQ	VQ	SDS-CT-05	LQ	VQ
2,3,7,8-TCDD	3.01		J	0.390	K J	U	0.453	K J	U	0.139	K J	U	0.100	K J	U	0.0830	K J	U
1,2,3,7,8-PECDD	11.8			3.50	J		2.07	J		0.562	K J	U	0.328	J		0.421	J	
1,2,3,4,7,8-HXCDD	16.8			5.66	J		2.71	J		0.807	J		0.464	J		0.442	J	
1,2,3,6,7,8-HXCDD	95.7			23.9			18.1			3.37	J		1.57	J		2.03	J	
1,2,3,7,8,9-HXCDD	50.8	B	J	13.0			7.64	B	J	2.08	J		1.06	J		1.45	B J	J
1,2,3,4,6,7,8-HPCDD	2500	B		287	B		325	B		52.5	B		22.4	B		31.6	B	
OCDD	22200	B D		1950	B		2340	B		394	B		146	B		199	B	
2,3,7,8-TCDF	16.9	B		0.449	J		0.874	B J	U	0.317	K J	U	0.237	K J	U	0.520	B J	U
1,2,3,7,8-PECDF	9.80			0.684	J		0.593	J		0.211	J		0.127	J		0.136	K J	U
2,3,4,7,8-PECDF	15.9	B		0.922	B J		1.65	B J		0.344	B J		0.199	K B J	U	0.427	K B J	U
1,2,3,4,7,8-HXCDF	29.7	B		2.58	J		4.01	B J		0.771	J		0.349	J		0.549	B J	
1,2,3,6,7,8-HXCDF	13.9			1.90	J		1.84	J		0.472	J		0.225	J		0.315	K J	U
1,2,3,7,8,9-HXCDF	1.05	K B J	U	0.169	K J	U	0.143	B J		0.111	K J	U	0.0510	J		0.155	U	
2,3,4,6,7,8-HXCDF	14.3	B		2.10	J		2.54	B J		0.555	J		0.320	J		0.467	B J	
1,2,3,4,6,7,8-HPCDF	497	B		44.9			104	B		17.8			8.82			9.47	B	
1,2,3,4,7,8,9-HPCDF	30.2			2.08	J		6.28			1.20	J		0.488	J		0.556	K J	U
OCDF	1870	B		128	B		319	B		71.6	B		28.7	B		27.2	B	
TEQ (full DL)	81.3			13.1			12.0			2.51			1.29			1.71		
TEQ (1/2 DL)	81.2			12.9			11.7			2.14			1.20			1.55		
TEQ (zero DL)	81.2			12.7			11.4			1.77			1.11			1.39		
TOTAL TETRA-FURANS	262	B		6.69			11.3	B		3.58			2.43			3.61	B	
TOTAL TETRA-DIOXINS	112			6.09			29.7			2.42			1.90			0.527		
TOTAL PENTA-FURANS	215	B		21.0	B		25.8	B		5.55	B		3.29	B		3.17	B	
TOTAL PENTA-DIOXINS	174			16.1			29.7			5.23			3.69			2.04		
TOTAL HEXA-FURANS	704	B		82.0			106	B		18.7			9.43			5.08	B	
TOTAL HEXA-DIOXINS	1010			109			150			29.6			15.1			19.3		
TOTAL HEPTA-FURANS	2190	B		151			376	B		57.9			24.8			26.5	B	
TOTAL HEPTA-DIOXINS	6800			553			809			112			48.8			148		

B - chemical was found in the method blank

DL - detection limit

G - The lock mass signal in the vicinity of native and labeled 1,2,3,7,8-PeCDD was observed in the lab blank, OPR, sample duplicate, and CRM. This congener and its surrogate are flagged "G" accordingly. The data are not considered significantly affected by these fluctuations.

K - A peak was detected that did not meet all the criteria for identification as the target analyte; the reported value is the estimated maximum possible concentration of the analyte present. K-qualified results are treated as non-detects for TEQ calculations at the reported value (i.e., half the reported value or zero).

LQ - lab qualifier

TEQ (full DL) - Toxic equivalent quotient (TEQ) calculated using the full value of the detection limit for undetected congener concentrations and mammalian toxic equivalency factor (TEF) values from Van den Berg et al., 2006.

TEQ (1/2 DL) - TEQ calculated using one-half the detection limit for undetected congener concentrations and mammalian TEF values.

TEQ (zero DL) - TEQ calculated using mammalian TEF values and excluding undetected congeners.

U - not detected

VQ - validation qualifier

Table B–6. Dioxin/Furan Results for Intertidal Clam Tissue Samples (pg/g ww)

Analyte	SDS-CT-01A	LQ	VQ	SDS-CT-01B	LQ	VQ	SDS-CT-02	LQ	VQ	SDS-CT-03	LQ	VQ	SDS-CT-04	LQ	VQ	SDS-CT-05	LQ	VQ
2,3,7,8-TCDD	0.109	K J	U	0.0925	U D		0.0540	K J	U	0.0486	U		0.0530	J		0.0501	U	
1,2,3,7,8-PECDD	0.212	K J	U	0.150	K D J	U	0.0488	U		0.0660	K J	U	0.0507	U		0.0501	U	
1,2,3,4,7,8-HXCDD	0.246	J		0.898	K D J	U	0.0488	U		0.0640	J		0.0507	U		0.0501	U	
1,2,3,6,7,8-HXCDD	1.23	J		0.217	U D		0.155	J		0.196	J		0.113	J		0.0600	K J	U
1,2,3,7,8,9-HXCDD	0.695	J		0.217	U D		0.0950	K J	U	0.153	K J	U	0.0507	U		0.0501	U	
1,2,3,4,6,7,8-HPCDD	26.8	B		5.00	K B D J	U	1.69	B J		1.83	B J		1.00	B J		0.772	B J	
OCDD	221	B		27.4	B D J		9.84	B J		8.90	B J		4.93	B J		5.15	B J	
2,3,7,8-TCDF	0.202	K J	U	0.536	U		0.101	U		0.0951	U		0.0610	U		0.102	U	
1,2,3,7,8-PECDF	0.088	K B J	U	0.0968	U D		0.0488	U		0.0486	U		0.0507	U		0.0501	U	
2,3,4,7,8-PECDF	0.213	K B J	U	0.131	K B D J	U	0.0790	K B J	U	0.0920	B J		0.0570	K B J	U	0.106	B J	
1,2,3,4,7,8-HXCDF	0.312	J		0.155	K D J	U	0.0580	K J	U	0.0533	U		0.0507	U		0.0501	U	
1,2,3,6,7,8-HXCDF	0.168	K J	U	0.138	U D		0.0488	U		0.0533	U		0.0507	U		0.0501	U	
1,2,3,7,8,9-HXCDF	0.105	J		0.138	U D		0.0488	U		0.0533	U		0.0507	U		0.0501	U	
2,3,4,6,7,8-HXCDF	0.223	J		0.138	U D		0.0560	K J	U	0.0533	U		0.0507	U		0.0501	U	
1,2,3,4,6,7,8-HPCDF	5.75			0.632	K D J	U	0.639	K J	U	0.343	K J	UJ	0.398	K J	U	0.210	K J	U
1,2,3,4,7,8,9-HPCDF	0.305	B J		0.173	U D		0.0488	U		0.0510	K B J	U	0.0582	U		0.0501	U	
OCDF	17.9			2.11	K D J	U	1.56	J		1.31	J	J	0.537	J		0.599	J	
TEQ (full DL)	1.11			0.595			0.216			0.241			0.186			0.192		
TEQ (1/2 DL)	0.894			0.302			0.126			0.158			0.131			0.117		
TEQ (zero DL)	0.681			0.00822			0.0358			0.0750			0.0759			0.0412		
TOTAL TETRA-FURANS	1.98	B		0.320	B D		0.457	B		0.474	B		0.322	B		0.172	B	
TOTAL TETRA-DIOXINS	1.16			0.0925	U D		0.075			0.152			0.0530			0.0501	U	
TOTAL PENTA-FURANS	8.84			0.0968	U D		0.0488	U		0.0920			0.148			0.194		
TOTAL PENTA-DIOXINS	1.40	J		0.107	U D		0.0488	U		0.130			0.0690			0.0501	U	
TOTAL HEXA-FURANS	7.24			0.138	U D		0.304			0.391			0.131			0.0501	U	
TOTAL HEXA-DIOXINS	12.1			1.67	D		1.06			0.841			1.15			0.0501	U	
TOTAL HEPTA-FURANS	20.9			0.173	U D		1.34			0.0486	U		0.0582	U		0.354		
TOTAL HEPTA-DIOXINS	72.5			7.96	D		4.09			4.67			2.73			2.25		

B - chemical was found in the method blank
DL - detection limit
G - The lock mass signal in the vicinity of native and labeled 1,2,3,7,8-PeCDD was observed in the lab blank, OPR, sample duplicate, and CRM. This congener and its surrogate are flagged “G” accordingly.
The data are not considered significantly affected by these fluctuations.
K - A peak was detected that did not meet all the criteria for identification as the target analyte; the reported value is the estimated maximum possible concentration of the analyte present
K-qualified results are treated as non-detects for TEQ calculations at the reported value (i.e., half the reported value or zero).
LQ - lab qualifier
TEQ (full DL) - Toxic equivalent quotient (TEQ) calculated using the full value of the detection limit for undetected congener concentrations and mammalian toxic equivalency factor (TEF) values
from Van den Berg et al., 2006.
TEQ (1/2 DL) - TEQ calculated using one-half the detection limit for undetected congener concentrations and mammalian TEF values.
TEQ (zero DL) - TEQ calculated using mammalian TEF values and excluding undetected congeners.
U - not detected
VQ - validation qualifier
ww - wet weight

Table B–7. Dioxin/Furan TEQs (pg/g dw)

Sample ID	TEQ (full DL)	TEQ (1/2 DL)	TEQ (zero DL)
Custom Plywood Mill - Collected by GeoMatrix			
ST-2	14.4	14.4	14.4
ST-3	5.13	4.89	4.65
ST-4	3.16	2.45	1.75
ST-6	17.6	17.6	17.6
ST-10	14.3	14.3	14.3
ST-11	13.9	13.9	13.8
ST-14	9.66	9.34	9.01
ST-16	2.53	2.19	1.85
ST-19	5.54	5.39	5.24
ST-26	13.0	12.2	11.4
ST-27	4.06	3.59	3.12
ST-32	2.54	2.37	2.20
Custom Plywood Mill			
SDS-CPD-01	4.02	3.74	3.46
SDS-CPD-03	5.92	5.57	5.22
SDS-CPD-04	2.68	2.18	1.69
SDS-CPD-05	2.25	1.65	1.05
SDS-CPD-09	2.70	2.42	2.15
SDS-CPD-12	2.08	1.86	1.64
SDS-CPD-15	2.08	1.88	1.68
SDS-CPD-16	3.82	3.56	3.31
SDS-CPD-17	4.30	4.15	4.00
Fidalgo Bay			
SDS-FB-01	0.504	0.311	0.118
SDS-FB-02	0.666	0.518	0.370
SDS-FB-03	0.586	0.490	0.394
SDS-FB-04	1.36	1.14	0.926
SDS-FB-05	0.640	0.456	0.273
SDS-FB-05	0.640	0.456	0.273
SDS-FB-07	1.26	0.876	0.493
SDS-FB-07-D	1.15	0.923	0.692
SDS-FB-08	1.02	0.731	0.443
SDS-FB-09	1.50	1.37	1.24
SDS-FB-10	2.33	2.22	2.12
Padilla Bay			
SDS-PB-01	0.401	0.271	0.142
SDS-PB-02	0.306	0.158	0.0104
SDS-PB-03	2.03	1.84	1.65
SDS-PB-04	0.219	0.110	0.00153
SDS-PB-05	0.770	0.602	0.435
SDS-PB-05-D	0.752	0.516	0.281
SDS-PB-06	0.241	0.129	0.0179
SDS-PB-07	0.353	0.219	0.0847
SDS-PB-08	0.439	0.245	0.0511
SDS-PB-09	0.187	0.0730	0.0638
SDS-PB-10	0.897	0.680	0.463
Clam Collection Site - Sediment			
SDS-CT-01A	81.3	81.2	81.2
SDS-CT-01B	13.1	12.9	12.7
SDS-CT-02	12.0	11.7	11.4
SDS-CT-03	2.51	2.14	1.77
SDS-CT-04	1.29	1.20	1.11
SDS-CT-05	1.71	1.55	1.39
Clam Collection Site - Tissue (pg/g ww)			
SDS-CT-01A	1.11	0.894	0.681
SDS-CT-01B	0.595	0.302	0.008
SDS-CT-02	0.216	0.126	0.036
SDS-CT-03	0.241	0.158	0.075
SDS-CT-04	0.186	0.131	0.0759
SDS-CT-05	0.192	0.117	0.0412

dw - dry weight
ww - wet weight

Table B–8. Conventionals Results for Custom Plywood Sediment Samples

Sample ID	CPD-01			CPD-02			CPD-03			CPD-04			CPD-05			CPD-06			CPD-07			CPD-08			CPD-08-D		
Collection Date	**6/9/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**	**6/10/2010**	**LQ**	**VQ**	**6/10/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**
Total Solids (% DW)	55.50			57.50			52.00			52.00			56.40			50.80			48.20			53.60			54.70		
Preserved Total Solids (% DW)	61.60			60.60			54.10			60.50			59.50			59.60			53.10			60.00			59.70		
Total Sulfides (mg/kg DW)	508		J	318		J	562		J	326		J	461		J	27.4		J	606		J	382		J	317		J
Total Organic Carbon (% DW)	0.937			0.752			1.38			0.848			0.554			0.573			1.24			1.12			1.27		
Grain Size (% DW)																											
Phi Scale <-1	0.8			0.1			0.2			2.2			1.2			0.1			1.1			0.2			0.3		
Phi Scale -1 to 0	0.2			0.1			0.8			0.5			0.1			0.3			1.1			0.5			0.5		
Phi Scale 0 to 1	0.3			0.4			1.0			1.0			0.2			0.6			1.6			0.9			1.0		
Phi Scale 1 to 2	0.5			0.5			1.3			1.1			0.6			0.6			2.2			1.1			1.4		
Phi Scale 2 to 3	0.6			0.6			2.1			1.6			1.5			2.0			2.5			1.6			2.1		
Phi Scale 3 to 4	10.3			13.0			10.5			18.7			15.1			17.7			9.9			14.6			15.5		
Phi Scale 4 to 5	43.5			40.5			33.4			37.4			35.2			31.4			33.9			34.6			35.1		
Phi Scale 5 to 6	18.2			18.5			19.2			16.1			17.9			17.8			17.0			18.5			17.7		
Phi Scale 6 to 7	8.7			8.5			10.4			7.5			9.0			9.7			10.2			9.2			8.5		
Phi Scale 7 to 8	3.8			4.2			5.5			3.5			4.4			4.6			5.3			4.7			4.3		
Phi Scale 8 to 9	3.0			3.0			4.0			2.6			3.1			3.2			3.8			3.2			3.0		
Phi Scale 9 to 10	3.1			3.1			3.9			2.3			3.3			3.5			3.7			3.2			3.0		
Phi Scale >10	7.1			7.5			7.7			5.6			8.4			8.6			7.9			7.8			7.6		
Percent Gravel (>2.0 mm)	0.8			0.1			0.2			2.2			1.2			0.1			1.1			0.2			0.3		
Percent Sand (<2.0 mm - 0.06 mm)	11.9			14.6			15.7			22.9			17.5			21.2			17.3			18.7			20.5		
Percent Silt (0.06 mm - 0.004 mm)	74.2			71.7			68.5			64.5			66.5			63.5			66.4			67.0			65.6		
Percent Clay (<0.004 mm - 0.004 mm)	13.2			13.6			15.6			10.5			14.8			15.3			15.4			14.2			13.6		
Percent Fines (Silt/Clay)	87.3			85.3			84.0			75.0			81.3			78.8			81.7			81.0			79.3		

DW - dry weight
J - estimated value
LQ - laboratory qualifier
U - not detected
VQ - validation qualifier

Table B–8. Conventionals Results for Custom Plywood Sediment Samples

Sample ID	**CPD-08-T**			**CPD-09**			**CPD-10**			**CPD-11**			**CPD-12**			**CPD-13**			**CPD-14**			**CPD-15**			**CPD-16**		
Collection Date	**6/9/2010**	**LQ**	**VQ**	**6/10/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**	**6/10/2010**	**LQ**	**VQ**	**6/10/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**	**6/10/2010**	**LQ**	**VQ**	**6/10/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**
Total Solids (% DW)	55.40			47.80			45.80			53.80			55.60			49.20			52.30			53.20			41.20		
Preserved Total Solids (% DW)	61.10			57.80			49.90			57.40			63.00			55.50			59.70			59.20			48.00		
Total Sulfides (mg/kg DW)	335		J	24.6		J	407		J	28.1		J	27.5		J	391		J	30.7		J	506		J	845		J
Total Organic Carbon (% DW)	0.447			0.988			1.91			0.485			0.863			1.6			1.15			1.1			1.66		
Grain Size (% DW)																											
Phi Scale <-1	0.6			0.4			2.3			1.7			3.4			1.7			0.5			0.3			0.5		
Phi Scale -1 to 0	0.4			0.3			1.5			0.2			0.3			0.9			0.2			0.5			0.8		
Phi Scale 0 to 1	0.9			2.1			2.2			0.6			0.9			1.5			0.3			0.9			0.6		
Phi Scale 1 to 2	1.1			1.0			2.8			0.7			0.9			2.0			0.6			1.1			1.0		
Phi Scale 2 to 3	1.5			1.7			2.7			1.4			2.4			1.9			1.1			2.0			1.7		
Phi Scale 3 to 4	14.4			15.6			7.5			13.8			18.1			7.1			5.7			13.8			5.8		
Phi Scale 4 to 5	36.9			32.2			26.5			29.5			31.1			35.9			29.0			32.6			30.8		
Phi Scale 5 to 6	16.4			17.2			20.4			20.2			16.9			15.9			24.9			19.0			22.4		
Phi Scale 6 to 7	9.4			9.7			12.2			10.7			8.8			11.9			12.9			10.1			13.5		
Phi Scale 7 to 8	4.1			4.4			6.1			4.9			3.8			6.3			6.1			4.5			6.9		
Phi Scale 8 to 9	3.4			3.4			4.3			3.6			2.6			4.1			4.1			3.0			4.3		
Phi Scale 9 to 10	3.1			3.6			3.5			3.7			3.1			3.6			4.3			3.3			3.8		
Phi Scale >10	7.7			8.6			8.2			8.9			7.8			7.2			10.5			8.8			7.8		
Percent Gravel (>2.0 mm)	0.6			0.4			2.3			1.7			3.4			1.7			0.5			0.3			0.5		
Percent Sand (<2.0 mm - 0.06 mm)	18.3			20.7			16.7			16.7			22.6			13.4			7.9			18.3			9.9		
Percent Silt (0.06 mm - 0.004 mm)	66.8			63.5			65.2			65.3			60.6			70.0			72.9			66.2			73.6		
Percent Clay (<0.004 mm - 0.004 mm)	14.2			15.6			16.0			16.2			13.5			14.9			18.9			15.1			15.9		
Percent Fines (Silt/Clay)	81.1			78.9			81.2			81.5			73.9			84.9			91.7			81.3			89.6		

DW - dry weight
J - estimated value
LQ - laboratory qualifier
U - not detected
VQ - validation qualifier

Table B–8. Conventionals Results for Custom Plywood Sediment Samples

Sample ID	**CPD-17**			**CPD-18**			**CPD-19**			**CPD-20**			**CPD-21**		
Collection Date	**6/9/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**	**6/9/2010**	**LQ**	**VQ**
Total Solids (% DW)	47.20			47.80			45.60			51.30			45.50		
Preserved Total Solids (% DW)	52.20			54.80			52.40			59.80			51.10		
Total Sulfides (mg/kg DW)	515		J	475		J	861		J	529		J	721		J
Total Organic Carbon (% DW)	0.893			1.36			1.29			0.391			1.24		
Grain Size (% DW)															
Phi Scale <-1	0.7			0.8			0.8			0.1	U		0.6		
Phi Scale -1 to 0	1.2			0.7			0.6			0.4			1.1		
Phi Scale 0 to 1	1.5			1.1			0.7			0.5			1.0		
Phi Scale 1 to 2	3.7			1.6			0.8			0.5			1.4		
Phi Scale 2 to 3	6.7			2.9			1.6			1.6			1.8		
Phi Scale 3 to 4	5.7			8.7			11.0			18.2			6.4		
Phi Scale 4 to 5	27.6			32.4			26.8			24.8			32.0		
Phi Scale 5 to 6	19.6			18.1			18.3			20.6			16.9		
Phi Scale 6 to 7	11.7			11.4			13.3			9.9			13.9		
Phi Scale 7 to 8	6.1			6.1			7.3			6.1			7.4		
Phi Scale 8 to 9	4.0			4.3			5.1			4.0			4.7		
Phi Scale 9 to 10	3.5			3.8			4.2			4.0			3.8		
Phi Scale >10	8.0			8.3			9.6			9.4			9.1		
Percent Gravel (>2.0 mm)	0.7			0.8			0.8			0.1	U		0.6		
Percent Sand (<2.0 mm - 0.06 mm)	18.8			15.0			14.7			21.2			11.7		
Percent Silt (0.06 mm - 0.004 mm)	65.0			68.0			65.7			61.4			70.2		
Percent Clay (<0.004 mm - 0.004 mm)	15.5			16.4			18.9			17.4			17.6		
Percent Fines (Silt/Clay)	80.5			84.3			84.5			78.8			87.7		

DW - dry weight
J - estimated value
LQ - laboratory qualifier
U - not detected
VQ - validation qualifier

Table B–9. Conventionals Results for Fidalgo Bay Sediment Samples

Sample ID	**FB-01**			**FB-02**			**FB-03**			**FB-04**			**FB-05**			**FB-06**			**FB-07**			**FB-07-D**			**FB-07-T**		
Collection Date	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**
Total Solids (% DW)	69.90			72.00			70.50			60.70			63.90			69.30			53.20			53.50			53.40		
Preserved Total Solids (% DW)	68.80			71.50			69.10			65.30			64.30			71.10			60.90			60.50			59.80		
Total Sulfides (mg/kg DW)	6.79			5.61			7.4			380			15.1			1.61			477			516			276		
Total Organic Carbon (% DW)	0.349			0.305			0.477			0.654			0.842			0.525			0.912			0.807			1.22		
Grain Size (% DW)																											
Phi Scale <-1	0.2			0.1	U		2.1			0.1			0.1	U		3.7			0.7			0.1	U		0.4		
Phi Scale -1 to 0	0.9			0.1			2.0			0.4			0.2			1.7			0.5			0.4			0.4		
Phi Scale 0 to 1	1.9			0.8			3.5			0.7			0.5			2.0			0.6			0.6			0.6		
Phi Scale 1 to 2	7.6			12.1			19.3			1.2			6.3			17.7			1.0			1.1			0.8		
Phi Scale 2 to 3	69.9			68.1			54.4			14.5			61.7			55.4			8.0			9.0			7.5		
Phi Scale 3 to 4	12.2			12.8			8.8			40.2			14.0			8.7			36.1			36.9			36.5		
Phi Scale 4 to 5	1.5			1.2			1.3			15.3			3.9			2.4			19.0			17.1			18.5		
Phi Scale 5 to 6	0.9			0.7			1.8			8.2			3.0			1.6			11.3			12.1			12.2		
Phi Scale 6 to 7	0.7			0.7			1.2			5.1			2.1			1.2			6.7			6.4			6.6		
Phi Scale 7 to 8	0.6			0.6			1.1			2.9			1.5			1.0			3.7			4.0			4.0		
Phi Scale 8 to 9	0.5			0.5			1.0			2.4			1.4			0.9			2.7			2.9			3.0		
Phi Scale 9 to 10	0.7			0.6			1.1			2.7			1.8			1.2			2.9			2.8			2.9		
Phi Scale >10	2.2			1.7			2.3			6.4			3.5			2.4			6.8			6.7			6.7		
Percent Gravel (>2.0 mm)	0.2			0.1	U		2.1			0.1			0.1	U		3.7			0.7			0.1	U		0.4		
Percent Sand (<2.0 mm - 0.06 mm)	92.5			93.9			88.0			57.0			82.7			85.5			46.2			48.0			45.8		
Percent Silt (0.06 mm - 0.004 mm)	3.7			3.2			5.4			31.5			10.5			6.2			40.7			39.6			41.3		
Percent Clay (<0.004 mm - 0.004 mm)	3.4			2.8			4.4			11.5			6.7			4.5			12.4			12.4			12.6		
Percent Fines (Silt/Clay)	7.2			6.0			9.8			42.9			17.2			10.8			53.2			52.0			53.8		

DW - dry weight
LQ - laboratory qualifier
U - not detected
VQ - validation qualifier

Table B–9. Conventionals Results for Fidalgo Bay Sediment Samples

Sample ID	FB-08			FB-09			FB-10		
Collection Date	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**
Total Solids (% DW)	58.10			54.60			50.30		
Preserved Total Solids (% DW)	64.50			61.10			54.40		
Total Sulfides (mg/kg DW)	272			192			713		
Total Organic Carbon (% DW)	0.741			0.819			1.35		
Grain Size (% DW)									
Phi Scale <-1	0.2			0.1			1.5		
Phi Scale -1 to 0	0.4			0.3			0.3		
Phi Scale 0 to 1	0.8			0.8			0.4		
Phi Scale 1 to 2	1.5			1.1			0.9		
Phi Scale 2 to 3	22.2			4.3			2.2		
Phi Scale 3 to 4	34.0			30.8			9.1		
Phi Scale 4 to 5	13.7			26.3			23.6		
Phi Scale 5 to 6	7.2			14.5			22.2		
Phi Scale 6 to 7	4.6			6.3			12.7		
Phi Scale 7 to 8	3.5			3.8			6.6		
Phi Scale 8 to 9	2.6			2.3			4.6		
Phi Scale 9 to 10	3.0			2.8			4.6		
Phi Scale >10	6.5			6.5			11.1		
Percent Gravel (>2.0 mm)	0.2			0.1			1.5		
Percent Sand (<2.0 mm - 0.06 mm)	58.9			37.3			12.9		
Percent Silt (0.06 mm - 0.004 mm)	29.0			50.9			65.1		
Percent Clay (<0.004 mm - 0.004 mm)	12.1			11.6			20.3		
Percent Fines (Silt/Clay)	40.9			62.6			85.5		

DW - dry weight
LQ - laboratory qualifier
U - not detected
VQ - validation qualifier

Table B–10. Conventionals Results for Fidalgo Bay Sediment Samples

Sample ID	PB-01			PB-02			PB-03			PB-04			PB-05			PB-05-D			PB-05-T			PB-06			PB-07		
Collection Date	**6/7/2010**	**LQ**	**VQ**	**6/7/2010**	**LQ**	**VQ**	**6/7/2010**	**LQ**	**VQ**	**6/7/2010**	**LQ**	**VQ**	**6/7/2010**	**LQ**	**VQ**	**6/7/2010**	**LQ**	**VQ**	**6/7/2010**	**LQ**	**VQ**	**6/7/2010**	**LQ**	**VQ**	**6/7/2010**	**LQ**	**VQ**
Total Solids (% DW)	64.40			76.40			46.90			74.50			63.40			62.25			62.50			78.90			73.10		
Preserved Total Solids (% DW)	61.20			73.20			53.70			72.90			64.90			62.70			64.00			73.40			71.90		
Total Sulfides (mg/kg DW)	39.2			27.6			324			1.34	U		48.6			48.1			32.2			1.34	U		13		
Total Organic Carbon (% DW)	0.679			0.171			1.2			0.984			0.19			0.426			0.377			0.215			0.422		
Grain Size (% DW)																											
Phi Scale <-1	0.2			0.3			0.1			1.9			0.1	U		0.1	U		0.1	U		1.6			0.2		
Phi Scale -1 to 0	0.4			4.2			0.9			6.1			0.2			0.2			0.2			5.6			4.7		
Phi Scale 0 to 1	2.9			32.1			1.1			28.1			0.5			0.6			0.6			29.7			14.3		
Phi Scale 1 to 2	19.2			52.5			3.1			56.0			1.9			2.2			2.2			56.3			28.0		
Phi Scale 2 to 3	46.0			9.0			10.1			5.7			23.1			23.0			22.0			5.3			38.3		
Phi Scale 3 to 4	16.8			0.2			16.8			0.1			48.6			48.2			48.4			0.1			7.2		
Phi Scale 4 to 5	5.7			0.1	U		18.9			0.1	U		9.0			9.2			9.2			0.1	U		1.7		
Phi Scale 5 to 6	2.2			0.1	U		15.1			0.1	U		4.3			4.0			4.4			0.1	U		1.2		
Phi Scale 6 to 7	1.3			0.1	U		8.3			0.1	U		2.6			2.6			2.5			0.1	U		0.9		
Phi Scale 7 to 8	0.8			0.1	U		5.6			0.1	U		1.9			1.8			2.0			0.1	U		0.7		
Phi Scale 8 to 9	0.7			0.1	U		4.5			0.1	U		1.6			1.7			1.6			0.1	U		0.6		
Phi Scale 9 to 10	0.8			0.1	U		4.5			0.1	U		2.1			1.9			2.0			0.1	U		0.7		
Phi Scale >10	2.8			0.1	U		11.1			0.1	U		4.3			4.6			4.8			0.1	U		1.7		
Percent Gravel (>2.0 mm)	0.2			0.3			0.1			1.9			0.1	U		0.1	U		0.1	U		1.6			0.2		
Percent Sand (<2.0 mm - 0.06 mm)	85.3			98.0			32.0			96.0			74.3			74.2			73.4			97.0			92.5		
Percent Silt (0.06 mm - 0.004 mm)	10.0			0.1	U		47.9			0.1	U		17.8			17.6			18.1			0.1	U		4.5		
Percent Clay (<0.004 mm - 0.004 mm)	4.3			0.1	U		20.1			0.1	U		8.0			8.2			8.4			0.1	U		3.0		
Percent Fines (Silt/Clay)	14.3			1.8			68.0			2.0			25.7			25.8			26.5			1.4			7.5		

DW - dry weight
LQ - laboratory qualifier
U - not detected
VQ - validation qualifier

Table B–10. Conventionals Results for Fidalgo Bay Sediment Samples

Sample ID	PB-08			PB-09			PB-10		
Collection Date	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**	**6/8/2010**	**LQ**	**VQ**
Total Solids (% DW)	55.70			78.10			52.00		
Preserved Total Solids (% DW)	62.00			76.50			60.20		
Total Sulfides (mg/kg DW)	231			1.6			1150		
Total Organic Carbon (% DW)	0.467			0.253			0.941		
Grain Size (% DW)									
Phi Scale <-1	0.1			7.7			0.1	U	
Phi Scale -1 to 0	0.7			17.8			0.7		
Phi Scale 0 to 1	1.0			32.3			1.3		
Phi Scale 1 to 2	2.0			32.5			1.8		
Phi Scale 2 to 3	31.2			4.9			9.5		
Phi Scale 3 to 4	38.1			1.0			29.6		
Phi Scale 4 to 5	11.6			0.1	U		20.3		
Phi Scale 5 to 6	4.5			0.1	U		11.8		
Phi Scale 6 to 7	2.4			0.1	U		6.7		
Phi Scale 7 to 8	1.7			0.1	U		4.5		
Phi Scale 8 to 9	1.4			0.1	U		3.4		
Phi Scale 9 to 10	1.5			0.1	U		3.3		
Phi Scale >10	3.8			0.1	U		7.1		
Percent Gravel (>2.0 mm)	0.1			7.7			0.1	U	
Percent Sand (<2.0 mm - 0.06 mm)	73.0			88.5			42.9		
Percent Silt (0.06 mm - 0.004 mm)	20.2			0.1	U		43.3		
Percent Clay (<0.004 mm - 0.004 mm)	6.7			0.1	U		13.8		
Percent Fines (Silt/Clay)	26.8			3.9			57.1		

DW - dry weight
LQ - laboratory qualifier
U - not detected
VQ - validation qualifier

Table B–11. Conventionals Results for Co-located Intertidal Sediment Samples

Sample ID	CT-01A			CT-01B			CT-02			CT-03			CT-04			CT-05		
Collection Date	**6/14/2010**	**LQ**	**VQ**	**6/14/2010**	**LQ**	**VQ**	**6/14/2010**	**LQ**	**VQ**	**6/14/2010**	**LQ**	**VQ**	**6/14/2010**	**LQ**	**VQ**	**6/14/2010**	**LQ**	**VQ**
Total Solids (% DW)	41.30			75.00			60.10			72.70			72.70			67.90		
Preserved Total Solids (% DW)	35.10			79.60			45.90			75.60			71.60			68.70		
Total Sulfides (mg/kg DW)	2480			484			534			271			235			329		
Total Organic Carbon (% DW)	5.56			1.89			1.3			0.823			1.05			1.44		
Grain Size (% DW)																		
Phi Scale <-1	7.6			54.8			8.2			3.2			4.7			2.9		
Phi Scale -1 to 0	2.9			14.2			3.1			0.8			1.1			1.4		
Phi Scale 0 to 1	5.6			12.4			3.5			1.5			2.0			3.1		
Phi Scale 1 to 2	23.3			8.9			7.4			12.4			12.6			21.3		
Phi Scale 2 to 3	22.2			3.0			25.0			58.4			55.6			39.5		
Phi Scale 3 to 4	14.1			0.8			33.7			12.5			15.1			12.3		
Phi Scale 4 to 5	10.3			1.7			4.3			3.0			2.1			6.3		
Phi Scale 5 to 6	5.3			0.8			3.6			2.1			1.4			3.4		
Phi Scale 6 to 7	2.0			0.8			2.6			1.2			1.0			2.1		
Phi Scale 7 to 8	0.9			0.7			1.8			1.0			1.0			1.6		
Phi Scale 8 to 9	0.6			0.5			1.5			1.3			0.9			1.4		
Phi Scale 9 to 10	0.8			0.5			1.7			0.9			0.7			1.5		
Phi Scale >10	4.4			0.9			3.7			1.8			1.8			3.1		
Percent Gravel (>2.0 mm)	7.6			54.8			8.2			3.2			4.7			2.9		
Percent Sand (<2.0 mm - 0.06 mm)	68.1			39.3			72.7			85.6			86.4			77.6		
Percent Silt (0.06 mm - 0.004 mm)	18.5			4.0			12.3			7.3			5.5			13.4		
Percent Clay (<0.004 mm - 0.004 mm)	5.8			1.9			6.9			4.0			3.4			6.0		
Percent Fines (Silt/Clay)	24.4			6.0			19.2			11.3			8.8			19.4		

DW - dry weight
LQ - laboratory qualifier
U - not detected
VQ - validation qualifier

APPENDIX C
ECOLOGY'S WORKBOOK TOOLS FOR CALCULATING SOIL AND GROUNDWATER CLEANUP LEVELS UNDER THE MODEL TOXICS CONTROL ACT CLEANUP REGULATION (DECEMBER, 2007); SOIL TPH WORKSHEET

(APPENDIX ON DVD ATTACHED TO INSIDE OF REPORT COVER)

Appendix C
Chemistry Laboratory Reports and Chain-of-Custody Forms

(provided electronically on CD)

Appendix C-1
Chemistry Laboratory Reports

Table of Contents: ARI Job RA17, RA18, RA23, RA31

Client: Science Applications, Intl.

Project: Fidalgo Bay/ Custom Plywood Dioxin

BC
Signature

June-28-2010
Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

June 28, 2010

Tim Hammermeister
SAIC
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

**RE: Project: Fidalgo Bay / Custom Plywood Dioxin Study
ARI Job No: RA17, RA18, RA23, & RA31**

Dear Tim:

Please find enclosed the Chain-of-Custody (COC) records, sample receipt documentation, and the final data package for samples from the project referenced above.

Sample receipt and details of the analyses are discussed in the Case Narrative.

An electronic copy of this data and associated raw data will be kept on file with ARI. Should you have any questions or problems, please feel free to contact me at any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Cheronne Oreiro
Project Manager
(206) 695-6214
cheronneo@arilabs.com

Enclosures

cc: eFile RA17/RA18/RA23/RA31

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Documentation

ARI Job ID: RA17, RA18, RA23, RA31

RA17

SAIC® From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Chris Hunt
Client Name: Ecology

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	TOC	Total Solids	Total Sulfides	Archive						Comments
SDS-PB-01	0-10cm	Sed	6/7/10	1307	4	X	X	X	X	X						
SDS-PB-02	0-10cm	Sed	6/7/10	1345	4	X	X	X	X	X						
SDS-PB-03	0-10cm	Sed	6/7/10	1407	4	X	X	X	X	X						
SDS-PB-04	0-10cm	Sed	6/7/10	1434	4	X	X	X	X	X						
SDS-PB-05	0-10cm	Sed	6/7/10	1450	4	X	X	X	X	X						
SDS-PB-05-D	0-10cm	Sed	6/7/10	1450	3	X	X	X	X							
SDS-PB-05-T	0-10cm	Sed	6/7/10	1450	3	X	X	X	X							
SDS-PB-06	0-10cm	Sed	6/7/10	1524	4	X	X	X	X	X						
SDS-PB-07	0-10cm	Sed	6/7/10	1550	4	X	X	X	X	X						

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:10	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

RA17:00003

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: SAIC

Project Name: Fidalgo Bay/Custom Plywood

COC No(s): NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: RA17

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) 4.4 3.6 5.1 5.2 1.9 1.9

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90877952

Cooler Accepted by: AV Date: 6/11/10 Time: 1010

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: AV Date: 6/11/10 Time: 1111

***** 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:

x Extra Jar (Dioxins) on SDS-PB-04 & SDS-PB-05-D
x on SDS-PB-04 time on bottles is 1429 except sulfides jar time is correct at 1434.

By: AV Date: 6/11/10

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm

Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

SAIC
From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.: ______ Project Mgr.: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Julie Wartes
Client Name: Ecology

Analyses / Tests: Grain Size, TOC, Total Solids, Total Sulfides, Archive

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	TOC	Total Solids	Total Sulfides	Archive						Comments
SDS-PB-08	0-10cm	sed	6/8/10	1521	4	X	X	X	X	X						
SDS-PB-09	0-10cm	sed	6/8/10	1558	4	X	X	X	X	X						
SDS-PB-10	0-10cm	sed	~~6/~~ 6/8/10	1620	4	X	X	X	X	X						
SDS-FB-01	0-10cm	sed	6/8/10	1003	4	X	X	X	X	X						
SDS-FB-02	0-10cm	sed	6/8/10	1021	4	X	X	X	X	X						
SDS-FB-03	0-10cm	sed	6/8/10	1052	4	X	X	X	X	X						
SDS-FB-04	0-10cm	sed	6/8/10	1152	4	X	X	X	X	X						
SDS-FB-05	0-10cm	sed	6/8/10	1348	4	X	X	X	X	X						
SDS-FB-06	0-10cm	sed	6/8/10	1114	4	X	X	X	X	X						
SDS-FB-07	0-10cm	sed	6/8/10	1045	4	X	X	X	X	X						
SDS-FB-07-D	0-10cm	sed	6/8/10	1045	3	X	X	X	X							
SDS-FB-07-T	0-10cm	sed	6/8/10	1045	3	X	X	X	X							

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:00	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

RA17:00005

SAIC
From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Julie Wintes
Client Name: Ecology

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain size	TOC	Total Solids	Total Sulfides	Archive						Comments
SDS-FB-08	0-10cm	Sed	6/8/10	1133	4	X	X	X	X	X						
SDS-FB-09	0-10cm	Sed	6/8/10	1435	4	X	X	X	X	X						
SDS-FB-10	0-10cm	Sed	6/8/10	1453	4	X	X	X	X	X						

Analyses / Tests

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:10	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation:	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

RA17:00006

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: SAIC
COC No(s): NA
Assigned ARI Job No: RA18

Project Name: Fidalgo Bay/Custom Plywood
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)........ 4.4 3.6 5.1 5.2 1.9 1.9

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: 90877952

Cooler Accepted by: AV Date: 6/11/10 Time: 1010

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:

	NA	YES	NO
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: JW Date: 6/11/10 Time: 1120

***** 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:

Samples SDS-FB-07, SDS-FB-07-D, & SDS-FB-07-T COC says sampled @ 1045, all bottles say 1405.

By: JW Date: 6/11/10

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm

Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

RA23

SAIC
From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Tim Hammermeister Will Hafner Julie Wong
Client Name: Ecology

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	TOC	Total Solids	Total Sulfides	Arch Mg						Comments
SDS-CPD-05	0-10cm	Sed	6/10/10	1057	4	X	X	X	X	X						
SDS-CPD-06	0-10cm	Sed	6/10/10	1116	4	X	X	X	X	X						
SDS-CPD-09	0-10cm	Sed	6/10/10	1130	4	X	X	X	X	X						
SDS-CPD-11	0-10cm	Sed	6/10/10	1144	4	X	X	X	X	X						
SDS-CPD-12	0-10cm	Sed	6/10/10	1200	4	X	X	X	X	X						
SDS-CPD-14	0-10cm	Sed	6/10/10	1212	4	X	X	X	X	X						
SDS-CPD-15	0-10cm	Sed	6/10/10	1223	4	X	X	X	X	X						

Shipping Information

Number of Shipping Containers:
Date Shipped:
Carrier:
Waybill No.:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:10	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

RA17 : 00008

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: SAIC

COC No(s): ______ NA

Assigned ARI Job No: ~~X~~ AV RA23

Project Name: Fidalgo Bay/Custom Plywood

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)........ 4.4 3.6 5.1 5.2 1.9 1.9

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90877952

Cooler Accepted by: AV Date: 6/11/10 Time: 1010

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: AV Date: 6/11/10 Time: 1230

*** 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	Small → "sm"
Peabubbles' 2-4 mm	Peabubbles → "pb"
LARGE Air Bubbles > 4 mm	Large → "lg"
	Headspace → "hs"

RA31

From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Chris Hunt
Client Name: Ecology

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	TOC	Total Solids	Total Sulfides	Archive						Comments
SDS-CPD-01	0-10cm	Sed	6/9/10	940	4	X	X	X	X	X						
SDS-CPD-02	0-10cm	Sed	6/9/10	1001	4	X	X	X	X	X						
SDS-CPD-03	0-10cm	Sed	6/9/10	1046	4	X	X	X	X	X						
SDS-CPD-04	0-10cm	Sed	6/9/10	1107	4	X	X	X	X	X						
SDS-CPD-07	0-10cm	Sed	6/9/10	1135	4	X	X	X	X	X						
SDS-CPD-08	0-10cm	Sed	6/9/10	1146	4	X	X	X	X	X						
SDS-CPD-08-D	0-10cm	Sed	6/9/10	1146	3	X	X	X	X							
SDS-CPD-08-T	0-10cm	Sed	6/9/10	1146	3	X	X	X	X							
SDS-CPD-10	0-10cm	Sed	6/9/10	1312	4	X	X	X	X	X						
SDS-CPD-13	0-10cm	Sed	6/9/10	1320	4	X	X	X	X	X						
SDS-CPD-16	0-10cm	Sed	6/9/10	1331	4	X	X	X	X	X						
SDS-CPD-17	0-10cm	Sed	6/9/10	1343	4	X	X	X	X	X						

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:10	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

RA17:00010

SAIC From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay Custom Plywood D/o Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Chris Hunt
Client Name: Ecology

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	TOC	Total solids	Total sulfides	Archive						Comments
SDS-CPD-18	0-10cm	Sed	6/9/10	1400	4	X	X	X	X	X						
SDS-CPD-19	0-10cm	Sed	6/9/10	1411	4	X	X	X	X	X						
SDS-CPD-20	0-10cm	Sed	6/9/10	1425	4	X	X	X	X	X						
SDS-CPD-21	0-10cm	Sed	6/9/10	1440	4	X	X	X	X	X						

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:10	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

RA17:00011

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: SAIC

COC No(s): NA

Assigned ARI Job No: RA31

Project Name: Fidalgo Bay/Custom Plywood

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?	NO
Were custody papers included with the cooler?	YES
Were custody papers properly filled out (ink, signed, etc.)	YES
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)	4.4 3.6 5.1 5.2 1.9 1.9

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90877952

Cooler Accepted by: AV Date: 6/11/10 Time: 1010

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	NO
What kind of packing material was used?	Bubble Wrap, Wet Ice
Was sufficient ice used (if appropriate)?	YES
Were all bottles sealed in individual plastic bags?	NO
Did all bottles arrive in good condition (unbroken)?	YES
Were all bottle labels complete and legible?	YES
Did the number of containers listed on COC match with the number of containers received?	YES
Did all bottle labels and tags agree with custody papers?	YES
Were all bottles used correct for the requested analyses?	YES
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA
Were all VOC vials free of air bubbles?	NA
Was sufficient amount of sample sent in each bottle?	YES
Date VOC Trip Blank was made at ARI	NA

Was Sample Split by ARI: NA YES Date/Time: Equipment: Split by:

Samples Logged by: AV Date: 6/11/10 Time: 1547

***** 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	Small → "sm"
Peabubbles 2-4 mm	Peabubbles → "pb"
LARGE Air Bubbles > 4 mm	Large → "lg"
	Headspace → "hs"

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: RA17, RA18, RA23, RA31

Case Narrative

Client: SAIC
Project: Fidalgo Bay / Custom Plywood Dioxin Study
ARI Job No.: RA17, RA18, RA23, & RA31

Sample Receipt

Forty-seven sediment samples were received June 11, 2010 under ARI jobs RA17, RA18, RA23, and RA31. The cooler temperatures measured by IR thermometer following ARI SOP were 1.9, 1.9, 3.6, 4.4, 5.1, and 5.2°C. Select sample containers were archived frozen upon receipt. For further details regarding sample receipt, please refer to the Cooler Receipt Forms.

General Chemistry Parameters (TOC/TS)

The samples were prepared and analyzed within method recommended holding times.

The method blanks were clean at the reporting limits. The LCS percent recoveries were within control limits.

The SRM percent recoveries were within limits.

The matrix spike percent recoveries of sulfide were outside the control limits for samples **SDS-CPD-05** and **SDS-CDP-01**. All other QC parameters were within control limits. No corrective action was taken.

The replicate RPD/RSDs were within control limits.

Geotechnical Parameters

Laboratory-specific case narratives follow.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: Science Applications International Corp.	**ARI Job No.:** RA17
Client Project: Fidalgo Bay/ Custom Plywood Dioxin	

Case Narrative

1. Nine samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology on June 11, 2010.
2. The samples were run in a single batch and one sample from another job, SDS-CPD-14, was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. Three samples, SDS-PB-02, SDS-PB-04 and SDS-PB-06, did not contain the required 5 grams of fines for the pipette portion of the analysis. The analytical balance has a capacity of about 200 grams (by 0.0001 grams) and a sample that would yield 5 grams of fines could not be split and stay within the capacity of the balance.
4. Samples SDS-PB-01, SDS-PB-05, SDS-PB-05-D, SDS-PB-05-T and SDS-PB-07 contained woody or other organic matter, which may have broken down during the sieving process affecting grain size analysis.
5. Samples SDS-PB-02, SDS-PB-06, and SDS-PB-07contained shell fragments.
6. The data is provided in summary tables and plots.
7. There were no other noted anomalies in this project.

Approved by: [signature]
Geotechnical Laboratory Manager

Date: 6/24/10

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: Science Applications International Corp.	**ARI Job No.:** RA18
Client Project: Fidalgo/Padilla Bay	

Case Narrative

1. Fifteen samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology on June 11, 2010.
2. The samples were run in a single batch and one sample from this job, SDS-PB-10, was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. One sample, SDS-PB-09, did not contain the required 5 grams of fines for the pipette portion of the analysis. The analytical balance has a capacity of about 200 grams (by 0.0001 grams) and a sample that would yield 5 grams of fines could not be split and stay within the capacity of the balance.
4. Samples SDS-PB-10, SDS-PB-08, and SDS-FB-06 contained woody or other organic matter, which may have broken down during the sieving process affecting grain size analysis.
5. Samples SDS-PB-09, SDS-FB-01, SDS-FB-03, SDS-FB-06, SDS-FB-07, and SDS-FB-07 contained shell fragments.
6. The data is provided in summary tables and plots.
7. There were no other noted anomalies in this project.

Approved by: ~~Gwenna Swett~~ Date: 6/21/10
Geotechnical Laboratory Manager

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: Science Applications International Corp.	**ARI Job No.:** RA23
Client Project: Fidalgo Bay/ Custom Plywood Dioxin	

Case Narrative

1. Seven samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology on June 11, 2010.
2. The samples were run in a single batch and one sample from this job, SDS-CPD-14, was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. Samples SDS-CPD-14, SDS-CPD-05, SDS-CPD-09, SDS-CPD-15 and SDS-CPD-06 contained woody or other organic matter, which may have broken down during the sieving process affecting grain size analysis.
4. All of the samples contained shell fragments.
5. The data is provided in summary tables and plots.
6. There were no other noted anomalies in this project.

Approved by: [signature] Date: 6/23/10
Geotechnical Laboratory Manager

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: Science Applications International Corp.	**ARI Job No.:** RA31
Client Project: Fidalgo Bay/ Custom Plywood Dioxin	

Case Narrative

1. Sixteen samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology on June 11, 2010.
2. The samples were run in a single batch and one sample from this job, SDS-CPD-01, was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. Samples SDS-CPD-07, SDS-CPD-10, SDS-CPD-13, and SDS-CPD-21 contained woody or other organic matter, which may have broken down during the sieving process affecting grain size analysis.
4. Samples SDS-CPD-01, SDS-CPD-02, SDS-CPD-03, SDS-CPD-04, SDS-CPD-08, SDS-CPD-08-D, SDS-CPD-08-T, SDS-CPD-16, SDS-CPD-18, and SDS-CPD-20 contained shell fragments.
5. The data is provided in summary tables and plots.
6. There were no other noted anomalies in this project.

Approved by: [signature] Date: 6/25/10
Geotechnical Laboratory Manager

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Data Reporting Qualifiers

Effective 7/10/2009

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.

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

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

Spike Recovery Control Limits for Conventional Wet Chemistry

Effective 5/1/09

Control limits are updated periodically. Assure that you have ARI's current control limits by downloading the files at the time of use. http://www.arilabs.com/portal/downloads/ARI-CLs.zip

	ARI's Control Limits	
Sample Matrix:	Water	Soil / Sediment
Matrix Spike Recoveries	% Recovery	% Recovery
Ammonia	75 - 125	75 - 125
Bromide	75 125	75 - 125
Chloride	75 125	75 - 125
Cyanide	75 - 125	75 - 125
Ferrous Iron	75 - 125	75 - 125
Fluoride	75 - 125	75 - 125
Formaldehyde	75 - 125	75 - 125
Hexane Extractable Material	-- - --	78 - 114
Hexavalent Chromium	75 - 125	75 - 125
Nitrate/Nitrite	75 - 125	75 - 125
Oil and Grease	75 - 125	75 - 125
Phenol	75 - 125	75 - 125
Phosphorous	75 - 125	75 - 125
Sulfate	75 - 125	75 - 125
Sulfide	75 - 125	75 - 125
Total Kjeldahl Nitrogen	75 - 125	75 - 125
Total Organic Carbon	75 - 125	75 - 125
Duplicate RPDs		
Acidity	±20%	±20%
Alkalinity	±20%	±20%
BOD	±20%	±20%
Cation Exchange	±20%	±20%
COD	±20%	±20%
Conductivity	±20%	±20%
Salinity	±20%	±20%
Solids	±20%	±20%
Turbidity	±20%	±20%

General Chemistry Analysis

ARI Job ID: RA17, RA18, RA23, RA31

General Chemistry Analysis
Report and Summary QC Forms

ARI Job ID: RA17, RA18, RA23, RA31

SAMPLE RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/07/10
Date Received: 06/11/10

Client ID: SDS-PB-01
ARI ID: 10-14040 RA17A

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	64.40
Preserved Total Solids	06/11/10 061110#1	EPA 160.3	Percent	0.01	61.20
Sulfide	06/11/10 061110#1	EPA 376.2	mg/kg	3.09	39.2
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.679

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/07/10
Date Received: 06/11/10

Client ID: SDS-PB-02
ARI ID: 10-14041 RA17B

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	76.40
Preserved Total Solids	06/11/10 061110#1	EPA 160.3	Percent	0.01	73.20
Sulfide	06/11/10 061110#1	EPA 376.2	mg/kg	2.47	27.6
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.171

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/07/10
Date Received: 06/11/10

Client ID: SDS-PB-03
ARI ID: 10-14042 RA17C

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	46.90
Preserved Total Solids	06/11/10 061110#1	EPA 160.3	Percent	0.01	53.70
Sulfide	06/11/10 061110#1	EPA 376.2	mg/kg	35.5	324
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	1.20

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/07/10
Date Received: 06/11/10

Client ID: SDS-PB-04
ARI ID: 10-14043 RA17D

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	74.50
Preserved Total Solids	06/11/10 061110#1	EPA 160.3	Percent	0.01	72.90
Sulfide	06/11/10 061110#1	EPA 376.2	mg/kg	1.34	< 1.34 U
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.984

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/07/10
Date Received: 06/11/10

Client ID: SDS-PB-05
ARI ID: 10-14044 RA17E

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	63.40
Preserved Total Solids	06/11/10 061110#1	EPA 160.3	Percent	0.01	64.90
Sulfide	06/11/10 061110#1	EPA 376.2	mg/kg	2.86	48.6
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.190

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/07/10
Date Received: 06/11/10

Client ID: SDS-PB-05-D
ARI ID: 10-14045 RA17F

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	62.25
Preserved Total Solids	06/11/10 061110#1	EPA 160.3	Percent	0.01	62.70
Sulfide	06/11/10 061110#1	EPA 376.2	mg/kg	2.94	48.1
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.426

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/07/10
Date Received: 06/11/10

Client ID: SDS-PB-05-T
ARI ID: 10-14046 RA17G

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	62.50
Preserved Total Solids	06/11/10 061110#1	EPA 160.3	Percent	0.01	64.00
Sulfide	06/11/10 061110#1	EPA 376.2	mg/kg	2.82	32.2
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.377

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/07/10
Date Received: 06/11/10

Client ID: SDS-PB-06
ARI ID: 10-14047 RA17H

Analyte	Date	Method	Units	RL	Sample	
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	78.90	
Preserved Total Solids	06/11/10 061110#1	EPA 160.3	Percent	0.01	73.40	
Sulfide	06/11/10 061110#1	EPA 376.2	mg/kg	1.34	< 1.34	U
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.215	

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/07/10
Date Received: 06/11/10

Client ID: SDS-PB-07
ARI ID: 10-14048 RA17I

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	73.10
Preserved Total Solids	06/11/10 061110#1	EPA 160.3	Percent	0.01	71.90
Sulfide	06/11/10 061110#1	EPA 376.2	mg/kg	1.23	13.0
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.422

RL Analytical reporting limit
U Undetected at reported detection limit

MS/MSD RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/07/10
Date Received: 06/11/10

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: RA17A Client ID: SDS-PB-01						
Sulfide	06/11/10	mg/kg	39.2	290	245	102.4%
Total Organic Carbon	06/22/10	Percent	0.679	1.67	0.822	120.6%

REPLICATE RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/07/10
Date Received: 06/11/10

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: RA17A Client ID: SDS-PB-01					
Total Solids	06/14/10	Percent	64.40	64.60 63.80	0.6%
Preserved Total Solids	06/11/10	Percent	61.20	60.80	0.7%
Sulfide	06/11/10	mg/kg	39.2	41.6	5.9%
Total Organic Carbon	06/22/10	Percent	0.679	0.784 0.623	11.8%

LAB CONTROL RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide EPA 376.2	PREP	06/11/10	mg/kg	6.95	8.13	85.5%
Total Organic Carbon Plumb,1981	ICVL	06/22/10	Percent	0.090	0.100	90.0%

METHOD BLANK RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	06/14/10	Percent	< 0.01 U
Preserved Total Solids	06/11/10	Percent	< 0.01 U
Sulfide	06/11/10	mg/kg	< 1.00 U
Total Organic Carbon	06/22/10	Percent	< 0.020 U

STANDARD REFERENCE RESULTS-CONVENTIONALS
RA17-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST #8704	06/22/10	Percent	3.09	3.35	92.2%

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-PB-08
ARI ID: 10-14049 RA18A

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	55.70
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	62.00
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	15.1	231
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.467

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-PB-09
ARI ID: 10-14050 RA18B

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	78.10
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	76.50
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	1.16	1.60
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.253

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-PB-10
ARI ID: 10-14051 RA18C

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	52.00
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	60.20
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	82.7	1,150
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.941

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-01
ARI ID: 10-14052 RA18D

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	69.90
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	68.80
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	1.41	6.79
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.349

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-02
ARI ID: 10-14053 RA18E

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	72.00
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	71.50
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	1.29	5.61
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.305

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-03
ARI ID: 10-14054 RA18F

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	70.50
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	69.10
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	1.39	7.40
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.477

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-04
ARI ID: 10-14055 RA18G

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	60.70
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	65.30
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	28.8	380
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.654

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-05
ARI ID: 10-14056 RA18H

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	63.90
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	64.30
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	1.49	15.1
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.842

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-06
ARI ID: 10-14057 RA18I

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	69.30
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	71.10
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	1.27	1.61
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.525

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-07
ARI ID: 10-14058 RA18J

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	53.20
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	60.90
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	29.1	477
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.912

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-07-D
ARI ID: 10-14059 RA18K

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	53.50
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	60.50
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	31.8	516
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.807

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-07-T
ARI ID: 10-14060 RA18L

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	53.40
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	59.80
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	16.0	276
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	1.22

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-08
ARI ID: 10-14061 RA18M

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	58.10
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	64.50
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	28.9	272
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.741

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-09
ARI ID: 10-14062 RA18N

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	54.60
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	61.10
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	15.8	192
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	0.819

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Client ID: SDS-FB-10
ARI ID: 10-14063 RA18O

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	50.30
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	54.40
Sulfide	06/12/10 061210#1	EPA 376.2	mg/kg	88.2	713
Total Organic Carbon	06/22/10 062210#1	Plumb,1981	Percent	0.020	1.35

RL Analytical reporting limit
U Undetected at reported detection limit

MS/MSD RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: RA18A Client ID: SDS-PB-08						
Sulfide	06/12/10	mg/kg	231	512	255	110.2%
Total Organic Carbon	06/22/10	Percent	0.467	1.43	0.786	122.5%

REPLICATE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: 06/08/10
Date Received: 06/11/10

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: RA18A Client ID: SDS-PB-08					
Total Solids	06/15/10	Percent	55.70	55.30 55.70	0.4%
Preserved Total Solids	06/16/10	Percent	62.00	62.70	1.1%
Sulfide	06/12/10	mg/kg	231	269 258	7.7%
Total Organic Carbon	06/22/10	Percent	0.467	0.475 0.447	3.1%

LAB CONTROL RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide EPA 376.2	PREP	06/12/10	mg/kg	8.13	8.13	100.0%
Total Organic Carbon Plumb,1981	ICVL	06/22/10	Percent	0.090	0.100	90.0%

METHOD BLANK RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	06/15/10	Percent	< 0.01 U
Preserved Total Solids	06/16/10	Percent	< 0.01 U
Sulfide	06/12/10	mg/kg	< 1.00 U
Total Organic Carbon	06/22/10	Percent	< 0.020 U

STANDARD REFERENCE RESULTS-CONVENTIONALS
RA18-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/24/10

Project: Fidalgo/Padilla Bay
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST #8704	06/22/10	Percent	3.09	3.35	92.2%

SAMPLE RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/10/10
Date Received: 06/11/10

Client ID: SDS-CPD-05
ARI ID: 10-14079 RA23A

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	56.40
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	59.50
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	32.8	461
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	0.554

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/10/10
Date Received: 06/11/10

Client ID: SDS-CPD-06
ARI ID: 10-14080 RA23B

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	50.80
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	59.60
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	1.59	27.4
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	0.573

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/10/10
Date Received: 06/11/10

Client ID: SDS-CPD-09
ARI ID: 10-14081 RA23C

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	47.80
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	57.80
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	1.67	24.6
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	0.988

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/10/10
Date Received: 06/11/10

Client ID: SDS-CPD-11
ARI ID: 10-14082 RA23D

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	53.80
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	57.40
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	1.66	28.1
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	0.485

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/10/10
Date Received: 06/11/10

Client ID: SDS-CPD-12
ARI ID: 10-14083 RA23E

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	55.60
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	63.00
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	1.56	27.5
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	0.863

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/10/10
Date Received: 06/11/10

Client ID: SDS-CPD-14
ARI ID: 10-14084 RA23F

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	52.30
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	59.70
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	1.60	30.7
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	1.15

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/10/10
Date Received: 06/11/10

Client ID: SDS-CPD-15
ARI ID: 10-14085 RA23G

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/14/10 061410#1	EPA 160.3	Percent	0.01	53.20
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	59.20
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	33.1	506
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	1.10

RL Analytical reporting limit
U Undetected at reported detection limit

MS/MSD RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/10/10
Date Received: 06/11/10

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: RA23A Client ID: SDS-CPD-05						
Sulfide	06/15/10	mg/kg	461	807	254	136.2%

REPLICATE RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/10/10
Date Received: 06/11/10

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: RA23A Client ID: SDS-CPD-05					
Sulfide	06/15/10	mg/kg	461	478	3.6%

LAB CONTROL RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide EPA 376.2	PREP	06/15/10	mg/kg	7.82	7.59	103.0%
Total Organic Carbon Plumb,1981	ICVL	06/17/10	Percent	0.094	0.100	94.0%

METHOD BLANK RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	06/14/10	Percent	< 0.01 U
Preserved Total Solids	06/16/10	Percent	< 0.01 U
	06/16/10		< 0.01 U
Sulfide	06/15/10	mg/kg	< 1.00 U
Total Organic Carbon	06/17/10	Percent	< 0.020 U

STANDARD REFERENCE RESULTS-CONVENTIONALS
RA23-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST #8704	06/17/10	Percent	3.10	3.35	92.5%

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-01
ARI ID: 10-14127 RA31A

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	55.50
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	61.60
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	33.0	508
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	0.937

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-02
ARI ID: 10-14128 RA31B

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	57.50
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	60.60
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	31.3	318
Total Organic Carbon	06/16/10 061610#1	Plumb,1981	Percent	0.020	0.752

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-03
ARI ID: 10-14129 RA31C

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	52.00
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	54.10
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	35.0	562
Total Organic Carbon	06/16/10 061610#1	Plumb,1981	Percent	0.020	1.38

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-04
ARI ID: 10-14130 RA31D

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	52.00
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	60.50
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	34.2	326
Total Organic Carbon	06/16/10 061610#1	Plumb,1981	Percent	0.020	0.848

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-07
ARI ID: 10-14131 RA31E

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	48.20
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	53.10
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	37.7	606
Total Organic Carbon	06/16/10 061610#1	Plumb,1981	Percent	0.020	1.24

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-08
ARI ID: 10-14132 RA31F

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	53.60
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	60.00
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	33.7	382
Total Organic Carbon	06/16/10 061610#1	Plumb,1981	Percent	0.020	1.12

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-08-D
ARI ID: 10-14133 RA31G

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	54.70
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	59.70
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	32.1	317
Total Organic Carbon	06/16/10 061610#1	Plumb,1981	Percent	0.020	1.27

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-08-T
ARI ID: 10-14134 RA31H

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	55.40
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	61.10
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	36.9	335
Total Organic Carbon	06/16/10 061610#1	Plumb,1981	Percent	0.020	0.447

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-10
ARI ID: 10-14135 RA31I

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	45.80
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	49.90
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	40.2	407
Total Organic Carbon	06/16/10 061610#1	Plumb,1981	Percent	0.020	1.91

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-13
ARI ID: 10-14136 RA31J

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	49.20
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	55.50
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	34.8	391
Total Organic Carbon	06/16/10 061610#1	Plumb,1981	Percent	0.020	1.60

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-16
ARI ID: 10-14137 RA31K

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	41.20
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	48.00
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	108	845
Total Organic Carbon	06/16/10 061610#1	Plumb,1981	Percent	0.020	1.66

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-17
ARI ID: 10-14138 RA31L

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	47.20
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	52.20
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	36.9	515
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	0.893

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-18
ARI ID: 10-14139 RA31M

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	47.80
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	54.80
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	38.7	475
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	1.36

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-19
ARI ID: 10-14140 RA31N

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	45.60
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	52.40
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	93.2	861
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	1.29

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-20
ARI ID: 10-14141 RA31O

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	51.30
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	59.80
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	32.4	529
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	0.391

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Client ID: SDS-CPD-21
ARI ID: 10-14142 RA31P

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/15/10 061510#1	EPA 160.3	Percent	0.01	45.50
Preserved Total Solids	06/16/10 061610#1	EPA 160.3	Percent	0.01	51.10
Sulfide	06/14/10 061410#1	EPA 376.2	mg/kg	38.4	721
Total Organic Carbon	06/17/10 061710#1	Plumb,1981	Percent	0.020	1.24

RL Analytical reporting limit
U Undetected at reported detection limit

MS/MSD RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: RA31A Client ID: SDS-CPD-01						
Sulfide	06/14/10	mg/kg	508	606	246	39.8%
Total Organic Carbon	06/17/10	Percent	0.937	2.27	1.15	115.6%

REPLICATE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: 06/09/10
Date Received: 06/11/10

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: RA31A Client ID: SDS-CPD-01					
Total Solids	06/15/10	Percent	55.50	55.60 55.70	0.2%
Preserved Total Solids	06/16/10	Percent	61.60	61.60	0.0%
Sulfide	06/14/10	mg/kg	508	430	16.6%
Total Organic Carbon	06/17/10	Percent	0.937	0.924 0.847	5.4%

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide EPA 376.2	PREP	06/14/10	mg/kg	6.55	7.96	82.3%
Total Organic Carbon	ICVL	06/16/10	Percent	0.091	0.100	91.0%
Plumb,1981	ICVL	06/17/10		0.094	0.100	94.0%

METHOD BLANK RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	06/15/10	Percent	< 0.01 U
Preserved Total Solids	06/16/10	Percent	< 0.01 U
Sulfide	06/14/10	mg/kg	< 1.00 U
Total Organic Carbon	06/16/10	Percent	< 0.020 U
	06/17/10		< 0.020 U

STANDARD REFERENCE RESULTS-CONVENTIONALS
RA31-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 06/23/10

Project: Fidalgo Bay/ Custom Plywood
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon	06/16/10	Percent	3.04	3.35	90.7%
NIST #8704	06/17/10		3.10	3.35	92.5%

Geotechnical Analysis

ARI Job ID: RA17, RA18, RA23, RA31

Geotechnical Analysis
Report and Summary QC Forms

ARI Job ID: RA17, RA18, RA23, RA31

Science Applications, Intl.

Fidalgo Bay/Custom Plywood Dioxin

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
SDS-CPD-14	100.0	100.0	99.5	99.3	99.0	98.4	97.3	91.7	62.7	37.8	24.9	18.8	14.8	10.5
	100.0	100.0	99.9	99.8	99.4	98.8	97.8	92.7	59.6	36.0	24.4	18.3	14.6	10.2
	100.0	100.0	99.5	99.3	99.0	98.4	97.3	92.2	57.1	34.2	22.9	17.1	13.4	9.5
SDS-PB-01	100.0	99.9	99.8	99.3	96.4	77.1	31.1	14.3	8.6	6.4	5.2	4.3	3.6	2.8
SDS-PB-02	100.0	100.0	99.7	95.5	63.4	10.9	1.9	1.8	NA	NA	NA	NA	NA	NA
SDS-PB-03	100.0	100.0	99.9	99.1	97.9	94.8	84.7	68.0	49.0	33.9	25.6	20.0	15.5	11.1
SDS-PB-04	100.0	99.7	98.1	91.9	63.8	7.8	2.1	2.0	NA	NA	NA	NA	NA	NA
SDS-PB-05	100.0	100.0	100.0	99.8	99.3	97.3	74.3	25.7	16.7	12.4	9.9	8.0	6.4	4.3
SDS-PB-05-D	100.0	100.0	100.0	99.8	99.2	97.0	73.9	25.8	16.6	12.6	10.0	8.2	6.4	4.6
SDS-PB-05-T	100.0	100.0	100.0	99.8	99.2	97.0	74.9	26.5	17.3	12.9	10.5	8.4	6.8	4.8
SDS-PB-06	100.0	99.5	98.4	92.8	63.1	6.8	1.5	1.4	NA	NA	NA	NA	NA	NA
SDS-PB-07	100.0	99.9	99.8	95.2	80.9	52.9	14.7	7.5	5.8	4.5	3.7	3.0	2.4	1.7

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.

Science Applications, Intl.

Fidalgo Bay/Custom Plywood Dioxin

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)
SDS-CPD-14	0.5	0.2	0.3	0.6	1.1	5.7	29.0	24.9	12.9	6.1	4.1	4.3	10.5	91.7
	0.1	0.1	0.3	0.6	1.0	5.1	33.1	23.6	11.6	6.1	3.7	4.5	10.2	92.7
	0.5	0.2	0.3	0.6	1.1	5.1	35.1	22.8	11.3	5.8	3.8	3.8	9.5	92.2
SDS-PB-01	0.2	0.4	2.9	19.2	46.0	16.8	5.7	2.2	1.3	0.8	0.7	0.8	2.8	14.3
SDS-PB-02	0.3	4.2	32.1	52.5	9.0	0.2	NA	NA	NA	NA	NA	NA	NA	1.8
SDS-PB-03	0.1	0.9	1.1	3.1	10.1	16.8	18.9	15.1	8.3	5.6	4.5	4.5	11.1	68.0
SDS-PB-04	1.9	6.1	28.1	56.0	5.7	0.1	NA	NA	NA	NA	NA	NA	NA	2.0
SDS-PB-05	0.0	0.2	0.5	1.9	23.1	48.6	9.0	4.3	2.6	1.9	1.6	2.1	4.3	25.7
SDS-PB-05-D	0.0	0.2	0.6	2.2	23.0	48.2	9.2	4.0	2.6	1.8	1.7	1.9	4.6	25.8
SDS-PB-05-T	0.0	0.2	0.6	2.2	22.0	48.4	9.2	4.4	2.5	2.0	1.6	2.0	4.8	26.5
SDS-PB-06	1.6	5.6	29.7	56.3	5.3	0.1	NA	NA	NA	NA	NA	NA	NA	1.4
SDS-PB-07	0.2	4.7	14.3	28.0	38.3	7.2	1.7	1.2	0.9	0.7	0.6	0.7	1.7	7.5

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:	Science Applications, Intl.		
		Client Project:	Fidalgo Bay/Custom Plywood Dioxin
ARI Trip. Sample ID:	RA23F	Batch No.:	RA17-1
Client Trip. Sample ID:	SDS-CPD-14	Page:	1 of 1

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
SDS-CPD-14	100.0	100.0	99.5	99.3	99.0	98.4	97.3	91.7	62.7	37.8	24.9	18.8	14.8	10.5
	100.0	100.0	99.9	99.8	99.4	98.8	97.8	92.7	59.6	36.0	24.4	18.3	14.6	10.2
	100.0	100.0	99.5	99.3	99.0	98.4	97.3	92.2	57.1	34.2	22.9	17.1	13.4	9.5
AVE	NA	100.00	99.62	99.44	99.12	98.54	97.49	92.19	59.78	35.99	24.07	18.09	14.25	10.08
STDEV	NA	0.00	0.22	0.28	0.27	0.26	0.29	0.53	2.80	1.77	1.05	0.88	0.78	0.48
%RSD	NA	0.00	0.22	0.28	0.27	0.26	0.30	0.58	4.68	4.91	4.37	4.86	5.46	4.78

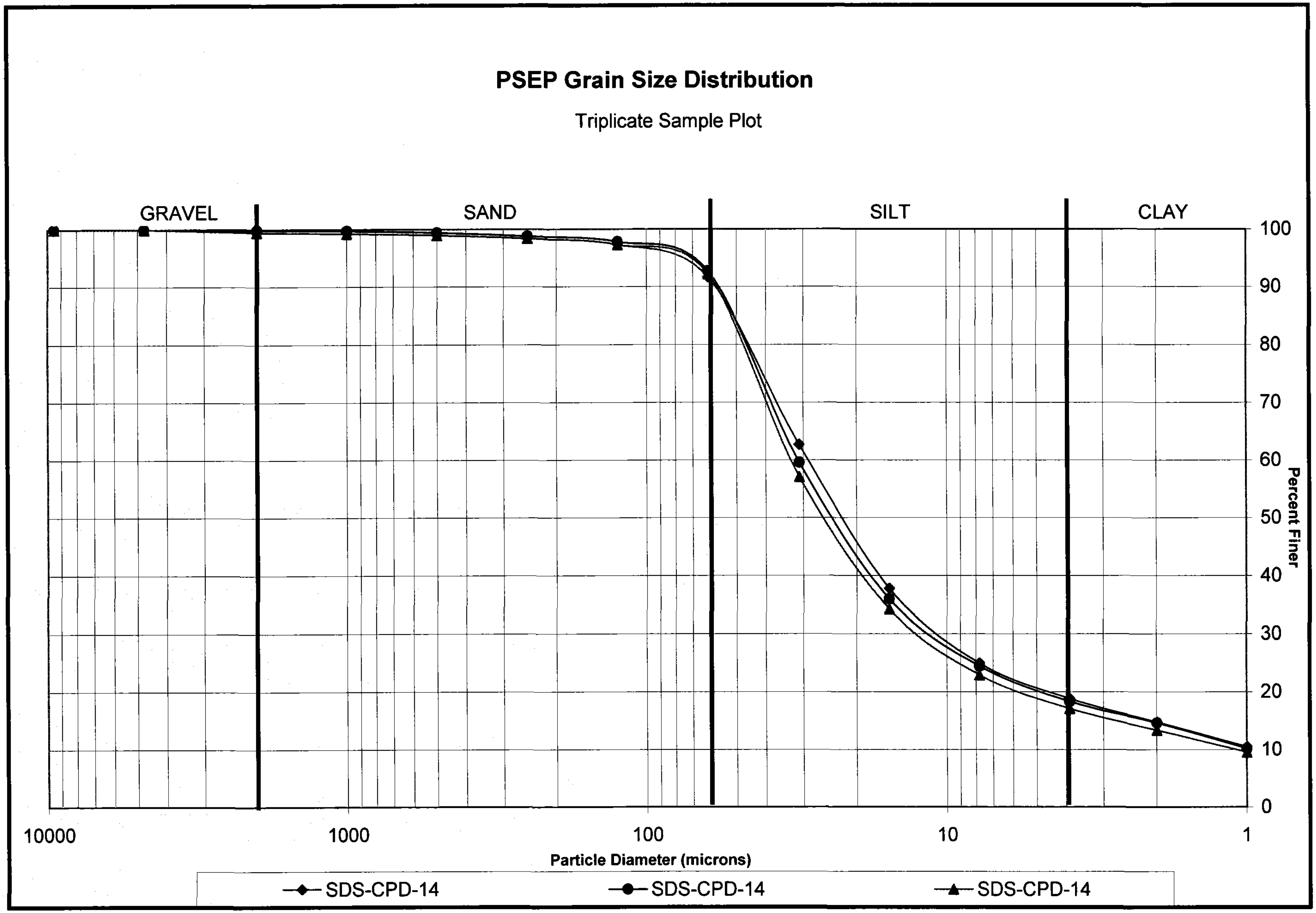
The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
SDS-CPD-14	6/10/2010	6/21/2010	6/22/2010	103.9		13.1
	6/10/2010	6/21/2010	6/22/2010	101.0		11.8
	6/10/2010	6/21/2010	6/22/2010	95.3		12.9
SDS-PB-01	6/7/2010	6/21/2010	6/22/2010	100.7		10.5
SDS-PB-02	6/7/2010	6/21/2010	6/22/2010	100.8	SS	2.1
SDS-PB-03	6/7/2010	6/21/2010	6/22/2010	100.6		13.5
SDS-PB-04	6/7/2010	6/21/2010	6/22/2010	101.0	SS	2.2
SDS-PB-05	6/7/2010	6/21/2010	6/22/2010	100.4		15.8
SDS-PB-05-D	6/7/2010	6/21/2010	6/22/2010	99.3		6.6
SDS-PB-05-T	6/7/2010	6/21/2010	6/22/2010	100.3		7.1
SDS-PB-06	6/7/2010	6/21/2010	6/22/2010	100.2	SS	1.2
SDS-PB-07	6/7/2010	6/21/2010	6/22/2010	100.1		8.2

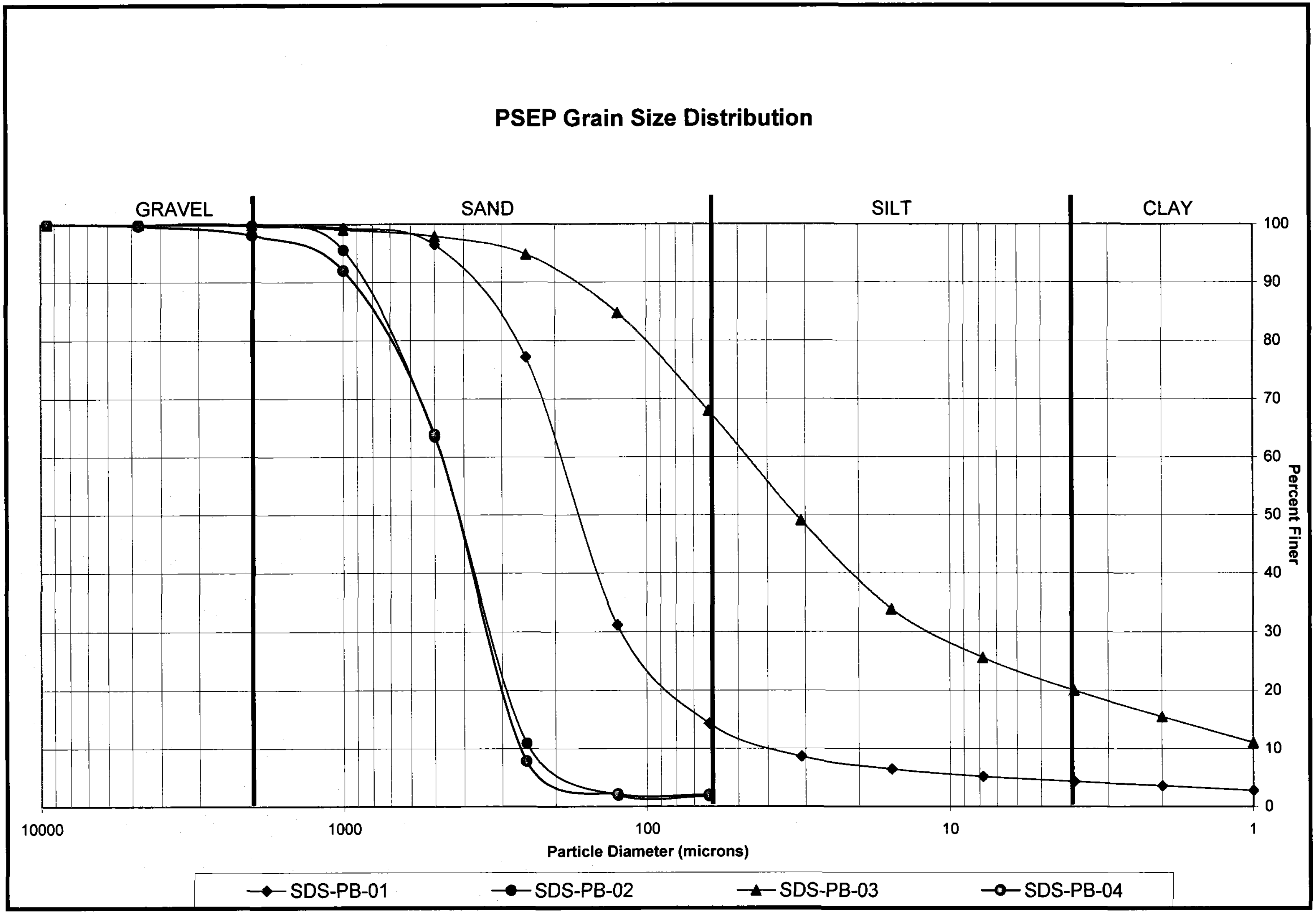
* ARI Internal QA limits = 95-105%

Notes to the Testing:

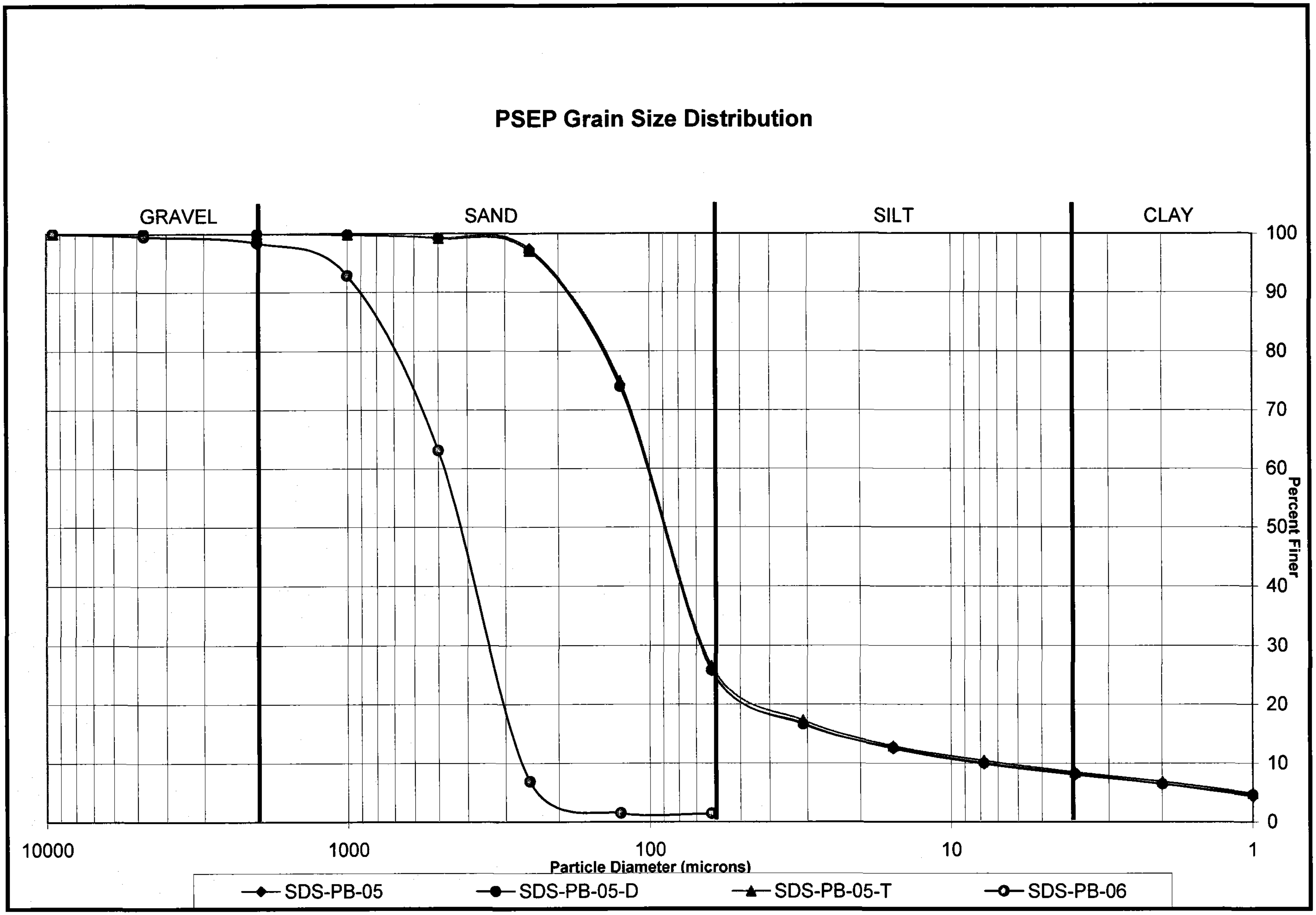
1. Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.


PSEP Grain Size Distribution
Triplicate Sample Plot
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)
SDS-CPD-14
SDS-CPD-14
SDS-CPD-14

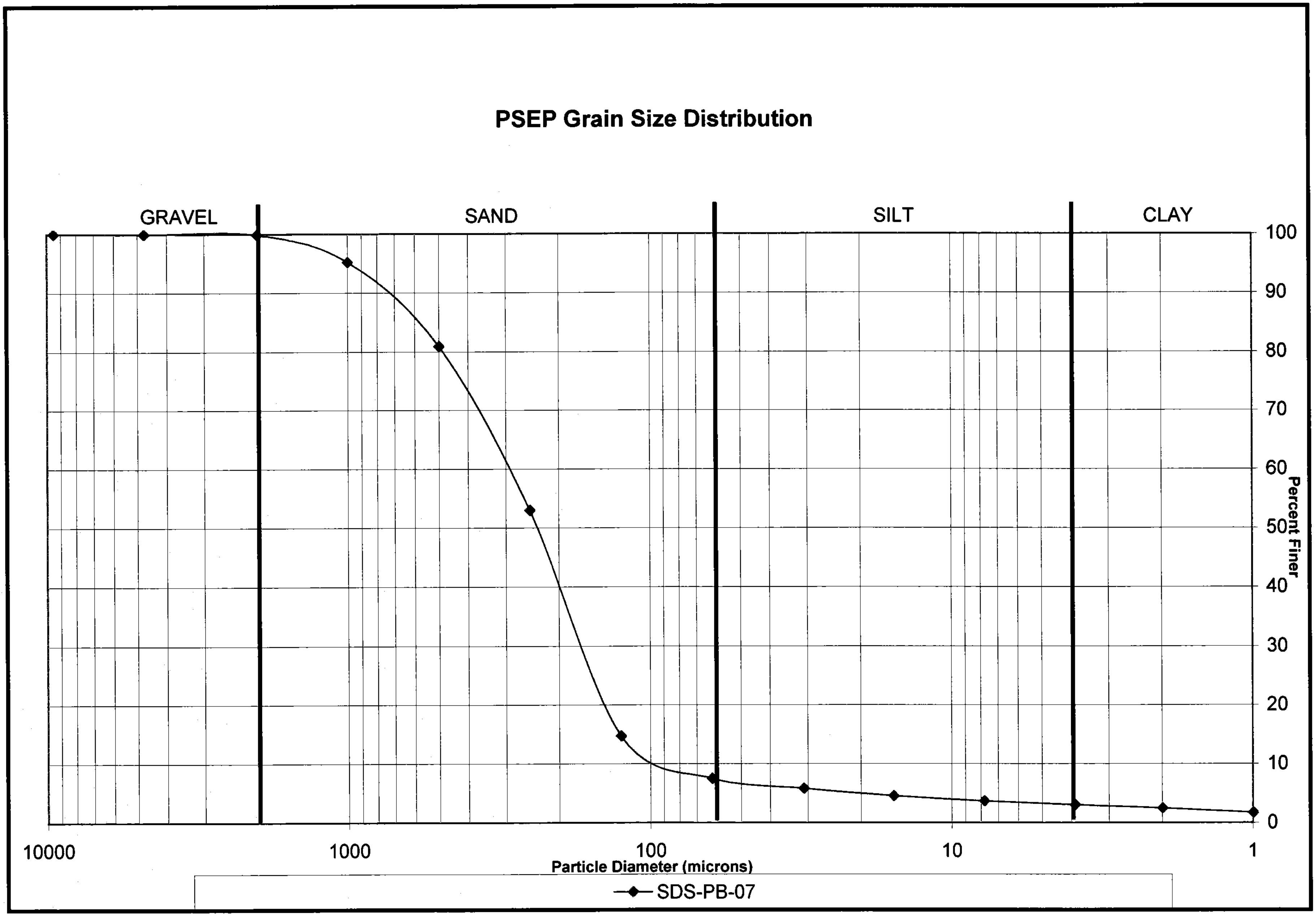
RA17:00096


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)
SDS-PB-01
SDS-PB-02
SDS-PB-03
SDS-PB-04

RA17:00097


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)
SDS-PB-05
SDS-PB-05-D
SDS-PB-05-T
SDS-PB-06

RA17:00098


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)
SDS-PB-07

RA17:0099S

Science Applications, Intl.

Fidalgo/Padilla Bay

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
SDS-PB-10	100.0	100.0	100.0	99.3	98.0	96.2	86.8	57.1	36.8	25.0	18.3	13.9	10.5	7.1
	100.0	100.0	100.0	99.3	98.2	96.6	86.4	56.7	37.3	25.1	18.5	13.8	10.6	7.2
	100.0	100.0	100.0	99.4	98.3	96.6	85.7	55.3	36.7	24.5	18.2	13.8	10.4	7.1
SDS-PB-08	100.0	100.0	99.9	99.2	98.1	96.1	64.9	26.8	15.2	10.7	8.3	6.6	5.3	3.8
SDS-PB-09	100.0	99.5	92.3	74.6	42.2	9.8	4.9	3.9	NA	NA	NA	NA	NA	NA
SDS-FB-01	100.0	100.0	99.8	98.8	96.9	89.3	19.4	7.2	5.7	4.8	4.0	3.4	2.9	2.2
SDS-FB-02	100.0	100.0	100.0	99.8	99.0	86.9	18.8	6.0	4.9	4.1	3.5	2.9	2.4	1.7
SDS-FB-03	100.0	99.2	97.9	95.8	92.3	73.0	18.6	9.8	8.5	6.8	5.6	4.5	3.5	2.3
SDS-FB-04	100.0	100.0	99.9	99.6	98.9	97.6	83.1	42.9	27.7	19.5	14.3	11.4	9.0	6.4
SDS-FB-05	100.0	100.0	100.0	99.8	99.3	93.0	31.2	17.2	13.3	10.4	8.3	6.7	5.3	3.5
SDS-FB-06	100.0	98.9	96.3	94.6	92.6	74.9	19.5	10.8	8.4	6.7	5.5	4.5	3.6	2.4
SDS-FB-07	100.0	99.4	99.3	98.9	98.3	97.3	89.3	53.2	34.2	22.9	16.2	12.4	9.7	6.8
SDS-FB-07-D	100.0	100.0	100.0	99.6	98.9	97.8	88.9	52.0	34.9	22.8	16.4	12.4	9.5	6.7
SDS-FB-07-T	100.0	99.6	99.6	99.2	98.6	97.8	90.3	53.8	35.3	23.1	16.5	12.5	9.6	6.7
SDS-FB-08	100.0	100.0	99.8	99.4	98.6	97.1	74.9	40.9	27.3	20.1	15.6	12.1	9.5	6.5
SDS-FB-09	100.0	100.0	99.9	99.6	98.8	97.7	93.4	62.6	36.3	21.8	15.4	11.6	9.3	6.5
SDS-FB-10	100.0	98.5	98.5	98.2	97.8	96.9	94.6	85.5	61.9	39.7	27.0	20.4	15.7	11.1

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.

Science Applications, Intl.

Fidalgo/Padilla Bay

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)
SDS-PB-10	0.0	0.7	1.3	1.8	9.5	29.6	20.3	11.8	6.7	4.5	3.4	3.3	7.1	57.1
	0.0	0.7	1.1	1.6	10.2	29.8	19.4	12.2	6.6	4.6	3.3	3.3	7.2	56.7
	0.0	0.6	1.1	1.6	10.9	30.4	18.6	12.2	6.3	4.4	3.4	3.3	7.1	55.3
SDS-PB-08	0.1	0.7	1.0	2.0	31.2	38.1	11.6	4.5	2.4	1.7	1.4	1.5	3.8	26.8
SDS-PB-09	7.7	17.8	32.3	32.5	4.9	1.0	NA	NA	NA	NA	NA	NA	NA	3.9
SDS-FB-01	0.2	0.9	1.9	7.6	69.9	12.2	1.5	0.9	0.7	0.6	0.5	0.7	2.2	7.2
SDS-FB-02	0.0	0.1	0.8	12.1	68.1	12.8	1.2	0.7	0.7	0.6	0.5	0.6	1.7	6.0
SDS-FB-03	2.1	2.0	3.5	19.3	54.4	8.8	1.3	1.8	1.2	1.1	1.0	1.1	2.3	9.8
SDS-FB-04	0.1	0.4	0.7	1.2	14.5	40.2	15.3	8.2	5.1	2.9	2.4	2.7	6.4	42.9
SDS-FB-05	0.0	0.2	0.5	6.3	61.7	14.0	3.9	3.0	2.1	1.5	1.4	1.8	3.5	17.2
SDS-FB-06	3.7	1.7	2.0	17.7	55.4	8.7	2.4	1.6	1.2	1.0	0.9	1.2	2.4	10.8
SDS-FB-07	0.7	0.5	0.6	1.0	8.0	36.1	19.0	11.3	6.7	3.7	2.7	2.9	6.8	53.2
SDS-FB-07-D	0.0	0.4	0.6	1.1	9.0	36.9	17.1	12.1	6.4	4.0	2.9	2.8	6.7	52.0
SDS-FB-07-T	0.4	0.4	0.6	0.8	7.5	36.5	18.5	12.2	6.6	4.0	3.0	2.9	6.7	53.8
SDS-FB-08	0.2	0.4	0.8	1.5	22.2	34.0	13.7	7.2	4.6	3.5	2.6	3.0	6.5	40.9
SDS-FB-09	0.1	0.3	0.8	1.1	4.3	30.8	26.3	14.5	6.3	3.8	2.3	2.8	6.5	62.6
SDS-FB-10	1.5	0.3	0.4	0.9	2.2	9.1	23.6	22.2	12.7	6.6	4.6	4.6	11.1	85.5

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:	Science Applications, Intl.	Client Project:	Fidalgo/Padilla Bay
ARI Trip. Sample ID:	RA18C	Batch No.:	RA18-1
Client Trip. Sample ID:	SDS-PB-10	Page:	1 of 1

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
SDS-PB-10	100.0	100.0	100.0	99.3	98.0	96.2	86.8	57.1	36.8	25.0	18.3	13.9	10.5	7.1
	100.0	100.0	100.0	99.3	98.2	96.6	86.4	56.7	37.3	25.1	18.5	13.8	10.6	7.2
	100.0	100.0	100.0	99.4	98.3	96.6	85.7	55.3	36.7	24.5	18.2	13.8	10.4	7.1
AVE	NA	100.00	99.98	99.32	98.15	96.50	86.30	56.37	36.92	24.87	18.34	13.83	10.48	7.17
STDEV	NA	0.00	0.03	0.04	0.15	0.24	0.53	0.95	0.33	0.30	0.12	0.04	0.07	0.05
%RSD	NA	0.00	0.03	0.04	0.15	0.25	0.62	1.68	0.89	1.22	0.66	0.26	0.63	0.68

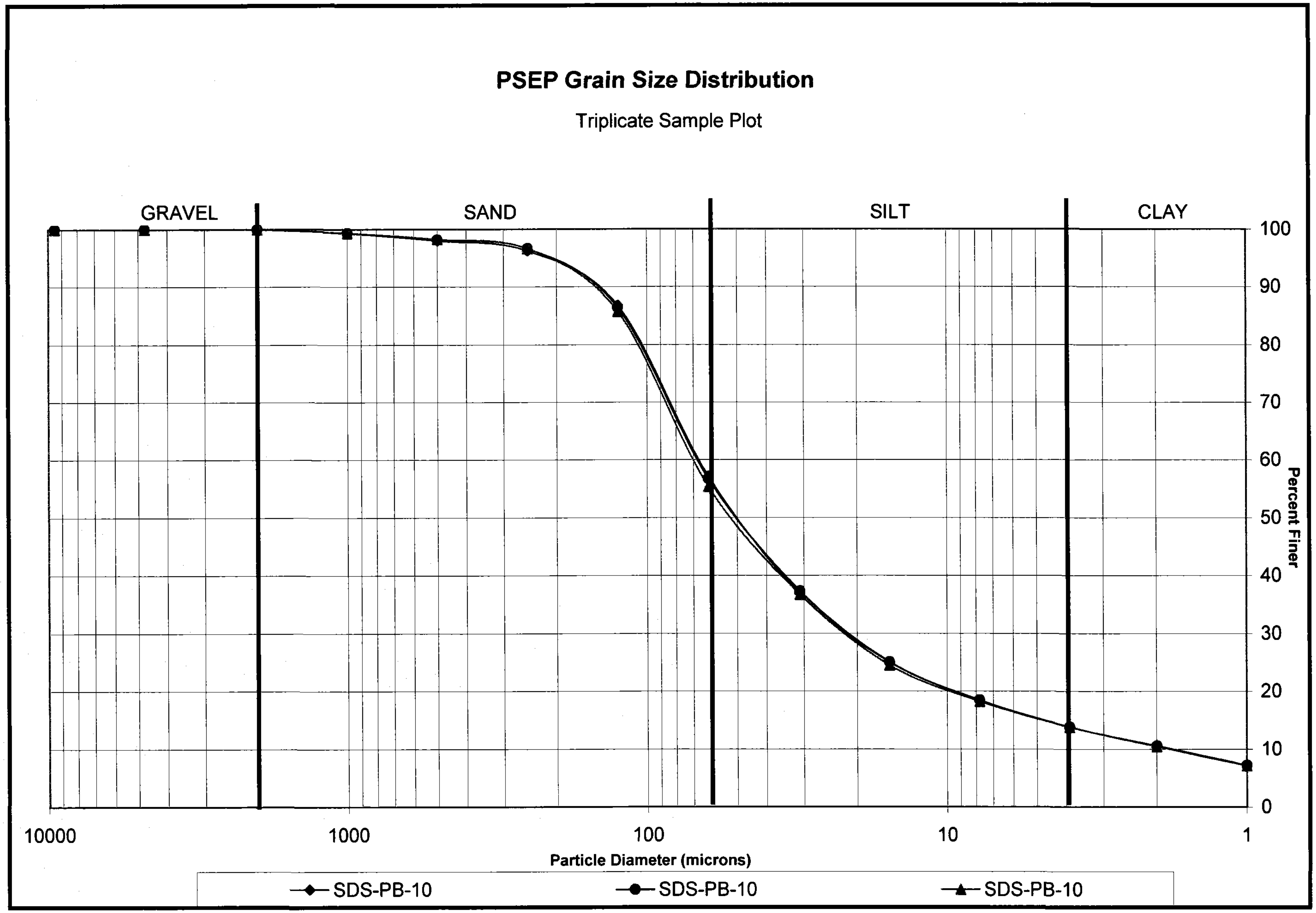
The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
SDS-PB-10	6/8/2010	6/17/2010	6/18/2010	98.7		14.9
	6/8/2010	6/17/2010	6/18/2010	101.6		14.4
	6/8/2010	6/17/2010	6/18/2010	99.9		13.9
SDS-PB-08	6/8/2010	6/17/2010	6/18/2010	98.4		8.1
SDS-PB-09	6/8/2010	6/17/2010	6/18/2010	101.8	SS	3.8
SDS-FB-01	6/8/2010	6/17/2010	6/18/2010	99.6		5.2
SDS-FB-02	6/8/2010	6/17/2010	6/18/2010	100.0		6.7
SDS-FB-03	6/8/2010	6/17/2010	6/18/2010	99.1		7.1
SDS-FB-04	6/8/2010	6/17/2010	6/18/2010	100.1		14.7
SDS-FB-05	6/8/2010	6/17/2010	6/18/2010	99.4		8.6
SDS-FB-06	6/8/2010	6/17/2010	6/18/2010	99.6		7.5
SDS-FB-07	6/8/2010	6/17/2010	6/18/2010	99.5		16.0
SDS-FB-07-D	6/8/2010	6/17/2010	6/18/2010	99.5		17.4
SDS-FB-07-T	6/8/2010	6/17/2010	6/18/2010	98.3		17.0
SDS-FB-08	6/8/2010	6/17/2010	6/18/2010	100.3		13.2
SDS-FB-09	6/8/2010	6/17/2010	6/18/2010	99.7		20.5
SDS-FB-10	6/8/2010	6/17/2010	6/18/2010	99.9		23.3

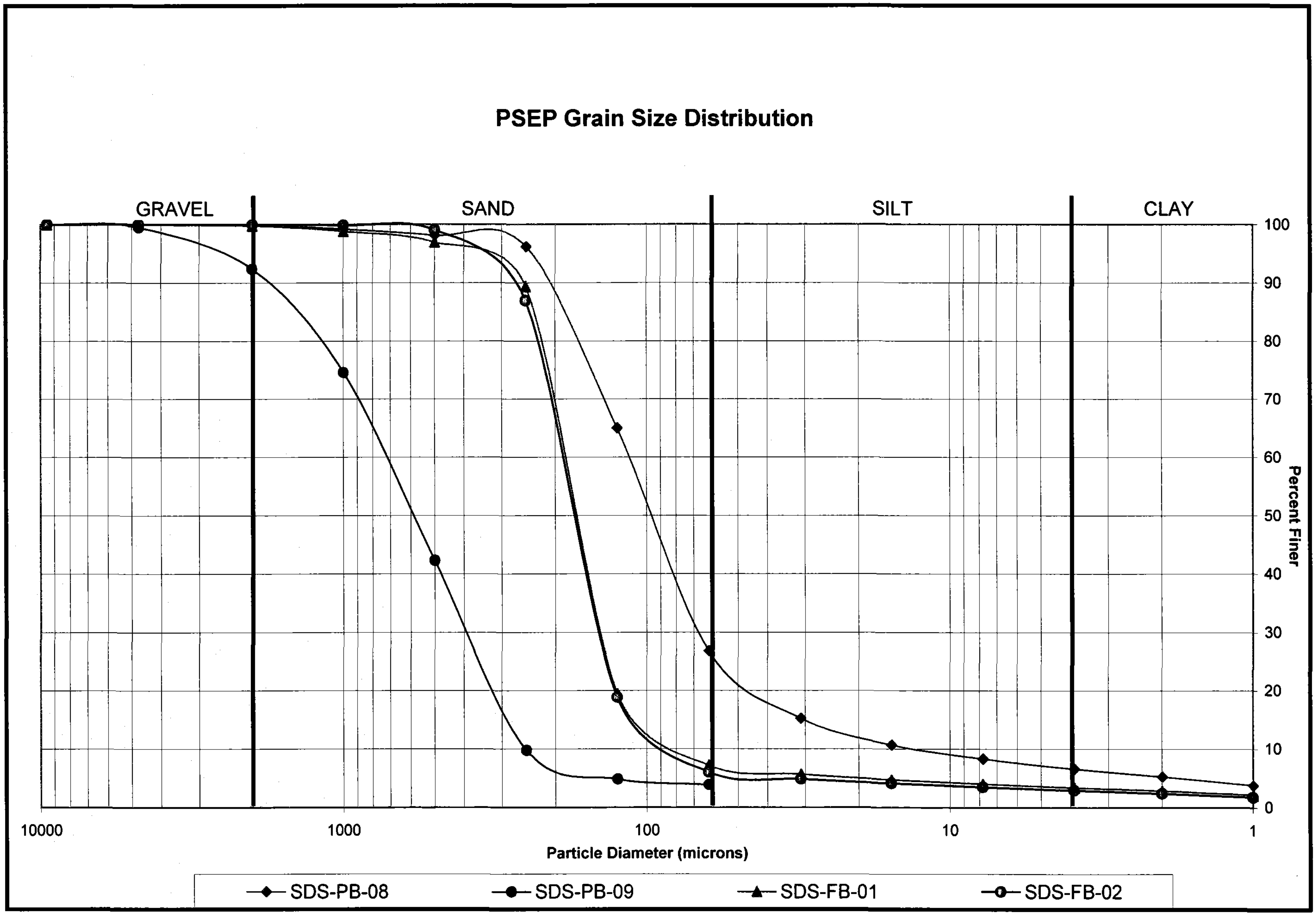
* ARI Internal QA limits = 95-105%

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.

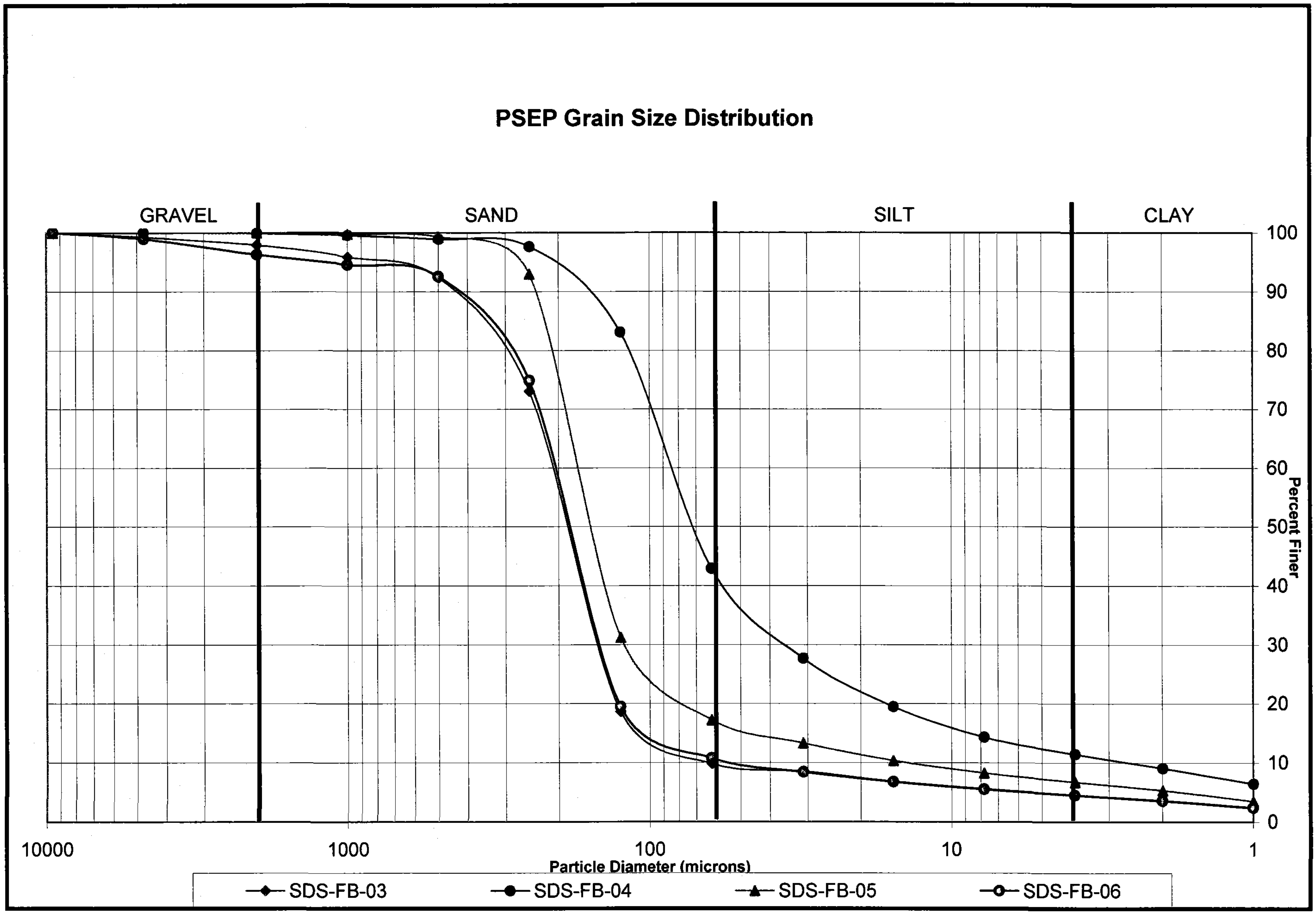

PSEP Grain Size Distribution
Triplicate Sample Plot
GRAVEL
SAND
SILT
CLAY
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
10000
1000
100
10
1
Particle Diameter (microns)
SDS-PB-10
SDS-PB-10
SDS-PB-10

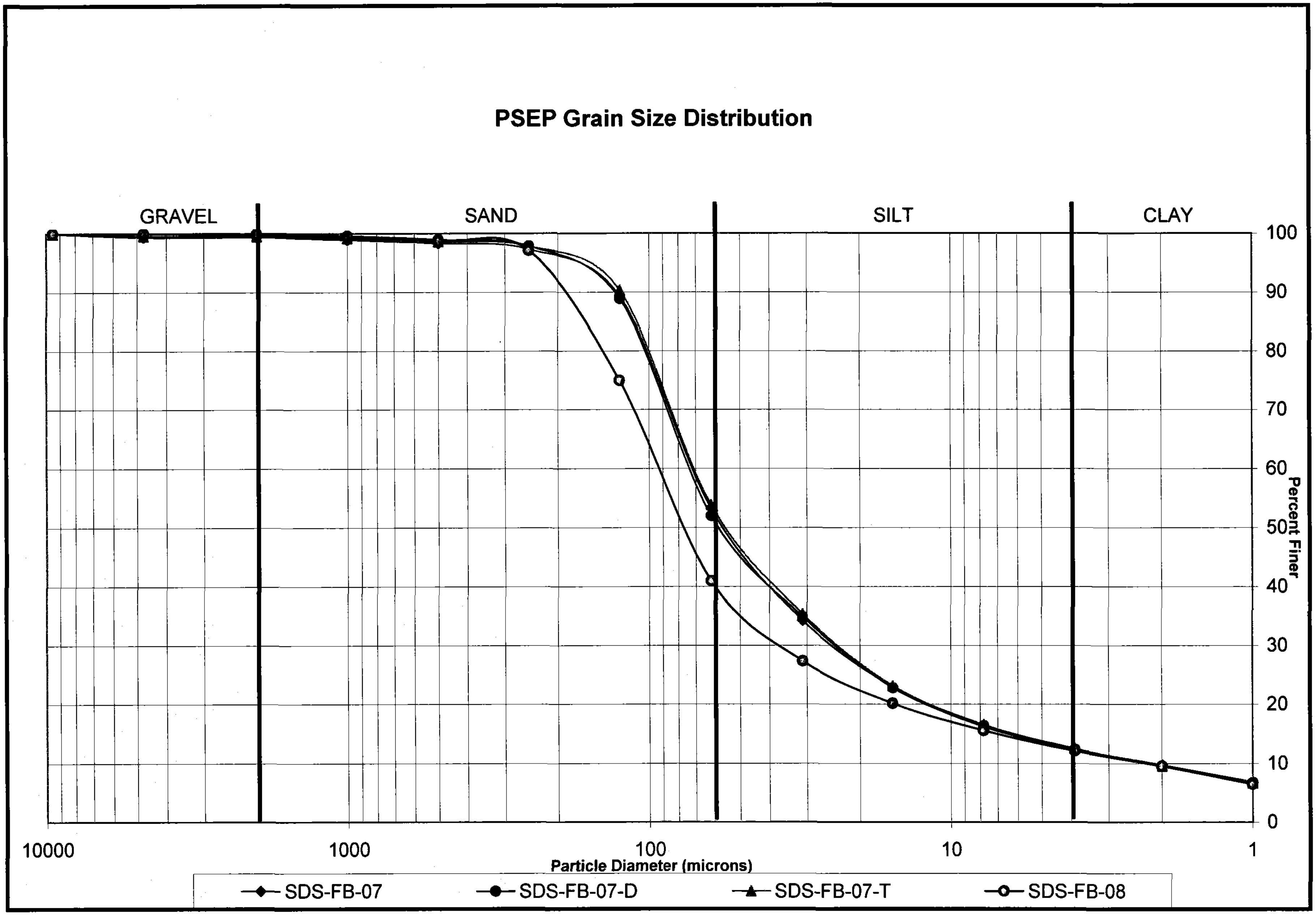
RA17:00103



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)
SDS-PB-08
SDS-PB-09
SDS-FB-01
SDS-FB-02

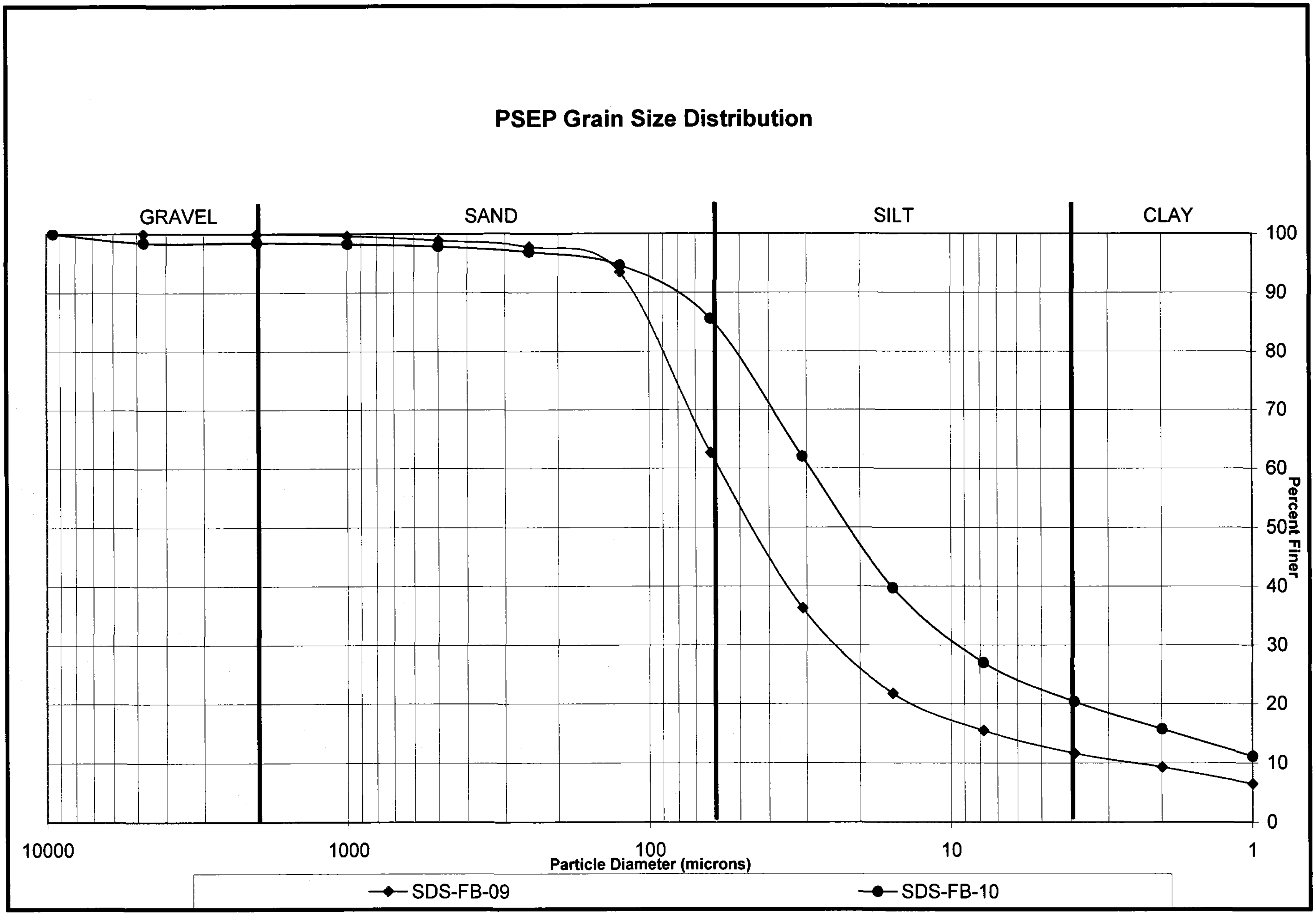
RA17:00104


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)
SDS-FB-03
SDS-FB-04
SDS-FB-05
SDS-FB-06



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)
SDS-FB-07
SDS-FB-07-D
SDS-FB-07-T
SDS-FB-08

RA17:00106


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)
SDS-FB-09
SDS-FB-10

RA17:00107

Science Applications, Intl.

Fidalgo Bay/Custom Plywood Dioxin

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
SDS-CPD-14	100.0	100.0	99.5	99.3	99.0	98.4	97.3	91.7	62.7	37.8	24.9	18.8	14.8	10.5
	100.0	100.0	99.9	99.8	99.4	98.8	97.8	92.7	59.6	36.0	24.4	18.3	14.6	10.2
	100.0	100.0	99.5	99.3	99.0	98.4	97.3	92.2	57.1	34.2	22.9	17.1	13.4	9.5
SDS-CPD-05	100.0	98.9	98.8	98.7	98.4	97.9	96.4	81.3	46.1	28.2	19.2	14.8	11.7	8.4
SDS-CPD-06	100.0	100.0	99.9	99.7	99.1	98.5	96.5	78.8	47.4	29.6	19.9	15.3	12.1	8.6
SDS-CPD-09	100.0	100.0	99.6	99.2	97.2	96.2	94.5	78.9	46.7	29.5	19.8	15.6	12.2	8.6
SDS-CPD-11	100.0	98.7	98.3	98.0	97.4	96.7	95.3	81.5	52.0	31.8	21.1	16.2	12.6	8.9
SDS-CPD-12	100.0	97.0	96.6	96.3	95.4	94.4	92.0	73.9	42.8	26.0	17.1	13.4	10.8	7.8
SDS-CPD-15	100.0	100.0	99.7	99.1	98.2	97.1	95.0	81.3	48.7	29.7	19.6	15.1	12.1	8.8

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.

Science Applications, Intl.

Fidalgo Bay/Custom Plywood Dioxin

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)
SDS-CPD-14	0.5	0.2	0.3	0.6	1.1	5.7	29.0	24.9	12.9	6.1	4.1	4.3	10.5	91.7
	0.1	0.1	0.3	0.6	1.0	5.1	33.1	23.6	11.6	6.1	3.7	4.5	10.2	92.7
	0.5	0.2	0.3	0.6	1.1	5.1	35.1	22.8	11.3	5.8	3.8	3.8	9.5	92.2
SDS-CPD-05	1.2	0.1	0.2	0.6	1.5	15.1	35.2	17.9	9.0	4.4	3.1	3.3	8.4	81.3
SDS-CPD-06	0.1	0.3	0.6	0.6	2.0	17.7	31.4	17.8	9.7	4.6	3.2	3.5	8.6	78.8
SDS-CPD-09	0.4	0.3	2.1	1.0	1.7	15.6	32.2	17.2	9.7	4.3	3.4	3.6	8.6	78.9
SDS-CPD-11	1.7	0.2	0.6	0.7	1.4	13.8	29.5	20.2	10.7	4.9	3.6	3.7	8.9	81.5
SDS-CPD-12	3.4	0.3	0.9	0.9	2.4	18.1	31.1	16.9	8.8	3.8	2.6	3.1	7.8	73.9
SDS-CPD-15	0.3	0.5	0.9	1.1	2.0	13.8	32.6	19.0	10.1	4.5	3.0	3.3	8.8	81.3

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:	Science Applications, Intl.	Client Project:	Fidalgo Bay/Custom Plywood Dioxin
ARI Trip. Sample ID:	RA23F	Batch No.:	RA23-1
Client Trip. Sample ID:	SDS-CPD-14	Page:	1 of 1

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
SDS-CPD-14	100.0	100.0	99.5	99.3	99.0	98.4	97.3	91.7	62.7	37.8	24.9	18.8	14.8	10.5
	100.0	100.0	99.9	99.8	99.4	98.8	97.8	92.7	59.6	36.0	24.4	18.3	14.6	10.2
	100.0	100.0	99.5	99.3	99.0	98.4	97.3	92.2	57.1	34.2	22.9	17.1	13.4	9.5
AVE	NA	100.00	99.62	99.44	99.12	98.54	97.49	92.19	59.78	35.99	24.07	18.09	14.25	10.08
STDEV	NA	0.00	0.22	0.28	0.27	0.26	0.29	0.53	2.80	1.77	1.05	0.88	0.78	0.48
%RSD	NA	0.00	0.22	0.28	0.27	0.26	0.30	0.58	4.68	4.91	4.37	4.86	5.46	4.78

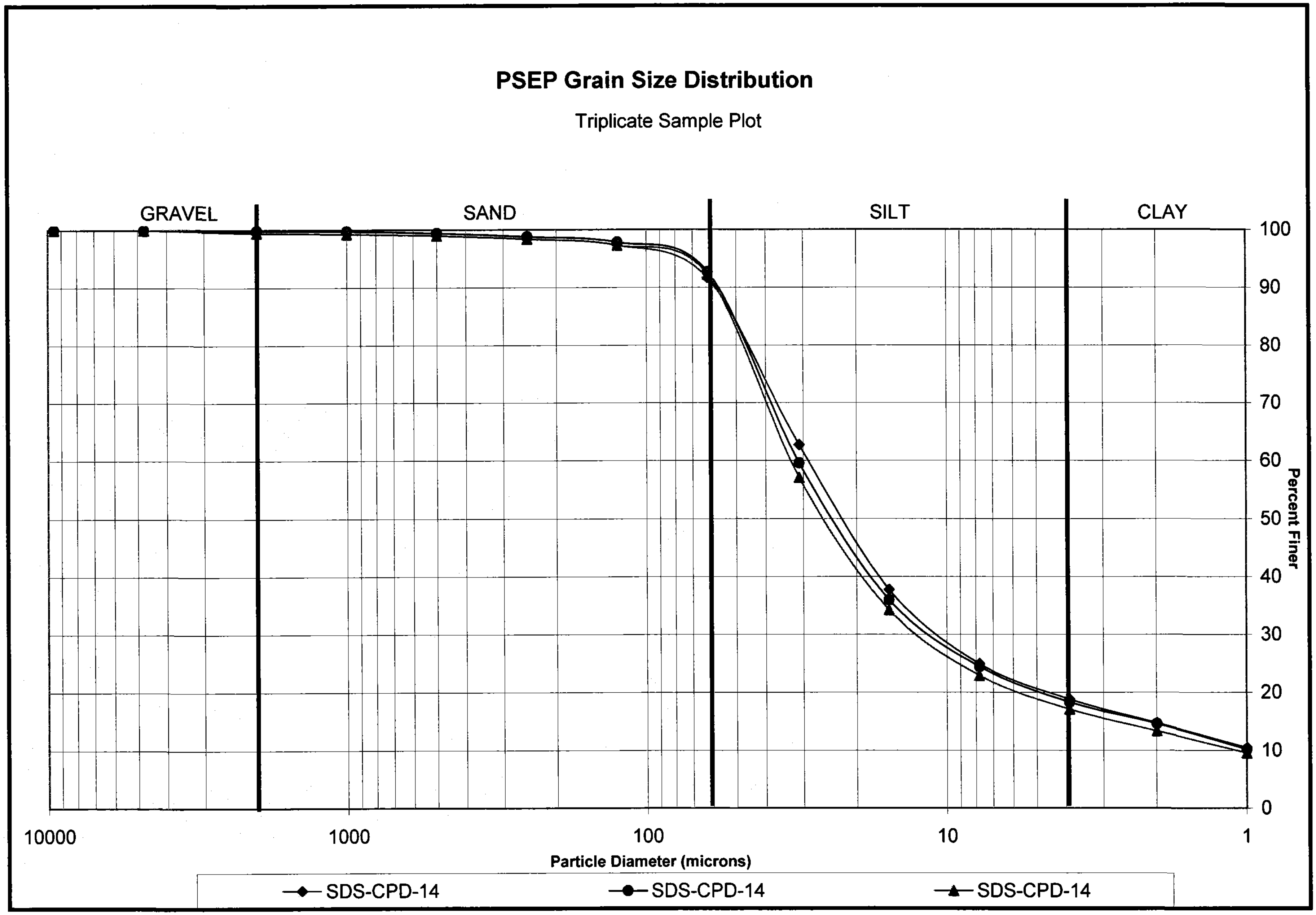
The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
SDS-CPD-14	6/10/2010	6/21/2010	6/22/2010	103.9		13.1
	6/10/2010	6/21/2010	6/22/2010	101.0		11.8
	6/10/2010	6/21/2010	6/22/2010	95.3		12.9
SDS-CPD-05	6/10/2010	6/21/2010	6/22/2010	103.6		19.5
SDS-CPD-06	6/10/2010	6/21/2010	6/22/2010	104.0		17.5
SDS-CPD-09	6/10/2010	6/21/2010	6/22/2010	99.1		14.7
SDS-CPD-11	6/10/2010	6/21/2010	6/22/2010	104.9		19.3
SDS-CPD-12	6/10/2010	6/21/2010	6/22/2010	98.7		15.4
SDS-CPD-15	6/10/2010	6/21/2010	6/22/2010	100.9		18.6

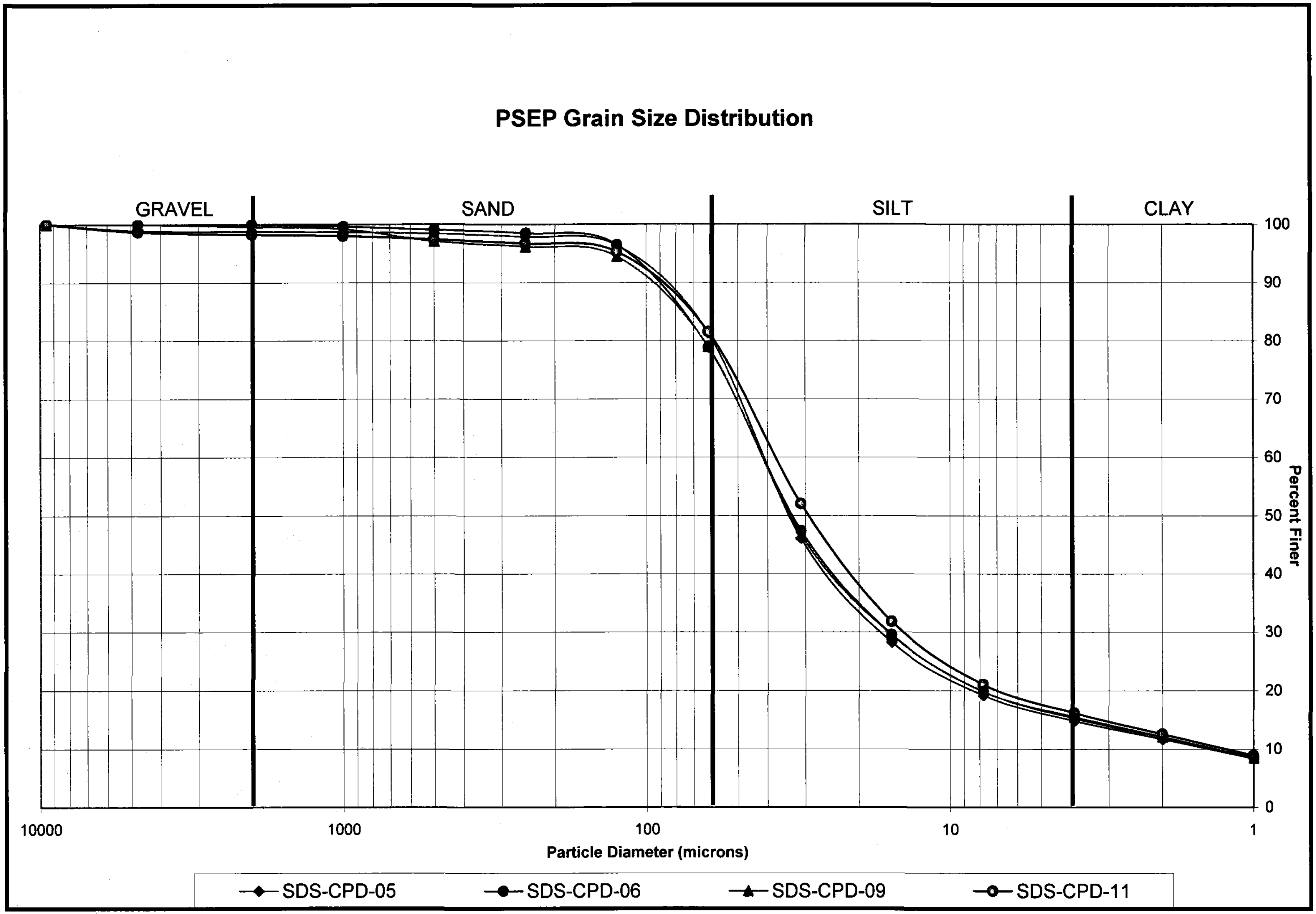
* ARI Internal QA limits = 95-105%

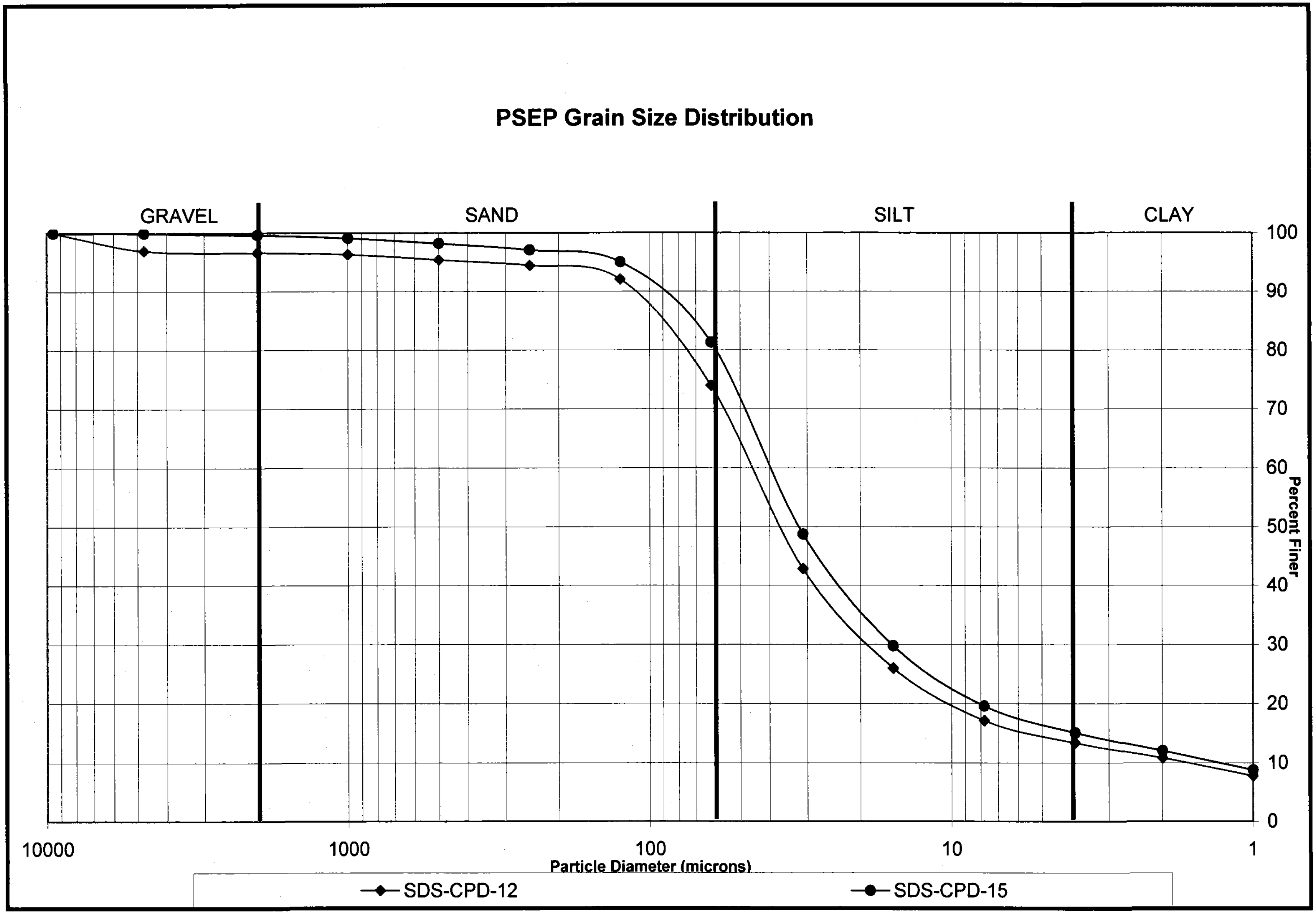
Notes to the Testing:

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
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)
SDS-CPD-14
SDS-CPD-14
SDS-CPD-14

RA17:00111


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)
SDS-CPD-05
SDS-CPD-06
SDS-CPD-09
SDS-CPD-11


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)
SDS-CPD-12
SDS-CPD-15

RA17:00113

Science Applications, Intl.

Fidalgo Bay/Custom Plywood Dioxin

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
SDS-CPD-01	100.0	100.0	99.2	99.0	98.7	98.2	97.6	87.3	43.9	25.6	16.9	13.1	10.1	7.1
	100.0	100.0	99.9	99.8	99.6	99.2	98.7	89.7	44.7	27.0	17.8	13.3	10.2	7.0
	100.0	100.0	100.0	99.8	99.6	99.2	98.6	88.6	44.6	26.2	17.6	13.3	10.4	7.2
SDS-CPD-02	100.0	100.0	99.9	99.7	99.4	98.9	98.2	85.3	44.8	26.3	17.7	13.6	10.6	7.5
SDS-CPD-03	100.0	100.0	99.8	99.0	98.0	96.7	94.5	84.0	50.6	31.4	21.0	15.5	11.6	7.7
SDS-CPD-04	100.0	98.9	97.8	97.3	96.3	95.2	93.7	75.0	37.6	21.5	14.0	10.5	7.9	5.6
SDS-CPD-07	100.0	100.0	98.9	97.8	96.3	94.1	91.6	81.7	47.8	30.8	20.7	15.4	11.6	7.9
SDS-CPD-08	100.0	100.0	99.8	99.3	98.4	97.3	95.7	81.0	46.5	28.0	18.9	14.2	11.0	7.8
SDS-CPD-08-D	100.0	100.0	99.7	99.3	98.3	96.9	94.8	79.3	44.1	26.5	17.9	13.6	10.6	7.6
SDS-CPD-08-T	100.0	99.7	99.4	98.9	98.1	97.0	95.5	81.1	44.2	27.8	18.4	14.2	10.8	7.7
SDS-CPD-10	100.0	98.9	97.7	96.3	94.1	91.3	88.6	81.2	54.7	34.3	22.1	16.1	11.8	8.2
SDS-CPD-13	100.0	99.8	98.3	97.4	95.9	93.9	92.0	84.9	49.0	33.1	21.2	14.9	10.8	7.2
SDS-CPD-16	100.0	100.0	99.5	98.7	98.0	97.1	95.4	89.6	58.7	36.3	22.8	15.9	11.6	7.8
SDS-CPD-17	100.0	99.6	99.3	98.0	96.6	92.9	86.2	80.5	52.9	33.2	21.6	15.5	11.5	8.0
SDS-CPD-18	100.0	99.6	99.2	98.5	97.5	95.8	93.0	84.3	51.9	33.7	22.3	16.3	12.0	8.3
SDS-CPD-19	100.0	99.2	99.2	98.6	97.9	97.1	95.5	84.5	57.8	39.4	26.2	18.9	13.8	9.6
SDS-CPD-20	100.0	100.0	100.0	99.6	99.1	98.6	97.0	78.8	54.0	33.4	23.5	17.3	13.3	9.4
SDS-CPD-21	100.0	100.0	99.4	98.3	97.3	96.0	94.1	87.7	55.8	38.9	25.0	17.6	12.9	9.1

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.

Science Applications, Intl.

Fidalgo Bay/Custom Plywood Dioxin

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)
SDS-CPD-01	0.8	0.2	0.3	0.5	0.6	10.3	43.5	18.2	8.7	3.8	3.0	3.1	7.1	87.3
	0.1	0.1	0.2	0.4	0.5	8.9	45.0	17.8	9.2	4.5	3.1	3.2	7.0	89.7
	0.0	0.1	0.3	0.4	0.6	10.0	44.0	18.5	8.5	4.3	3.0	3.2	7.2	88.6
SDS-CPD-02	0.1	0.1	0.4	0.5	0.6	13.0	40.5	18.5	8.5	4.2	3.0	3.1	7.5	85.3
SDS-CPD-03	0.2	0.8	1.0	1.3	2.1	10.5	33.4	19.2	10.4	5.5	4.0	3.9	7.7	84.0
SDS-CPD-04	2.2	0.5	1.0	1.1	1.6	18.7	37.4	16.1	7.5	3.5	2.6	2.3	5.6	75.0
SDS-CPD-07	1.1	1.1	1.6	2.2	2.5	9.9	33.9	17.0	10.2	5.3	3.8	3.7	7.9	81.7
SDS-CPD-08	0.2	0.5	0.9	1.1	1.6	14.6	34.6	18.5	9.2	4.7	3.2	3.2	7.8	81.0
SDS-CPD-08-D	0.3	0.5	1.0	1.4	2.1	15.5	35.1	17.7	8.5	4.3	3.0	3.0	7.6	79.3
SDS-CPD-08-T	0.6	0.4	0.9	1.1	1.5	14.4	36.9	16.4	9.4	4.1	3.4	3.1	7.7	81.1
SDS-CPD-10	2.3	1.5	2.2	2.8	2.7	7.5	26.5	20.4	12.2	6.1	4.3	3.5	8.2	81.2
SDS-CPD-13	1.7	0.9	1.5	2.0	1.9	7.1	35.9	15.9	11.9	6.3	4.1	3.6	7.2	84.9
SDS-CPD-16	0.5	0.8	0.6	1.0	1.7	5.8	30.8	22.4	13.5	6.9	4.3	3.8	7.8	89.6
SDS-CPD-17	0.7	1.2	1.5	3.7	6.7	5.7	27.6	19.6	11.7	6.1	4.0	3.5	8.0	80.5
SDS-CPD-18	0.8	0.7	1.1	1.6	2.9	8.7	32.4	18.1	11.4	6.1	4.3	3.8	8.3	84.3
SDS-CPD-19	0.8	0.6	0.7	0.8	1.6	11.0	26.8	18.3	13.3	7.3	5.1	4.2	9.6	84.5
SDS-CPD-20	0.0	0.4	0.5	0.5	1.6	18.2	24.8	20.6	9.9	6.1	4.0	4.0	9.4	78.8
SDS-CPD-21	0.6	1.1	1.0	1.4	1.8	6.4	32.0	16.9	13.9	7.4	4.7	3.8	9.1	87.7

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:	Science Applications, Intl.	Client Project:	Fidalgo Bay/Custom Plywood Dioxin
ARI Trip. Sample ID:	RA31A	Batch No.:	RA31-1
Client Trip. Sample ID:	SDS-CPD-01	Page:	1 of 1

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
SDS-CPD-01	100.0	100.0	99.2	99.0	98.7	98.2	97.6	87.3	43.9	25.6	16.9	13.1	10.1	7.1
	100.0	100.0	99.9	99.8	99.6	99.2	98.7	89.7	44.7	27.0	17.8	13.3	10.2	7.0
	100.0	100.0	100.0	99.8	99.6	99.2	98.6	88.6	44.6	26.2	17.6	13.3	10.4	7.2
AVE	NA	100.00	99.69	99.56	99.30	98.86	98.28	88.55	44.41	26.25	17.42	13.24	10.22	7.09
STDEV	NA	0.00	0.44	0.47	0.52	0.55	0.58	1.22	0.48	0.66	0.45	0.12	0.13	0.10
%RSD	NA	0.00	0.44	0.47	0.52	0.56	0.59	1.37	1.08	2.52	2.60	0.91	1.24	1.45

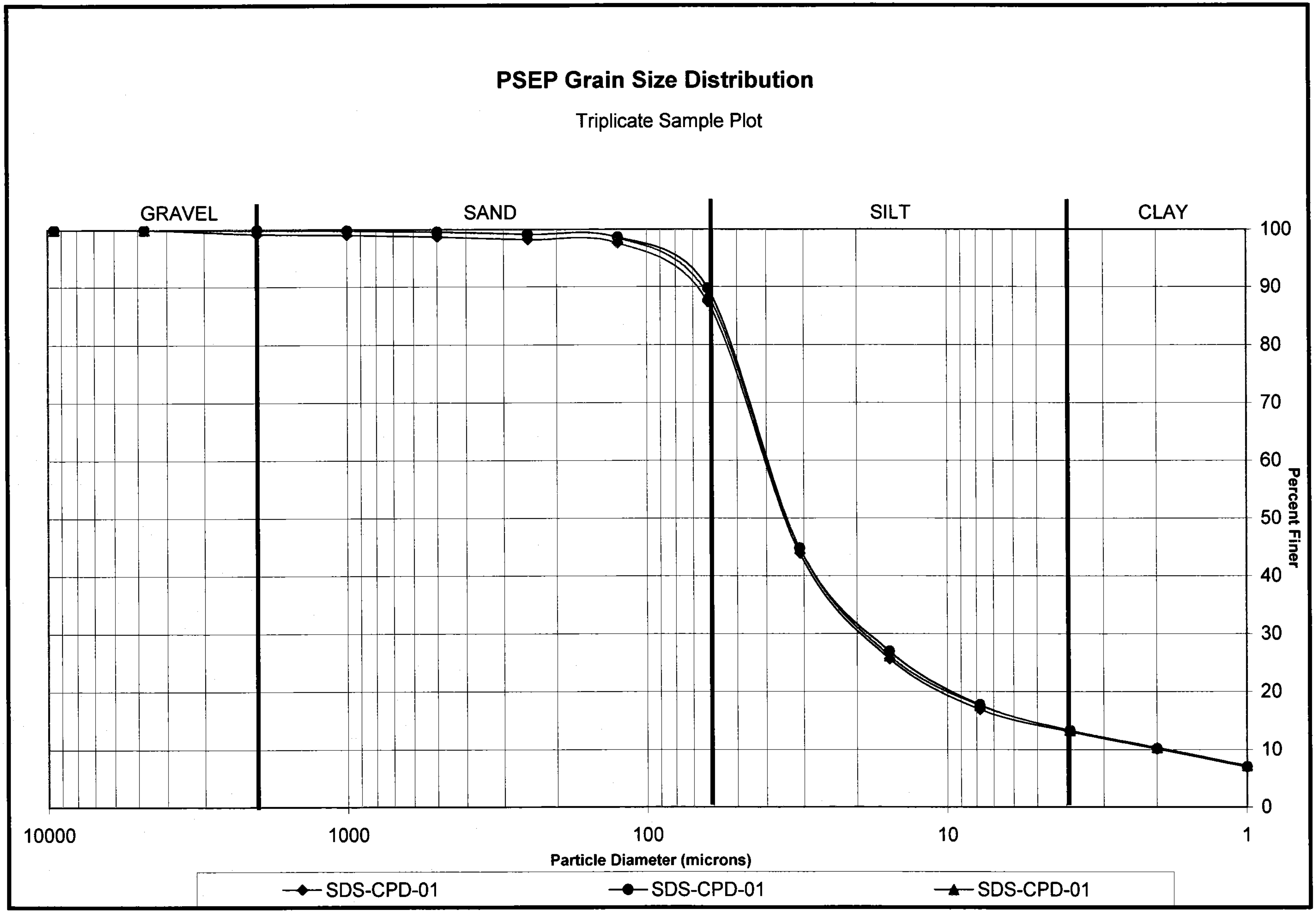
The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
SDS-CPD-01	6/9/2010	6/15/2010	6/23/2010	101.0		16.1
	6/9/2010	6/15/2010	6/23/2010	103.7		16.8
	6/9/2010	6/15/2010	6/23/2010	102.0		17.0
SDS-CPD-02	6/9/2010	6/15/2010	6/23/2010	102.8		17.4
SDS-CPD-03	6/9/2010	6/15/2010	6/23/2010	101.5		16.0
SDS-CPD-04	6/9/2010	6/16/2010	6/23/2010	101.2		17.8
SDS-CPD-07	6/9/2010	6/16/2010	6/23/2010	102.0		14.3
SDS-CPD-08	6/9/2010	6/16/2010	6/23/2010	104.6		19.1
SDS-CPD-08-D	6/9/2010	6/16/2010	6/23/2010	99.6		18.7
SDS-CPD-08-T	6/9/2010	6/16/2010	6/23/2010	102.2		20.0
SDS-CPD-10	6/9/2010	6/16/2010	6/23/2010	104.4		17.7
SDS-CPD-13	6/9/2010	6/16/2010	6/23/2010	99.8		17.9
SDS-CPD-16	6/9/2010	6/16/2010	6/23/2010	101.4		17.6
SDS-CPD-17	6/9/2010	6/16/2010	6/23/2010	105.0		17.7
SDS-CPD-18	6/9/2010	6/16/2010	6/23/2010	101.8		17.9
SDS-CPD-19	6/9/2010	6/16/2010	6/23/2010	100.6		17.0
SDS-CPD-20	6/9/2010	6/16/2010	6/24/2010	101.3		17.5
SDS-CPD-21	6/9/2010	6/16/2010	6/23/2010	99.0		16.6

* ARI Internal QA limits = 95-105%

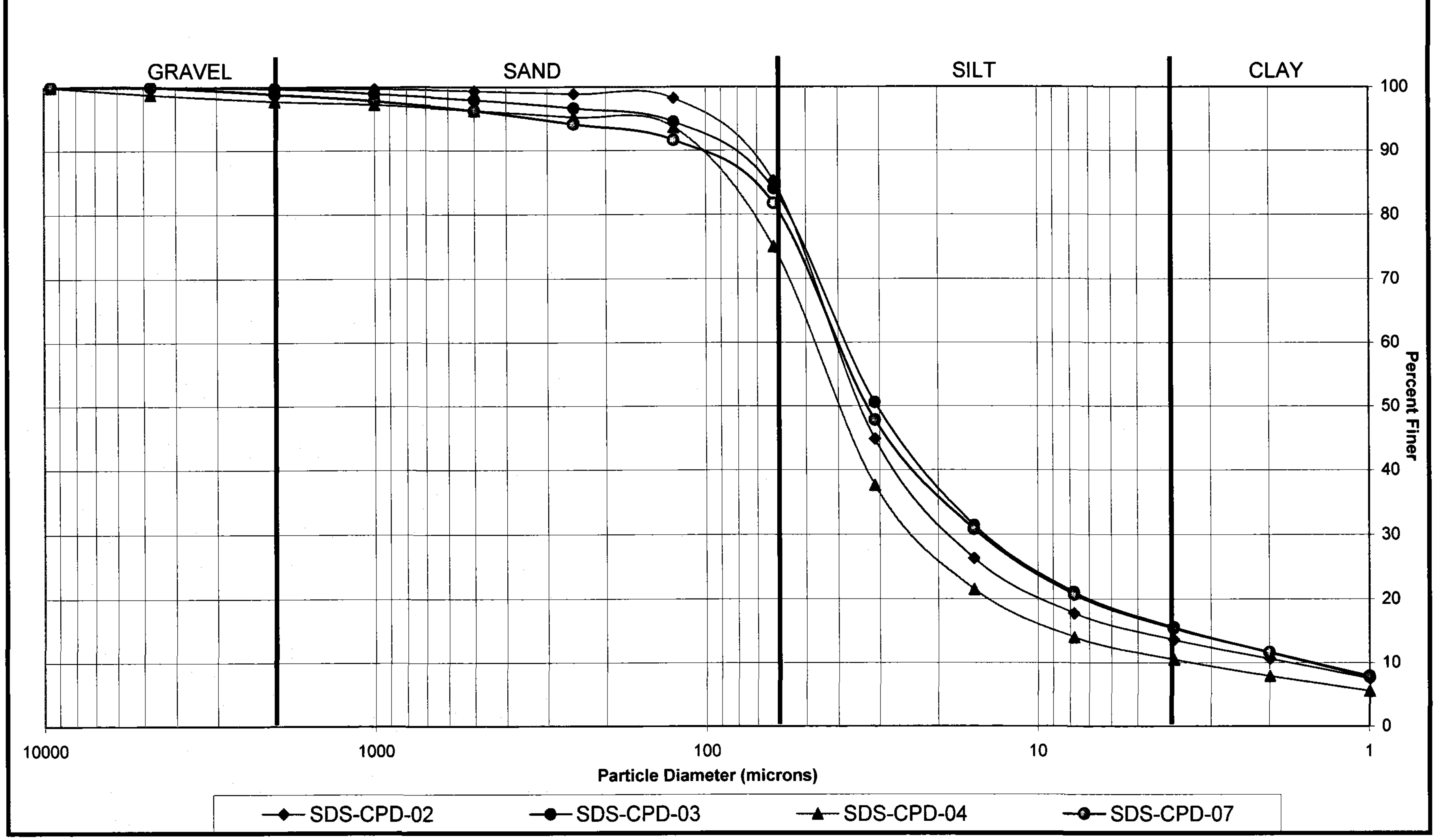
Notes to the Testing:

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.

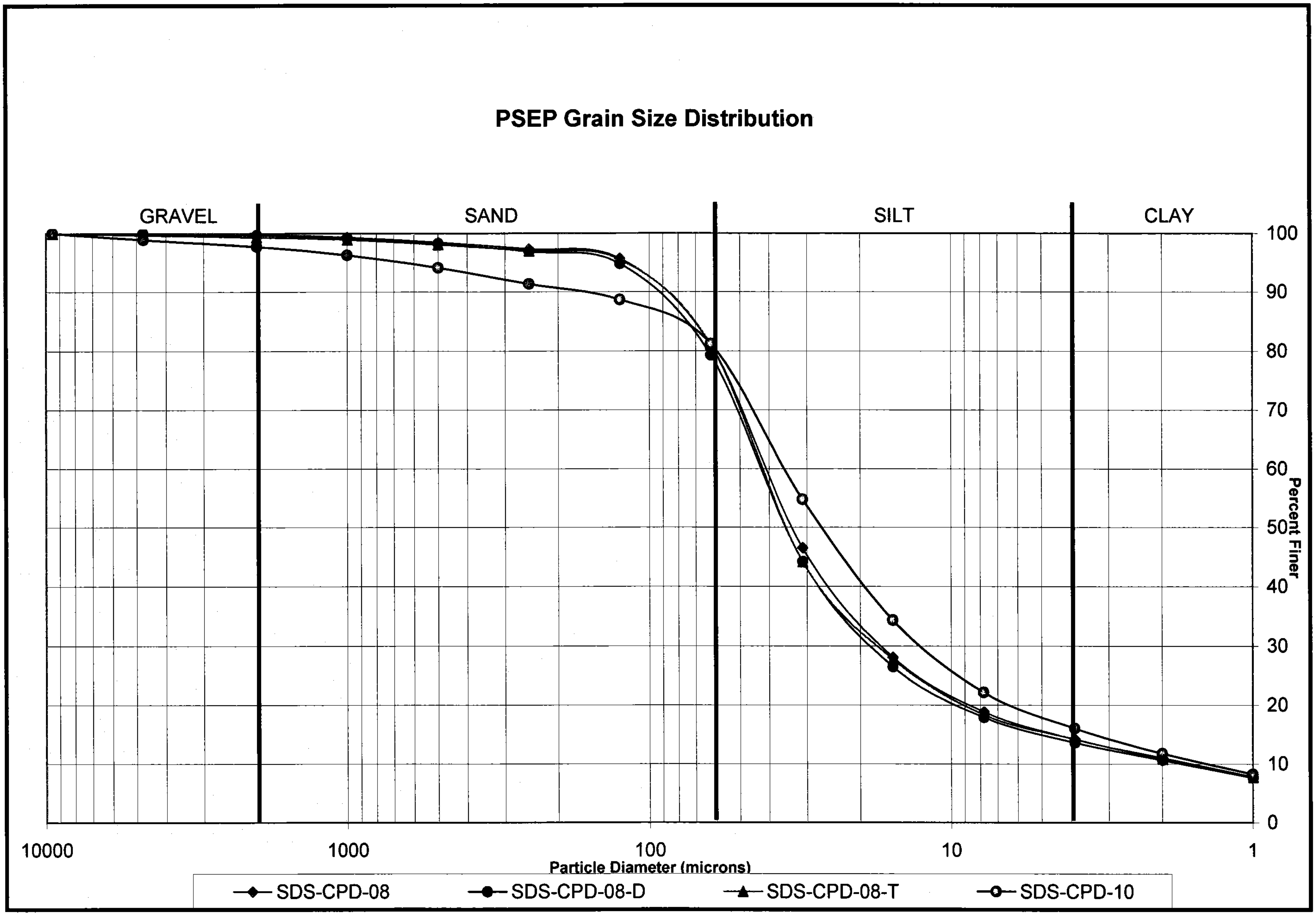


PSEP Grain Size Distribution
Triplicate Sample Plot
GRAVEL
SAND
SILT
CLAY
100
90
80
70
60
50
40
30
20
10
0
Percent Finer
10000
1000
100
10
1
Particle Diameter (microns)
SDS-CPD-01
SDS-CPD-01
SDS-CPD-01

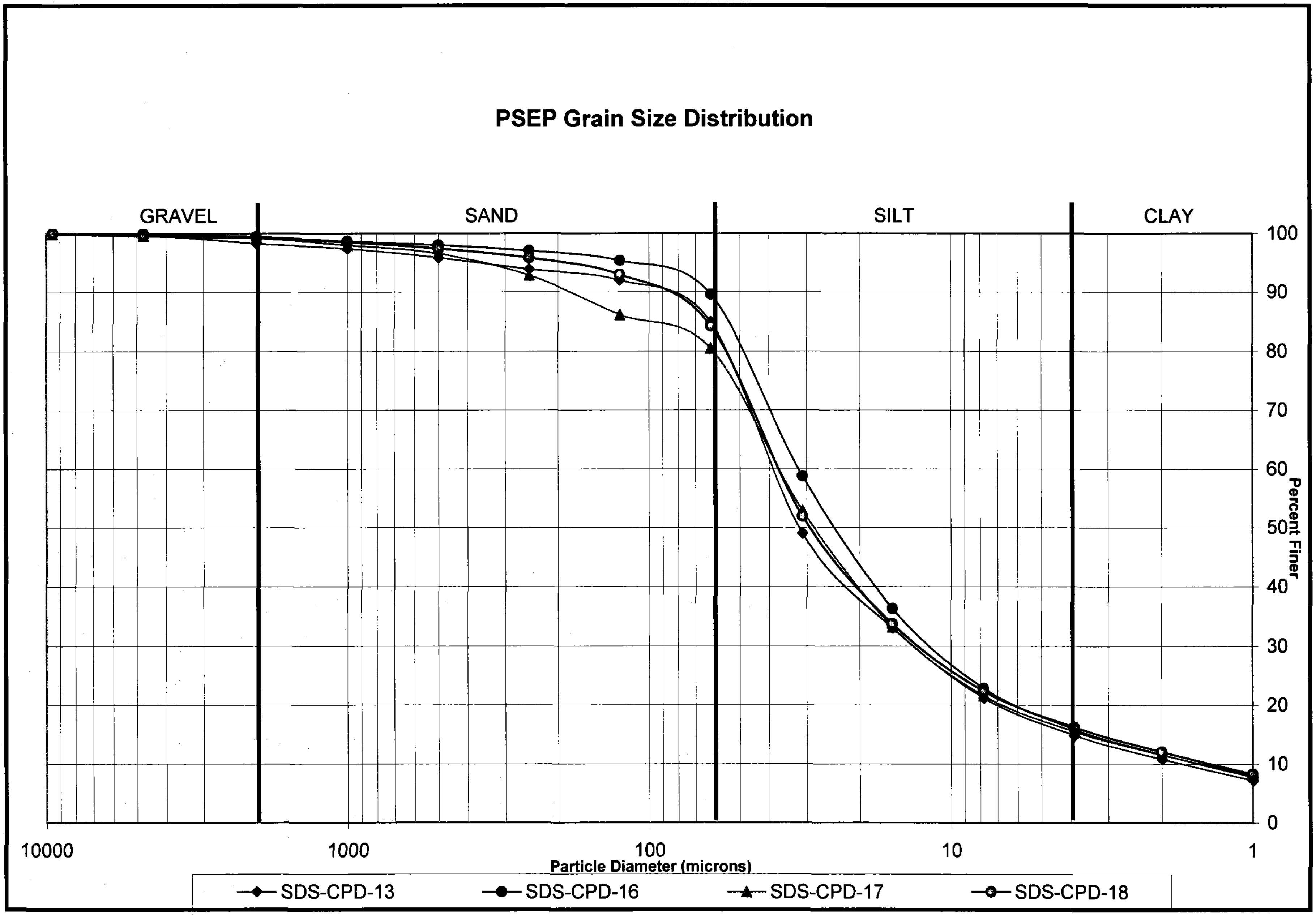
PSEP Grain Size Distribution



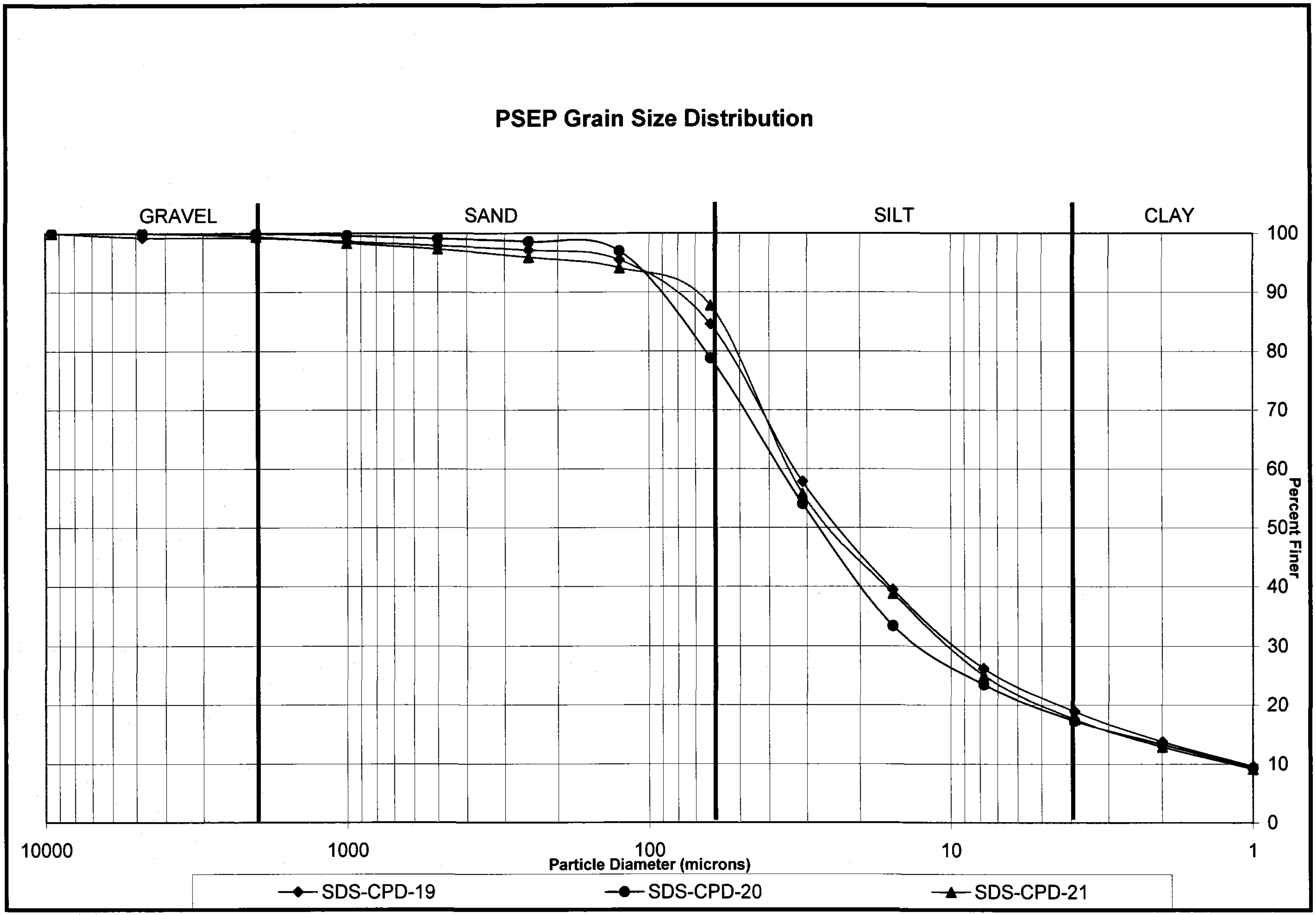
RA17:00118


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)
SDS-CPD-08
SDS-CPD-08-D
SDS-CPD-08-T
SDS-CPD-10

RA17:00119



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)
SDS-CPD-13
SDS-CPD-16
SDS-CPD-17
SDS-CPD-18



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)
SDS-CPD-19
SDS-CPD-20
SDS-CPD-21

RA17:00121

Table of Contents: ARI Job RA55

Client: Science Applications, Intl. Project: Fidalgo Bay/Custom Plywood Dioxin S

Signature

July-02-2010
Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

July 2, 2010

Tim Hammermeister
SAIC
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

RE: Project: Fidalgo Bay / Custom Plywood Dioxin Study
ARI Job No: RA55

Dear Tim:

Please find enclosed the Chain-of-Custody (COC) record, sample receipt documentation, and the final data package for samples from the project referenced above.

Sample receipt and details of the analyses are discussed in the Case Narrative.

An electronic copy of this data and associated raw data will be kept on file with ARI. Should you have any questions or problems, please feel free to contact me at any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Cheronne Oreiro
Project Manager
(206) 695-6214
cheronneo@arilabs.com

Enclosures

cc: eFile RA55

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Documentation

ARI Job ID: RA55

SAIC
From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay/Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: WH CH AW JW DK
Client Name: Ecology

Shipping Information

Number of Shipping Containers: 1
Date Shipped: 6/15/10
Carrier: SAIC
Waybill No.:

Analyses / Tests

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	Total Sulfides	TOC	Total Solids	Archive						Comments
SDS-CT-01A	0-10cm	sed	6/14/10	1047	4	X	X	X	X	X						
SDS-CT-01B	0-10cm	sed	6/14/10	1115	4	X	X	X	X	X						
SDS-CT-02	0-10cm	sed	6/14/10	1147	4	X	X	X	X	X						
SDS-CT-03	0-10cm	sed	6/14/10	1230	4	X	X	X	X	X						
SDS-CT-04	0-10cm	sed	6/14/10	1331	4	X	X	X	X	X						
SDS-CT-05	0-10cm	sed	6/14/10	1306	4	X	X	X	X	X						

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 06/15/2010 1405	Date/Time: 6/15/10 1405	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

RA55:00003

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: SAIC

Project Name: Fidalgo Bay / Custom Plywood Dio, St.

COC No(s): ______ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: ______

Assigned ARI Job No: RA55

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)........ 2.2 ____ ____ ____ ____ ____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90941619

Cooler Accepted by: JW Date: 6/15/10 Time: 1405

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: JW Date: 6/15/10 Time: 1516

***** 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"
			Peabubbles → "pb"
			Large → "lg"
			Headspace → "hs"

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: RA55

Case Narrative

Client: SAIC
Project: Fidalgo Bay / Custom Plywood Dioxin Study
ARI Job No.: RA55

Sample Receipt

Six sediment samples were received June 15, 2010 under ARI job RA55. The cooler temperature measured by IR thermometer following ARI SOP was 2.2°C. Select sample containers were archived frozen upon receipt. For further details regarding sample receipt, please refer to the Cooler Receipt Forms.

General Chemistry Parameters (TOC/TS)

The samples were prepared and analyzed within method recommended holding times.

The method blanks were clean at the reporting limits. The LCS percent recoveries were within control limits.

The SRM percent recovery was within limits.

The matrix spike percent recovery and replicate RPD/RSDs were within control limits.

Geotechnical Parameters

A laboratory-specific case narrative follows.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Client: Science Applications International Corp.	**ARI Job No.:** RA55
Client Project: Fidalgo Bay/ Custom Plywood Dioxin S	

Case Narrative

1. Six samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology on June 15, 2010.
2. The samples were run in a single batch and one sample from this job, SDS-CT-03, was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. Samples SDS-CT-01A and SDS-CT-02 contained woody or other organic matter, which may have broken down during the sieving process affecting grain size analysis.
4. Samples SDS-CT-01B, SDS-CT-02, SDS-CT-04, and SDS-CT-05 contained shell fragments.
5. Samples SDS-CT-01A, SDS-CT-02, and SDS-CT-04 displayed an oily sheen and a fuel-like odor. Organic contaminates may skew the grain size data.
6. The data is provided in summary tables and plots.
7. There were no other noted anomalies in this project.

Approved by: ____________ Date: 6/25/10
Geotechnical Laboratory Manager

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Spike Recovery Control Limits for Conventional Wet Chemistry

Effective 5/1/09

Control limits are updated periodically. Assure that you have ARI's current control limits by downloading the files at the time of use. http://www.arilabs.com/portal/downloads/ARI-CLs.zip

	ARI's Control Limits	
Sample Matrix:	Water	Soil / Sediment
Matrix Spike Recoveries	% Recovery	% Recovery
Ammonia	75 - 125	75 - 125
Bromide	75 125	75 - 125
Chloride	75 125	75 - 125
Cyanide	75 - 125	75 - 125
Ferrous Iron	75 - 125	75 - 125
Fluoride	75 - 125	75 - 125
Formaldehyde	75 - 125	75 - 125
Hexane Extractable Material	-- - --	78 - 114
Hexavalent Chromium	75 - 125	75 - 125
Nitrate/Nitrite	75 - 125	75 - 125
Oil and Grease	75 - 125	75 - 125
Phenol	75 - 125	75 - 125
Phosphorous	75 - 125	75 - 125
Sulfate	75 - 125	75 - 125
Sulfide	75 - 125	75 - 125
Total Kjeldahl Nitrogen	75 - 125	75 - 125
Total Organic Carbon	75 - 125	75 - 125
Duplicate RPDs		
Acidity	±20%	±20%
Alkalinity	±20%	±20%
BOD	±20%	±20%
Cation Exchange	±20%	±20%
COD	±20%	±20%
Conductivity	±20%	±20%
Salinity	±20%	±20%
Solids	±20%	±20%
Turbidity	±20%	±20%

General Chemistry Analysis

ARI Job ID: RA55

General Chemistry Analysis
Report and Summary QC Forms

ARI Job ID: RA55

SAMPLE RESULTS-CONVENTIONALS
RA55-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 07/02/10

Project: Fidalgo Bay/Custom Plywood D
Event: NA
Date Sampled: 06/14/10
Date Received: 06/15/10

Client ID: SDS-CT-01A
ARI ID: 10-14254 RA55A

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	41.30
Preserved Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	35.10
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	278	2,480
Total Organic Carbon	07/01/10 070110#1	Plumb,1981	Percent	0.020	5.56

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA55-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 07/02/10

Project: Fidalgo Bay/Custom Plywood D
Event: NA
Date Sampled: 06/14/10
Date Received: 06/15/10

Client ID: SDS-CT-01B
ARI ID: 10-14255 RA55B

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	75.00
Preserved Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	79.60
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	24.8	484
Total Organic Carbon	07/01/10 070110#1	Plumb,1981	Percent	0.020	1.89

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA55-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 07/02/10

Project: Fidalgo Bay/Custom Plywood D
Event: NA
Date Sampled: 06/14/10
Date Received: 06/15/10

Client ID: SDS-CT-02
ARI ID: 10-14256 RA55C

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	60.10
Preserved Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	45.90
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	43.5	534
Total Organic Carbon	07/01/10 070110#1	Plumb,1981	Percent	0.020	1.30

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA55-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 07/02/10

Project: Fidalgo Bay/Custom Plywood D
Event: NA
Date Sampled: 06/14/10
Date Received: 06/15/10

Client ID: SDS-CT-03
ARI ID: 10-14257 RA55D

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	72.70
Preserved Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	75.60
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	25.5	271
Total Organic Carbon	07/01/10 070110#1	Plumb,1981	Percent	0.020	0.823

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA55-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 07/02/10

Project: Fidalgo Bay/Custom Plywood D
Event: NA
Date Sampled: 06/14/10
Date Received: 06/15/10

Client ID: SDS-CT-04
ARI ID: 10-14258 RA55E

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	72.70
Preserved Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	71.60
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	12.8	235
Total Organic Carbon	07/01/10 070110#1	Plumb,1981	Percent	0.020	1.05

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
RA55-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 07/02/10

Project: Fidalgo Bay/Custom Plywood D
Event: NA
Date Sampled: 06/14/10
Date Received: 06/15/10

Client ID: SDS-CT-05
ARI ID: 10-14259 RA55F

Analyte	Date	Method	Units	RL	Sample
Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	67.90
Preserved Total Solids	06/17/10 061710#1	EPA 160.3	Percent	0.01	68.70
Sulfide	06/15/10 061510#1	EPA 376.2	mg/kg	27.9	329
Total Organic Carbon	07/01/10 070110#1	Plumb,1981	Percent	0.020	1.44

RL Analytical reporting limit
U Undetected at reported detection limit

MS/MSD RESULTS-CONVENTIONALS
RA55-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 07/02/10

Project: Fidalgo Bay/Custom Plywood D
Event: NA
Date Sampled: 06/14/10
Date Received: 06/15/10

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: RA55A Client ID: SDS-CT-01A						
Total Organic Carbon	07/01/10	Percent	5.56	13.5	8.84	89.8%

REPLICATE RESULTS-CONVENTIONALS
RA55-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 07/02/10

Project: Fidalgo Bay/Custom Plywood D
Event: NA
Date Sampled: 06/14/10
Date Received: 06/15/10

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: RA55A Client ID: SDS-CT-01A					
Total Solids	06/17/10	Percent	41.30	41.50 41.00	0.6%
Preserved Total Solids	06/17/10	Percent	35.10	35.90	2.3%
Total Organic Carbon	07/01/10	Percent	5.56	5.72 4.34	14.5%

LAB CONTROL RESULTS-CONVENTIONALS
RA55-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 07/02/10

Project: Fidalgo Bay/Custom Plywood D
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide EPA 376.2	PREP	06/15/10	mg/kg	7.82	7.59	103.0%
Total Organic Carbon Plumb,1981	ICVL	07/01/10	Percent	0.093	0.100	93.0%

METHOD BLANK RESULTS-CONVENTIONALS
RA55-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 07/02/10

Project: Fidalgo Bay/Custom Plywood D
Event: NA
Date Sampled: NA
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	06/17/10	Percent	< 0.01 U
Preserved Total Solids	06/17/10	Percent	< 0.01 U
Sulfide	06/15/10	mg/kg	< 1.00 U
Total Organic Carbon	07/01/10	Percent	< 0.020 U

STANDARD REFERENCE RESULTS-CONVENTIONALS
RA55-Science Applications, Intl.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Sediment
Data Release Authorized:
Reported: 07/02/10

Project: Fidalgo Bay/Custom Plywood D
Event: NA
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon NIST #8704	07/01/10	Percent	3.21	3.35	95.8%

Geotechnical Analysis

ARI Job ID: RA55

Geotechnical Analysis
Report and Summary QC Forms

ARI Job ID: RA55

Science Applications International, Corp.

Fidalgo Bay/Custom Plywood Dioxin S

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
SDS-CT-03	100.0	97.9	96.8	96.1	94.6	82.2	23.8	11.3	8.3	6.2	5.0	4.0	2.7	1.8
	100.0	98.8	97.8	96.8	95.3	82.5	23.2	11.0	8.2	6.2	5.0	3.7	2.6	1.9
	100.0	93.9	92.5	91.8	90.3	78.5	21.9	9.4	8.0	6.2	4.9	3.8	2.6	1.9
SDS-CT-01A	100.0	97.3	92.4	89.5	84.0	60.7	38.5	24.4	14.1	8.7	6.8	5.8	5.2	4.4
SDS-CT-01B	100.0	65.2	45.2	31.0	18.6	9.7	6.8	6.0	4.3	3.4	2.6	1.9	1.4	0.9
SDS-CT-02	100.0	95.2	91.8	88.7	85.2	77.8	52.9	19.2	14.9	11.3	8.7	6.9	5.4	3.7
SDS-CT-04	100.0	97.8	95.3	94.1	92.1	79.5	23.9	8.8	6.7	5.4	4.3	3.3	2.4	1.8
SDS-CT-05	100.0	98.6	97.1	95.6	92.5	71.2	31.7	19.4	13.1	9.8	7.7	6.1	4.7	3.1

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.

Science Applications International, Corp.

Fidalgo Bay/Custom Plywood Dioxin S

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)
SDS-CT-03	3.2	0.8	1.5	12.4	58.4	12.5	3.0	2.1	1.2	1.0	1.3	0.9	1.8	11.3
	2.2	1.0	1.6	12.8	59.3	12.2	2.8	2.0	1.2	1.3	1.2	0.7	1.9	11.0
	7.5	0.7	1.4	11.9	56.6	12.5	1.3	1.9	1.2	1.1	1.3	0.7	1.9	9.4
SDS-CT-01A	7.6	2.9	5.6	23.3	22.2	14.1	10.3	5.3	2.0	0.9	0.6	0.8	4.4	24.4
SDS-CT-01B	54.8	14.2	12.4	8.9	3.0	0.8	1.7	0.8	0.8	0.7	0.5	0.5	0.9	6.0
SDS-CT-02	8.2	3.1	3.5	7.4	25.0	33.7	4.3	3.6	2.6	1.8	1.5	1.7	3.7	19.2
SDS-CT-04	4.7	1.1	2.0	12.6	55.6	15.1	2.1	1.4	1.0	1.0	0.9	0.7	1.8	8.8
SDS-CT-05	2.9	1.4	3.1	21.3	39.5	12.3	6.3	3.4	2.1	1.6	1.4	1.5	3.1	19.4

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:	Science Applications International, Corp.	Client Project:	Fidalgo Bay/Custom Plywood Dioxin S
ARI Trip. Sample ID:	RA55D	Batch No.:	RA55-1
Client Trip. Sample ID:	SDS-CT-03	Page:	1 of 1

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
SDS-CT-03	100.0	97.9	96.8	96.1	94.6	82.2	23.8	11.3	8.3	6.2	5.0	4.0	2.7	1.8
	100.0	98.8	97.8	96.8	95.3	82.5	23.2	11.0	8.2	6.2	5.0	3.7	2.6	1.9
	100.0	93.9	92.5	91.8	90.3	78.5	21.9	9.4	8.0	6.2	4.9	3.8	2.6	1.9
AVE	NA	96.83	95.71	94.89	93.40	81.05	22.95	10.56	8.19	6.20	4.98	3.85	2.60	1.88
STDEV	NA	2.59	2.82	2.72	2.67	2.23	0.95	1.05	0.16	0.03	0.04	0.15	0.07	0.04
%RSD	NA	2.68	2.94	2.87	2.86	2.76	4.12	9.91	1.95	0.53	0.87	3.94	2.83	1.99

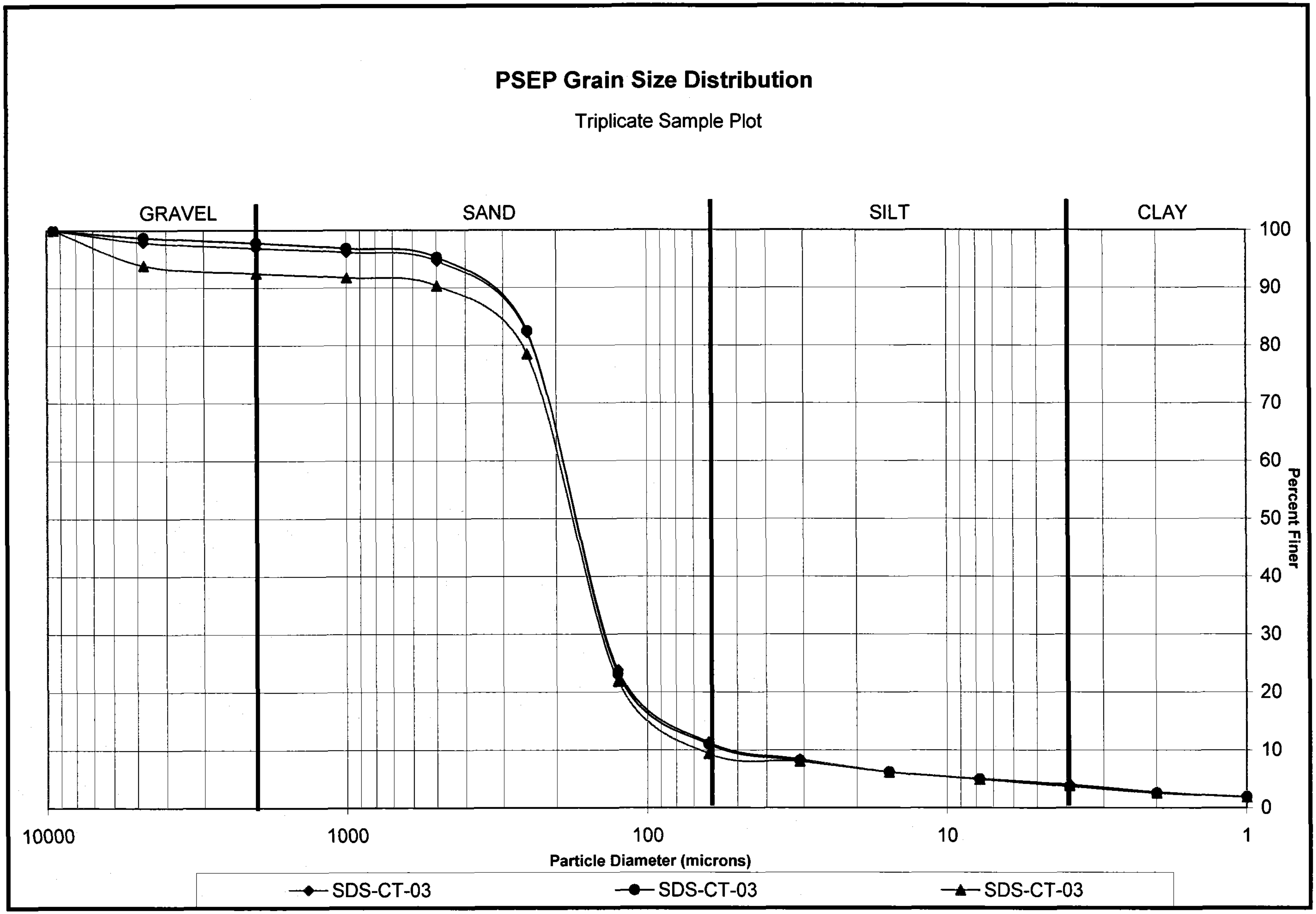
The Triplicate Applies To The Following Samples

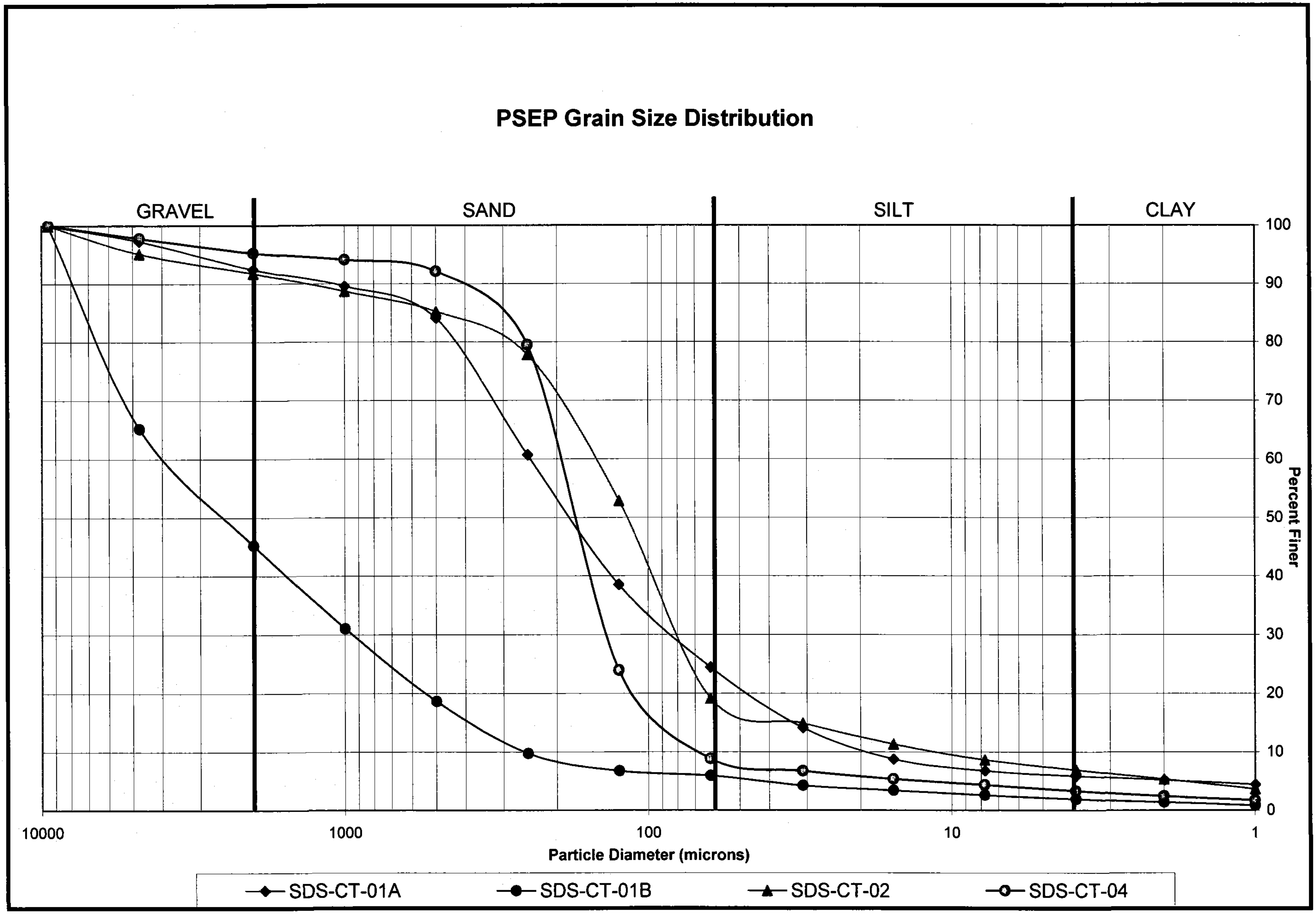
Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
SDS-CT-03	6/14/2010	6/24/2010	6/25/2010	100.9		8.1
	6/14/2010	6/24/2010	6/25/2010	100.4		7.8
	6/14/2010	6/24/2010	6/25/2010	99.1		6.7
SDS-CT-01A	6/14/2010	6/24/2010	6/25/2010	97.9		8.1
SDS-CT-01B	6/14/2010	6/24/2010	6/25/2010	101.3		7.6
SDS-CT-02	6/14/2010	6/24/2010	6/25/2010	99.1		5.5
SDS-CT-04	6/14/2010	6/24/2010	6/25/2010	99.7		8.4
SDS-CT-05	6/14/2010	6/24/2010	6/25/2010	102.1		7.7

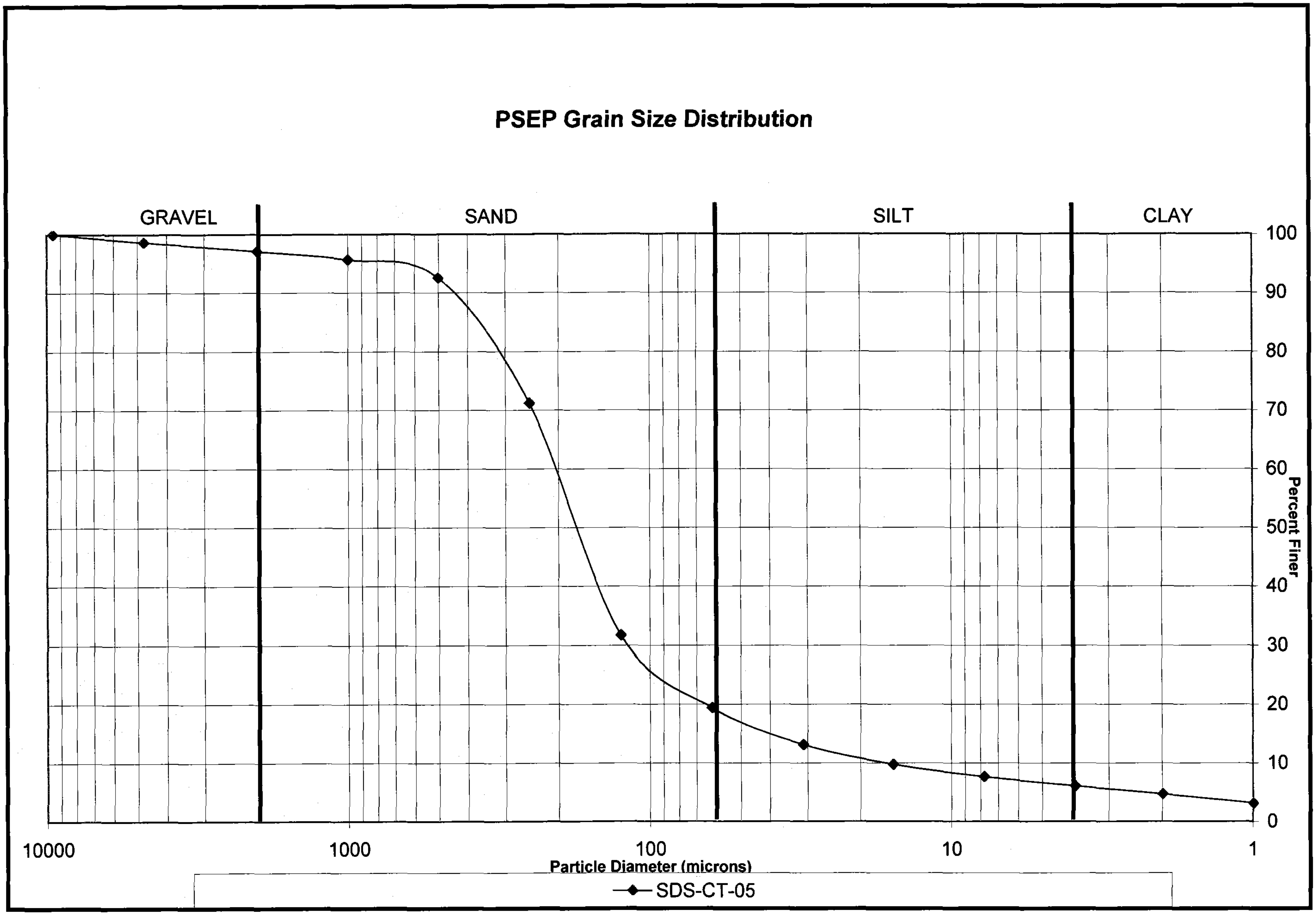
* ARI Internal QA limits = 95-105%

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
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)
SDS-CT-03
SDS-CT-03
SDS-CT-03


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)
SDS-CT-01A
SDS-CT-01B
SDS-CT-02
SDS-CT-04


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)
SDS-CT-05

BATCH SUMMARY

Batch ID: WG33444	***Date:*** 24-Aug-2010
Analysis Type: Dioxin/Furan	***Matrix Type:*** Aqueous

BATCH MAKEUP

Contract: 4406

Samples:

L14873-1	SDS-FB-RB
L14873-2	SDS-FB-ER
L14873-3	SDS-PB-ER
L14873-4	SDS-CPD-ER

Blank:
WG33444-101

Reference or Spike:
WG33444-102

Comments:

RESUBMISSION 08-SEP-10: Disregard all previous submissions. All data remain unchanged except for the following:

1- The samples SDS-FB-RB, SDS-FB-ER, and SDS-CPD-ER (AXYS ID: L14873-1, -2, and -4, respectively) are reported for all compounds except for TCDD data. The TCDD data did not meet method specifications and are reported in WG33704.

2- The percent recovery of surrogate ^{13}C-2,3,7,8-TCDF in the sample SDS-FB-RB (AXYS ID: L14873-1) was observed to be below the method lower limit and is flagged with a 'V' on the report form. As the isotope dilution method of quantification produces data that are recovery corrected, the slight variances from the method acceptance criteria are deemed not to affect the quantification of these analytes. Percent surrogate recoveries are used as general method performance indicator only.

3- All client sample extract volumes have been revised to 10 uL on the report forms.

There are no data available for samples SDS-FB-RB, SDS-FB-ER and SDS-CPD-ER (Axys IDs: L14873-1,-2,-4). These samples were set for a repeat analysis in another batch. Data will be available in another database.

1- Data are not blank corrected

2- The percent recovery value of native 1,2,3,7,8,9 HxCDD in the OPR (AXYS ID: WG33444-102) was slightly above the method control limit and has been flagged with an 'N'. This compound was not detected in any samples and data are considered not significantly affected by this variance.

3- The recoveries of several ^{13}C-labeled-surrogates in the Spiked Matrix sample (AXYS ID WG33444-102) were slightly outside the method acceptance criteria; these compounds have been flagged with a 'V'. As the isotope dilution method of quantification produces data that are recovery corrected, the slight variances from the method acceptance criteria are deemed not to affect the quantification of these analytes. Percent surrogate recoveries are used as general method performance indicator only.

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-FB-RB
Sample Collection:
08-Jun-2010 11:55

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14873-1
Matrix:	AQUEOUS	**Sample Size:**	0.516 L
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	12-Aug-2010 **Time:** 19:48:29	**GC Column ID:**	DB5
Extract Volume (uL):	10	**Sample Data Filename:**	**DX0M_106E S: 34**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_106E S: 24
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_106E S: 31
Concentration Units:	pg/L		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	X				
1,2,3,7,8-PECDD [3]	U		0.969		
1,2,3,4,7,8-HXCDD	U		0.969		
1,2,3,6,7,8-HXCDD	U		0.969		
1,2,3,7,8,9-HXCDD	U		0.969		
1,2,3,4,6,7,8-HPCDD	U		0.969		
OCDD	K B J	1.80	0.969	1.35	1.000
2,3,7,8-TCDF	U		2.40		
1,2,3,7,8-PECDF	U		0.969		
2,3,4,7,8-PECDF	U		0.969		
1,2,3,4,7,8-HXCDF	U		0.969		
1,2,3,6,7,8-HXCDF	U		0.969		
1,2,3,7,8,9-HXCDF	U		0.969		
2,3,4,6,7,8-HXCDF	U		0.969		
1,2,3,4,6,7,8-HPCDF	U		0.969		
1,2,3,4,7,8,9-HPCDF	U		0.969		
OCDF	K B J	1.08	0.969	2.00	1.002
TOTAL TETRA-DIOXINS	X				
TOTAL PENTA-DIOXINS	U		0.969		
TOTAL HEXA-DIOXINS	U		0.969		
TOTAL HEPTA-DIOXINS	U		0.969		
TOTAL TETRA-FURANS	J	4.04	2.40		
TOTAL PENTA-FURANS	U		0.969		
TOTAL HEXA-FURANS	U		0.969		
TOTAL HEPTA-FURANS	U		0.969		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL; X = result reported separately.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 08-Sep-2010 12:54:43; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14873-1_Form1A_DX0M_106ES34_SJ1180388.html; Workgroup: WG33444; Design ID: 1402]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-FB-RB
Sample Collection:
08-Jun-2010 11:55

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14873-1 Ri
Matrix:	AQUEOUS	**Sample Size:**	0.428 L
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	20-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	01-Sep-2010 **Time:** 21:03:52	**GC Column ID:**	DB5
Extract Volume (uL):	10	**Sample Data Filename:**	**DX0M_116 S: 6**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_114 S: 29
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_116 S: 2
Concentration Units:	pg/L		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		1.17		
1,2,3,7,8-PECDD [3]	X				
1,2,3,4,7,8-HXCDD	X				
1,2,3,6,7,8-HXCDD	X				
1,2,3,7,8,9-HXCDD	X				
1,2,3,4,6,7,8-HPCDD	X				
OCDD	X				
2,3,7,8-TCDF	X				
1,2,3,7,8-PECDF	X				
2,3,4,7,8-PECDF	X				
1,2,3,4,7,8-HXCDF	X				
1,2,3,6,7,8-HXCDF	X				
1,2,3,7,8,9-HXCDF	X				
2,3,4,6,7,8-HXCDF	X				
1,2,3,4,6,7,8-HPCDF	X				
1,2,3,4,7,8,9-HPCDF	X				
OCDF	X				
TOTAL TETRA-DIOXINS	U		1.17		
TOTAL PENTA-DIOXINS	X				
TOTAL HEXA-DIOXINS	X				
TOTAL HEPTA-DIOXINS	X				
TOTAL TETRA-FURANS	X				
TOTAL PENTA-FURANS	X				
TOTAL HEXA-FURANS	X				
TOTAL HEPTA-FURANS	X				

(1) Where applicable, custom lab flags have been used on this report; U = not detected; X = result reported separately.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 08-Sep-2010 14:02:43; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14873-1_Form1A_DX0M_116S6_SJ1187555.html; Workgroup: WG33704; Design ID: 1402]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-FB-ER
Sample Collection:
08-Jun-2010 12:00

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14873-2
Matrix:	AQUEOUS	**Sample Size:**	0.525 L
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	12-Aug-2010 **Time:** 20:43:31	**GC Column ID:**	DB5
Extract Volume (uL):	10	**Sample Data Filename:**	**DX0M_106E S: 35**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_106E S: 24
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_106E S: 31
Concentration Units:	pg/L		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	X				
1,2,3,7,8-PECDD [3]	U		0.952		
1,2,3,4,7,8-HXCDD	U		0.952		
1,2,3,6,7,8-HXCDD	U		0.952		
1,2,3,7,8,9-HXCDD	U		0.952		
1,2,3,4,6,7,8-HPCDD	U		0.952		
OCDD	B J	1.19	0.952	0.80	1.000
2,3,7,8-TCDF	U		0.952		
1,2,3,7,8-PECDF	U		0.952		
2,3,4,7,8-PECDF	U		0.952		
1,2,3,4,7,8-HXCDF	U		0.952		
1,2,3,6,7,8-HXCDF	U		0.952		
1,2,3,7,8,9-HXCDF	U		0.952		
2,3,4,6,7,8-HXCDF	U		0.952		
1,2,3,4,6,7,8-HPCDF	U		0.952		
1,2,3,4,7,8,9-HPCDF	U		0.952		
OCDF	U		0.952		
TOTAL TETRA-DIOXINS	X				
TOTAL PENTA-DIOXINS	U		0.952		
TOTAL HEXA-DIOXINS	U		0.952		
TOTAL HEPTA-DIOXINS	U		0.952		
TOTAL TETRA-FURANS	U		0.952		
TOTAL PENTA-FURANS	U		0.952		
TOTAL HEXA-FURANS	U		0.952		
TOTAL HEPTA-FURANS	U		0.952		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; B = analyte found in sample and the associated blank; J = concentration less than LMCL; X = result reported separately.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: ________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 08-Sep-2010 12:54:43; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14873-2_Form1A_DX0M_106ES35_SJ1180389.html; Workgroup: WG33444; Design ID: 1402]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-FB-ER
Sample Collection:
08-Jun-2010 12:00

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14873-2 R
Matrix:	AQUEOUS	**Sample Size:**	0.431 L
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	20-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	28-Aug-2010 **Time:** 09:46:12	**GC Column ID:**	DB5
Extract Volume (uL):	10	**Sample Data Filename:**	**DX0M_114 S: 42**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_114 S: 29
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_114 S: 34
Concentration Units:	pg/L		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		1.16		
1,2,3,7,8-PECDD [3]	X				
1,2,3,4,7,8-HXCDD	X				
1,2,3,6,7,8-HXCDD	X				
1,2,3,7,8,9-HXCDD	X				
1,2,3,4,6,7,8-HPCDD	X				
OCDD	X				
2,3,7,8-TCDF	X				
1,2,3,7,8-PECDF	X				
2,3,4,7,8-PECDF	X				
1,2,3,4,7,8-HXCDF	X				
1,2,3,6,7,8-HXCDF	X				
1,2,3,7,8,9-HXCDF	X				
2,3,4,6,7,8-HXCDF	X				
1,2,3,4,6,7,8-HPCDF	X				
1,2,3,4,7,8,9-HPCDF	X				
OCDF	X				
TOTAL TETRA-DIOXINS	U		1.16		
TOTAL PENTA-DIOXINS	X				
TOTAL HEXA-DIOXINS	X				
TOTAL HEPTA-DIOXINS	X				
TOTAL TETRA-FURANS	X				
TOTAL PENTA-FURANS	X				
TOTAL HEXA-FURANS	X				
TOTAL HEPTA-FURANS	X				

(1) Where applicable, custom lab flags have been used on this report; U = not detected; X = result reported separately.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 08-Sep-2010 14:02:43; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14873-2_Form1A_DX0M_114S42_SJ1186853.html; Workgroup: WG33704; Design ID: 1402]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-ER
Sample Collection:
08-Jun-2010 16:20

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14873-3
Matrix:	AQUEOUS	**Sample Size:**	0.503 L
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	12-Aug-2010 **Time:** 21:38:34	**GC Column ID:**	DB5
Extract Volume (uL):	10	**Sample Data Filename:**	**DX0M_106E S: 36**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_106E S: 24
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_106E S: 31
Concentration Units:	pg/L		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		0.994		
1,2,3,7,8-PECDD [3]	U		0.994		
1,2,3,4,7,8-HXCDD	U		0.994		
1,2,3,6,7,8-HXCDD	U		0.994		
1,2,3,7,8,9-HXCDD	U		0.994		
1,2,3,4,6,7,8-HPCDD	U		0.994		
OCDD	K B J	1.03	0.994	0.72	1.000
2,3,7,8-TCDF	U		0.994		
1,2,3,7,8-PECDF	U		0.994		
2,3,4,7,8-PECDF	U		0.994		
1,2,3,4,7,8-HXCDF	U		0.994		
1,2,3,6,7,8-HXCDF	U		0.994		
1,2,3,7,8,9-HXCDF	U		0.994		
2,3,4,6,7,8-HXCDF	U		0.994		
1,2,3,4,6,7,8-HPCDF	U		0.994		
1,2,3,4,7,8,9-HPCDF	U		0.994		
OCDF	U		0.994		
TOTAL TETRA-DIOXINS	U		0.994		
TOTAL PENTA-DIOXINS	U		0.994		
TOTAL HEXA-DIOXINS	U		0.994		
TOTAL HEPTA-DIOXINS	U		0.994		
TOTAL TETRA-FURANS	U		0.994		
TOTAL PENTA-FURANS	U		0.994		
TOTAL HEXA-FURANS	U		0.994		
TOTAL HEPTA-FURANS	U		0.994		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 08-Sep-2010 12:54:43; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14873-3_Form1A_DX0M_106ES36_SJ1180390.html; Workgroup: WG33444; Design ID: 1402]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CPD-ER
Sample Collection:
09-Jun-2010 12:08

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14873-4 i
Matrix:	AQUEOUS	**Sample Size:**	0.498 L
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	01-Sep-2010 **Time:** 20:11:39	**GC Column ID:**	DB5
Extract Volume (uL):	10	**Sample Data Filename:**	**DX0M_116 S: 5**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_106E S: 24
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_116 S: 2
Concentration Units:	pg/L		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	X				
1,2,3,7,8-PECDD [3]	U		1.01		
1,2,3,4,7,8-HXCDD	U		1.01		
1,2,3,6,7,8-HXCDD	U		1.01		
1,2,3,7,8,9-HXCDD	U		1.01		
1,2,3,4,6,7,8-HPCDD	U		1.01		
OCDD	K B J	3.47	1.01	1.04	1.000
2,3,7,8-TCDF	U		1.01		
1,2,3,7,8-PECDF	U		1.01		
2,3,4,7,8-PECDF	U		1.01		
1,2,3,4,7,8-HXCDF	U		1.01		
1,2,3,6,7,8-HXCDF	U		1.01		
1,2,3,7,8,9-HXCDF	U		1.01		
2,3,4,6,7,8-HXCDF	U		1.01		
1,2,3,4,6,7,8-HPCDF	U		1.01		
1,2,3,4,7,8,9-HPCDF	U		1.01		
OCDF	U		1.01		
TOTAL TETRA-DIOXINS	X				
TOTAL PENTA-DIOXINS	U		1.01		
TOTAL HEXA-DIOXINS	U		1.01		
TOTAL HEPTA-DIOXINS	U		1.01		
TOTAL TETRA-FURANS	U		1.01		
TOTAL PENTA-FURANS	U		1.01		
TOTAL HEXA-FURANS	U		1.01		
TOTAL HEPTA-FURANS	U		1.01		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL; X = result reported separately.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: ________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 08-Sep-2010 12:54:43; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14873-4_Form1A_DX0M_116S5_SJ1187528.html; Workgroup: WG33444; Design ID: 1402]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CPD-ER
Sample Collection:
09-Jun-2010 12:08

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14873-4 R
Matrix:	AQUEOUS	**Sample Size:**	0.447 L
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	20-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	28-Aug-2010 **Time:** 10:41:14	**GC Column ID:**	DB5
Extract Volume (uL):	10	**Sample Data Filename:**	**DX0M_114 S: 43**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_114 S: 29
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_114 S: 34
Concentration Units:	pg/L		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		1.12		
1,2,3,7,8-PECDD [3]	X				
1,2,3,4,7,8-HXCDD	X				
1,2,3,6,7,8-HXCDD	X				
1,2,3,7,8,9-HXCDD	X				
1,2,3,4,6,7,8-HPCDD	X				
OCDD	X				
2,3,7,8-TCDF	X				
1,2,3,7,8-PECDF	X				
2,3,4,7,8-PECDF	X				
1,2,3,4,7,8-HXCDF	X				
1,2,3,6,7,8-HXCDF	X				
1,2,3,7,8,9-HXCDF	X				
2,3,4,6,7,8-HXCDF	X				
1,2,3,4,6,7,8-HPCDF	X				
1,2,3,4,7,8,9-HPCDF	X				
OCDF	X				
TOTAL TETRA-DIOXINS	U		1.12		
TOTAL PENTA-DIOXINS	X				
TOTAL HEXA-DIOXINS	X				
TOTAL HEPTA-DIOXINS	X				
TOTAL TETRA-FURANS	X				
TOTAL PENTA-FURANS	X				
TOTAL HEXA-FURANS	X				
TOTAL HEPTA-FURANS	X				

(1) Where applicable, custom lab flags have been used on this report; U = not detected; X = result reported separately.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 08-Sep-2010 14:02:43; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14873-4_Form1A_DX0M_114S43_SJ1186854.html; Workgroup: WG33704; Design ID: 1402]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	N/A
		Lab Sample I.D.:	WG33444-101 :5PT
Matrix:	AQUEOUS	**Sample Size:**	0.500 L
Sample Receipt Date:	N/A	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	12-Aug-2010 **Time:** 10:21:28	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_106E S: 24**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_106E S: 24
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_106E S: 20
Concentration Units:	pg/L		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		1.00		
1,2,3,7,8-PECDD [3]	U		1.00		
1,2,3,4,7,8-HXCDD	U		1.20		
1,2,3,6,7,8-HXCDD	U		1.20		
1,2,3,7,8,9-HXCDD	U		1.20		
1,2,3,4,6,7,8-HPCDD	K J	1.04	1.01	0.83	1.000
OCDD	K J	2.42	1.00	1.22	1.000
2,3,7,8-TCDF	U		1.00		
1,2,3,7,8-PECDF	U		1.00		
2,3,4,7,8-PECDF	U		1.00		
1,2,3,4,7,8-HXCDF	U		1.00		
1,2,3,6,7,8-HXCDF	U		1.00		
1,2,3,7,8,9-HXCDF	U		1.00		
2,3,4,6,7,8-HXCDF	U		1.00		
1,2,3,4,6,7,8-HPCDF	U		1.00		
1,2,3,4,7,8,9-HPCDF	U		1.00		
OCDF	J	1.57	1.00	0.97	1.002
TOTAL TETRA-DIOXINS	U		1.00		
TOTAL PENTA-DIOXINS	U		1.00		
TOTAL HEXA-DIOXINS	U		1.20		
TOTAL HEPTA-DIOXINS	U		1.01		
TOTAL TETRA-FURANS	U		1.00		
TOTAL PENTA-FURANS	U		1.00		
TOTAL HEXA-FURANS	U		1.00		
TOTAL HEPTA-FURANS	U		1.00		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 24-Aug-2010 13:33:21; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33444-101_Form1A_DX0M_106ES24_SJ1180324.html; Workgroup: WG33444; Design ID: 1402]

Form 8A
PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**OPR Data Filename:**	**DX0M_106E S: 21**
Matrix:	AQUEOUS	**Lab Sample I.D.:**	WG33444-102 :5PT
Extraction Date:	23-Jul-2010	**Analysis Date:**	12-Aug-2010 **Time:** 07:39:03

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 20 uL EXTRACT VOLUME.

COMPOUND	LAB FLAG [1]	ION ABUND. RATIO [2]	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS [3] (ng/mL)	% RECOVERY
2,3,7,8-TCDD		0.71	10.0	9.84	6.70 - 15.8	98.4
1,2,3,7,8-PECDD [4]		0.57	52.0	52.3	36.4 - 73.8	101
1,2,3,4,7,8-HXCDD		1.26	56.5	51.0	39.6 - 92.7	90.2
1,2,3,6,7,8-HXCDD		1.21	55.5	56.5	42.2 - 74.4	102
1,2,3,7,8,9-HXCDD	N	1.26	54.0	119	34.6 - 87.5	220
1,2,3,4,6,7,8-HPCDD		0.97	47.5	48.5	33.3 - 66.5	102
OCDD		0.82	100	96.2	78.0 - 144	96.2
2,3,7,8-TCDF		0.76	10.7	11.3	8.03 - 16.9	105
1,2,3,7,8-PECDF		1.56	46.0	50.9	36.8 - 61.6	111
2,3,4,7,8-PECDF		1.51	47.0	53.0	32.0 - 75.2	113
1,2,3,4,7,8-HXCDF		1.23	50.0	57.0	36.0 - 67.0	114
1,2,3,6,7,8-HXCDF		1.17	47.5	50.1	39.9 - 61.8	105
1,2,3,7,8,9-HXCDF		1.20	52.5	56.1	41.0 - 68.3	107
2,3,4,6,7,8-HXCDF		1.12	53.0	57.2	37.1 - 82.7	108
1,2,3,4,6,7,8-HPCDF		1.00	50.0	54.3	41.0 - 61.0	109
1,2,3,4,7,8,9-HPCDF		1.00	50.0	52.3	39.0 - 69.0	105
OCDF		0.79	104	71.4	65.5 - 177	68.6

(1) Where applicable, custom lab flags have been used on this report; N = authentic recovery is not within method/contract control limits.
(2) Contract-required Ion Abundance Ratios are specified in Table 9, Method 1613.
(3) Contract-required concentration range as determined from the percent of the test concentration in Table 6, Method 1613, under OPR.
(4) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Celine Vaillant________

BATCH SUMMARY

Batch ID:	WG33418	***Date:*** 20-Aug-2010
Analysis Type:	Dioxin/Furan	***Matrix Type:*** Solid

BATCH MAKEUP

Contract: 4406

Samples:

L14884-4	SDS-CPD-04
L14884-11	SDS-PB-01
L14884-14	SDS-PB-04
L14884-15	SDS-PB-05
L14884-16	SDS-PB-05-D
L14884-17	SDS-PB-06
L14884-18	SDS-PB-07
L14884-19	SDS-CPD-05
L14884-23	SDS-CPD-12
L14884-25	SDS-CPD-15

Blank:
WG33418-101

Reference or Spike:
WG33418-102
WG33418-104

Duplicate:
WG33418-103

Comments:

1. Data are not blank corrected.
2. The CRM (AXYS ID WG33418-104) recovered well, however for some compounds the recovery fell outside the certified range.
3. The lock mass signal in the vicinity of native and labeled 1,2,3,7,8-PeCDD was observed in the Lab Blank, OPR, sample duplicate, and CRM (AXYS ID: WG33418-101, -102, -103, -104, respectively). The compound 1,2,3,7,8-PECDD and its surrogate are flagged with a 'G' on the report form. The data are not considered significantly affected by these fluctuations.
4. The surrogate recoveries in the duplicate sample SDS-PB-01 (Duplicate) (AXYS ID: WG33418-103) fell below the lower method control limit, and are flagged with a 'V' on the report form. The duplication analysis demonstrates that the low recoveries have a negligible impact on the data. The replicates agree well for congeners quantified against exact labeled analogs, and for congeners quantified against surrogates whose recoveries are within the control limits.
5. Percent recovery of clean up standard 37CL-2,3,7,8-TCDD in the several samples and several surrogate recoveries in the Lab Blank, sample SDS-PB-06, and SDS-CPD-15 (AXYS ID: WG33418-101, L14884-17, and -25, respectively) were observed to be slightly outside the method limits and have been flagged with a 'V' on the report form. As the isotope dilution method of quantification produces data that are recovery corrected, the slight variances from the method acceptance criteria are deemed not to affect the quantification of these analytes. Percent surrogate recoveries are used as general method performance indicator only.
6. The analysis of samples SDS-CPD-01, SDS-CPD-03, SDS-CPD-16, SDS-PB-02, SDS-PB-03 and SDS-CPD-09 (AXYS ID: L14884-1, -3, -10, -12, -13, -21) was not successful and data is not available in this batch summary

AXYS METHOD MLA-017 Rev 17

Form 1A
PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CPD-04
Sample Collection:
09-Jun-2010 11:07

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-4
Matrix:	SOLID	**Sample Size:**	9.63 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 15:03:04	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_170 S: 9**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_170 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	40.4

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.220	0.0519	0.59	1.001
1,2,3,7,8-PECDD [3]	K J	0.714	0.0519	0.47	1.001
1,2,3,4,7,8-HXCDD	J	0.936	0.108	1.08	1.000
1,2,3,6,7,8-HXCDD	J	3.44	0.108	1.19	1.000
1,2,3,7,8,9-HXCDD	J	2.52	0.108	1.38	1.010
1,2,3,4,6,7,8-HPCDD	B	41.4	0.110	1.06	1.000
OCDD	B	274	0.0606	0.89	1.000
2,3,7,8-TCDF		1.80	0.0519	0.80	1.002
1,2,3,7,8-PECDF	J	0.328	0.0519	1.70	1.000
2,3,4,7,8-PECDF	B J	0.515	0.0519	1.73	1.000
1,2,3,4,7,8-HXCDF	J	0.678	0.0942	1.24	1.000
1,2,3,6,7,8-HXCDF	K J	0.471	0.0942	1.50	1.000
1,2,3,7,8,9-HXCDF	U		0.0942		
2,3,4,6,7,8-HXCDF	J	0.572	0.0942	1.16	1.000
1,2,3,4,6,7,8-HPCDF		11.3	0.0747	1.06	1.000
1,2,3,4,7,8,9-HPCDF	J	0.757	0.0747	1.12	1.000
OCDF		39.6	0.0519	0.88	1.002
TOTAL TETRA-DIOXINS	B	21.1	0.0519		
TOTAL PENTA-DIOXINS		17.1	0.0519		
TOTAL HEXA-DIOXINS		55.0	0.108		
TOTAL HEPTA-DIOXINS	B	100	0.110		
TOTAL TETRA-FURANS		11.4	0.0519		
TOTAL PENTA-FURANS		7.49	0.0519		
TOTAL HEXA-FURANS		13.4	0.0942		
TOTAL HEPTA-FURANS		34.3	0.0747		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:43:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-4_Form1A_DX0B_170S9_SJ1178297.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CPD-04
Sample Collection:
09-Jun-2010 11:07

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.			FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-4
Matrix:	SOLID	**Sample Size:**	9.63 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Aug-2010 **Time:** 21:20:54	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_102 S: 4**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_102 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	40.4

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	J	0.791	0.239	0.70	1.001

(1) Where applicable, custom lab flags have been used on this report; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

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Report Filename: 1613_DIOXINS_1613DB225_L14884-4_Form1A_DB03_102S4_SJ1178901.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-01
Sample Collection:
07-Jun-2010 13:07

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-11 (A)
Matrix:	SOLID	**Sample Size:**	10.8 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 16:52:40	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_170 S: 11**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_170 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	28.0

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.074	0.0463	0.33	1.001
1,2,3,7,8-PECDD [3]	K J	0.089	0.0463	0.74	1.001
1,2,3,4,7,8-HXCDD	K J	0.096	0.0774	0.92	1.000
1,2,3,6,7,8-HXCDD	J	0.576	0.0774	1.16	1.000
1,2,3,7,8,9-HXCDD	K J	0.423	0.0774	1.97	1.010
1,2,3,4,6,7,8-HPCDD	B J	3.55	0.0463	1.03	1.000
OCDD	B	20.4	0.0560	0.89	1.000
2,3,7,8-TCDF	J	0.351	0.0463	0.75	1.001
1,2,3,7,8-PECDF	U		0.0563		
2,3,4,7,8-PECDF	B J	0.082	0.0563	1.52	1.000
1,2,3,4,7,8-HXCDF	J	0.091	0.0504	1.12	1.001
1,2,3,6,7,8-HXCDF	K J	0.084	0.0504	0.97	1.000
1,2,3,7,8,9-HXCDF	U		0.0504		
2,3,4,6,7,8-HXCDF	J	0.083	0.0504	1.31	1.000
1,2,3,4,6,7,8-HPCDF	K J	0.821	0.0506	0.82	1.000
1,2,3,4,7,8,9-HPCDF	U		0.0506		
OCDF	J	1.70	0.0463	0.83	1.002
TOTAL TETRA-DIOXINS	B	0.261	0.0463		
TOTAL PENTA-DIOXINS		0.731	0.0463		
TOTAL HEXA-DIOXINS		4.18	0.0774		
TOTAL HEPTA-DIOXINS	B	8.45	0.0463		
TOTAL TETRA-FURANS		1.47	0.0463		
TOTAL PENTA-FURANS		0.384	0.0563		
TOTAL HEXA-FURANS		1.09	0.0504		
TOTAL HEPTA-FURANS		1.20	0.0506		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:43:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-11_Form1A_DX0B_170S11_SJ1178299.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-01
Sample Collection:
07-Jun-2010 13:07

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-11 (A)
Matrix:	SOLID	**Sample Size:**	10.8 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Aug-2010 **Time:** 22:34:03	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_102 S: 6**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_102 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	28.0

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.201		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

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Report Filename: 1613_DIOXINS_1613DB225_L14884-11_Form1A_DB03_102S6_SJ1178902.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-04
Sample Collection:
07-Jun-2010 14:39

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-14 i
Matrix:	SOLID	**Sample Size:**	10.3 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Aug-2010 **Time:** 12:18:42	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_177 S: 6**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_177 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	17.6

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.069	0.0504	0.50	1.001
1,2,3,7,8-PECDD [3]	U		0.0486		
1,2,3,4,7,8-HXCDD	U		0.0607		
1,2,3,6,7,8-HXCDD	K J	0.117	0.0607	0.99	1.000
1,2,3,7,8,9-HXCDD	U		0.0607		
1,2,3,4,6,7,8-HPCDD	K B J	0.428	0.0486	0.85	1.000
OCDD	K B J	2.07	0.0593	1.08	1.000
2,3,7,8-TCDF	K J	0.134	0.0486	0.47	1.001
1,2,3,7,8-PECDF	K J	0.053	0.0486	2.23	1.001
2,3,4,7,8-PECDF	K B J	0.080	0.0486	1.80	1.001
1,2,3,4,7,8-HXCDF	U		0.0486		
1,2,3,6,7,8-HXCDF	K J	0.049	0.0486	0.85	1.001
1,2,3,7,8,9-HXCDF	U		0.0486		
2,3,4,6,7,8-HXCDF	K J	0.050	0.0486	1.92	1.000
1,2,3,4,6,7,8-HPCDF	J	0.153	0.0689	0.90	1.000
1,2,3,4,7,8,9-HPCDF	U		0.0689		
OCDF	K J	0.150	0.0486	0.56	1.001
TOTAL TETRA-DIOXINS	U		0.0504		
TOTAL PENTA-DIOXINS	U		0.0486		
TOTAL HEXA-DIOXINS		0.533	0.0607		
TOTAL HEPTA-DIOXINS	U		0.0486		
TOTAL TETRA-FURANS	U		0.0486		
TOTAL PENTA-FURANS	U		0.0486		
TOTAL HEXA-FURANS		0.157	0.0486		
TOTAL HEPTA-FURANS		0.332	0.0689		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: ________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:43:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-14_Form1A_DX0B_177S6_SJ1178584.html; Workgroup: WG33418; Design ID: 699]

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested. Results are compliant with NELAP where specific accreditation is held.

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-04
Sample Collection:
07-Jun-2010 14:39

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-14
Matrix:	SOLID	**Sample Size:**	10.3 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	05-Aug-2010 **Time:** 01:00:24	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_102 S: 10**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_102 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	17.6

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.247		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

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Report Filename: 1613_DIOXINS_1613DB225_L14884-14_Form1A_DB03_102S10_SJ1178904.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-05
Sample Collection:
07-Jun-2010 14:50

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-15 i
Matrix:	SOLID	**Sample Size:**	10.9 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Aug-2010 **Time:** 13:13:31	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_177 S: 7**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_177 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	29.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.157	0.0652	0.97	1.002
1,2,3,7,8-PECDD [3]	J	0.214	0.0462	0.59	1.000
1,2,3,4,7,8-HXCDD	J	0.164	0.0605	1.38	1.000
1,2,3,6,7,8-HXCDD	K J	0.853	0.0605	1.78	1.000
1,2,3,7,8,9-HXCDD	J	0.582	0.0605	1.07	1.010
1,2,3,4,6,7,8-HPCDD	B	6.03	0.0480	1.10	1.000
OCDD	B	38.7	0.0711	0.89	1.000
2,3,7,8-TCDF	J	0.547	0.0668	0.73	1.001
1,2,3,7,8-PECDF	K J	0.078	0.0461	2.47	1.001
2,3,4,7,8-PECDF	K B J	0.181	0.0461	1.90	1.001
1,2,3,4,7,8-HXCDF	K J	0.152	0.0605	1.02	1.000
1,2,3,6,7,8-HXCDF	J	0.080	0.0605	1.25	1.000
1,2,3,7,8,9-HXCDF	U		0.0605		
2,3,4,6,7,8-HXCDF	K J	0.134	0.0605	0.62	1.000
1,2,3,4,6,7,8-HPCDF	J	2.07	0.0493	0.95	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.074	0.0493	0.53	1.000
OCDF	J	3.65	0.0553	0.89	1.002
TOTAL TETRA-DIOXINS	B	0.297	0.0652		
TOTAL PENTA-DIOXINS		0.907	0.0462		
TOTAL HEXA-DIOXINS		6.39	0.0605		
TOTAL HEPTA-DIOXINS	B	16.1	0.0480		
TOTAL TETRA-FURANS		1.68	0.0668		
TOTAL PENTA-FURANS		1.35	0.0461		
TOTAL HEXA-FURANS		0.967	0.0605		
TOTAL HEPTA-FURANS		4.81	0.0493		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:43:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-15_Form1A_DX0B_177S7_SJ1178585.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-05
Sample Collection:
07-Jun-2010 14:50

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-15
Matrix:	SOLID	**Sample Size:**	10.9 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	05-Aug-2010 **Time:** 01:36:58	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_102 S: 11**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_102 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	29.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	J	0.450	0.238	0.71	1.001

(1) Where applicable, custom lab flags have been used on this report; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:42:50; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-15_Form1A_DB03_102S11_SJ1178905.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-06
Sample Collection:
07-Jun-2010 15:24

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-17
Matrix:	SOLID	**Sample Size:**	10.2 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Aug-2010 **Time:** 15:04:20	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_175A S: 7**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_175A S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	20.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.076	0.0591	0.35	1.001
1,2,3,7,8-PECDD [3]	K J	0.073	0.0493	0.09	1.001
1,2,3,4,7,8-HXCDD	U		0.0753		
1,2,3,6,7,8-HXCDD	U		0.0753		
1,2,3,7,8,9-HXCDD	U		0.0753		
1,2,3,4,6,7,8-HPCDD	K B J	0.463	0.0493	0.77	1.000
OCDD	B J	2.44	0.0493	0.98	1.000
2,3,7,8-TCDF	K J	0.101	0.0493	1.10	1.001
1,2,3,7,8-PECDF	U		0.0493		
2,3,4,7,8-PECDF	B J	0.057	0.0493	1.74	1.001
1,2,3,4,7,8-HXCDF	U		0.0493		
1,2,3,6,7,8-HXCDF	U		0.0493		
1,2,3,7,8,9-HXCDF	U		0.0493		
2,3,4,6,7,8-HXCDF	U		0.0493		
1,2,3,4,6,7,8-HPCDF	K J	0.105	0.0507	0.87	1.000
1,2,3,4,7,8,9-HPCDF	U		0.0507		
OCDF	J	0.256	0.0493	0.99	1.002
TOTAL TETRA-DIOXINS	U		0.0591		
TOTAL PENTA-DIOXINS	U		0.0493		
TOTAL HEXA-DIOXINS		0.584	0.0753		
TOTAL HEPTA-DIOXINS	B	0.694	0.0493		
TOTAL TETRA-FURANS	U		0.0493		
TOTAL PENTA-FURANS		0.057	0.0493		
TOTAL HEXA-FURANS		0.088	0.0493		
TOTAL HEPTA-FURANS		0.163	0.0507		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:43:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-17_Form1A_DX0B_175AS7_SJ1178310.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-PB-06
Sample Collection:
07-Jun-2010 15:24

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-17
Matrix:	SOLID	**Sample Size:**	10.2 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	05-Aug-2010 **Time:** 02:50:10	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_102 S: 13**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_102 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	20.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.239		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
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Signed: _________Bryan Alonzo________

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Report Filename: 1613_DIOXINS_1613DB225_L14884-17_Form1A_DB03_102S13_SJ1178906.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-PB-07
Sample Collection:
07-Jun-2010 15:47

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-18
Matrix:	SOLID	**Sample Size:**	10.2 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Aug-2010 **Time:** 15:59:08	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_175A S: 8**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_175A S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	24.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.092	0.0655	0.32	1.001
1,2,3,7,8-PECDD [3]	K J	0.114	0.0489	0.34	1.001
1,2,3,4,7,8-HXCDD	K J	0.061	0.0491	1.86	1.000
1,2,3,6,7,8-HXCDD	J	0.280	0.0491	1.22	1.001
1,2,3,7,8,9-HXCDD	J	0.217	0.0491	1.21	1.010
1,2,3,4,6,7,8-HPCDD	K B J	1.80	0.0489	0.86	1.000
OCDD	B	9.92	0.0489	0.87	1.000
2,3,7,8-TCDF	K J	0.192	0.0489	0.90	1.001
1,2,3,7,8-PECDF	K J	0.061	0.0489	2.09	1.001
2,3,4,7,8-PECDF	B J	0.093	0.0489	1.62	1.000
1,2,3,4,7,8-HXCDF	K J	0.056	0.0489	1.66	1.000
1,2,3,6,7,8-HXCDF	U		0.0489		
1,2,3,7,8,9-HXCDF	U		0.0489		
2,3,4,6,7,8-HXCDF	K J	0.055	0.0489	0.48	1.000
1,2,3,4,6,7,8-HPCDF	J	0.387	0.0601	1.12	1.000
1,2,3,4,7,8,9-HPCDF	U		0.0601		
OCDF	J	0.722	0.0489	0.91	1.002
TOTAL TETRA-DIOXINS	U		0.0655		
TOTAL PENTA-DIOXINS		0.104	0.0489		
TOTAL HEXA-DIOXINS		2.14	0.0491		
TOTAL HEPTA-DIOXINS	B	2.27	0.0489		
TOTAL TETRA-FURANS		0.169	0.0489		
TOTAL PENTA-FURANS		0.211	0.0489		
TOTAL HEXA-FURANS		0.468	0.0489		
TOTAL HEPTA-FURANS		0.866	0.0601		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

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Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:43:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-18_Form1A_DX0B_175AS8_SJ1178311.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-07
Sample Collection:
07-Jun-2010 15:47

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-18
Matrix:	SOLID	**Sample Size:**	10.2 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	05-Aug-2010 **Time:** 03:26:44	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_102 S: 14**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_102 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	24.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.149		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
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Report Filename: 1613_DIOXINS_1613DB225_L14884-18_Form1A_DB03_102S14_SJ1178907.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CPD-05
Sample Collection:
10-Jun-2010 10:57

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Matrix:	SOLID	**Lab Sample I.D.:**	L14884-19
Sample Receipt Date:	17-Jun-2010	**Sample Size:**	9.59 g (dry)
Extraction Date:	22-Jul-2010	**Initial Calibration Date:**	05-Aug-2010
Analysis Date:	09-Aug-2010 **Time:** 16:53:56	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB5
Injection Volume (uL):	1.0	**Sample Data Filename:**	**DX0B_175A S: 9**
Dilution Factor:	N/A	**Blank Data Filename:**	DX0B_170 S: 5
Concentration Units:	pg/g (dry weight basis)	**Cal. Ver. Data Filename:**	DX0B_175A S: 1
		% Moisture:	42.4

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.253	0.157	0.43	1.001
1,2,3,7,8-PECDD [3]	K J	0.761	0.0712	0.48	1.001
1,2,3,4,7,8-HXCDD	K J	0.731	0.0902	1.54	1.000
1,2,3,6,7,8-HXCDD	J	2.30	0.0902	1.15	1.000
1,2,3,7,8,9-HXCDD	J	1.90	0.0902	1.09	1.010
1,2,3,4,6,7,8-HPCDD	B	19.7	0.0926	1.06	1.000
OCDD	B	126	0.0521	0.89	1.000
2,3,7,8-TCDF		2.98	0.0872	0.77	1.001
1,2,3,7,8-PECDF	J	0.511	0.0521	1.50	1.000
2,3,4,7,8-PECDF	B J	0.633	0.0521	1.66	1.000
1,2,3,4,7,8-HXCDF	J	0.612	0.0893	1.22	1.000
1,2,3,6,7,8-HXCDF	J	0.399	0.0893	1.06	1.000
1,2,3,7,8,9-HXCDF	U		0.0893		
2,3,4,6,7,8-HXCDF	J	0.318	0.0893	1.27	1.000
1,2,3,4,6,7,8-HPCDF	J	5.19	0.117	1.01	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.418	0.117	1.27	1.000
OCDF		13.3	0.0671	0.88	1.002
TOTAL TETRA-DIOXINS	B	21.6	0.157		
TOTAL PENTA-DIOXINS		15.4	0.0712		
TOTAL HEXA-DIOXINS		21.0	0.0902		
TOTAL HEPTA-DIOXINS	B	54.9	0.0926		
TOTAL TETRA-FURANS		15.0	0.0872		
TOTAL PENTA-FURANS		5.76	0.0521		
TOTAL HEXA-FURANS		7.21	0.0893		
TOTAL HEPTA-FURANS		13.9	0.117		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
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(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

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Signed: _________Bryan Alonzo________

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Report Filename: 1613_DIOXINS_1613DB5_L14884-19_Form1A_DX0B_175AS9_SJ1178312.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CPD-05
Sample Collection:
10-Jun-2010 10:57

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-19
Matrix:	SOLID	**Sample Size:**	9.59 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	05-Aug-2010 **Time:** 04:03:19	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_102 S: 15**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_102 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	42.4

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	K J	0.980	0.408	0.53	1.002

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

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Report Filename: 1613_DIOXINS_1613DB225_L14884-19_Form1A_DB03_102S15_SJ1178908.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CPD-15
Sample Collection:
10-Jun-2010 12:23

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-25
Matrix:	SOLID	**Sample Size:**	10.0 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Aug-2010 **Time:** 19:38:20	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_175A S: 12**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_175A S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	42.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.194	0.0544	0.32	1.001
1,2,3,7,8-PECDD [3]	J	0.599	0.0573	0.55	1.000
1,2,3,4,7,8-HXCDD	J	0.688	0.0770	1.09	1.000
1,2,3,6,7,8-HXCDD	J	2.71	0.0770	1.22	1.000
1,2,3,7,8,9-HXCDD	J	2.20	0.0770	1.18	1.010
1,2,3,4,6,7,8-HPCDD	B	27.1	0.0703	1.06	1.000
OCDD	B	171	0.0499	0.88	1.001
2,3,7,8-TCDF		1.73	0.0752	0.84	1.002
1,2,3,7,8-PECDF	K J	0.336	0.0683	2.19	1.000
2,3,4,7,8-PECDF	B J	0.243	0.0683	1.30	1.010
1,2,3,4,7,8-HXCDF	K J	0.607	0.0722	1.60	1.000
1,2,3,6,7,8-HXCDF	K J	0.320	0.0722	1.02	1.000
1,2,3,7,8,9-HXCDF	U		0.0722		
2,3,4,6,7,8-HXCDF	J	0.457	0.0722	1.11	1.000
1,2,3,4,6,7,8-HPCDF		7.62	0.0894	1.09	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.454	0.0894	0.83	1.000
OCDF		19.9	0.0793	0.87	1.002
TOTAL TETRA-DIOXINS	B	7.85	0.0544		
TOTAL PENTA-DIOXINS		7.70	0.0573		
TOTAL HEXA-DIOXINS		28.1	0.0770		
TOTAL HEPTA-DIOXINS	B	70.7	0.0703		
TOTAL TETRA-FURANS		8.10	0.0752		
TOTAL PENTA-FURANS		4.04	0.0683		
TOTAL HEXA-FURANS		8.08	0.0722		
TOTAL HEPTA-FURANS		19.3	0.0894		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

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Signed: ________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:43:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-25_Form1A_DX0B_175AS12_SJ1178315.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CPD-15
Sample Collection:
10-Jun-2010 12:23

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-25
Matrix:	SOLID	**Sample Size:**	10.0 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	05-Aug-2010 **Time:** 05:53:05	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_102 S: 18**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_102 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	42.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	K J	0.908	0.357	0.91	1.002

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:42:50; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-25_Form1A_DB03_102S18_SJ1178909.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-PB-01 (Duplicate)
Sample Collection:
07-Jun-2010 13:07

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	WG33418-103 (DUP L14884-11)
Matrix:	SOLID	**Sample Size:**	10.6 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 17:47:29	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_170 S: 12**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_170 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	27.3

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.075	0.0711	0.46	1.000
1,2,3,7,8-PECDD [3]	U G		0.117		
1,2,3,4,7,8-HXCDD	J	0.190	0.0698	1.17	1.000
1,2,3,6,7,8-HXCDD	K J	0.578	0.0698	1.60	1.000
1,2,3,7,8,9-HXCDD	J	0.533	0.0698	1.35	1.010
1,2,3,4,6,7,8-HPCDD	B J	3.45	0.0488	1.13	1.000
OCDD	B	20.4	0.0952	0.91	1.000
2,3,7,8-TCDF	J	0.343	0.0571	0.85	1.001
1,2,3,7,8-PECDF	U		0.158		
2,3,4,7,8-PECDF	U		0.158		
1,2,3,4,7,8-HXCDF	K J	0.105	0.0816	3.22	1.000
1,2,3,6,7,8-HXCDF	J	0.107	0.0816	1.34	1.000
1,2,3,7,8,9-HXCDF	U		0.0816		
2,3,4,6,7,8-HXCDF	K J	0.118	0.0816	0.57	1.000
1,2,3,4,6,7,8-HPCDF	J	0.911	0.131	1.16	1.000
1,2,3,4,7,8,9-HPCDF	U		0.131		
OCDF	J	1.61	0.0520	0.93	1.002
TOTAL TETRA-DIOXINS	U		0.0711		
TOTAL PENTA-DIOXINS		0.561	0.117		
TOTAL HEXA-DIOXINS		4.29	0.0698		
TOTAL HEPTA-DIOXINS	B	8.45	0.0488		
TOTAL TETRA-FURANS		0.954	0.0571		
TOTAL PENTA-FURANS	U		0.158		
TOTAL HEXA-FURANS		0.993	0.0816		
TOTAL HEPTA-FURANS		1.86	0.131		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL; G = lock mass interference present.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:43:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33418-103_Form1A_DX0B_170S12_SJ1178300.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-01 (Duplicate)
Sample Collection:
07-Jun-2010 13:07

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	WG33418-103 (DUP L14884-11)
Matrix:	SOLID	**Sample Size:**	10.6 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Aug-2010 **Time:** 23:10:40	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_102 S: 7**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_102 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	27.3

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.284		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:42:50; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_WG33418-103_Form1A_DB03_102S7_SJ1178903.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

PCDD/PCDF ANALYSIS REPORT
RELATIVE PERCENT DIFFERENCE

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No. FIDALGO BAY, CUSTOM PLYWOOD DX STUDY

Contract No.: 4406

Client ID: SDS-PB-01

Concentration Units: pg/g (dry weight basis)

COMPOUND	L14884-11 (A) LAB FLAG [1]	L14884-11 (A) CONC. FOUND	WG33418-103 LAB FLAG [1]	WG33418-103 CONC. FOUND	MEAN	RELATIVE PERCENT DIFFERENCE
2,3,7,8-TCDD	K J	0.074	K J	0.075		
1,2,3,7,8-PECDD	K J	0.089	U G			
1,2,3,4,7,8-HXCDD	K J	0.096	J	0.190		
1,2,3,6,7,8-HXCDD	J	0.576	K J	0.578		
1,2,3,7,8,9-HXCDD	K J	0.423	J	0.533		
1,2,3,4,6,7,8-HPCDD	J	3.55	J	3.45	3.50	2.94
OCDD		20.4		20.4	20.4	0.108
2,3,7,8-TCDF	U		U			
1,2,3,7,8-PECDF	U		U			
2,3,4,7,8-PECDF	J	0.082	U			
1,2,3,4,7,8-HXCDF	J	0.091	K J	0.105		
1,2,3,6,7,8-HXCDF	K J	0.084	J	0.107		
1,2,3,7,8,9-HXCDF	U		U			
2,3,4,6,7,8-HXCDF	J	0.083	K J	0.118		
1,2,3,4,6,7,8-HPCDF	K J	0.821	J	0.911		
1,2,3,4,7,8,9-HPCDF	U		U			
OCDF	J	1.70	J	1.61	1.65	5.75

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL; G = lock mass interference present.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: RPD.xsl; Created: 20-Aug-2010 11:44:27; Application: XMLTransformer-1.10.25;
Report Filename: RPD_DIOXINS_1613-RPD_WG33418-103_L14884-11_.html; Workgroup: WG33418; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	N/A
		Lab Sample I.D.:	WG33418-101
Matrix:	SOLID	**Sample Size:**	10.0 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 11:23:42	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_170 S: 5**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_170 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_170 S: 1
Concentration Units:	pg/g		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	J	0.114	0.0500	0.73	1.001
1,2,3,7,8-PECDD [3]	U G		0.0500		
1,2,3,4,7,8-HXCDD	U		0.0500		
1,2,3,6,7,8-HXCDD	U		0.0500		
1,2,3,7,8,9-HXCDD	U		0.0500		
1,2,3,4,6,7,8-HPCDD	J	0.052	0.0500	1.13	1.000
OCDD	K J	0.088	0.0500	0.42	1.000
2,3,7,8-TCDF	U		0.0500		
1,2,3,7,8-PECDF	U		0.0500		
2,3,4,7,8-PECDF	K J	0.062	0.0500	1.02	1.001
1,2,3,4,7,8-HXCDF	U		0.0500		
1,2,3,6,7,8-HXCDF	U		0.0500		
1,2,3,7,8,9-HXCDF	U		0.0500		
2,3,4,6,7,8-HXCDF	U		0.0500		
1,2,3,4,6,7,8-HPCDF	U		0.0500		
1,2,3,4,7,8,9-HPCDF	U		0.0500		
OCDF	U		0.0500		
TOTAL TETRA-DIOXINS		0.114	0.0500		
TOTAL PENTA-DIOXINS	U		0.0500		
TOTAL HEXA-DIOXINS	U		0.0500		
TOTAL HEPTA-DIOXINS		0.052	0.0500		
TOTAL TETRA-FURANS	U		0.0500		
TOTAL PENTA-FURANS	U		0.0500		
TOTAL HEXA-FURANS	U		0.0500		
TOTAL HEPTA-FURANS	U		0.0500		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL; G = lock mass interference present.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 20-Aug-2010 11:43:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33418-101_Form1A_DX0B_170S5_SJ1178292.html; Workgroup: WG33418; Design ID: 699]

Form 8A

PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**OPR Data Filename:**	**DX0B_170 S: 2**
Matrix:	SOLID	**Lab Sample I.D.:**	WG33418-102
Extraction Date:	22-Jul-2010	**Analysis Date:**	06-Aug-2010 **Time:** 08:39:11

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 20 uL EXTRACT VOLUME.

COMPOUND	LAB FLAG [1]	ION ABUND. RATIO [2]	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS [3] (ng/mL)	% RECOVERY
2,3,7,8-TCDD		0.80	10.0	10.5	6.70 - 15.8	105
1,2,3,7,8-PECDD [4]	G	0.62	52.0	52.4	36.4 - 73.8	101
1,2,3,4,7,8-HXCDD		1.26	56.5	57.4	39.6 - 92.7	102
1,2,3,6,7,8-HXCDD		1.24	55.5	57.6	42.2 - 74.4	104
1,2,3,7,8,9-HXCDD		1.26	54.0	53.4	34.6 - 87.5	98.8
1,2,3,4,6,7,8-HPCDD		1.06	47.5	46.4	33.3 - 66.5	97.8
OCDD		0.89	100	99.8	78.0 - 144	99.8
2,3,7,8-TCDF		0.80	10.7	11.1	8.03 - 16.9	104
1,2,3,7,8-PECDF		1.57	46.0	46.6	36.8 - 61.6	101
2,3,4,7,8-PECDF		1.55	47.0	49.2	32.0 - 75.2	105
1,2,3,4,7,8-HXCDF		1.25	50.0	49.2	36.0 - 67.0	98.5
1,2,3,6,7,8-HXCDF		1.25	47.5	46.7	39.9 - 61.8	98.4
1,2,3,7,8,9-HXCDF		1.26	52.5	51.7	41.0 - 68.3	98.4
2,3,4,6,7,8-HXCDF		1.27	53.0	51.3	37.1 - 82.7	96.8
1,2,3,4,6,7,8-HPCDF		1.06	50.0	51.5	41.0 - 61.0	103
1,2,3,4,7,8,9-HPCDF		1.05	50.0	49.7	39.0 - 69.0	99.4
OCDF		0.91	104	109	65.5 - 177	104

(1) Where applicable, custom lab flags have been used on this report; G = lock mass interference present.
(2) Contract-required Ion Abundance Ratios are specified in Table 9, Method 1613.
(3) Contract-required concentration range as determined from the percent of the test concentration in Table 6, Method 1613, under OPR.
(4) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

Form 8G

PCDD/PCDF CERTIFIED REFERENCE MATERIAL (CRM) REPORT FOR NIST SRM 1944

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Lab Sample I.D.:**	WG33418-104
Matrix:	SOLID	**Sample Size:**	1.00 g (dry)
Extraction Date:	22-Jul-2010	**Initial Calibration Date:**	05-Aug-2010
Analysis Date:	06-Aug-2010 **Time:** 12:18:29	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB5
Injection Volume (uL):	1.0	**CRM Data Filename:**	**DX0B_170 S: 6**
Dilution Factor:	N/A	**Blank Data Filename:**	DX0B_170 S: 5
Concentration Units:	pg/g (dry weight basis)	**Cal. Ver. Data Filename:**	DX0B_170 S: 1

COMPOUND	LAB FLAG [1]	DETERMINED	CERTIFIED / REFERENCE
2,3,7,8-TCDD		132	133 +/- 9
1,2,3,7,8-PECDD [2]	G	18.6	19 +/- 2
1,2,3,4,7,8-HXCDD		28.8	26 +/- 3
1,2,3,6,7,8-HXCDD		67.7	56 +/- 6
1,2,3,7,8,9-HXCDD		75.8	53 +/- 7
1,2,3,4,6,7,8-HPCDD		794	800 +/- 70
OCDD		5820	5800 +/- 700
2,3,7,8-TCDF		175	39 +/- 15
1,2,3,7,8-PECDF		44.8	45 +/- 7
2,3,4,7,8-PECDF		43.3	45 +/- 4
1,2,3,4,7,8-HXCDF		200	220 +/- 30
1,2,3,6,7,8-HXCDF		86.3	90 +/- 10
1,2,3,7,8,9-HXCDF		2.83	19 +/- 18
2,3,4,6,7,8-HXCDF		49.0	54 +/- 6
1,2,3,4,6,7,8-HPCDF		965	1000 +/- 100
1,2,3,4,7,8,9-HPCDF		43.4	40 +/- 6
OCDF		1080	1000 +/- 100

(1) Where applicable, custom lab flags have been used on this report; G = lock mass interference present.
(2) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form8G.xsl; Created: 20-Aug-2010 11:43:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33418-104_Form8G_SJ1178294.html; Workgroup: WG33418; Design ID: 699]

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested. Results are compliant with NELAP where specific accreditation is held.

Form 8G

PCDD/PCDF CERTIFIED REFERENCE MATERIAL (CRM) REPORT FOR NIST SRM 1944

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Lab Sample I.D.:**	WG33418-104
Matrix:	SOLID	**Sample Size:**	1.00 g (dry)
Extraction Date:	22-Jul-2010	**Initial Calibration Date:**	13-Jul-2010
Analysis Date:	04-Aug-2010 **Time:** 11:23:22	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB225
Injection Volume (uL):	2.0	**CRM Data Filename:**	**DB03_101 S: 7**
Dilution Factor:	N/A	**Blank Data Filename:**	DX0B_170 S: 5
Concentration Units:	pg/g (dry weight basis)	**Cal. Ver. Data Filename:**	DB03_101 S: 2

COMPOUND	LAB FLAG [1]	DETERMINED	CERTIFIED / REFERENCE
2,3,7,8-TCDF	K	29.2	39 +/- 15

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form8G.xsl; Created: 20-Aug-2010 11:42:50; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_WG33418-104_Form8G_SJ1178844.html; Workgroup: WG33418; Design ID: 699]

BATCH SUMMARY

Batch ID:	WG33419	***Date:*** 27-Aug-2010
Analysis Type:	Dioxin/Furan	***Matrix Type:*** Solid

BATCH MAKEUP

Contract: 4406

Samples:

L14884-27	SDS-CT-01B
L14884-29	SDS-CT-03
L14884-30	SDS-CT-04
L14884-32	SDS-CPD-17
L14884-37	SDS-PB-08
L14884-38	SDS-PB-09
L14884-40	SDS-FB-01
L14884-41	SDS-FB-02
L14884-45	SDS-FB-06

Blank:
WG33419-101

Reference or Spike:
WG33419-102
WG33419-104

Duplicate:
WG33419-103

Comments:

1. Data are not blank corrected.
2. Percent surrogate recovery of 13C-2,3,7,8-TCDD in the Lab Blank (AXYS ID: WG33419-101) was below the range required for accurate quantification. As a result the surrogate and its associated analytes have been flagged ‘NQ’ on the report form.
3. The lock mass signal in the vicinity of native and labeled 1,2,3,7,8-PeCDD was observed in the sample SDS-FB-02 (AXYS ID: L14884-41). The compound 1,2,3,7,8-PECDD and its surrogate are flagged with a ‘G’ on the report form. The data are not considered significantly affected by these fluctuations.
4. The surrogate recoveries in the duplicate sample SDS-PB-09 (Duplicate) (AXYS ID: WG33419-103) fell below the lower method control limit, and are flagged with a ‘V’ on the report form. The duplication analysis demonstrates that the low recoveries have a negligible impact on the data. For target analytes whose concentrations are lower than ten times that of the corresponding detection limit, greater percent differences were observed but overall, there was good agreement in target analyte concentrations between the duplicate samples. The replicates agree well for congeners quantified against exact labeled analogs, and for congeners quantified against surrogates whose recoveries are within the control limits.
5. The analysis of samples SDS-CT-01A, SDS-CT-02, SDS-CT-05, SDS-PB-10, SDS-FB-03, SDS-FB-04 and SDS-FB-05 (AXYS ID: L14884-26, -28, -31, -39, -42, -43, and -44, respectively) was not successful and data is not available in this batch summary.

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-01B
Sample Collection:
14-Jun-2010 11:15

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-27
Matrix:	SOLID	**Sample Size:**	9.91 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 01:36:03	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_169B S: 5**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_169B S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_169 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	23.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.390	0.0505	0.61	1.001
1,2,3,7,8-PECDD [3]	J	3.50	0.0505	0.59	1.000
1,2,3,4,7,8-HXCDD	J	5.66	0.0705	1.28	1.000
1,2,3,6,7,8-HXCDD		23.9	0.0705	1.26	1.000
1,2,3,7,8,9-HXCDD		13.0	0.0705	1.26	1.010
1,2,3,4,6,7,8-HPCDD	B	287	0.230	1.05	1.000
OCDD	B	1950	0.0505	0.88	1.000
2,3,7,8-TCDF	J	1.06	0.0505	0.78	1.002
1,2,3,7,8-PECDF	J	0.684	0.0505	1.75	1.001
2,3,4,7,8-PECDF	B J	0.922	0.0505	1.71	1.000
1,2,3,4,7,8-HXCDF	J	2.58	0.0694	1.27	1.000
1,2,3,6,7,8-HXCDF	J	1.90	0.0694	1.24	1.000
1,2,3,7,8,9-HXCDF	K J	0.169	0.0694	0.94	1.000
2,3,4,6,7,8-HXCDF	J	2.10	0.0694	1.23	1.000
1,2,3,4,6,7,8-HPCDF		44.9	0.0695	1.02	1.001
1,2,3,4,7,8,9-HPCDF	J	2.08	0.0695	0.99	1.000
OCDF	B	128	0.0505	0.89	1.002
TOTAL TETRA-DIOXINS		6.09	0.0505		
TOTAL PENTA-DIOXINS		16.1	0.0505		
TOTAL HEXA-DIOXINS		109	0.0705		
TOTAL HEPTA-DIOXINS		553	0.230		
TOTAL TETRA-FURANS		6.69	0.0505		
TOTAL PENTA-FURANS	B	21.0	0.0505		
TOTAL HEXA-FURANS		82.0	0.0694		
TOTAL HEPTA-FURANS		151	0.0695		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-27_Form1A_DX0B_169BS5_SJ1179396.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-01B
Sample Collection:
14-Jun-2010 11:15

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-27 i
Matrix:	SOLID	**Sample Size:**	9.91 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	11-Aug-2010 **Time:** 00:42:30	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_110 S: 8**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_110 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_110 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	23.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	J	0.449	0.292	0.84	1.001

(1) Where applicable, custom lab flags have been used on this report; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:49:42; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-27_Form1A_DB03_110S8_SJ1179598.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-03
Sample Collection:
14-Jun-2010 12:30

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-29
Matrix:	SOLID	**Sample Size:**	10.8 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 02:30:56	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_169B S: 6**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_169B S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_169 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	24.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.139	0.0465	0.49	1.001
1,2,3,7,8-PECDD [3]	K J	0.562	0.0465	0.71	1.000
1,2,3,4,7,8-HXCDD	J	0.807	0.0465	1.38	1.000
1,2,3,6,7,8-HXCDD	J	3.37	0.0465	1.20	1.000
1,2,3,7,8,9-HXCDD	J	2.08	0.0465	1.31	1.010
1,2,3,4,6,7,8-HPCDD	B	52.5	0.0818	1.05	1.000
OCDD	B	394	0.0465	0.89	1.000
2,3,7,8-TCDF	J	0.547	0.0465	0.77	1.001
1,2,3,7,8-PECDF	J	0.211	0.0465	1.37	1.000
2,3,4,7,8-PECDF	B J	0.344	0.0465	1.36	1.000
1,2,3,4,7,8-HXCDF	J	0.771	0.0465	1.27	1.000
1,2,3,6,7,8-HXCDF	J	0.472	0.0465	1.23	1.000
1,2,3,7,8,9-HXCDF	K J	0.111	0.0465	0.94	1.000
2,3,4,6,7,8-HXCDF	J	0.555	0.0465	1.42	1.000
1,2,3,4,6,7,8-HPCDF		17.8	0.0589	1.04	1.000
1,2,3,4,7,8,9-HPCDF	J	1.20	0.0589	0.99	1.000
OCDF	B	71.6	0.0465	0.90	1.002
TOTAL TETRA-DIOXINS		2.42	0.0465		
TOTAL PENTA-DIOXINS		5.23	0.0465		
TOTAL HEXA-DIOXINS		29.6	0.0465		
TOTAL HEPTA-DIOXINS		112	0.0818		
TOTAL TETRA-FURANS		3.58	0.0465		
TOTAL PENTA-FURANS	B	5.55	0.0465		
TOTAL HEXA-FURANS		18.7	0.0465		
TOTAL HEPTA-FURANS		57.9	0.0589		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: ________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-29_Form1A_DX0B_169BS6_SJ1179397.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-03
Sample Collection:
14-Jun-2010 12:30

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-29 i
Matrix:	SOLID	**Sample Size:**	10.8 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	11-Aug-2010 **Time:** 01:55:42	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_110 S: 10**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_110 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_110 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	24.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	K J	0.317	0.180	0.95	1.001

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:49:42; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-29_Form1A_DB03_110S10_SJ1179600.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-04
Sample Collection:
14-Jun-2010 13:31

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-30
Matrix:	SOLID	**Sample Size:**	10.3 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 03:25:50	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_169B S: 7**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_169B S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_169 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	24.1

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.100	0.0484	0.58	1.001
1,2,3,7,8-PECDD [3]	J	0.328	0.0484	0.69	1.000
1,2,3,4,7,8-HXCDD	J	0.464	0.0601	1.09	1.000
1,2,3,6,7,8-HXCDD	J	1.57	0.0601	1.20	1.000
1,2,3,7,8,9-HXCDD	J	1.06	0.0601	1.40	1.010
1,2,3,4,6,7,8-HPCDD	B	22.4	0.0714	1.08	1.000
OCDD	B	146	0.0484	0.90	1.000
2,3,7,8-TCDF	J	0.431	0.0484	0.75	1.002
1,2,3,7,8-PECDF	J	0.127	0.0484	1.73	1.000
2,3,4,7,8-PECDF	K B J	0.199	0.0484	1.19	1.000
1,2,3,4,7,8-HXCDF	J	0.349	0.0484	1.37	1.000
1,2,3,6,7,8-HXCDF	J	0.225	0.0484	1.08	1.000
1,2,3,7,8,9-HXCDF	J	0.051	0.0484	1.23	1.000
2,3,4,6,7,8-HXCDF	J	0.320	0.0484	1.28	1.000
1,2,3,4,6,7,8-HPCDF		8.82	0.0637	1.06	1.000
1,2,3,4,7,8,9-HPCDF	J	0.488	0.0637	1.09	1.000
OCDF	B	28.7	0.0484	0.86	1.002
TOTAL TETRA-DIOXINS		1.90	0.0484		
TOTAL PENTA-DIOXINS		3.69	0.0484		
TOTAL HEXA-DIOXINS		15.1	0.0601		
TOTAL HEPTA-DIOXINS		48.8	0.0714		
TOTAL TETRA-FURANS		2.43	0.0484		
TOTAL PENTA-FURANS	B	3.29	0.0484		
TOTAL HEXA-FURANS		9.43	0.0484		
TOTAL HEPTA-FURANS		24.8	0.0637		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-30_Form1A_DX0B_169BS7_SJ1179398.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-04
Sample Collection:
14-Jun-2010 13:31

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-30 i
Matrix:	SOLID	**Sample Size:**	10.3 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	11-Aug-2010 **Time:** 02:32:21	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_110 S: 11**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_110 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_110 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	24.1

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	K J	0.237	0.215	1.04	1.001

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:49:42; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-30_Form1A_DB03_110S11_SJ1179601.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

Form 1A
PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CPD-17
Sample Collection:
09-Jun-2010 13:43

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-32
Matrix:	SOLID	**Sample Size:**	9.78 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	11-Aug-2010 **Time:** 13:09:43	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_179 S: 7**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_169B S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_179 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	48.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.281	0.0511	0.60	1.001
1,2,3,7,8-PECDD [3]	J	1.09	0.0511	0.68	1.000
1,2,3,4,7,8-HXCDD	J	1.48	0.0948	1.33	1.000
1,2,3,6,7,8-HXCDD		5.73	0.0948	1.29	1.000
1,2,3,7,8,9-HXCDD	J	3.80	0.0948	1.21	1.010
1,2,3,4,6,7,8-HPCDD	B	74.7	0.152	1.04	1.000
OCDD	B	504	0.0511	0.89	1.000
2,3,7,8-TCDF		2.37	0.0902	0.79	1.001
1,2,3,7,8-PECDF	J	0.442	0.0511	1.41	1.001
2,3,4,7,8-PECDF	B J	0.694	0.0511	1.67	1.000
1,2,3,4,7,8-HXCDF	J	1.23	0.103	1.16	1.000
1,2,3,6,7,8-HXCDF	J	0.732	0.103	1.22	1.000
1,2,3,7,8,9-HXCDF	U		0.103		
2,3,4,6,7,8-HXCDF	J	1.03	0.103	1.28	1.000
1,2,3,4,6,7,8-HPCDF		24.0	0.0977	1.05	1.000
1,2,3,4,7,8,9-HPCDF	J	1.38	0.0977	1.06	1.000
OCDF	B	76.1	0.0511	0.88	1.002
TOTAL TETRA-DIOXINS		15.2	0.0511		
TOTAL PENTA-DIOXINS		16.7	0.0511		
TOTAL HEXA-DIOXINS		51.5	0.0948		
TOTAL HEPTA-DIOXINS		174	0.152		
TOTAL TETRA-FURANS		15.1	0.0902		
TOTAL PENTA-FURANS	B	13.1	0.0511		
TOTAL HEXA-FURANS		29.1	0.103		
TOTAL HEPTA-FURANS		70.5	0.0977		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CPD-17
Sample Collection:
09-Jun-2010 13:43

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-32 i
Matrix:	SOLID	**Sample Size:**	9.78 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	11-Aug-2010 **Time:** 03:45:33	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_110 S: 13**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_110 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_110 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	48.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF		1.18	0.176	0.86	1.001

(1) Where applicable, custom lab flags have been used on this report.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:49:42; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-32_Form1A_DB03_110S13_SJ1179603.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-08
Sample Collection:
08-Jun-2010 15:21

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-37
Matrix:	SOLID	**Sample Size:**	11.1 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Aug-2010 **Time:** 15:03:07	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_177 S: 9**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_169B S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_177 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	30.3

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.083	0.0449	0.27	1.001
1,2,3,7,8-PECDD [3]	K J	0.118	0.0449	0.39	1.001
1,2,3,4,7,8-HXCDD	K J	0.143	0.0568	1.57	1.000
1,2,3,6,7,8-HXCDD	K J	0.427	0.0568	1.66	1.000
1,2,3,7,8,9-HXCDD	K J	0.378	0.0568	0.99	1.010
1,2,3,4,6,7,8-HPCDD	B J	3.52	0.0449	1.02	1.000
OCDD	B	22.7	0.0886	0.92	1.000
2,3,7,8-TCDF	J	0.306	0.0449	0.86	1.001
1,2,3,7,8-PECDF	K J	0.077	0.0449	2.11	1.000
2,3,4,7,8-PECDF	K B J	0.126	0.0449	1.31	1.000
1,2,3,4,7,8-HXCDF	K J	0.112	0.0478	1.59	1.000
1,2,3,6,7,8-HXCDF	K J	0.068	0.0478	1.61	1.000
1,2,3,7,8,9-HXCDF	U		0.0478		
2,3,4,6,7,8-HXCDF	K J	0.087	0.0478	2.03	1.000
1,2,3,4,6,7,8-HPCDF	J	0.855	0.0738	1.12	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.090	0.0738	0.83	1.000
OCDF	B J	1.79	0.0631	0.99	1.002
TOTAL TETRA-DIOXINS		0.799	0.0449		
TOTAL PENTA-DIOXINS		0.654	0.0449		
TOTAL HEXA-DIOXINS		3.43	0.0568		
TOTAL HEPTA-DIOXINS		9.95	0.0449		
TOTAL TETRA-FURANS		0.995	0.0449		
TOTAL PENTA-FURANS	B	0.768	0.0449		
TOTAL HEXA-FURANS		0.805	0.0478		
TOTAL HEPTA-FURANS		2.10	0.0738		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-37_Form1A_DX0B_177S9_SJ1179428.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-08
Sample Collection:
08-Jun-2010 15:21

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-37 i
Matrix:	SOLID	**Sample Size:**	11.1 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	11-Aug-2010 **Time:** 10:43:20	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_111 S: 5**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_110 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_111 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	30.3

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	K J	0.198	0.169	0.30	1.000

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:49:42; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-37_Form1A_DB03_111S5_SJ1179614.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-09
Sample Collection:
08-Jun-2010 15:58

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-38 (A)
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 04:20:44	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_169B S: 8**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_169B S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_169 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	16.4

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		0.0466		
1,2,3,7,8-PECDD [3]	J	0.054	0.0466	0.60	1.000
1,2,3,4,7,8-HXCDD	U		0.0466		
1,2,3,6,7,8-HXCDD	K J	0.103	0.0466	0.98	1.000
1,2,3,7,8,9-HXCDD	K J	0.102	0.0466	0.76	1.009
1,2,3,4,6,7,8-HPCDD	B J	0.636	0.0466	1.00	1.000
OCDD	B J	3.51	0.0466	0.88	1.000
2,3,7,8-TCDF	K J	0.078	0.0466	0.61	1.001
1,2,3,7,8-PECDF	U		0.0466		
2,3,4,7,8-PECDF	B J	0.056	0.0466	1.60	1.001
1,2,3,4,7,8-HXCDF	U		0.0466		
1,2,3,6,7,8-HXCDF	U		0.0466		
1,2,3,7,8,9-HXCDF	U		0.0466		
2,3,4,6,7,8-HXCDF	K J	0.057	0.0466	1.86	1.000
1,2,3,4,6,7,8-HPCDF	J	0.225	0.0466	0.93	1.000
1,2,3,4,7,8,9-HPCDF	U		0.0466		
OCDF	B J	0.378	0.0466	0.88	1.002
TOTAL TETRA-DIOXINS	U		0.0466		
TOTAL PENTA-DIOXINS		0.054	0.0466		
TOTAL HEXA-DIOXINS		0.553	0.0466		
TOTAL HEPTA-DIOXINS		1.49	0.0466		
TOTAL TETRA-FURANS	U		0.0466		
TOTAL PENTA-FURANS	B	0.132	0.0466		
TOTAL HEXA-FURANS		0.185	0.0466		
TOTAL HEPTA-FURANS		0.429	0.0466		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-38_Form1A_DX0B_169BS8_SJ1179399.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-09
Sample Collection:
08-Jun-2010 15:58

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-38 i (A)
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	11-Aug-2010 **Time:** 04:22:11	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_110 S: 14**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_110 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_110 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	16.4

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.134		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:49:42; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-38_Form1A_DB03_110S14_SJ1179604.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-FB-01
Sample Collection:
08-Jun-2010 10:03

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-40
Matrix:	SOLID	**Sample Size:**	10.8 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Aug-2010 **Time:** 16:52:44	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_177 S: 11**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_169B S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_177 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	25.3

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.081	0.0464	0.56	1.001
1,2,3,7,8-PECDD [3]	K J	0.144	0.0464	0.47	1.000
1,2,3,4,7,8-HXCDD	K J	0.129	0.0464	1.70	1.000
1,2,3,6,7,8-HXCDD	K J	0.691	0.0464	1.03	1.000
1,2,3,7,8,9-HXCDD	J	0.477	0.0464	1.18	1.010
1,2,3,4,6,7,8-HPCDD	B J	4.23	0.0464	1.13	1.000
OCDD	B	23.5	0.0464	0.91	1.000
2,3,7,8-TCDF	J	0.414	0.0464	0.70	1.002
1,2,3,7,8-PECDF	K J	0.063	0.0464	1.22	1.001
2,3,4,7,8-PECDF	B J	0.120	0.0464	1.40	1.000
1,2,3,4,7,8-HXCDF	J	0.103	0.0464	1.09	1.000
1,2,3,6,7,8-HXCDF	K J	0.071	0.0464	1.04	1.000
1,2,3,7,8,9-HXCDF	U		0.0464		
2,3,4,6,7,8-HXCDF	K J	0.081	0.0464	1.72	1.000
1,2,3,4,6,7,8-HPCDF	J	1.02	0.0464	0.95	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.089	0.0464	1.53	1.000
OCDF	B J	1.58	0.0464	0.91	1.002
TOTAL TETRA-DIOXINS		0.362	0.0464		
TOTAL PENTA-DIOXINS		0.670	0.0464		
TOTAL HEXA-DIOXINS		4.63	0.0464		
TOTAL HEPTA-DIOXINS		9.95	0.0464		
TOTAL TETRA-FURANS		1.57	0.0464		
TOTAL PENTA-FURANS	B	1.09	0.0464		
TOTAL HEXA-FURANS		1.12	0.0464		
TOTAL HEPTA-FURANS		2.39	0.0464		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-40_Form1A_DX0B_177S11_SJ1179430.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-FB-01
Sample Collection:
08-Jun-2010 10:03

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-40 i
Matrix:	SOLID	**Sample Size:**	10.8 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	11-Aug-2010 **Time:** 11:56:32	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_111 S: 7**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_110 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_111 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	25.3

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	K J	0.201	0.138	1.02	1.001

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:49:42; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-40_Form1A_DB03_111S7_SJ1179616.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-FB-02
Sample Collection:
08-Jun-2010 10:21

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-41 L
Matrix:	SOLID	**Sample Size:**	9.96 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	20-Aug-2010 **Time:** 11:49:21	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_110 S: 18**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_169B S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_110 S: 13
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	27.0

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.087	0.0502	0.23	1.003
1,2,3,7,8-PECDD [3]	K J G	0.107	0.0502	0.39	1.000
1,2,3,4,7,8-HXCDD	K J	0.129	0.0857	2.05	1.001
1,2,3,6,7,8-HXCDD	J	0.488	0.0857	1.18	1.001
1,2,3,7,8,9-HXCDD	J	0.273	0.0857	1.15	1.000
1,2,3,4,6,7,8-HPCDD	B J	4.49	0.0680	1.12	1.000
OCDD	B	33.7	0.170	0.94	1.000
2,3,7,8-TCDF	K	1.48	0.0502	0.60	1.001
1,2,3,7,8-PECDF	K J	0.221	0.0858	1.06	1.002
2,3,4,7,8-PECDF	B J	0.518	0.0858	1.46	1.000
1,2,3,4,7,8-HXCDF	K J	0.174	0.171	2.57	1.000
1,2,3,6,7,8-HXCDF	U		0.171		
1,2,3,7,8,9-HXCDF	U		0.171		
2,3,4,6,7,8-HXCDF	U		0.171		
1,2,3,4,6,7,8-HPCDF	K J	1.05	0.0502	1.37	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.208	0.0502	0.43	1.001
OCDF	K B J	3.89	0.0502	0.74	1.002
TOTAL TETRA-DIOXINS	J	0.143	0.0502		
TOTAL PENTA-DIOXINS	J	0.102	0.0502		
TOTAL HEXA-DIOXINS	J	2.25	0.0857		
TOTAL HEPTA-DIOXINS		10.4	0.0680		
TOTAL TETRA-FURANS		3.64	0.0502		
TOTAL PENTA-FURANS	B J	2.24	0.0858		
TOTAL HEXA-FURANS	J	0.646	0.171		
TOTAL HEPTA-FURANS	J	2.09	0.0502		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL; G = lock mass interference present.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-41_Form1A_DX0M_110S18_SJ1181972.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-FB-02
Sample Collection:
08-Jun-2010 10:21

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-41 L
Matrix:	SOLID	**Sample Size:**	9.96 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	20-Aug-2010 **Time:** 05:10:43	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_114A S: 16**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_110 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_114A S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	27.0

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	J	0.835	0.282	0.88	1.000

(1) Where applicable, custom lab flags have been used on this report; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:49:42; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-41_Form1A_DB03_114AS16_SJ1184599.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17			**CLIENT SAMPLE NO.**
	Form 1A		**SDS-FB-06**
	PCDD/PCDF ANALYSIS REPORT		**Sample Collection: 08-Jun-2010 11:14**

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-45
Matrix:	SOLID	**Sample Size:**	9.87 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	11-Aug-2010 **Time:** 11:20:07	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_179 S: 5**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_169B S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_179 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	24.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.120	0.0507	0.60	1.001
1,2,3,7,8-PECDD [3]	K J	0.157	0.0507	0.79	1.000
1,2,3,4,7,8-HXCDD	J	0.144	0.0520	1.17	1.000
1,2,3,6,7,8-HXCDD	J	0.594	0.0520	1.15	1.000
1,2,3,7,8,9-HXCDD	K J	0.365	0.0520	1.49	1.010
1,2,3,4,6,7,8-HPCDD	B J	3.68	0.0610	1.01	1.000
OCDD	B	22.9	0.0507	0.92	1.000
2,3,7,8-TCDF	J	0.340	0.0507	0.81	1.001
1,2,3,7,8-PECDF	J	0.057	0.0507	1.64	1.001
2,3,4,7,8-PECDF	K B J	0.127	0.0507	1.04	1.000
1,2,3,4,7,8-HXCDF	K J	0.093	0.0507	1.52	1.000
1,2,3,6,7,8-HXCDF	J	0.094	0.0507	1.20	1.000
1,2,3,7,8,9-HXCDF	U		0.0507		
2,3,4,6,7,8-HXCDF	K J	0.051	0.0507	1.82	1.000
1,2,3,4,6,7,8-HPCDF	J	0.863	0.0583	1.07	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.096	0.0583	1.48	1.000
OCDF	B J	1.71	0.0507	0.81	1.002
TOTAL TETRA-DIOXINS		0.646	0.0507		
TOTAL PENTA-DIOXINS		0.614	0.0507		
TOTAL HEXA-DIOXINS		4.39	0.0520		
TOTAL HEPTA-DIOXINS		8.62	0.0610		
TOTAL TETRA-FURANS		1.22	0.0507		
TOTAL PENTA-FURANS	B	0.426	0.0507		
TOTAL HEXA-FURANS		0.936	0.0507		
TOTAL HEPTA-FURANS		1.91	0.0583		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-45_Form1A_DX0B_179S5_SJ1179443.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17			**CLIENT SAMPLE NO.**
			SDS-FB-06
			Sample Collection:
			08-Jun-2010 11:14

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-45
Matrix:	SOLID	**Sample Size:**	9.87 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	03-Aug-2010 **Time:** 16:13:06	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_099 S: 13**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_110 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_099 S: 3
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	24.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.244		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:49:42; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-45_Form1A_DB03_099S13_SJ1179588.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-PB-09 (Duplicate)
Sample Collection:
08-Jun-2010 15:58

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	WG33419-103 (DUP L14884-38)
Matrix:	SOLID	**Sample Size:**	10.9 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 05:15:34	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_169B S: 9**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_169B S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_169 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	14.5

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.060	0.0523	0.53	1.001
1,2,3,7,8-PECDD [3]	J	0.118	0.0458	0.53	1.000
1,2,3,4,7,8-HXCDD	J	0.110	0.0851	1.38	1.000
1,2,3,6,7,8-HXCDD	K J	0.120	0.0851	0.83	1.000
1,2,3,7,8,9-HXCDD	J	0.140	0.0851	1.26	1.010
1,2,3,4,6,7,8-HPCDD	B J	0.571	0.0458	0.98	1.000
OCDD	B J	3.37	0.0702	0.79	1.000
2,3,7,8-TCDF	J	0.084	0.0458	0.83	1.001
1,2,3,7,8-PECDF	K J	0.116	0.0458	0.90	1.001
2,3,4,7,8-PECDF	K B J	0.123	0.0458	1.12	1.000
1,2,3,4,7,8-HXCDF	K J	0.103	0.0529	1.56	1.000
1,2,3,6,7,8-HXCDF	J	0.067	0.0529	1.38	1.000
1,2,3,7,8,9-HXCDF	K J	0.083	0.0529	2.36	1.000
2,3,4,6,7,8-HXCDF	J	0.105	0.0529	1.10	1.001
1,2,3,4,6,7,8-HPCDF	K J	0.192	0.0657	1.21	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.094	0.0657	0.69	1.000
OCDF	B J	0.396	0.0539	0.96	1.002
TOTAL TETRA-DIOXINS	U		0.0523		
TOTAL PENTA-DIOXINS		0.118	0.0458		
TOTAL HEXA-DIOXINS		0.250	0.0851		
TOTAL HEPTA-DIOXINS		1.22	0.0458		
TOTAL TETRA-FURANS		0.084	0.0458		
TOTAL PENTA-FURANS	U		0.0458		
TOTAL HEXA-FURANS		0.248	0.0529		
TOTAL HEPTA-FURANS	U		0.0657		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33419-103_Form1A_DX0B_169BS9_SJ1179400.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17			**CLIENT SAMPLE NO.**
	Form 1A		**SDS-PB-09 (Duplicate)**
	PCDD/PCDF ANALYSIS REPORT		**Sample Collection:**
			08-Jun-2010 15:58

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	WG33419-103 i (DUP L14884-38)
Matrix:	SOLID	**Sample Size:**	10.9 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	11-Aug-2010 **Time:** 04:58:45	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_110 S: 15**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_110 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_110 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	14.5

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.390		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:49:42; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_WG33419-103_Form1A_DB03_110S15_SJ1179605.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

PCDD/PCDF ANALYSIS REPORT
RELATIVE PERCENT DIFFERENCE

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No. FIDALGO BAY, CUSTOM PLYWOOD DX STUDY

Contract No.: 4406

Client ID: SDS-PB-09

Concentration Units: pg/g (dry weight basis)

COMPOUND	L14884-38 (A)		WG33419-103		MEAN	RELATIVE PERCENT DIFFERENCE
	LAB FLAG [1]	CONC. FOUND	LAB FLAG [1]	CONC. FOUND		
2,3,7,8-TCDD	U		K J	0.060		
1,2,3,7,8-PECDD	J	0.054	J	0.118	0.086	74.4
1,2,3,4,7,8-HXCDD	U		J	0.110		
1,2,3,6,7,8-HXCDD	K J	0.103	K J	0.120		
1,2,3,7,8,9-HXCDD	K J	0.102	J	0.140		
1,2,3,4,6,7,8-HPCDD	J	0.636	J	0.571	0.604	10.8
OCDD	J	3.51	J	3.37	3.44	4.16
2,3,7,8-TCDF	U		U			
1,2,3,7,8-PECDF	U		K J	0.116		
2,3,4,7,8-PECDF	J	0.056	K J	0.123		
1,2,3,4,7,8-HXCDF	U		K J	0.103		
1,2,3,6,7,8-HXCDF	U		J	0.067		
1,2,3,7,8,9-HXCDF	U		K J	0.083		
2,3,4,6,7,8-HXCDF	K J	0.057	J	0.105		
1,2,3,4,6,7,8-HPCDF	J	0.225	K J	0.192		
1,2,3,4,7,8,9-HPCDF	U		K J	0.094		
OCDF	J	0.378	J	0.396	0.387	4.65

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	N/A
Contract No.:	4406	**Lab Sample I.D.:**	WG33419-101
Matrix:	SOLID	**Sample Size:**	10.0 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	05-Aug-2010
Extraction Date:	22-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 00:41:14	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_169B S: 4**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_169B S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_169 S: 1
Concentration Units:	pg/g		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	NQ				
1,2,3,7,8-PECDD [3]	U		0.0500		
1,2,3,4,7,8-HXCDD	U		0.0500		
1,2,3,6,7,8-HXCDD	U		0.0500		
1,2,3,7,8,9-HXCDD	U		0.0500		
1,2,3,4,6,7,8-HPCDD	K J	0.078	0.0500	0.71	1.000
OCDD	J	0.332	0.0500	0.90	1.000
2,3,7,8-TCDF	U		0.0500		
1,2,3,7,8-PECDF	U		0.0500		
2,3,4,7,8-PECDF	J	0.061	0.0500	1.75	1.000
1,2,3,4,7,8-HXCDF	U		0.0500		
1,2,3,6,7,8-HXCDF	U		0.0500		
1,2,3,7,8,9-HXCDF	U		0.0500		
2,3,4,6,7,8-HXCDF	U		0.0500		
1,2,3,4,6,7,8-HPCDF	U		0.0500		
1,2,3,4,7,8,9-HPCDF	U		0.0500		
OCDF	J	0.069	0.0500	0.82	1.002
TOTAL TETRA-DIOXINS	NQ				
TOTAL PENTA-DIOXINS	U		0.0500		
TOTAL HEXA-DIOXINS	U		0.0500		
TOTAL HEPTA-DIOXINS	U		0.0500		
TOTAL TETRA-FURANS	U		0.0500		
TOTAL PENTA-FURANS		0.061	0.0500		
TOTAL HEXA-FURANS	U		0.0500		
TOTAL HEPTA-FURANS	U		0.0500		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL; NQ = data not quantifiable.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33419-101_Form1A_DX0B_169BS4_SJ1179394.html; Workgroup: WG33419; Design ID: 699]

AXYS METHOD MLA-017 Rev 17

Form 8A
PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**OPR Data Filename:**	**DX0B_169B S: 1**
Matrix:	SOLID	**Lab Sample I.D.:**	WG33419-102 i
Extraction Date:	22-Jul-2010	**Analysis Date:**	05-Aug-2010 **Time:** 21:56:51

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 20 uL EXTRACT VOLUME.

COMPOUND	LAB FLAG [1]	ION ABUND. RATIO [2]	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS [3] (ng/mL)	% RECOVERY
2,3,7,8-TCDD		0.83	10.0	9.08	6.70 - 15.8	90.8
1,2,3,7,8-PECDD [4]		0.62	52.0	50.3	36.4 - 73.8	96.7
1,2,3,4,7,8-HXCDD		1.28	56.5	56.4	39.6 - 92.7	99.7
1,2,3,6,7,8-HXCDD		1.27	55.5	56.2	42.2 - 74.4	101
1,2,3,7,8,9-HXCDD		1.27	54.0	54.2	34.6 - 87.5	100
1,2,3,4,6,7,8-HPCDD		1.06	47.5	45.9	33.3 - 66.5	96.6
OCDD		0.90	100	99.2	78.0 - 144	99.2
2,3,7,8-TCDF		0.78	10.7	11.0	8.03 - 16.9	103
1,2,3,7,8-PECDF		1.57	46.0	47.0	36.8 - 61.6	102
2,3,4,7,8-PECDF		1.57	47.0	48.9	32.0 - 75.2	104
1,2,3,4,7,8-HXCDF		1.24	50.0	48.3	36.0 - 67.0	96.6
1,2,3,6,7,8-HXCDF		1.25	47.5	46.4	39.9 - 61.8	97.6
1,2,3,7,8,9-HXCDF		1.26	52.5	50.7	41.0 - 68.3	96.6
2,3,4,6,7,8-HXCDF		1.26	53.0	51.6	37.1 - 82.7	97.3
1,2,3,4,6,7,8-HPCDF		1.04	50.0	54.4	41.0 - 61.0	109
1,2,3,4,7,8,9-HPCDF		1.02	50.0	49.7	39.0 - 69.0	99.4
OCDF		0.91	104	96.4	65.5 - 177	92.7

(1) Where applicable, custom lab flags have been used on this report.
(2) Contract-required Ion Abundance Ratios are specified in Table 9, Method 1613.
(3) Contract-required concentration range as determined from the percent of the test concentration in Table 6, Method 1613, under OPR.
(4) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form8A.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33419-102_Form8A_SJ1177649.html; Workgroup: WG33419; Design ID: 699]

Form 8G

PCDD/PCDF CERTIFIED REFERENCE MATERIAL (CRM) REPORT FOR NIST SRM 1944

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Lab Sample I.D.:**	WG33419-104
Matrix:	SOLID	**Sample Size:**	1.01 g (dry)
Extraction Date:	22-Jul-2010	**Initial Calibration Date:**	05-Aug-2010
Analysis Date:	11-Aug-2010 **Time:** 10:25:19	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB5
Injection Volume (uL):	1.0	**CRM Data Filename:**	**DX0B_179 S: 4**
Dilution Factor:	N/A	**Blank Data Filename:**	DX0B_169B S: 4
Concentration Units:	pg/g (dry weight basis)	**Cal. Ver. Data Filename:**	DX0B_179 S: 1

COMPOUND	LAB FLAG [1]	DETERMINED	CERTIFIED / REFERENCE
2,3,7,8-TCDD		133	133 +/- 9
1,2,3,7,8-PECDD [2]		20.5	19 +/- 2
1,2,3,4,7,8-HXCDD		27.0	26 +/- 3
1,2,3,6,7,8-HXCDD		63.4	56 +/- 6
1,2,3,7,8,9-HXCDD		61.6	53 +/- 7
1,2,3,4,6,7,8-HPCDD		765	800 +/- 70
OCDD		5800	5800 +/- 700
2,3,7,8-TCDF		182	39 +/- 15
1,2,3,7,8-PECDF		51.3	45 +/- 7
2,3,4,7,8-PECDF		48.3	45 +/- 4
1,2,3,4,7,8-HXCDF		206	220 +/- 30
1,2,3,6,7,8-HXCDF		89.7	90 +/- 10
1,2,3,7,8,9-HXCDF		3.24	19 +/- 18
2,3,4,6,7,8-HXCDF		48.9	54 +/- 6
1,2,3,4,6,7,8-HPCDF		931	1000 +/- 100
1,2,3,4,7,8,9-HPCDF		36.1	40 +/- 6
OCDF		1150	1000 +/- 100

(1) Where applicable, custom lab flags have been used on this report.
(2) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form8G.xsl; Created: 27-Aug-2010 11:52:06; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33419-104_Form8G_SJ1179442.html; Workgroup: WG33419; Design ID: 699]

Form 8G

PCDD/PCDF CERTIFIED REFERENCE MATERIAL (CRM) REPORT FOR NIST SRM 1944

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Lab Sample I.D.:**	WG33419-104 i
Matrix:	SOLID	**Sample Size:**	1.01 g (dry)
Extraction Date:	22-Jul-2010	**Initial Calibration Date:**	13-Jul-2010
Analysis Date:	10-Aug-2010 **Time:** 23:29:13	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB225
Injection Volume (uL):	2.0	**CRM Data Filename:**	**DB03_110 S: 6**
Dilution Factor:	N/A	**Blank Data Filename:**	DB03_110 S: 5
Concentration Units:	pg/g (dry weight basis)	**Cal. Ver. Data Filename:**	DB03_110 S: 2

COMPOUND	LAB FLAG [1]	DETERMINED	CERTIFIED / REFERENCE
2,3,7,8-TCDF		32.5	39 +/- 15

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form8G.xsl; Created: 27-Aug-2010 11:49:42; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_WG33419-104_Form8G_SJ1179596.html; Workgroup: WG33419; Design ID: 699]

BATCH SUMMARY

Batch ID: WG33420	***Date:*** 09-Sep-2010
Analysis Type: Dioxin/Furan	***Matrix Type:*** Solid

BATCH MAKEUP

Contract: 4406

Samples:

L14884-50	SDS-FB-10
L15027-7	10654011
L15027-9	10654015
L15027-10	10654021
L15027-11	10654022

Blank:
WG33420-101

Reference or Spike:
WG33420-102

Comments:

1. The results are not blank-corrected.
2. The recoveries of the cleanup standard 37Cl-2,3,7,8-TCDD in the method blank and in samples 10654011, 10654021, 10654015 fell below the lower method control limit, and are flagged “V” accordingly. The cleanup standard is used to monitor the performance of the extract cleanup, and no analytes are quantified against it.
3. The recoveries of 13C-labeled TCDF, 1,2,3,4,7,8-HxCDD, and 1,2,3,7,8,9-HxCDF in sample 10654015 fell below the lower method control limits, and are flagged “V” accordingly. The results are recovery-corrected, the labeled compound recoveries, although below the lower method control limit, are sufficient for accurate quantification.

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-10
Sample Collection:
08-Jun-2010 14:53

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-50 i2
Matrix:	SOLID	**Sample Size:**	10.2 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	26-Aug-2010 **Time:** 01:06:43	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_112 S: 19**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX01_175A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_112 S: 13
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	44.4

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	J	0.269	0.0543	0.68	1.002
1,2,3,7,8-PECDD [3]	B J	0.720	0.0617	0.65	1.001
1,2,3,4,7,8-HXCDD	K J	0.649	0.0907	1.85	1.000
1,2,3,6,7,8-HXCDD	J	2.83	0.0907	1.15	1.001
1,2,3,7,8,9-HXCDD	J	2.18	0.0907	1.19	1.000
1,2,3,4,6,7,8-HPCDD	B	29.8	0.209	1.02	1.000
OCDD	B	205	0.282	0.88	1.000
2,3,7,8-TCDF		1.85	0.0587	0.73	1.001
1,2,3,7,8-PECDF	K J	0.205	0.103	0.84	1.002
2,3,4,7,8-PECDF	J	0.470	0.103	1.39	1.001
1,2,3,4,7,8-HXCDF	J	0.243	0.115	1.13	1.001
1,2,3,6,7,8-HXCDF	K J	0.344	0.115	0.46	1.001
1,2,3,7,8,9-HXCDF	U		0.115		
2,3,4,6,7,8-HXCDF	B J	0.371	0.115	1.41	1.000
1,2,3,4,6,7,8-HPCDF	B	6.33	0.134	0.90	1.000
1,2,3,4,7,8,9-HPCDF	K B J	0.475	0.134	0.80	1.001
OCDF	B	16.5	0.150	0.82	1.002
TOTAL TETRA-DIOXINS		8.39	0.0543		
TOTAL PENTA-DIOXINS		7.76	0.0617		
TOTAL HEXA-DIOXINS		33.8	0.0907		
TOTAL HEPTA-DIOXINS		116	0.209		
TOTAL TETRA-FURANS		7.50	0.0587		
TOTAL PENTA-FURANS		3.83	0.103		
TOTAL HEXA-FURANS		4.56	0.115		
TOTAL HEPTA-FURANS	B	16.8	0.134		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 09-Sep-2010 14:48:07; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-50_Form1A_DX0M_112S19_SJ1185655.html; Workgroup: WG33420; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-10
Sample Collection:
08-Jun-2010 14:53

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-50
Matrix:	SOLID	**Sample Size:**	10.2 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 14:13:55	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_105 S: 12**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_105 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_105 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	44.4

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	K J	0.840	0.594	0.54	1.001

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 09-Sep-2010 14:50:36; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-50_Form1A_DB03_105S12_SJ1179464.html; Workgroup: WG33420; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A
PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
10654011
Sample Collection:
04-Sep-2008 10:59

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L15027-7
Matrix:	SOLID	**Sample Size:**	10.1 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	06-Aug-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	07-Aug-2010 **Time:** 17:10:44	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX01_176D S: 5**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX01_175A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX01_176D S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	39.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.392	0.0495	0.47	1.000
1,2,3,7,8-PECDD [3]	B J	1.69	0.0495	0.61	1.000
1,2,3,4,7,8-HXCDD	J	2.65	0.467	1.17	1.000
1,2,3,6,7,8-HXCDD		13.5	0.467	1.38	1.000
1,2,3,7,8,9-HXCDD		6.60	0.467	1.30	1.010
1,2,3,4,6,7,8-HPCDD	B	262	0.565	1.08	1.000
OCDD	B	1950	0.111	0.91	1.000
2,3,7,8-TCDF		2.35	0.115	0.88	1.002
1,2,3,7,8-PECDF	K J	0.777	0.0495	1.20	1.001
2,3,4,7,8-PECDF	J	1.13	0.0495	1.50	1.000
1,2,3,4,7,8-HXCDF	J	3.11	0.132	1.40	1.000
1,2,3,6,7,8-HXCDF	K J	1.75	0.132	1.01	1.001
1,2,3,7,8,9-HXCDF	U		0.132		
2,3,4,6,7,8-HXCDF	B J	2.13	0.132	1.23	1.000
1,2,3,4,6,7,8-HPCDF	B	75.0	0.167	1.05	1.001
1,2,3,4,7,8,9-HPCDF	K B J	4.36	0.167	0.88	1.001
OCDF	B	344	0.0495	0.90	1.002
TOTAL TETRA-DIOXINS		23.3	0.0495		
TOTAL PENTA-DIOXINS		20.0	0.0495		
TOTAL HEXA-DIOXINS		119	0.467		
TOTAL HEPTA-DIOXINS		562	0.565		
TOTAL TETRA-FURANS		14.5	0.115		
TOTAL PENTA-FURANS		21.0	0.0495		
TOTAL HEXA-FURANS		82.8	0.132		
TOTAL HEPTA-FURANS	B	269	0.167		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 09-Sep-2010 14:48:07; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L15027-7_Form1A_DX01_176DS5_SJ1179239.html; Workgroup: WG33420; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654011
Sample Collection:
04-Sep-2008 10:59

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-7
Matrix:	SOLID	**Sample Size:**	10.1 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 22:45:38	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_106 S: 6**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_105 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_106 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	39.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF		1.28	0.218	0.86	1.002

(1) Where applicable, custom lab flags have been used on this report.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 09-Sep-2010 14:50:36; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L15027-7_Form1A_DB03_106S6_SJ1179477.html; Workgroup: WG33420; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654015
Sample Collection:
04-Sep-2008 14:19

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L15027-9 L
Matrix:	SOLID	**Sample Size:**	10.0 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	01-Sep-2010 **Time:** 13:25:48	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_115 S: 54**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX01_175A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_115 S: 44
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	43.1

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	J	0.500	0.184	0.74	1.000
1,2,3,7,8-PECDD [3]	B J	1.21	0.275	0.70	1.001
1,2,3,4,7,8-HXCDD	J	1.73	0.434	1.12	1.000
1,2,3,6,7,8-HXCDD		5.91	0.434	1.26	1.000
1,2,3,7,8,9-HXCDD	J	4.83	0.434	1.36	1.000
1,2,3,4,6,7,8-HPCDD	B	95.9	0.668	0.98	1.000
OCDD	B	651	0.569	0.88	1.000
2,3,7,8-TCDF		5.96	0.281	0.76	1.001
1,2,3,7,8-PECDF	J	0.925	0.599	1.57	1.002
2,3,4,7,8-PECDF	J	1.67	0.599	1.50	1.001
1,2,3,4,7,8-HXCDF	J	1.92	0.830	1.23	1.001
1,2,3,6,7,8-HXCDF	K J	0.836	0.830	0.68	1.001
1,2,3,7,8,9-HXCDF	U		0.830		
2,3,4,6,7,8-HXCDF	K B J	1.32	0.830	0.79	1.001
1,2,3,4,6,7,8-HPCDF	B	25.7	0.571	0.90	1.000
1,2,3,4,7,8,9-HPCDF	B J	1.48	0.571	0.92	1.001
OCDF	B	81.7	0.548	0.82	1.002
TOTAL TETRA-DIOXINS		11.6	0.184		
TOTAL PENTA-DIOXINS		13.1	0.275		
TOTAL HEXA-DIOXINS		61.3	0.434		
TOTAL HEPTA-DIOXINS		234	0.668		
TOTAL TETRA-FURANS		29.4	0.281		
TOTAL PENTA-FURANS		15.7	0.599		
TOTAL HEXA-FURANS		29.3	0.830		
TOTAL HEPTA-FURANS	B	82.8	0.571		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 09-Sep-2010 14:48:07; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L15027-9_Form1A_DX0M_115S54_SJ1187789.html; Workgroup: WG33420; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654015
Sample Collection:
04-Sep-2008 14:19

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Matrix:	SOLID	**Lab Sample I.D.:**	L15027-9
Sample Receipt Date:	16-Jul-2010	**Sample Size:**	10.0 g (dry)
Extraction Date:	23-Jul-2010	**Initial Calibration Date:**	13-Jul-2010
Analysis Date:	06-Aug-2010 **Time:** 23:58:51	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB225
Injection Volume (uL):	2.0	**Sample Data Filename:**	**DB03_106 S: 8**
Dilution Factor:	N/A	**Blank Data Filename:**	DB03_105 S: 5
Concentration Units:	pg/g (dry weight basis)	**Cal. Ver. Data Filename:**	DB03_106 S: 2
		% Moisture:	43.1

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF		1.09	0.654	0.80	1.001

(1) Where applicable, custom lab flags have been used on this report.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 09-Sep-2010 14:50:36; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L15027-9_Form1A_DB03_106S8_SJ1179479.html; Workgroup: WG33420; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654021
Sample Collection:
05-Sep-2008 09:23

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-10 W
Matrix:	SOLID	**Sample Size:**	10.1 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	01-Sep-2010 **Time:** 11:35:48	**GC Column ID:**	DB5
Extract Volume (uL):	50	**Sample Data Filename:**	**DX0M_115 S: 52**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX01_175A S: 5
Dilution Factor:	2.5	**Cal. Ver. Data Filename:**	DX0M_115 S: 44
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	48.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	D J	1.60	1.34	0.67	0.999
1,2,3,7,8-PECDD [3]	B D J	3.47	1.48	0.66	1.000
1,2,3,4,7,8-HXCDD	D J	3.69	1.45	1.40	1.000
1,2,3,6,7,8-HXCDD	D	14.0	1.45	1.31	1.000
1,2,3,7,8,9-HXCDD	D J	6.19	1.45	1.36	1.000
1,2,3,4,6,7,8-HPCDD	B D	238	1.46	0.99	1.000
OCDD	B D	1590	1.89	0.85	1.000
2,3,7,8-TCDF	D	3.14	0.958	0.79	1.003
1,2,3,7,8-PECDF	U D		1.54		
2,3,4,7,8-PECDF	U D		1.54		
1,2,3,4,7,8-HXCDF	K D J	4.25	2.03	0.99	1.000
1,2,3,6,7,8-HXCDF	U D		2.03		
1,2,3,7,8,9-HXCDF	U D		2.03		
2,3,4,6,7,8-HXCDF	K B D J	2.90	2.03	0.80	1.000
1,2,3,4,6,7,8-HPCDF	B D	78.1	1.53	0.93	1.000
1,2,3,4,7,8,9-HPCDF	B D J	4.66	1.53	1.00	1.000
OCDF	B D	278	2.97	0.83	1.002
TOTAL TETRA-DIOXINS	D	33.4	1.34		
TOTAL PENTA-DIOXINS	D	31.7	1.48		
TOTAL HEXA-DIOXINS	D	127	1.45		
TOTAL HEPTA-DIOXINS	D	517	1.46		
TOTAL TETRA-FURANS	D	20.3	0.958		
TOTAL PENTA-FURANS	D	23.4	1.54		
TOTAL HEXA-FURANS	D	60.3	2.03		
TOTAL HEPTA-FURANS	B D	226	1.53		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; D = dilution data; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 09-Sep-2010 14:48:07; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L15027-10_Form1A_DX0M_115S52_SJ1187787.html; Workgroup: WG33420; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654021
Sample Collection:
05-Sep-2008 09:23

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L15027-10
Matrix:	SOLID	**Sample Size:**	10.1 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	07-Aug-2010 **Time:** 00:35:29	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_106 S: 9**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_105 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_106 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	48.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF		1.62	0.412	0.84	1.001

(1) Where applicable, custom lab flags have been used on this report.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 09-Sep-2010 14:50:36; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L15027-10_Form1A_DB03_106S9_SJ1179480.html; Workgroup: WG33420; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
10654022
Sample Collection:
05-Sep-2008 10:15

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L15027-11 W
Matrix:	SOLID	**Sample Size:**	10.2 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	01-Sep-2010 **Time:** 12:30:51	**GC Column ID:**	DB5
Extract Volume (uL):	50	**Sample Data Filename:**	**DX0M_115 S: 53**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX01_175A S: 5
Dilution Factor:	2.5	**Cal. Ver. Data Filename:**	DX0M_115 S: 44
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	39.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U D		0.301		
1,2,3,7,8-PECDD [3]	B D J	0.913	0.359	0.67	1.001
1,2,3,4,7,8-HXCDD	D J	1.80	0.320	1.25	1.000
1,2,3,6,7,8-HXCDD	K D J	4.68	0.320	0.94	1.000
1,2,3,7,8,9-HXCDD	D J	3.83	0.320	1.31	1.000
1,2,3,4,6,7,8-HPCDD	B D	73.3	0.525	1.03	1.000
OCDD	B D	482	0.789	0.85	1.000
2,3,7,8-TCDF	D J	1.89	0.332	0.75	1.001
1,2,3,7,8-PECDF	U D		0.347		
2,3,4,7,8-PECDF	D J	0.847	0.347	1.42	1.001
1,2,3,4,7,8-HXCDF	D J	1.12	0.216	1.13	1.002
1,2,3,6,7,8-HXCDF	D J	0.929	0.216	1.10	1.001
1,2,3,7,8,9-HXCDF	U D		0.216		
2,3,4,6,7,8-HXCDF	B D J	0.684	0.216	1.24	1.001
1,2,3,4,6,7,8-HPCDF	B D	21.5	0.523	1.03	1.000
1,2,3,4,7,8,9-HPCDF	K B D J	2.18	0.523	0.81	1.000
OCDF	B D	69.3	0.693	0.81	1.002
TOTAL TETRA-DIOXINS	D	15.8	0.301		
TOTAL PENTA-DIOXINS	D	16.1	0.359		
TOTAL HEXA-DIOXINS	D	52.8	0.320		
TOTAL HEPTA-DIOXINS	D	176	0.525		
TOTAL TETRA-FURANS	D	11.6	0.332		
TOTAL PENTA-FURANS	D	8.14	0.347		
TOTAL HEXA-FURANS	D	16.4	0.216		
TOTAL HEPTA-FURANS	B D	63.1	0.523		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; D = dilution data; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 09-Sep-2010 14:48:07; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L15027-11_Form1A_DX0M_115S53_SJ1187788.html; Workgroup: WG33420; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654022
Sample Collection:
05-Sep-2008 10:15

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-11
Matrix:	SOLID	**Sample Size:**	10.2 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	07-Aug-2010 **Time:** 01:12:07	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_106 S: 10**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_105 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_106 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	39.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	K	1.16	0.206	1.03	1.002

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

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Report Filename: 1613_DIOXINS_1613DB225_L15027-11_Form1A_DB03_106S10_SJ1179481.html; Workgroup: WG33420; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	N/A
		Lab Sample I.D.:	WG33420-101
Matrix:	SOLID	**Sample Size:**	10.0 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	06-Aug-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	06-Aug-2010 **Time:** 23:13:55	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX01_175A S: 5**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX01_175A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX01_175A S: 1
Concentration Units:	pg/g		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		0.0500		
1,2,3,7,8-PECDD [3]	K J	0.077	0.0500	2.91	1.000
1,2,3,4,7,8-HXCDD	U		0.0800		
1,2,3,6,7,8-HXCDD	U		0.0800		
1,2,3,7,8,9-HXCDD	U		0.0800		
1,2,3,4,6,7,8-HPCDD	K J	0.141	0.0500	0.73	1.000
OCDD	K J	0.302	0.0500	1.28	1.000
2,3,7,8-TCDF	U		0.0500		
1,2,3,7,8-PECDF	U		0.0800		
2,3,4,7,8-PECDF	U		0.0800		
1,2,3,4,7,8-HXCDF	U		0.0500		
1,2,3,6,7,8-HXCDF	U		0.0500		
1,2,3,7,8,9-HXCDF	U		0.0500		
2,3,4,6,7,8-HXCDF	K J	0.106	0.0500	1.85	1.000
1,2,3,4,6,7,8-HPCDF	K J	0.126	0.0500	1.67	1.000
1,2,3,4,7,8,9-HPCDF	J	0.117	0.0500	1.09	1.000
OCDF	J	0.242	0.0500	1.01	1.002
TOTAL TETRA-DIOXINS	U		0.0500		
TOTAL PENTA-DIOXINS	U		0.0500		
TOTAL HEXA-DIOXINS	U		0.0500		
TOTAL HEPTA-DIOXINS	U		0.0500		
TOTAL TETRA-FURANS	U		0.0500		
TOTAL PENTA-FURANS	U		0.0500		
TOTAL HEXA-FURANS	U		0.0500		
TOTAL HEPTA-FURANS		0.117	0.0500		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 09-Sep-2010 14:48:07; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33420-101_Form1A_DX01_175AS5_SJ1179202.html; Workgroup: WG33420; Design ID: 699]

Form 8A
PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**OPR Data Filename:**	**DX01_175A S: 2**
Matrix:	SOLID	**Lab Sample I.D.:**	WG33420-102
Extraction Date:	23-Jul-2010	**Analysis Date:**	06-Aug-2010 **Time:** 20:29:51

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 20 uL EXTRACT VOLUME.

COMPOUND	LAB FLAG [1]	ION ABUND. RATIO [2]	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS [3] (ng/mL)	% RECOVERY
2,3,7,8-TCDD		0.79	10.6	9.60	7.10 - 16.7	90.6
1,2,3,7,8-PECDD [4]		0.66	56.6	48.3	39.6 - 80.4	85.4
1,2,3,4,7,8-HXCDD		1.24	59.2	53.6	41.4 - 97.1	90.5
1,2,3,6,7,8-HXCDD		1.25	51.8	54.0	39.4 - 69.4	104
1,2,3,7,8,9-HXCDD		1.24	56.7	50.4	36.3 - 91.9	88.8
1,2,3,4,6,7,8-HPCDD		1.08	50.0	45.0	35.0 - 70.0	90.0
OCDD		0.93	108	88.6	84.2 - 155	82.1
2,3,7,8-TCDF		0.81	10.9	10.3	8.18 - 17.2	94.2
1,2,3,7,8-PECDF		1.57	50.0	44.4	40.0 - 67.0	88.8
2,3,4,7,8-PECDF		1.58	50.0	46.0	34.0 - 80.0	92.0
1,2,3,4,7,8-HXCDF		1.28	54.4	48.7	39.2 - 72.9	89.5
1,2,3,6,7,8-HXCDF		1.25	50.0	45.9	42.0 - 65.0	91.8
1,2,3,7,8,9-HXCDF		1.22	50.0	54.9	39.0 - 65.0	110
2,3,4,6,7,8-HXCDF		1.23	53.1	51.6	37.2 - 82.8	97.2
1,2,3,4,6,7,8-HPCDF		1.03	50.0	49.9	41.0 - 61.0	99.8
1,2,3,4,7,8,9-HPCDF		1.02	50.0	50.1	39.0 - 69.0	100
OCDF		0.93	109	89.5	68.4 - 185	82.4

(1) Where applicable, custom lab flags have been used on this report.
(2) Contract-required Ion Abundance Ratios are specified in Table 9, Method 1613.
(3) Contract-required concentration range as determined from the percent of the test concentration in Table 6, Method 1613, under OPR.
(4) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form8A.xsl; Created: 09-Sep-2010 14:48:07; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33420-102_Form8A_SJ1179198.html; Workgroup: WG33420; Design ID: 699]

BATCH SUMMARY

Batch ID:	WG33623	***Date:***	10-Sep-2010
Analysis Type:	Dioxin/Furan	***Matrix Type:***	Solid

BATCH MAKEUP

Contract: 4406

Samples:

L14884-1	SDS-CPD-01
L14884-3	SDS-CPD-03
L14884-10	SDS-CPD-16
L14884-12	SDS-PB-02
L14884-16	SDS-PB-05-D
L14884-21	SDS-CPD-09
L14884-23	SDS-CPD-12

Blank:
WG33623-101

Reference or Spike:
WG33623-102
WG33623-104

Duplicate:

Comments:

1. Data are not blank corrected.
2. Elevated levels of 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF and 2,3,4,7,8-PeCDF were observed in the Lab Blank (AXYS ID WG33622-101). Cautions should be taken in evaluation of sample data for these congeners which concentrations were not significantly greater than those of the Lab Blank. However, TEQ values for all client samples except for sample SDS-PB-02 (AXYS ID L14884-12) were significantly greater than that of the Lab Blank, indicating TEQ values were not impacted by the variances for these samples.
3. A disturbance of the mass ions used to monitor instrument performance (lock-mass) was observed at the retention time corresponding to 1,2,3,6,7-PeCDD (a non-2,3,7,8-PeCDD) in samples SDS-CPD-01, SDS-CPD-03, SDS-CPD-16, SDS-PB-05-D and the Lab Blank (AXYS ID L14881-1, -3, -10, -16 and WG33623-101, respectively). This congener is flagged with a ‘G’ on the quantification summary accompanying the chromatograms when it is detected. As the interference only affected congener that was non-2,3,7,8-PeCDD and a small contributor to the overall total Penta-Dioxins, data are not considered affected by the variance.

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-CPD-01
Sample Collection:
09-Jun-2010 09:40

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-1 R
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 13:52:07	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_199A S: 6**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_199A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_199A S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	39.4

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.238	0.0468	0.52	1.001
1,2,3,7,8-PECDD [3]	B J	1.12	0.0468	0.57	1.001
1,2,3,4,7,8-HXCDD	J	1.46	0.0983	1.34	1.000
1,2,3,6,7,8-HXCDD	B	5.27	0.0983	1.24	1.000
1,2,3,7,8,9-HXCDD	B J	3.82	0.0983	1.34	1.010
1,2,3,4,6,7,8-HPCDD	B	70.8	0.144	1.06	1.000
OCDD	B	452	0.0468	0.89	1.000
2,3,7,8-TCDF	B	2.42	0.0468	0.78	1.001
1,2,3,7,8-PECDF	B J	0.382	0.0468	1.45	1.000
2,3,4,7,8-PECDF	B J	0.660	0.0468	1.59	1.000
1,2,3,4,7,8-HXCDF	B J	1.02	0.0509	1.17	1.000
1,2,3,6,7,8-HXCDF	J	0.594	0.0509	1.28	1.000
1,2,3,7,8,9-HXCDF	J	0.086	0.0509	1.17	1.000
2,3,4,6,7,8-HXCDF	B J	0.641	0.0509	1.32	1.000
1,2,3,4,6,7,8-HPCDF		16.8	0.0810	1.05	1.000
1,2,3,4,7,8,9-HPCDF	J	1.10	0.0810	1.11	1.000
OCDF	B	59.7	0.0468	0.86	1.002
TOTAL TETRA-DIOXINS		57.7	0.0468		
TOTAL PENTA-DIOXINS	B	63.5	0.0468		
TOTAL HEXA-DIOXINS		94.6	0.0983		
TOTAL HEPTA-DIOXINS	B	166	0.144		
TOTAL TETRA-FURANS	B	14.7	0.0468		
TOTAL PENTA-FURANS	B	10.2	0.0468		
TOTAL HEXA-FURANS	B	20.8	0.0509		
TOTAL HEPTA-FURANS		58.5	0.0810		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:46:20; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-1_Form1A_DX0B_199AS6_SJ1187168.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-CPD-01
Sample Collection:
09-Jun-2010 09:40

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-1 R
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	28-Aug-2010 **Time:** 04:52:03	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_123A S: 13**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_132 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_123A S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	39.4

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	1.19	0.0542	0.84	1.002

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Matthew Ou________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:47:12; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-1_Form1A_DB03_123AS13_SJ1188788.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CPD-03
Sample Collection:
09-Jun-2010 10:46

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-3 R
Matrix:	SOLID	**Sample Size:**	10.9 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 14:47:02	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_199A S: 7**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_199A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_199A S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	42.6

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.306	0.0460	0.55	1.001
1,2,3,7,8-PECDD [3]	B J	1.20	0.0460	0.53	1.001
1,2,3,4,7,8-HXCDD	J	1.72	0.0587	1.25	1.000
1,2,3,6,7,8-HXCDD	B	7.77	0.0587	1.29	1.000
1,2,3,7,8,9-HXCDD	B J	4.48	0.0587	1.24	1.010
1,2,3,4,6,7,8-HPCDD	B	139	0.341	1.05	1.000
OCDD	B	1000	0.0460	0.89	1.000
2,3,7,8-TCDF	B	2.38	0.0460	0.76	1.001
1,2,3,7,8-PECDF	B J	0.539	0.0460	1.48	1.000
2,3,4,7,8-PECDF	B J	0.991	0.0460	1.67	1.000
1,2,3,4,7,8-HXCDF	B J	1.83	0.0670	1.25	1.000
1,2,3,6,7,8-HXCDF	J	1.10	0.0670	1.32	1.000
1,2,3,7,8,9-HXCDF	J	0.139	0.0670	1.11	1.000
2,3,4,6,7,8-HXCDF	B J	1.27	0.0670	1.35	1.000
1,2,3,4,6,7,8-HPCDF		41.0	0.105	1.03	1.000
1,2,3,4,7,8,9-HPCDF	J	2.23	0.105	0.93	1.000
OCDF	B	154	0.0460	0.89	1.002
TOTAL TETRA-DIOXINS		15.2	0.0460		
TOTAL PENTA-DIOXINS	B	16.3	0.0460		
TOTAL HEXA-DIOXINS		74.1	0.0587		
TOTAL HEPTA-DIOXINS	B	327	0.341		
TOTAL TETRA-FURANS	B	15.4	0.0460		
TOTAL PENTA-FURANS	B	16.4	0.0460		
TOTAL HEXA-FURANS	B	45.5	0.0670		
TOTAL HEPTA-FURANS		154	0.105		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: ________Matthew Ou________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:46:20; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-3_Form1A_DX0B_199AS7_SJ1187169.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-CPD-03
Sample Collection:
09-Jun-2010 10:46

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-3 R
Matrix:	SOLID	**Sample Size:**	10.9 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	28-Aug-2010 **Time:** 05:28:40	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_123A S: 14**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_132 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_123A S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	42.6

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	1.04	0.149	0.87	1.002

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Matthew Ou_________

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Report Filename: 1613_DIOXINS_1613DB225_L14884-3_Form1A_DB03_123AS14_SJ1188789.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CPD-16
Sample Collection:
09-Jun-2010 13:31

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-10 R
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 15:42:03	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_199A S: 8**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_199A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_199A S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	47.8

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.282	0.0468	0.52	1.001
1,2,3,7,8-PECDD [3]	B J	1.02	0.0468	0.59	1.001
1,2,3,4,7,8-HXCDD	J	1.10	0.0723	1.22	1.000
1,2,3,6,7,8-HXCDD	B J	4.64	0.0723	1.31	1.000
1,2,3,7,8,9-HXCDD	B J	3.35	0.0723	1.16	1.010
1,2,3,4,6,7,8-HPCDD	B	64.8	0.189	1.04	1.000
OCDD	B	421	0.0468	0.89	1.000
2,3,7,8-TCDF	B	2.54	0.0468	0.81	1.001
1,2,3,7,8-PECDF	B J	0.460	0.0468	1.64	1.000
2,3,4,7,8-PECDF	B J	0.703	0.0468	1.61	1.001
1,2,3,4,7,8-HXCDF	B J	1.05	0.0468	1.18	1.000
1,2,3,6,7,8-HXCDF	J	0.676	0.0468	1.41	1.000
1,2,3,7,8,9-HXCDF	J	0.081	0.0468	1.27	1.000
2,3,4,6,7,8-HXCDF	B J	0.773	0.0468	1.28	1.000
1,2,3,4,6,7,8-HPCDF		18.2	0.0881	1.05	1.000
1,2,3,4,7,8,9-HPCDF	K J	1.15	0.0881	0.80	1.000
OCDF	B	71.8	0.0468	0.87	1.002
TOTAL TETRA-DIOXINS		18.1	0.0468		
TOTAL PENTA-DIOXINS	B	17.8	0.0468		
TOTAL HEXA-DIOXINS		56.1	0.0723		
TOTAL HEPTA-DIOXINS	B	155	0.189		
TOTAL TETRA-FURANS	B	13.9	0.0468		
TOTAL PENTA-FURANS	B	10.3	0.0468		
TOTAL HEXA-FURANS	B	21.2	0.0468		
TOTAL HEPTA-FURANS		59.0	0.0881		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:46:20; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-10_Form1A_DX0B_199AS8_SJ1187170.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-CPD-16
Sample Collection:
09-Jun-2010 13:31

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-10 R
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	28-Aug-2010 **Time:** 06:05:19	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_123A S: 15**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_132 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_123A S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	47.8

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	1.34	0.172	0.76	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:47:12; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-10_Form1A_DB03_123AS15_SJ1188790.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A
PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-PB-02
Sample Collection:
07-Jun-2010 13:45

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-12 Ri
Matrix:	SOLID	**Sample Size:**	10.2 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 00:18:53	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_205E S: 6**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_199A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_205E S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	21.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.054	0.0489	0.24	1.001
1,2,3,7,8-PECDD [3]	U		0.0489		
1,2,3,4,7,8-HXCDD	K J	0.049	0.0489	0.80	1.000
1,2,3,6,7,8-HXCDD	K B J	0.088	0.0489	1.90	1.000
1,2,3,7,8,9-HXCDD	K B J	0.081	0.0489	0.93	1.010
1,2,3,4,6,7,8-HPCDD	B J	0.369	0.0489	1.16	1.000
OCDD	B J	1.49	0.0489	0.87	1.000
2,3,7,8-TCDF	B J	0.943	0.0489	0.77	1.001
1,2,3,7,8-PECDF	B J	0.135	0.0489	1.58	1.001
2,3,4,7,8-PECDF	B J	0.298	0.0489	1.57	1.001
1,2,3,4,7,8-HXCDF	B J	0.052	0.0489	1.06	1.001
1,2,3,6,7,8-HXCDF	J	0.049	0.0489	1.19	1.001
1,2,3,7,8,9-HXCDF	U		0.0489		
2,3,4,6,7,8-HXCDF	B J	0.055	0.0489	1.37	1.000
1,2,3,4,6,7,8-HPCDF	J	0.097	0.0489	1.16	1.000
1,2,3,4,7,8,9-HPCDF	U		0.0489		
OCDF	K B J	0.150	0.0489	1.15	1.002
TOTAL TETRA-DIOXINS		0.058	0.0489		
TOTAL PENTA-DIOXINS	B	0.074	0.0489		
TOTAL HEXA-DIOXINS		0.141	0.0489		
TOTAL HEPTA-DIOXINS	B	0.840	0.0489		
TOTAL TETRA-FURANS	B	2.86	0.0489		
TOTAL PENTA-FURANS	B	1.26	0.0489		
TOTAL HEXA-FURANS	B	0.155	0.0489		
TOTAL HEPTA-FURANS		0.097	0.0489		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:46:20; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-12_Form1A_DX0B_205ES6_SJ1188685.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-PB-02
Sample Collection:
07-Jun-2010 13:45

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-12 R
Matrix:	SOLID	**Sample Size:**	10.2 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	28-Aug-2010 **Time:** 06:41:56	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_123A S: 16**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_132 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_123A S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	21.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	K B J	0.615	0.0660	0.91	1.001

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:47:12; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-12_Form1A_DB03_123AS16_SJ1188791.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-PB-05-D
Sample Collection:
07-Jun-2010 14:50

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-16 R
Matrix:	SOLID	**Sample Size:**	10.4 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 17:31:53	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_199A S: 10**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_199A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_199A S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	28.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.089	0.0479	0.55	1.001
1,2,3,7,8-PECDD [3]	K B J	0.162	0.0479	0.80	1.000
1,2,3,4,7,8-HXCDD	J	0.197	0.0479	1.25	1.000
1,2,3,6,7,8-HXCDD	B J	0.940	0.0479	1.30	1.000
1,2,3,7,8,9-HXCDD	B J	0.677	0.0479	1.13	1.010
1,2,3,4,6,7,8-HPCDD	B	7.04	0.0514	1.05	1.000
OCDD	B	41.2	0.0479	0.89	1.000
2,3,7,8-TCDF	B	1.14	0.0479	0.77	1.002
1,2,3,7,8-PECDF	K B J	0.168	0.0479	1.30	1.000
2,3,4,7,8-PECDF	B J	0.331	0.0479	1.42	1.000
1,2,3,4,7,8-HXCDF	B J	0.194	0.0479	1.16	1.000
1,2,3,6,7,8-HXCDF	K J	0.117	0.0479	1.65	1.000
1,2,3,7,8,9-HXCDF	U		0.0479		
2,3,4,6,7,8-HXCDF	B J	0.151	0.0479	1.16	1.000
1,2,3,4,6,7,8-HPCDF	J	1.46	0.0479	1.10	1.000
1,2,3,4,7,8,9-HPCDF	J	0.119	0.0479	0.96	1.000
OCDF	B J	2.81	0.0479	0.86	1.002
TOTAL TETRA-DIOXINS		1.99	0.0479		
TOTAL PENTA-DIOXINS	B	1.85	0.0479		
TOTAL HEXA-DIOXINS		7.86	0.0479		
TOTAL HEPTA-DIOXINS	B	18.6	0.0514		
TOTAL TETRA-FURANS	B	4.65	0.0479		
TOTAL PENTA-FURANS	B	2.29	0.0479		
TOTAL HEXA-FURANS	B	2.22	0.0479		
TOTAL HEPTA-FURANS		4.00	0.0479		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:46:20; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-16_Form1A_DX0B_199AS10_SJ1187172.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-PB-05-D
Sample Collection:
07-Jun-2010 14:50

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-16 R
Matrix:	SOLID	**Sample Size:**	10.4 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	28-Aug-2010 **Time:** 07:18:43	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_123A S: 17**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_132 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_123A S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	28.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.647	0.0683	0.81	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Matthew Ou________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:47:12; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-16_Form1A_DB03_123AS17_SJ1188792.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CPD-09
Sample Collection:
10-Jun-2010 11:30

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.			FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-21 R
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 22:33:13	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_200 S: 4**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_199A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_200 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	41.5

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.225	0.0466	0.61	1.001
1,2,3,7,8-PECDD [3]	B J	0.814	0.0466	0.67	1.001
1,2,3,4,7,8-HXCDD	J	1.11	0.0532	1.12	1.000
1,2,3,6,7,8-HXCDD	B J	3.22	0.0532	1.33	1.000
1,2,3,7,8,9-HXCDD	B J	2.45	0.0532	1.21	1.010
1,2,3,4,6,7,8-HPCDD	B	32.8	0.114	1.05	1.000
OCDD	B	186	0.0466	0.90	1.000
2,3,7,8-TCDF	B	2.84	0.0466	0.76	1.001
1,2,3,7,8-PECDF	B J	0.380	0.0466	1.42	1.001
2,3,4,7,8-PECDF	K B J	0.692	0.0466	1.88	1.000
1,2,3,4,7,8-HXCDF	B J	0.681	0.0466	1.41	1.000
1,2,3,6,7,8-HXCDF	J	0.488	0.0466	1.17	1.000
1,2,3,7,8,9-HXCDF	K J	0.053	0.0466	1.03	1.000
2,3,4,6,7,8-HXCDF	B J	0.507	0.0466	1.24	1.000
1,2,3,4,6,7,8-HPCDF		7.93	0.0673	1.05	1.000
1,2,3,4,7,8,9-HPCDF	J	0.645	0.0673	1.06	1.000
OCDF	B	21.4	0.0466	0.88	1.002
TOTAL TETRA-DIOXINS		113	0.0466		
TOTAL PENTA-DIOXINS	B	71.2	0.0466		
TOTAL HEXA-DIOXINS		65.6	0.0532		
TOTAL HEPTA-DIOXINS	B	87.5	0.114		
TOTAL TETRA-FURANS	B	14.6	0.0466		
TOTAL PENTA-FURANS	B	7.08	0.0466		
TOTAL HEXA-FURANS	B	11.5	0.0466		
TOTAL HEPTA-FURANS		24.5	0.0673		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:46:20; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-21_Form1A_DX0B_200S4_SJ1187177.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CPD-09
Sample Collection:
10-Jun-2010 11:30

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-21 Ri
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Sep-2010 **Time:** 12:02:26	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_132 S: 6**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_132 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_132 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	41.5

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	1.13	0.0623	0.81	1.002

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:47:12; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-21_Form1A_DB03_132S6_SJ1189683.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CPD-12
Sample Collection:
10-Jun-2010 12:00

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-23 R
Matrix:	SOLID	**Sample Size:**	9.97 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 23:28:05	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_200 S: 5**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_199A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_200 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	39.8

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K B J	0.169	0.0502	0.60	1.002
1,2,3,7,8-PECDD [3]	B J	0.623	0.0502	0.62	1.001
1,2,3,4,7,8-HXCDD	J	0.667	0.0628	1.14	1.000
1,2,3,6,7,8-HXCDD	B J	2.48	0.0628	1.19	1.000
1,2,3,7,8,9-HXCDD	B J	1.96	0.0628	1.17	1.010
1,2,3,4,6,7,8-HPCDD	B	24.2	0.0856	1.05	1.000
OCDD	B	143	0.0502	0.90	1.000
2,3,7,8-TCDF	B	2.49	0.0502	0.78	1.001
1,2,3,7,8-PECDF	B J	0.369	0.0502	1.41	1.000
2,3,4,7,8-PECDF	B J	0.563	0.0502	1.53	1.000
1,2,3,4,7,8-HXCDF	B J	0.603	0.0502	1.19	1.000
1,2,3,6,7,8-HXCDF	J	0.403	0.0502	1.25	1.000
1,2,3,7,8,9-HXCDF	U		0.0502		
2,3,4,6,7,8-HXCDF	B J	0.435	0.0502	1.35	1.000
1,2,3,4,6,7,8-HPCDF		6.04	0.0502	1.04	1.000
1,2,3,4,7,8,9-HPCDF	J	0.421	0.0502	1.03	1.000
OCDF	B	14.5	0.0502	0.87	1.002
TOTAL TETRA-DIOXINS		10.4	0.0502		
TOTAL PENTA-DIOXINS	B	12.1	0.0502		
TOTAL HEXA-DIOXINS		33.8	0.0628		
TOTAL HEPTA-DIOXINS	B	74.2	0.0856		
TOTAL TETRA-FURANS	B	13.0	0.0502		
TOTAL PENTA-FURANS	B	5.94	0.0502		
TOTAL HEXA-FURANS	B	8.65	0.0502		
TOTAL HEPTA-FURANS		18.3	0.0502		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:46:20; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14884-23_Form1A_DX0B_200S5_SJ1187178.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-CPD-12
Sample Collection:
10-Jun-2010 12:00

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-23 Ri
Matrix:	SOLID	**Sample Size:**	9.97 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Sep-2010 **Time:** 12:39:12	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_132 S: 7**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_132 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_132 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	39.8

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.957	0.0587	0.71	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Matthew Ou_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:47:12; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14884-23_Form1A_DB03_132S7_SJ1189684.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	N/A
		Lab Sample I.D.:	WG33623-101
Matrix:	SOLID	**Sample Size:**	10.0 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 12:57:12	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_199A S: 5**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_199A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_199A S: 1
Concentration Units:	pg/g		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.066	0.0500	0.32	1.001
1,2,3,7,8-PECDD [3]	J	0.064	0.0500	0.64	1.000
1,2,3,4,7,8-HXCDD	U		0.0500		
1,2,3,6,7,8-HXCDD	K J	0.092	0.0500	0.85	1.000
1,2,3,7,8,9-HXCDD	K J	0.072	0.0500	1.79	1.009
1,2,3,4,6,7,8-HPCDD	J	0.075	0.0500	0.91	1.000
OCDD	J	0.088	0.0500	0.97	1.000
2,3,7,8-TCDF	J	0.536	0.0500	0.75	1.001
1,2,3,7,8-PECDF	K J	0.121	0.0500	2.18	1.000
2,3,4,7,8-PECDF	J	0.257	0.0500	1.43	1.001
1,2,3,4,7,8-HXCDF	J	0.073	0.0500	1.19	1.000
1,2,3,6,7,8-HXCDF	U		0.0500		
1,2,3,7,8,9-HXCDF	U		0.0500		
2,3,4,6,7,8-HXCDF	J	0.069	0.0500	1.09	1.000
1,2,3,4,6,7,8-HPCDF	U		0.0500		
1,2,3,4,7,8,9-HPCDF	U		0.0500		
OCDF	K J	0.065	0.0500	1.25	1.001
TOTAL TETRA-DIOXINS	U		0.0500		
TOTAL PENTA-DIOXINS		0.064	0.0500		
TOTAL HEXA-DIOXINS	U		0.0500		
TOTAL HEPTA-DIOXINS		0.075	0.0500		
TOTAL TETRA-FURANS		1.20	0.0500		
TOTAL PENTA-FURANS		0.396	0.0500		
TOTAL HEXA-FURANS		0.143	0.0500		
TOTAL HEPTA-FURANS	U		0.0500		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:46:20; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33623-101_Form1A_DX0B_199AS5_SJ1187166.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	N/A
		Lab Sample I.D.:	WG33623-101 i
Matrix:	SOLID	**Sample Size:**	10.0 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	13-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Sep-2010 **Time:** 11:25:39	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_132 S: 5**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_132 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_132 S: 2
Concentration Units:	pg/g		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	J	0.249	0.0500	0.80	1.001

(1) Where applicable, custom lab flags have been used on this report; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 11-Sep-2010 15:47:12; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_WG33623-101_Form1A_DB03_132S5_SJ1189681.html; Workgroup: WG33623; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 8A

PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**OPR Data Filename:**	**DX0B_199A S: 2**
Matrix:	SOLID	**Lab Sample I.D.:**	WG33623-102
Extraction Date:	13-Aug-2010	**Analysis Date:**	27-Aug-2010 **Time:** 10:12:19

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 20 uL EXTRACT VOLUME.

COMPOUND	LAB FLAG [1]	ION ABUND. RATIO [2]	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS [3] (ng/mL)	% RECOVERY
2,3,7,8-TCDD		0.79	10.0	10.4	6.70 - 15.8	104
1,2,3,7,8-PECDD [4]		0.61	52.0	52.1	36.4 - 73.8	100
1,2,3,4,7,8-HXCDD		1.26	56.5	54.7	39.6 - 92.7	96.8
1,2,3,6,7,8-HXCDD		1.24	55.5	55.4	42.2 - 74.4	99.7
1,2,3,7,8,9-HXCDD		1.24	54.0	53.5	34.6 - 87.5	99.0
1,2,3,4,6,7,8-HPCDD		1.07	47.5	47.9	33.3 - 66.5	101
OCDD		0.89	100	94.6	78.0 - 144	94.6
2,3,7,8-TCDF		0.81	10.7	11.0	8.03 - 16.9	103
1,2,3,7,8-PECDF		1.55	46.0	46.1	36.8 - 61.6	100
2,3,4,7,8-PECDF		1.56	47.0	47.8	32.0 - 75.2	102
1,2,3,4,7,8-HXCDF		1.26	50.0	47.9	36.0 - 67.0	95.8
1,2,3,6,7,8-HXCDF		1.25	47.5	45.2	39.9 - 61.8	95.1
1,2,3,7,8,9-HXCDF		1.26	52.5	51.1	41.0 - 68.3	97.3
2,3,4,6,7,8-HXCDF		1.25	53.0	50.2	37.1 - 82.7	94.7
1,2,3,4,6,7,8-HPCDF		1.05	50.0	50.3	41.0 - 61.0	101
1,2,3,4,7,8,9-HPCDF		1.02	50.0	47.3	39.0 - 69.0	94.6
OCDF		0.89	104	88.9	65.5 - 177	85.5

(1) Where applicable, custom lab flags have been used on this report.
(2) Contract-required Ion Abundance Ratios are specified in Table 9, Method 1613.
(3) Contract-required concentration range as determined from the percent of the test concentration in Table 6, Method 1613, under OPR.
(4) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou_________

For Axys Internal Use Only [XSL Template: Form8A.xsl; Created: 11-Sep-2010 15:46:20; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33623-102_Form8A_SJ1187162.html; Workgroup: WG33623; Design ID: 699]

Form 8G

PCDD/PCDF CERTIFIED REFERENCE MATERIAL (CRM) REPORT FOR NIST SRM 1944

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Lab Sample I.D.:**	WG33623-104
Matrix:	SOLID	**Sample Size:**	1.03 g (received)
Extraction Date:	13-Aug-2010	**Initial Calibration Date:**	26-Aug-2010
Analysis Date:	30-Aug-2010 **Time:** 17:19:13	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB5
Injection Volume (uL):	1.0	**CRM Data Filename:**	**DX0B_201 S: 11**
Dilution Factor:	N/A	**Blank Data Filename:**	DX0B_199A S: 5
Concentration Units:	pg/g (received weight basis)	**Cal. Ver. Data Filename:**	DX0B_201 S: 1

COMPOUND	LAB FLAG [1]	DETERMINED	CERTIFIED / REFERENCE
2,3,7,8-TCDD		136	133 +/- 9
1,2,3,7,8-PECDD [2]	J	17.7	19 +/- 2
1,2,3,4,7,8-HXCDD	J	26.2	26 +/- 3
1,2,3,6,7,8-HXCDD		59.9	56 +/- 6
1,2,3,7,8,9-HXCDD		63.8	53 +/- 7
1,2,3,4,6,7,8-HPCDD		802	800 +/- 70
OCDD		5750	5800 +/- 700
2,3,7,8-TCDF	X		
1,2,3,7,8-PECDF		45.5	45 +/- 7
2,3,4,7,8-PECDF		47.5	45 +/- 4
1,2,3,4,7,8-HXCDF		199	220 +/- 30
1,2,3,6,7,8-HXCDF		87.6	90 +/- 10
1,2,3,7,8,9-HXCDF	J	2.62	19 +/- 18
2,3,4,6,7,8-HXCDF	J	46.9	54 +/- 6
1,2,3,4,6,7,8-HPCDF		949	1000 +/- 100
1,2,3,4,7,8,9-HPCDF	J	40.5	40 +/- 6
OCDF		1030	1000 +/- 100

(1) Where applicable, custom lab flags have been used on this report; J = concentration less than LMCL; X = result reported separately.
(2) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou_________

For Axys Internal Use Only [XSL Template: Form8G.xsl; Created: 11-Sep-2010 15:46:20; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33623-104_Form8G_SJ1187195.html; Workgroup: WG33623; Design ID: 699]

Form 8G

PCDD/PCDF CERTIFIED REFERENCE MATERIAL (CRM) REPORT FOR NIST SRM 1944

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Lab Sample I.D.:**	WG33623-104
Matrix:	SOLID	**Sample Size:**	1.03 g (received)
Extraction Date:	13-Aug-2010	**Initial Calibration Date:**	24-Aug-2010
Analysis Date:	28-Aug-2010 **Time:** 07:55:28	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB225
Injection Volume (uL):	2.0	**CRM Data Filename:**	**DB03_123A S: 18**
Dilution Factor:	N/A	**Blank Data Filename:**	DB03_132 S: 5
Concentration Units:	pg/g (received weight basis)	**Cal. Ver. Data Filename:**	DB03_123A S: 2

COMPOUND	LAB FLAG [1]	DETERMINED	CERTIFIED / REFERENCE
2,3,7,8-TCDF		32.7	39 +/- 15

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Matthew Ou_________

For Axys Internal Use Only [XSL Template: Form8G.xsl; Created: 11-Sep-2010 15:47:12; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_WG33623-104_Form8G_SJ1188793.html; Workgroup: WG33623; Design ID: 699]

BATCH SUMMARY

Batch ID:	WG33742	***Date:***	13-Sep-2010
Analysis Type:	Dioxin/Furan	***Matrix Type:***	Solid

BATCH MAKEUP

Contract: 4406

Samples:

L14884-26	SDS-CT-01A	L15027-1	10654001
L14884-28	SDS-CT-02	L15027-2	10654002
L14884-31	SDS-CT-05	L15027-3	10654003
L14884-39	SDS-PB-10	L15027-5	10654008
L14884-42	SDS-FB-03	L15027-6	10654009
L14884-43	SDS-FB-04	L15027-8	10654013
L14884-44	SDS-FB-05	L15027-12	10654026
L14884-46	SDS-FB-07		
L14884-47	SDS-FB-07-D		
L14884-48	SDS-FB-08		
L14884-49	SDS-FB-09		

Blank:
WG33742-101

Reference or Spike:
WG33742-102
WG33742-104

Duplicate:
WG33742-103

Comments:

1. The results are not blank-corrected. The level of 2,3,7,8-TCDF is slightly high in the procedural blank.
2. The value of 2,3,7,8-TCDD determined for the reference material NIST exceeds the reference value, although the recovery of TCDD in the OPR is within control limits.

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CT-01A
Sample Collection:
14-Jun-2010 10:47

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-26 Ri
Matrix:	SOLID	**Sample Size:**	9.72 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Sep-2010 **Time:** 16:41:42	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_119 S: 9**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_119 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	54.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD		3.01	0.0756	0.65	1.001
1,2,3,7,8-PECDD [3]		11.8	0.174	0.56	1.001
1,2,3,4,7,8-HXCDD		16.8	0.263	1.18	1.000
1,2,3,6,7,8-HXCDD		95.7	0.263	1.20	1.000
1,2,3,7,8,9-HXCDD	B	50.8	0.263	1.22	1.000
1,2,3,4,6,7,8-HPCDD	B	2500	0.600	0.98	1.000
OCDD	E				
2,3,7,8-TCDF	B	41.9	0.130	0.74	1.002
1,2,3,7,8-PECDF		9.80	0.159	1.43	1.000
2,3,4,7,8-PECDF	B	15.9	0.159	1.41	1.000
1,2,3,4,7,8-HXCDF	B	29.7	0.299	1.18	1.000
1,2,3,6,7,8-HXCDF		13.9	0.299	1.14	1.000
1,2,3,7,8,9-HXCDF	K B J	1.05	0.299	1.04	1.000
2,3,4,6,7,8-HXCDF	B	14.3	0.299	1.12	1.001
1,2,3,4,6,7,8-HPCDF	B	497	0.494	0.96	1.000
1,2,3,4,7,8,9-HPCDF		30.2	0.494	0.91	1.000
OCDF	B	1870	0.0907	0.85	1.001
TOTAL TETRA-DIOXINS		112	0.0756		
TOTAL PENTA-DIOXINS		174	0.174		
TOTAL HEXA-DIOXINS		1010	0.263		
TOTAL HEPTA-DIOXINS		6800	0.600		
TOTAL TETRA-FURANS	B	262	0.130		
TOTAL PENTA-FURANS	B	215	0.159		
TOTAL HEXA-FURANS	B	704	0.299		
TOTAL HEPTA-FURANS	B	2190	0.494		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL; E = exceeds calibrated linear range, see dilution data.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-26_Form1A_DX0M_119S9_SJ1188500.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CT-01A
Sample Collection:
14-Jun-2010 10:47

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-26 RW
Matrix:	SOLID	**Sample Size:**	9.72 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Sep-2010 **Time:** 17:02:29	**GC Column ID:**	DB5
Extract Volume (uL):	200	**Sample Data Filename:**	**DX0M_123 S: 11**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	10	**Cal. Ver. Data Filename:**	DX0M_123 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	54.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	X				
1,2,3,7,8-PECDD [3]	X				
1,2,3,4,7,8-HXCDD	X				
1,2,3,6,7,8-HXCDD	X				
1,2,3,7,8,9-HXCDD	X				
1,2,3,4,6,7,8-HPCDD	X				
OCDD	B D	22200	5.97	0.85	1.000
2,3,7,8-TCDF	X				
1,2,3,7,8-PECDF	X				
2,3,4,7,8-PECDF	X				
1,2,3,4,7,8-HXCDF	X				
1,2,3,6,7,8-HXCDF	X				
1,2,3,7,8,9-HXCDF	X				
2,3,4,6,7,8-HXCDF	X				
1,2,3,4,6,7,8-HPCDF	X				
1,2,3,4,7,8,9-HPCDF	X				
OCDF	X				
TOTAL TETRA-DIOXINS	X				
TOTAL PENTA-DIOXINS	X				
TOTAL HEXA-DIOXINS	X				
TOTAL HEPTA-DIOXINS	X				
TOTAL TETRA-FURANS	X				
TOTAL PENTA-FURANS	X				
TOTAL HEXA-FURANS	X				
TOTAL HEPTA-FURANS	X				

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; D = dilution data; X = result reported separately.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-26_Form1A_DX0M_123S11_SJ1190062.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-CT-01A
Sample Collection:
14-Jun-2010 10:47

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-26 R
Matrix:	SOLID	**Sample Size:**	9.72 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	07-Sep-2010 **Time:** 23:45:56	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 7**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	54.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	16.9	0.161	0.77	1.002

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L14884-26_Form1A_DB03_128S7_SJ1190205.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-CT-02
Sample Collection:
14-Jun-2010 11:47

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-28 Ri
Matrix:	SOLID	**Sample Size:**	10.6 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Sep-2010 **Time:** 17:36:44	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_119 S: 10**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_119 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	34.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.453	0.0527	0.59	1.001
1,2,3,7,8-PECDD [3]	J	2.07	0.0558	0.58	1.001
1,2,3,4,7,8-HXCDD	J	2.71	0.147	1.24	1.000
1,2,3,6,7,8-HXCDD		18.1	0.147	1.18	1.000
1,2,3,7,8,9-HXCDD	B	7.64	0.147	1.26	1.000
1,2,3,4,6,7,8-HPCDD	B	325	0.261	0.96	1.000
OCDD	B	2340	0.0555	0.87	1.000
2,3,7,8-TCDF	K B	1.82	0.0473	0.65	1.001
1,2,3,7,8-PECDF	J	0.593	0.0893	1.60	1.001
2,3,4,7,8-PECDF	B J	1.65	0.0893	1.58	1.000
1,2,3,4,7,8-HXCDF	B J	4.01	0.101	1.13	1.000
1,2,3,6,7,8-HXCDF	J	1.84	0.101	1.37	1.000
1,2,3,7,8,9-HXCDF	B J	0.143	0.101	1.23	1.000
2,3,4,6,7,8-HXCDF	B J	2.54	0.101	1.36	1.000
1,2,3,4,6,7,8-HPCDF	B	104	0.201	0.99	1.000
1,2,3,4,7,8,9-HPCDF		6.28	0.201	0.96	1.000
OCDF	B	319	0.0473	0.84	1.002
TOTAL TETRA-DIOXINS		29.7	0.0527		
TOTAL PENTA-DIOXINS		29.7	0.0558		
TOTAL HEXA-DIOXINS		150	0.147		
TOTAL HEPTA-DIOXINS		809	0.261		
TOTAL TETRA-FURANS	B	11.3	0.0473		
TOTAL PENTA-FURANS	B	25.8	0.0893		
TOTAL HEXA-FURANS	B	106	0.101		
TOTAL HEPTA-FURANS	B	376	0.201		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-28_Form1A_DX0M_119S10_SJ1188486.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CT-02
Sample Collection:
14-Jun-2010 11:47

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-28 R
Matrix:	SOLID	**Sample Size:**	10.6 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 00:59:29	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 9**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	34.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.874	0.0477	0.86	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L14884-28_Form1A_DB03_128S9_SJ1190207.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CT-05
Sample Collection:
14-Jun-2010 13:06

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.			FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-31 Ri
Matrix:	SOLID	**Sample Size:**	10.6 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Sep-2010 **Time:** 18:31:47	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_119 S: 11**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_119 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	27.1

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.083	0.0470	0.36	1.001
1,2,3,7,8-PECDD [3]	J	0.421	0.0679	0.55	1.001
1,2,3,4,7,8-HXCDD	J	0.442	0.0845	1.15	1.001
1,2,3,6,7,8-HXCDD	J	2.03	0.0845	1.26	1.000
1,2,3,7,8,9-HXCDD	B J	1.45	0.0845	1.20	1.000
1,2,3,4,6,7,8-HPCDD	B	31.6	0.132	0.91	1.000
OCDD	B	199	0.193	0.85	1.000
2,3,7,8-TCDF	K B	1.01	0.0489	0.63	1.001
1,2,3,7,8-PECDF	K J	0.136	0.123	1.11	1.000
2,3,4,7,8-PECDF	K B J	0.427	0.123	1.20	1.001
1,2,3,4,7,8-HXCDF	B J	0.549	0.155	1.29	1.000
1,2,3,6,7,8-HXCDF	K J	0.315	0.155	0.89	1.000
1,2,3,7,8,9-HXCDF	U		0.155		
2,3,4,6,7,8-HXCDF	B J	0.467	0.155	1.38	1.000
1,2,3,4,6,7,8-HPCDF	B	9.47	0.123	1.04	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.556	0.123	1.24	1.000
OCDF	B	27.2	0.0762	0.88	1.002
TOTAL TETRA-DIOXINS		0.527	0.0470		
TOTAL PENTA-DIOXINS		2.04	0.0679		
TOTAL HEXA-DIOXINS		19.3	0.0845		
TOTAL HEPTA-DIOXINS		148	0.132		
TOTAL TETRA-FURANS	B	3.61	0.0489		
TOTAL PENTA-FURANS	B	3.17	0.123		
TOTAL HEXA-FURANS	B	5.08	0.155		
TOTAL HEPTA-FURANS	B	26.5	0.123		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-31_Form1A_DX0M_119S11_SJ1188488.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-CT-05
Sample Collection:
14-Jun-2010 13:06

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-31 R
Matrix:	SOLID	**Sample Size:**	10.6 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 01:36:07	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 10**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	27.1

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.520	0.0656	0.74	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L14884-31_Form1A_DB03_128S10_SJ1190208.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-PB-10
Sample Collection:
08-Jun-2010 16:20

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-39 Ri
Matrix:	SOLID	**Sample Size:**	11.1 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Sep-2010 **Time:** 08:12:20	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_122 S: 23**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_122 S: 13
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	38.8

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.052	0.0451	0.12	1.000
1,2,3,7,8-PECDD [3]	K J	0.152	0.0451	0.83	1.000
1,2,3,4,7,8-HXCDD	J	0.267	0.0451	1.10	1.001
1,2,3,6,7,8-HXCDD	J	1.08	0.0451	1.12	1.000
1,2,3,7,8,9-HXCDD	K B J	0.859	0.0451	0.89	1.000
1,2,3,4,6,7,8-HPCDD	B	17.4	0.0842	0.98	1.000
OCDD	B	196	0.133	0.87	1.000
2,3,7,8-TCDF	B	1.30	0.0451	0.74	1.001
1,2,3,7,8-PECDF	K J	0.063	0.0616	2.13	1.000
2,3,4,7,8-PECDF	B J	0.315	0.0616	1.46	1.001
1,2,3,4,7,8-HXCDF	B J	0.208	0.0534	1.26	1.000
1,2,3,6,7,8-HXCDF	K J	0.133	0.0534	0.82	1.001
1,2,3,7,8,9-HXCDF	U		0.0534		
2,3,4,6,7,8-HXCDF	K B J	0.189	0.0534	0.99	1.001
1,2,3,4,6,7,8-HPCDF	K B J	1.92	0.0451	0.84	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.201	0.0451	1.44	1.000
OCDF	B J	4.71	0.0472	0.79	1.002
TOTAL TETRA-DIOXINS		1.26	0.0451		
TOTAL PENTA-DIOXINS		0.613	0.0451		
TOTAL HEXA-DIOXINS		11.3	0.0451		
TOTAL HEPTA-DIOXINS		201	0.0842		
TOTAL TETRA-FURANS	B	4.61	0.0451		
TOTAL PENTA-FURANS	B	1.41	0.0616		
TOTAL HEXA-FURANS	B	1.42	0.0534		
TOTAL HEPTA-FURANS	B	3.30	0.0451		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-39_Form1A_DX0M_122S23_SJ1189292.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-PB-10
Sample Collection:
08-Jun-2010 16:20

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-39 R
Matrix:	SOLID	**Sample Size:**	11.1 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 02:12:46	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 11**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	38.8

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.626	0.0451	0.83	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L14884-39_Form1A_DB03_128S11_SJ1190209.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-03
Sample Collection:
08-Jun-2010 10:52

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-42 Ri
Matrix:	SOLID	**Sample Size:**	11.3 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Sep-2010 **Time:** 01:46:56	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_122 S: 16**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_122 S: 13
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	22.1

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.066	0.0443	0.08	1.000
1,2,3,7,8-PECDD [3]	J	0.127	0.0443	0.63	1.001
1,2,3,4,7,8-HXCDD	K J	0.196	0.0449	1.00	1.000
1,2,3,6,7,8-HXCDD	J	0.747	0.0449	1.33	1.000
1,2,3,7,8,9-HXCDD	B J	0.469	0.0449	1.18	1.000
1,2,3,4,6,7,8-HPCDD	B	4.41	0.0443	0.96	1.000
OCDD	B	26.3	0.0994	0.88	1.000
2,3,7,8-TCDF	B	1.13	0.0801	0.76	1.001
1,2,3,7,8-PECDF	K J	0.102	0.0516	2.72	1.001
2,3,4,7,8-PECDF	B J	0.282	0.0516	1.75	1.001
1,2,3,4,7,8-HXCDF	B J	0.186	0.0443	1.20	1.000
1,2,3,6,7,8-HXCDF	K J	0.111	0.0443	1.66	1.001
1,2,3,7,8,9-HXCDF	U		0.0443		
2,3,4,6,7,8-HXCDF	K B J	0.134	0.0443	0.96	1.001
1,2,3,4,6,7,8-HPCDF	B J	0.869	0.0481	1.01	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.056	0.0481	1.25	1.000
OCDF	B J	1.59	0.0443	0.77	1.002
TOTAL TETRA-DIOXINS		0.579	0.0443		
TOTAL PENTA-DIOXINS		0.481	0.0443		
TOTAL HEXA-DIOXINS		6.02	0.0449		
TOTAL HEPTA-DIOXINS		96.8	0.0443		
TOTAL TETRA-FURANS	B	3.54	0.0801		
TOTAL PENTA-FURANS	B	0.802	0.0516		
TOTAL HEXA-FURANS	B	0.750	0.0443		
TOTAL HEPTA-FURANS	B	2.10	0.0481		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-42_Form1A_DX0M_122S16_SJ1189285.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-03
Sample Collection:
08-Jun-2010 10:52

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-42 R
Matrix:	SOLID	**Sample Size:**	11.3 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 02:49:23	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 12**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	22.1

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.547	0.0443	0.87	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L14884-42_Form1A_DB03_128S12_SJ1190210.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-FB-04
Sample Collection:
08-Jun-2010 11:52

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-43 Ri
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Sep-2010 **Time:** 02:41:59	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_122 S: 17**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_122 S: 13
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	34.3

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.190	0.0466	0.45	1.001
1,2,3,7,8-PECDD [3]	J	0.344	0.0654	0.55	1.001
1,2,3,4,7,8-HXCDD	J	0.278	0.128	1.36	1.001
1,2,3,6,7,8-HXCDD	J	1.69	0.128	1.29	1.001
1,2,3,7,8,9-HXCDD	B J	1.27	0.128	1.07	1.000
1,2,3,4,6,7,8-HPCDD	B	13.3	0.0931	1.08	1.000
OCDD	B	88.3	0.0507	0.86	1.000
2,3,7,8-TCDF	B	1.99	0.0466	0.77	1.001
1,2,3,7,8-PECDF	J	0.199	0.0863	1.38	1.001
2,3,4,7,8-PECDF	K B J	0.381	0.0863	0.91	1.001
1,2,3,4,7,8-HXCDF	B J	0.364	0.0842	1.14	1.001
1,2,3,6,7,8-HXCDF	K J	0.265	0.0842	0.84	1.000
1,2,3,7,8,9-HXCDF	U		0.0842		
2,3,4,6,7,8-HXCDF	B J	0.253	0.0842	1.11	1.000
1,2,3,4,6,7,8-HPCDF	B J	2.93	0.0847	0.90	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.234	0.0847	1.49	1.000
OCDF	B J	5.69	0.0884	0.86	1.002
TOTAL TETRA-DIOXINS		7.08	0.0466		
TOTAL PENTA-DIOXINS		4.24	0.0654		
TOTAL HEXA-DIOXINS		20.9	0.128		
TOTAL HEPTA-DIOXINS		157	0.0931		
TOTAL TETRA-FURANS	B	7.85	0.0466		
TOTAL PENTA-FURANS	B	2.66	0.0863		
TOTAL HEXA-FURANS	B	3.50	0.0842		
TOTAL HEPTA-FURANS	B	2.93	0.0847		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-43_Form1A_DX0M_122S17_SJ1189286.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-04
Sample Collection:
08-Jun-2010 11:52

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-43 R
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 03:26:10	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 13**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	34.3

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.923	0.0484	0.70	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L14884-43_Form1A_DB03_128S13_SJ1190211.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-FB-05
Sample Collection:
08-Jun-2010 13:48

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-44 Ri2 (A)
Matrix:	SOLID	**Sample Size:**	11.1 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Sep-2010 **Time:** 16:07:28	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_123 S: 10**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_123 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	23.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.086	0.0452	0.35	1.001
1,2,3,7,8-PECDD [3]	K J	0.135	0.0452	0.80	1.001
1,2,3,4,7,8-HXCDD	K J	0.156	0.0452	1.79	1.000
1,2,3,6,7,8-HXCDD	J	0.811	0.0452	1.32	1.001
1,2,3,7,8,9-HXCDD	B J	0.710	0.0452	1.34	1.000
1,2,3,4,6,7,8-HPCDD	B	6.99	0.0573	0.98	1.000
OCDD	B	44.8	0.0672	0.86	1.000
2,3,7,8-TCDF	B J	0.947	0.0452	0.67	1.001
1,2,3,7,8-PECDF	K J	0.107	0.0452	1.12	1.002
2,3,4,7,8-PECDF	K B J	0.201	0.0452	0.95	1.001
1,2,3,4,7,8-HXCDF	K B J	0.102	0.0649	1.55	1.000
1,2,3,6,7,8-HXCDF	J	0.085	0.0649	1.06	1.000
1,2,3,7,8,9-HXCDF	U		0.0649		
2,3,4,6,7,8-HXCDF	B J	0.126	0.0649	1.10	1.001
1,2,3,4,6,7,8-HPCDF	B J	1.53	0.0452	0.97	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.105	0.0452	0.79	1.001
OCDF	B J	2.33	0.0452	0.94	1.002
TOTAL TETRA-DIOXINS		0.795	0.0452		
TOTAL PENTA-DIOXINS		0.906	0.0452		
TOTAL HEXA-DIOXINS		7.90	0.0452		
TOTAL HEPTA-DIOXINS		22.6	0.0573		
TOTAL TETRA-FURANS	B	3.18	0.0452		
TOTAL PENTA-FURANS	B	1.31	0.0452		
TOTAL HEXA-FURANS	B	1.80	0.0649		
TOTAL HEPTA-FURANS	B	3.60	0.0452		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-44_Form1A_DX0M_123S10_SJ1190060.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-05
Sample Collection:
08-Jun-2010 13:48

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-44 R (A)
Matrix:	SOLID	**Sample Size:**	11.1 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 04:02:48	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 14**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	23.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.493	0.0452	0.84	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

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Report Filename: 1613_DIOXINS_1613DB225_L14884-44_Form1A_DB03_128S14_SJ1190212.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-FB-07
Sample Collection:
08-Jun-2010 14:05

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-46 Ri
Matrix:	SOLID	**Sample Size:**	11.1 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Sep-2010 **Time:** 06:22:14	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_122 S: 21**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_122 S: 13
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	39.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.113	0.0451	0.34	1.001
1,2,3,7,8-PECDD [3]	K J	0.337	0.0530	0.48	1.001
1,2,3,4,7,8-HXCDD	J	0.355	0.0518	1.29	1.000
1,2,3,6,7,8-HXCDD	K J	1.51	0.0518	1.46	1.000
1,2,3,7,8,9-HXCDD	B J	1.33	0.0518	1.14	1.000
1,2,3,4,6,7,8-HPCDD	B	13.4	0.0600	0.96	1.000
OCDD	B	99.5	0.102	0.87	1.000
2,3,7,8-TCDF	B	1.54	0.0672	0.77	1.001
1,2,3,7,8-PECDF	K J	0.093	0.0839	0.71	1.001
2,3,4,7,8-PECDF	B J	0.421	0.0839	1.43	1.001
1,2,3,4,7,8-HXCDF	K B J	0.368	0.0451	1.65	1.000
1,2,3,6,7,8-HXCDF	K J	0.222	0.0451	2.09	1.000
1,2,3,7,8,9-HXCDF	U		0.0451		
2,3,4,6,7,8-HXCDF	K B J	0.207	0.0451	0.89	1.000
1,2,3,4,6,7,8-HPCDF	B J	3.01	0.0451	0.93	1.000
1,2,3,4,7,8,9-HPCDF	J	0.185	0.0451	0.90	1.000
OCDF	B J	6.67	0.0451	0.87	1.002
TOTAL TETRA-DIOXINS		4.21	0.0451		
TOTAL PENTA-DIOXINS		2.93	0.0530		
TOTAL HEXA-DIOXINS		9.03	0.0518		
TOTAL HEPTA-DIOXINS		148	0.0600		
TOTAL TETRA-FURANS	B	6.50	0.0672		
TOTAL PENTA-FURANS	B	2.00	0.0839		
TOTAL HEXA-FURANS	B	3.11	0.0451		
TOTAL HEPTA-FURANS	B	7.56	0.0451		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-46_Form1A_DX0M_122S21_SJ1189290.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-07
Sample Collection:
08-Jun-2010 14:05

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-46 R
Matrix:	SOLID	**Sample Size:**	11.1 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 04:39:27	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 15**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	39.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.785	0.0524	0.78	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

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Report Filename: 1613_DIOXINS_1613DB225_L14884-46_Form1A_DB03_128S15_SJ1190213.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-FB-07-D
Sample Collection:
08-Jun-2010 14:05

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14884-47 Ri
Matrix:	SOLID	**Sample Size:**	11.2 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Sep-2010 **Time:** 04:32:10	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_122 S: 19**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_122 S: 13
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	38.0

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	J	0.130	0.0446	0.81	1.002
1,2,3,7,8-PECDD [3]	J	0.303	0.0446	0.59	1.001
1,2,3,4,7,8-HXCDD	K J	0.269	0.0446	0.84	1.000
1,2,3,6,7,8-HXCDD	K J	1.36	0.0446	1.00	1.000
1,2,3,7,8,9-HXCDD	B J	0.998	0.0446	1.30	1.000
1,2,3,4,6,7,8-HPCDD	B	11.0	0.0794	1.05	1.000
OCDD	B	75.6	0.0632	0.88	1.000
2,3,7,8-TCDF	B	1.89	0.0446	0.69	1.001
1,2,3,7,8-PECDF	K J	0.175	0.0669	1.19	1.001
2,3,4,7,8-PECDF	K B J	0.413	0.0669	1.00	1.000
1,2,3,4,7,8-HXCDF	K B J	0.291	0.0544	0.85	1.001
1,2,3,6,7,8-HXCDF	K J	0.121	0.0544	2.19	1.001
1,2,3,7,8,9-HXCDF	U		0.0544		
2,3,4,6,7,8-HXCDF	K B J	0.246	0.0544	1.67	1.000
1,2,3,4,6,7,8-HPCDF	B J	2.50	0.0447	1.02	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.188	0.0447	0.81	1.000
OCDF	B J	5.26	0.0446	0.87	1.002
TOTAL TETRA-DIOXINS		2.67	0.0446		
TOTAL PENTA-DIOXINS		1.34	0.0446		
TOTAL HEXA-DIOXINS		14.8	0.0446		
TOTAL HEPTA-DIOXINS		144	0.0794		
TOTAL TETRA-FURANS	B	7.08	0.0446		
TOTAL PENTA-FURANS	B	0.510	0.0669		
TOTAL HEXA-FURANS	B	2.85	0.0544		
TOTAL HEPTA-FURANS	B	6.48	0.0447		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-47_Form1A_DX0M_122S19_SJ1189288.html; Workgroup: WG33742; Design ID: 699]

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested. Results are compliant with NELAP where specific accreditation is held.

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-07-D
Sample Collection:
08-Jun-2010 14:05

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-47 R
Matrix:	SOLID	**Sample Size:**	11.2 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 05:16:12	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 16**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	38.0

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	0.969	0.0446	0.70	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L14884-47_Form1A_DB03_128S16_SJ1190214.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-FB-08
Sample Collection:
08-Jun-2010 11:33

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.			FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-48 Ri
Matrix:	SOLID	**Sample Size:**	10.9 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Sep-2010 **Time:** 05:27:12	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_122 S: 20**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_122 S: 13
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	34.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.132	0.0459	0.44	1.001
1,2,3,7,8-PECDD [3]	J	0.248	0.0459	0.52	1.000
1,2,3,4,7,8-HXCDD	K J	0.284	0.0459	1.55	1.000
1,2,3,6,7,8-HXCDD	K J	1.27	0.0459	1.43	1.000
1,2,3,7,8,9-HXCDD	K B J	0.879	0.0459	1.63	1.000
1,2,3,4,6,7,8-HPCDD	B	10.6	0.0817	1.02	1.000
OCDD	B	82.5	0.0595	0.85	1.000
2,3,7,8-TCDF	B	1.29	0.0459	0.67	1.001
1,2,3,7,8-PECDF	K J	0.110	0.0711	5.55	1.000
2,3,4,7,8-PECDF	K B J	0.316	0.0711	1.14	1.000
1,2,3,4,7,8-HXCDF	K B J	0.254	0.0652	0.92	1.001
1,2,3,6,7,8-HXCDF	J	0.169	0.0652	1.34	1.001
1,2,3,7,8,9-HXCDF	U		0.0652		
2,3,4,6,7,8-HXCDF	B J	0.219	0.0652	1.06	1.000
1,2,3,4,6,7,8-HPCDF	B J	2.24	0.0939	1.02	1.000
1,2,3,4,7,8,9-HPCDF	J	0.200	0.0939	0.92	1.000
OCDF	B J	4.22	0.0459	0.88	1.002
TOTAL TETRA-DIOXINS		2.07	0.0459		
TOTAL PENTA-DIOXINS		2.09	0.0459		
TOTAL HEXA-DIOXINS		10.7	0.0459		
TOTAL HEPTA-DIOXINS		141	0.0817		
TOTAL TETRA-FURANS	B	4.66	0.0459		
TOTAL PENTA-FURANS	B	1.13	0.0711		
TOTAL HEXA-FURANS	B	1.69	0.0652		
TOTAL HEPTA-FURANS	B	2.57	0.0939		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-48_Form1A_DX0M_122S20_SJ1189289.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-08
Sample Collection:
08-Jun-2010 11:33

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.			FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-48 R
Matrix:	SOLID	**Sample Size:**	10.9 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 05:52:59	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 17**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	34.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.706	0.0459	0.78	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L14884-48_Form1A_DB03_128S17_SJ1190215.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-09
Sample Collection:
08-Jun-2010 14:35

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-49 Ri
Matrix:	SOLID	**Sample Size:**	11.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Sep-2010 **Time:** 07:17:17	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_122 S: 22**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_122 S: 13
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	34.6

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.155	0.0428	0.47	1.001
1,2,3,7,8-PECDD [3]	J	0.440	0.0428	0.63	1.000
1,2,3,4,7,8-HXCDD	J	0.417	0.0428	1.10	1.000
1,2,3,6,7,8-HXCDD	J	1.68	0.0428	1.25	1.001
1,2,3,7,8,9-HXCDD	B J	1.34	0.0428	1.25	1.000
1,2,3,4,6,7,8-HPCDD	B	14.6	0.0948	1.00	1.000
OCDD	B	101	0.0468	0.88	1.000
2,3,7,8-TCDF	B	1.88	0.0428	0.73	1.001
1,2,3,7,8-PECDF	J	0.231	0.0495	1.67	1.001
2,3,4,7,8-PECDF	B J	0.501	0.0495	1.44	1.000
1,2,3,4,7,8-HXCDF	B J	0.406	0.0741	1.20	1.000
1,2,3,6,7,8-HXCDF	J	0.231	0.0741	1.15	1.001
1,2,3,7,8,9-HXCDF	U		0.0741		
2,3,4,6,7,8-HXCDF	B J	0.258	0.0741	1.32	1.000
1,2,3,4,6,7,8-HPCDF	B J	3.04	0.0428	0.92	1.000
1,2,3,4,7,8,9-HPCDF	K J	0.259	0.0428	0.84	1.000
OCDF	B J	7.07	0.0947	0.81	1.002
TOTAL TETRA-DIOXINS		7.64	0.0428		
TOTAL PENTA-DIOXINS		4.96	0.0428		
TOTAL HEXA-DIOXINS		21.1	0.0428		
TOTAL HEPTA-DIOXINS		160	0.0948		
TOTAL TETRA-FURANS	B	7.36	0.0428		
TOTAL PENTA-FURANS	B	2.29	0.0495		
TOTAL HEXA-FURANS	B	4.57	0.0741		
TOTAL HEPTA-FURANS	B	7.75	0.0428		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-49_Form1A_DX0M_122S22_SJ1189291.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-09
Sample Collection:
08-Jun-2010 14:35

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-49 R
Matrix:	SOLID	**Sample Size:**	11.7 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 06:29:45	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 18**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	34.6

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	0.973	0.0428	0.81	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L14884-49_Form1A_DB03_128S18_SJ1190216.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654001
Sample Collection:
03-Sep-2008 11:28

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.			FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L15027-1 Ri2
Matrix:	SOLID	**Sample Size:**	10.5 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	07-Sep-2010 **Time:** 21:01:25	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_121F S: 4**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_121F S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	55.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	J	0.608	0.135	0.69	1.001
1,2,3,7,8-PECDD [3]	J	2.74	0.0474	0.55	1.001
1,2,3,4,7,8-HXCDD	J	3.66	0.242	1.11	1.000
1,2,3,6,7,8-HXCDD		19.4	0.242	1.19	1.000
1,2,3,7,8,9-HXCDD	B	10.8	0.242	1.24	1.000
1,2,3,4,6,7,8-HPCDD	B	376	0.432	0.99	1.000
OCDD	B	2710	0.0489	0.87	1.000
2,3,7,8-TCDF	B	5.22	0.0699	0.71	1.001
1,2,3,7,8-PECDF	K J	0.953	0.175	1.22	1.000
2,3,4,7,8-PECDF	B J	1.97	0.175	1.36	1.001
1,2,3,4,7,8-HXCDF	B J	4.64	0.205	1.06	1.001
1,2,3,6,7,8-HXCDF	J	2.55	0.205	1.36	1.000
1,2,3,7,8,9-HXCDF	B J	0.260	0.205	1.26	1.000
2,3,4,6,7,8-HXCDF	B J	2.64	0.205	1.10	1.001
1,2,3,4,6,7,8-HPCDF	B	104	0.373	0.97	1.000
1,2,3,4,7,8,9-HPCDF		5.70	0.373	1.01	1.000
OCDF	B	411	0.0474	0.85	1.002
TOTAL TETRA-DIOXINS		62.6	0.135		
TOTAL PENTA-DIOXINS		38.9	0.0474		
TOTAL HEXA-DIOXINS		200	0.242		
TOTAL HEPTA-DIOXINS		1010	0.432		
TOTAL TETRA-FURANS	B	33.4	0.0699		
TOTAL PENTA-FURANS	B	32.9	0.175		
TOTAL HEXA-FURANS	B	110	0.205		
TOTAL HEPTA-FURANS	B	368	0.373		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L15027-1_Form1A_DX0M_121FS4_SJ1188693.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
10654001
Sample Collection:
03-Sep-2008 11:28

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L15027-1 Ri
Matrix:	SOLID	**Sample Size:**	10.5 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Sep-2010 **Time:** 22:53:08	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_131 S: 6**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_131 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	55.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	2.39	0.118	0.83	1.000

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

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Report Filename: 1613_DIOXINS_1613DB225_L15027-1_Form1A_DB03_131S6_SJ1190320.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654002
Sample Collection:
03-Sep-2008 12:39

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-2 Ri2
Matrix:	SOLID	**Sample Size:**	10.6 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	07-Sep-2010 **Time:** 21:56:28	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_121F S: 5**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_121F S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	44.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.276	0.0471	0.58	1.001
1,2,3,7,8-PECDD [3]	J	1.06	0.0496	0.58	1.001
1,2,3,4,7,8-HXCDD	J	1.49	0.0951	1.26	1.000
1,2,3,6,7,8-HXCDD		6.69	0.0951	1.13	1.000
1,2,3,7,8,9-HXCDD	B J	4.24	0.0951	1.25	1.000
1,2,3,4,6,7,8-HPCDD	B	118	0.268	0.99	1.000
OCDD	B	859	0.196	0.86	1.000
2,3,7,8-TCDF	B	2.78	0.0471	0.74	1.001
1,2,3,7,8-PECDF	K J	0.434	0.108	1.92	1.000
2,3,4,7,8-PECDF	B J	0.745	0.108	1.40	1.000
1,2,3,4,7,8-HXCDF	K B J	1.64	0.105	1.02	1.000
1,2,3,6,7,8-HXCDF	J	0.875	0.105	1.25	1.001
1,2,3,7,8,9-HXCDF	K B J	0.112	0.105	0.50	1.001
2,3,4,6,7,8-HXCDF	B J	1.11	0.105	1.06	1.000
1,2,3,4,6,7,8-HPCDF	B	31.5	0.146	0.95	1.000
1,2,3,4,7,8,9-HPCDF	K J	1.78	0.146	0.73	1.000
OCDF	B	112	0.134	0.85	1.002
TOTAL TETRA-DIOXINS		19.5	0.0471		
TOTAL PENTA-DIOXINS		19.5	0.0496		
TOTAL HEXA-DIOXINS		72.7	0.0951		
TOTAL HEPTA-DIOXINS		392	0.268		
TOTAL TETRA-FURANS	B	16.1	0.0471		
TOTAL PENTA-FURANS	B	11.5	0.108		
TOTAL HEXA-FURANS	B	28.5	0.105		
TOTAL HEPTA-FURANS	B	95.6	0.146		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: ________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L15027-2_Form1A_DX0M_121FS5_SJ1188694.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654002
Sample Collection:
03-Sep-2008 12:39

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-2 Ri
Matrix:	SOLID	**Sample Size:**	10.6 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	09-Sep-2010 **Time:** 23:29:45	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_131 S: 7**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_131 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	44.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	1.41	0.150	0.83	1.000

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L15027-2_Form1A_DB03_131S7_SJ1190321.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654003
Sample Collection:
03-Sep-2008 13:21

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.			FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L15027-3 Ri2
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	07-Sep-2010 **Time:** 22:51:30	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_121F S: 6**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_121F S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	34.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.197	0.0656	1.01	1.001
1,2,3,7,8-PECDD [3]	K J	0.890	0.103	0.75	1.001
1,2,3,4,7,8-HXCDD	K J	0.837	0.112	1.00	1.000
1,2,3,6,7,8-HXCDD	J	3.42	0.112	1.14	1.000
1,2,3,7,8,9-HXCDD	B J	2.15	0.112	1.08	1.000
1,2,3,4,6,7,8-HPCDD	B	57.1	0.167	0.94	1.000
OCDD	B	440	0.0468	0.85	1.000
2,3,7,8-TCDF	B	2.78	0.0884	0.69	1.002
1,2,3,7,8-PECDF	J	0.337	0.0851	1.41	1.000
2,3,4,7,8-PECDF	K B J	0.525	0.0851	2.00	1.000
1,2,3,4,7,8-HXCDF	B J	0.970	0.109	1.21	1.000
1,2,3,6,7,8-HXCDF	J	0.527	0.109	1.25	1.000
1,2,3,7,8,9-HXCDF	U		0.109		
2,3,4,6,7,8-HXCDF	K B J	0.567	0.109	0.86	1.000
1,2,3,4,6,7,8-HPCDF	B	17.6	0.146	1.02	1.000
1,2,3,4,7,8,9-HPCDF	K J	1.18	0.146	1.45	1.001
OCDF	B	93.4	0.0561	0.81	1.002
TOTAL TETRA-DIOXINS		15.9	0.0656		
TOTAL PENTA-DIOXINS		7.83	0.103		
TOTAL HEXA-DIOXINS		38.3	0.112		
TOTAL HEPTA-DIOXINS		251	0.167		
TOTAL TETRA-FURANS	B	15.2	0.0884		
TOTAL PENTA-FURANS	B	7.20	0.0851		
TOTAL HEXA-FURANS	B	15.5	0.109		
TOTAL HEPTA-FURANS	B	58.2	0.146		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L15027-3_Form1A_DX0M_121FS6_SJ1188695.html; Workgroup: WG33742; Design ID: 699]

CLIENT SAMPLE NO.
10654003
Sample Collection:
03-Sep-2008 13:21

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-3 Ri
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Sep-2010 **Time:** 00:06:24	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_131 S: 8**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_131 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	34.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	1.26	0.0754	0.82	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L15027-3_Form1A_DB03_131S8_SJ1190322.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654008
Sample Collection:
04-Sep-2008 08:23

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-5 Ri
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	07-Sep-2010 **Time:** 23:46:32	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_121F S: 7**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_121F S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	49.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	J	0.626	0.0468	0.77	1.001
1,2,3,7,8-PECDD [3]	J	2.60	0.0515	0.62	1.001
1,2,3,4,7,8-HXCDD	J	3.47	0.112	1.09	1.000
1,2,3,6,7,8-HXCDD		18.8	0.112	1.20	1.001
1,2,3,7,8,9-HXCDD	B	9.90	0.112	1.24	1.000
1,2,3,4,6,7,8-HPCDD	B	384	0.305	0.99	1.000
OCDD	B	2930	0.0792	0.87	1.000
2,3,7,8-TCDF	B	4.51	0.0617	0.71	1.001
1,2,3,7,8-PECDF	J	0.939	0.101	1.50	1.002
2,3,4,7,8-PECDF	B J	1.86	0.101	1.53	1.000
1,2,3,4,7,8-HXCDF	B	4.70	0.129	1.15	1.001
1,2,3,6,7,8-HXCDF	J	2.42	0.129	1.07	1.000
1,2,3,7,8,9-HXCDF	K B J	0.218	0.129	1.73	1.000
2,3,4,6,7,8-HXCDF	B J	2.45	0.129	1.12	1.001
1,2,3,4,6,7,8-HPCDF	B	117	0.137	0.99	1.000
1,2,3,4,7,8,9-HPCDF		7.15	0.137	0.93	1.000
OCDF	B	481	0.0468	0.84	1.002
TOTAL TETRA-DIOXINS		29.1	0.0468		
TOTAL PENTA-DIOXINS		29.1	0.0515		
TOTAL HEXA-DIOXINS		175	0.112		
TOTAL HEPTA-DIOXINS		1020	0.305		
TOTAL TETRA-FURANS	B	28.1	0.0617		
TOTAL PENTA-FURANS	B	31.8	0.101		
TOTAL HEXA-FURANS	B	119	0.129		
TOTAL HEPTA-FURANS	B	449	0.137		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: ________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L15027-5_Form1A_DX0M_121FS7_SJ1188696.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654008
Sample Collection:
04-Sep-2008 08:23

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-5 R
Matrix:	SOLID	**Sample Size:**	10.7 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Sep-2010 **Time:** 00:43:01	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_131 S: 9**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_131 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	49.7

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	1.64	0.0831	0.77	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L15027-5_Form1A_DB03_131S9_SJ1190323.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654009
Sample Collection:
04-Sep-2008 09:37

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-6 Ri
Matrix:	SOLID	**Sample Size:**	5.81 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 00:41:35	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_121F S: 8**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_121F S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	42.8

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	J	0.529	0.0861	0.66	1.001
1,2,3,7,8-PECDD [3]	J	2.51	0.0861	0.53	1.000
1,2,3,4,7,8-HXCDD	J	3.08	0.110	1.18	1.000
1,2,3,6,7,8-HXCDD		16.2	0.110	1.17	1.000
1,2,3,7,8,9-HXCDD	B J	8.89	0.110	1.15	1.000
1,2,3,4,6,7,8-HPCDD	B	458	0.326	1.00	1.000
OCDD	B	3510	0.149	0.87	1.000
2,3,7,8-TCDF	B	5.13	0.0861	0.70	1.001
1,2,3,7,8-PECDF	K J	0.520	0.0977	4.28	1.000
2,3,4,7,8-PECDF	B J	1.70	0.0977	1.59	1.001
1,2,3,4,7,8-HXCDF	B J	3.45	0.147	1.23	1.001
1,2,3,6,7,8-HXCDF	J	1.69	0.147	1.22	1.001
1,2,3,7,8,9-HXCDF	K B J	0.190	0.147	0.99	1.000
2,3,4,6,7,8-HXCDF	B J	2.17	0.147	1.07	1.000
1,2,3,4,6,7,8-HPCDF	B	81.3	0.298	1.00	1.001
1,2,3,4,7,8,9-HPCDF	K J	4.58	0.298	0.88	1.000
OCDF	B	305	0.0861	0.83	1.002
TOTAL TETRA-DIOXINS		21.0	0.0861		
TOTAL PENTA-DIOXINS		26.4	0.0861		
TOTAL HEXA-DIOXINS		159	0.110		
TOTAL HEPTA-DIOXINS		1300	0.326		
TOTAL TETRA-FURANS	B	31.8	0.0861		
TOTAL PENTA-FURANS	B	25.5	0.0977		
TOTAL HEXA-FURANS	B	79.0	0.147		
TOTAL HEPTA-FURANS	B	276	0.298		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L15027-6_Form1A_DX0M_121FS8_SJ1188697.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654009
Sample Collection:
04-Sep-2008 09:37

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L15027-6 R
Matrix:	SOLID	**Sample Size:**	5.81 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Sep-2010 **Time:** 01:19:39	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_131 S: 10**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_131 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	42.8

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	2.00	0.195	0.81	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L15027-6_Form1A_DB03_131S10_SJ1190324.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
10654013
Sample Collection:
04-Sep-2008 13:04

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-8 Ri
Matrix:	SOLID	**Sample Size:**	10.9 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 01:36:37	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_121F S: 9**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_121F S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	37.0

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.237	0.0460	0.52	1.000
1,2,3,7,8-PECDD [3]	J	0.616	0.0460	0.63	1.001
1,2,3,4,7,8-HXCDD	J	0.686	0.0479	1.20	1.001
1,2,3,6,7,8-HXCDD	J	2.87	0.0479	1.23	1.000
1,2,3,7,8,9-HXCDD	B J	2.25	0.0479	1.21	1.000
1,2,3,4,6,7,8-HPCDD	B	39.2	0.108	0.99	1.000
OCDD	B	271	0.0460	0.86	1.000
2,3,7,8-TCDF	B	2.33	0.0460	0.71	1.001
1,2,3,7,8-PECDF	J	0.378	0.0534	1.69	1.002
2,3,4,7,8-PECDF	K B J	0.704	0.0534	1.83	1.001
1,2,3,4,7,8-HXCDF	K B J	0.852	0.0616	0.98	1.000
1,2,3,6,7,8-HXCDF	K J	0.477	0.0616	0.94	1.001
1,2,3,7,8,9-HXCDF	K B J	0.062	0.0616	1.47	1.000
2,3,4,6,7,8-HXCDF	B J	0.551	0.0616	1.16	1.000
1,2,3,4,6,7,8-HPCDF	B	9.84	0.0734	1.00	1.000
1,2,3,4,7,8,9-HPCDF	J	0.586	0.0734	0.97	1.000
OCDF	B	29.4	0.0607	0.84	1.002
TOTAL TETRA-DIOXINS		8.39	0.0460		
TOTAL PENTA-DIOXINS		8.39	0.0460		
TOTAL HEXA-DIOXINS		37.5	0.0479		
TOTAL HEPTA-DIOXINS		224	0.108		
TOTAL TETRA-FURANS	B	11.4	0.0460		
TOTAL PENTA-FURANS	B	5.52	0.0534		
TOTAL HEXA-FURANS	B	10.1	0.0616		
TOTAL HEPTA-FURANS	B	27.8	0.0734		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: ________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L15027-8_Form1A_DX0M_121FS9_SJ1188698.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654013
Sample Collection:
04-Sep-2008 13:04

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-8 R
Matrix:	SOLID	**Sample Size:**	10.9 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Sep-2010 **Time:** 01:56:18	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_131 S: 11**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_131 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	37.0

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.946	0.0478	0.80	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L15027-8_Form1A_DB03_131S11_SJ1190325.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
10654026
Sample Collection:
05-Sep-2008 13:42

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L15027-12 Ri
Matrix:	SOLID	**Sample Size:**	10.8 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 02:31:40	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_121F S: 10**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_121F S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	41.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.194	0.0465	0.62	1.001
1,2,3,7,8-PECDD [3]	J	0.706	0.0465	0.56	1.001
1,2,3,4,7,8-HXCDD	J	0.720	0.0645	1.13	1.000
1,2,3,6,7,8-HXCDD	J	2.96	0.0645	1.15	1.000
1,2,3,7,8,9-HXCDD	B J	2.34	0.0645	1.23	1.000
1,2,3,4,6,7,8-HPCDD	B	33.7	0.0996	0.98	1.000
OCDD	B	230	0.0698	0.86	1.000
2,3,7,8-TCDF	B	2.55	0.0465	0.75	1.001
1,2,3,7,8-PECDF	K J	0.267	0.0699	0.96	1.000
2,3,4,7,8-PECDF	B J	0.591	0.0699	1.62	1.001
1,2,3,4,7,8-HXCDF	K B J	0.815	0.106	1.52	1.001
1,2,3,6,7,8-HXCDF	K J	0.552	0.106	0.99	1.000
1,2,3,7,8,9-HXCDF	U		0.106		
2,3,4,6,7,8-HXCDF	B J	0.761	0.106	1.09	1.001
1,2,3,4,6,7,8-HPCDF	B	9.44	0.0926	0.92	1.000
1,2,3,4,7,8,9-HPCDF	J	0.672	0.0926	1.17	1.001
OCDF	B	26.3	0.0465	0.84	1.002
TOTAL TETRA-DIOXINS		7.84	0.0465		
TOTAL PENTA-DIOXINS		9.10	0.0465		
TOTAL HEXA-DIOXINS		35.1	0.0645		
TOTAL HEPTA-DIOXINS		192	0.0996		
TOTAL TETRA-FURANS	B	11.4	0.0465		
TOTAL PENTA-FURANS	B	6.14	0.0699		
TOTAL HEXA-FURANS	B	9.36	0.106		
TOTAL HEPTA-FURANS	B	25.0	0.0926		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L15027-12_Form1A_DX0M_121FS10_SJ1188687.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654026
Sample Collection:
05-Sep-2008 13:42

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L15027-12 R
Matrix:	SOLID	**Sample Size:**	10.8 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Sep-2010 **Time:** 02:32:56	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_131 S: 12**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_131 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	41.9

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	1.19	0.0560	0.74	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L15027-12_Form1A_DB03_131S12_SJ1190326.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
SDS-FB-05 (Duplicate)
Sample Collection:
08-Jun-2010 13:48

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	WG33742-103 i (DUP L14884-44)
Matrix:	SOLID	**Sample Size:**	10.1 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Sep-2010 **Time:** 15:46:39	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_119 S: 8**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_119 S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	28.3

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		0.0495		
1,2,3,7,8-PECDD [3]	K J	0.190	0.0495	0.36	1.002
1,2,3,4,7,8-HXCDD	K J	0.228	0.0495	0.96	1.000
1,2,3,6,7,8-HXCDD	J	0.877	0.0495	1.19	1.000
1,2,3,7,8,9-HXCDD	B J	0.699	0.0495	1.35	1.000
1,2,3,4,6,7,8-HPCDD	B	6.67	0.0583	1.12	1.000
OCDD	B	40.4	0.0495	0.85	1.000
2,3,7,8-TCDF	B	1.24	0.0722	0.72	1.001
1,2,3,7,8-PECDF	U		0.109		
2,3,4,7,8-PECDF	K B J	0.357	0.109	1.28	1.000
1,2,3,4,7,8-HXCDF	K B J	0.168	0.0495	1.52	1.001
1,2,3,6,7,8-HXCDF	K J	0.105	0.0495	1.66	1.000
1,2,3,7,8,9-HXCDF	U		0.0495		
2,3,4,6,7,8-HXCDF	K B J	0.156	0.0495	0.92	1.000
1,2,3,4,6,7,8-HPCDF	B J	1.68	0.0501	1.07	1.001
1,2,3,4,7,8,9-HPCDF	U		0.0501		
OCDF	B J	2.34	0.0495	0.95	1.002
TOTAL TETRA-DIOXINS		0.807	0.0495		
TOTAL PENTA-DIOXINS		0.741	0.0495		
TOTAL HEXA-DIOXINS		7.91	0.0495		
TOTAL HEPTA-DIOXINS		95.7	0.0583		
TOTAL TETRA-FURANS	B	2.63	0.0722		
TOTAL PENTA-FURANS	B	0.601	0.109		
TOTAL HEXA-FURANS	B	0.906	0.0495		
TOTAL HEPTA-FURANS	B	3.68	0.0501		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_WG33742-103_Form1A_DX0M_119S8_SJ1188499.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19			CLIENT SAMPLE NO.
	Form 1A PCDD/PCDF ANALYSIS REPORT		SDS-FB-05 (Duplicate) Sample Collection: 08-Jun-2010 13:48

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	WG33742-103 (DUP L14884-44)
Matrix:	SOLID	**Sample Size:**	10.1 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	08-Sep-2010 **Time:** 00:22:43	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 8**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	28.3

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B J	0.765	0.147	0.79	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_WG33742-103_Form1A_DB03_128S8_SJ1190206.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

PCDD/PCDF ANALYSIS REPORT
RELATIVE PERCENT DIFFERENCE

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No. FIDALGO BAY, CUSTOM PLYWOOD DX STUDY

Contract No.: 4406

Client ID: SDS-FB-05

Concentration Units: pg/g (dry weight basis)

COMPOUND	L14884-44 (A)		WG33742-103		MEAN	RELATIVE PERCENT DIFFERENCE
	LAB FLAG [1]	CONC. FOUND	LAB FLAG [1]	CONC. FOUND		
2,3,7,8-TCDD	K J	0.086	U			
1,2,3,7,8-PECDD	K J	0.135	K J	0.190		
1,2,3,4,7,8-HXCDD	K J	0.156	K J	0.228		
1,2,3,6,7,8-HXCDD	J	0.811	J	0.877	0.844	7.76
1,2,3,7,8,9-HXCDD	J	0.710	J	0.699	0.704	1.54
1,2,3,4,6,7,8-HPCDD		6.99		6.67	6.83	4.67
OCDD		44.8		40.4	42.6	10.5
2,3,7,8-TCDF	J	0.493	J	0.765	0.629	43.2
1,2,3,7,8-PECDF	K J	0.107	U			
2,3,4,7,8-PECDF	K J	0.201	K J	0.357		
1,2,3,4,7,8-HXCDF	K J	0.102	K J	0.168		
1,2,3,6,7,8-HXCDF	J	0.085	K J	0.105		
1,2,3,7,8,9-HXCDF	U		U			
2,3,4,6,7,8-HXCDF	J	0.126	K J	0.156		
1,2,3,4,6,7,8-HPCDF	J	1.53	J	1.68	1.60	9.34
1,2,3,4,7,8,9-HPCDF	K J	0.105	U			
OCDF	J	2.33	J	2.34	2.33	0.454

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: RPD.xsl; Created: 13-Sep-2010 12:10:30; Application: XMLTransformer-1.10.26;
Report Filename: RPD_DIOXINS_1613-RPD_WG33742-103_L14884-44_.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	N/A
Contract No.:	4406	**Lab Sample I.D.:**	WG33742-101 Ri2
Matrix:	SOLID	**Sample Size:**	10.0 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	10-Sep-2010 **Time:** 10:37:17	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_123 S: 4**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_123 S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_123 S: 1
Concentration Units:	pg/g		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		0.0500		
1,2,3,7,8-PECDD [3]	U		0.0500		
1,2,3,4,7,8-HXCDD	U		0.0500		
1,2,3,6,7,8-HXCDD	U		0.0500		
1,2,3,7,8,9-HXCDD	K J	0.054	0.0500	0.55	1.000
1,2,3,4,6,7,8-HPCDD	K J	0.068	0.0500	1.53	1.000
OCDD	K J	0.227	0.0500	1.15	1.000
2,3,7,8-TCDF	J	0.448	0.0500	0.88	1.003
1,2,3,7,8-PECDF	U		0.0706		
2,3,4,7,8-PECDF	K J	0.099	0.0706	1.21	1.002
1,2,3,4,7,8-HXCDF	J	0.051	0.0500	1.06	1.000
1,2,3,6,7,8-HXCDF	U		0.0500		
1,2,3,7,8,9-HXCDF	K J	0.068	0.0500	0.32	0.999
2,3,4,6,7,8-HXCDF	K J	0.071	0.0500	3.23	1.000
1,2,3,4,6,7,8-HPCDF	J	0.085	0.0500	1.17	1.001
1,2,3,4,7,8,9-HPCDF	U		0.0500		
OCDF	K J	0.059	0.0500	1.39	1.002
TOTAL TETRA-DIOXINS	U		0.0500		
TOTAL PENTA-DIOXINS	U		0.0500		
TOTAL HEXA-DIOXINS	U		0.0500		
TOTAL HEPTA-DIOXINS	U		0.0500		
TOTAL TETRA-FURANS		0.620	0.0500		
TOTAL PENTA-FURANS		0.078	0.0706		
TOTAL HEXA-FURANS		0.051	0.0500		
TOTAL HEPTA-FURANS		0.085	0.0500		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_WG33742-101_Form1A_DX0M_123S4_SJ1190067.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	N/A
		Lab Sample I.D.:	WG33742-101
Matrix:	SOLID	**Sample Size:**	10.0 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	25-Aug-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	07-Sep-2010 **Time:** 22:32:20	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_128 S: 5**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_128 S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_128 S: 2
Concentration Units:	pg/g		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	J	0.214	0.0500	0.77	1.001

(1) Where applicable, custom lab flags have been used on this report; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_WG33742-101_Form1A_DB03_128S5_SJ1190201.html; Workgroup: WG33742; Design ID: 699]

Form 8A
PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**OPR Data Filename:**	**DX0M_119 S: 3**
Matrix:	SOLID	**Lab Sample I.D.:**	WG33742-102 i
Extraction Date:	25-Aug-2010	**Analysis Date:**	04-Sep-2010 **Time:** 11:11:28

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 20 uL EXTRACT VOLUME.

COMPOUND	LAB FLAG [1]	ION ABUND. RATIO [2]	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS [3] (ng/mL)	% RECOVERY
2,3,7,8-TCDD		0.75	10.0	8.78	6.70 - 15.8	87.8
1,2,3,7,8-PECDD [4]		0.61	52.0	46.7	36.4 - 73.8	89.8
1,2,3,4,7,8-HXCDD		1.23	56.5	51.0	39.6 - 92.7	90.3
1,2,3,6,7,8-HXCDD		1.13	55.5	51.1	42.2 - 74.4	92.1
1,2,3,7,8,9-HXCDD		1.24	54.0	51.7	34.6 - 87.5	95.7
1,2,3,4,6,7,8-HPCDD		1.01	47.5	44.9	33.3 - 66.5	94.6
OCDD		0.87	100	93.7	78.0 - 144	93.7
2,3,7,8-TCDF		0.73	10.7	10.0	8.03 - 16.9	93.5
1,2,3,7,8-PECDF		1.48	46.0	42.8	36.8 - 61.6	93.0
2,3,4,7,8-PECDF		1.43	47.0	42.2	32.0 - 75.2	89.8
1,2,3,4,7,8-HXCDF		1.16	50.0	48.1	36.0 - 67.0	96.2
1,2,3,6,7,8-HXCDF		1.12	47.5	45.9	39.9 - 61.8	96.7
1,2,3,7,8,9-HXCDF		1.14	52.5	50.6	41.0 - 68.3	96.5
2,3,4,6,7,8-HXCDF		1.17	53.0	52.2	37.1 - 82.7	98.5
1,2,3,4,6,7,8-HPCDF		0.92	50.0	52.7	41.0 - 61.0	105
1,2,3,4,7,8,9-HPCDF		0.98	50.0	50.0	39.0 - 69.0	100
OCDF		0.87	104	89.6	65.5 - 177	86.2

(1) Where applicable, custom lab flags have been used on this report.
(2) Contract-required Ion Abundance Ratios are specified in Table 9, Method 1613.
(3) Contract-required concentration range as determined from the percent of the test concentration in Table 6, Method 1613, under OPR.
(4) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form8A.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_WG33742-102_Form8A_SJ1188491.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 8G

PCDD/PCDF CERTIFIED REFERENCE MATERIAL (CRM) REPORT FOR NIST SRM 1944

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Lab Sample I.D.:**	WG33742-104 i
Matrix:	SOLID	**Sample Size:**	1.22 g (dry)
Extraction Date:	25-Aug-2010	**Initial Calibration Date:**	30-Jul-2010
Analysis Date:	08-Sep-2010 **Time:** 03:26:42	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB5
Injection Volume (uL):	1.0	**CRM Data Filename:**	**DX0M_121F S: 11**
Dilution Factor:	N/A	**Blank Data Filename:**	DX0M_123 S: 4
Concentration Units:	pg/g (dry weight basis)	**Cal. Ver. Data Filename:**	DX0M_121F S: 1

COMPOUND	LAB FLAG [1]	DETERMINED	CERTIFIED / REFERENCE
2,3,7,8-TCDD		201	133 +/- 9
1,2,3,7,8-PECDD [2]	K J	18.4	19 +/- 2
1,2,3,4,7,8-HXCDD	J	29.1	26 +/- 3
1,2,3,6,7,8-HXCDD		61.6	56 +/- 6
1,2,3,7,8,9-HXCDD		74.6	53 +/- 7
1,2,3,4,6,7,8-HPCDD		824	800 +/- 70
OCDD		6150	5800 +/- 700
2,3,7,8-TCDF	X		
1,2,3,7,8-PECDF		48.1	45 +/- 7
2,3,4,7,8-PECDF		46.3	45 +/- 4
1,2,3,4,7,8-HXCDF		233	220 +/- 30
1,2,3,6,7,8-HXCDF		93.6	90 +/- 10
1,2,3,7,8,9-HXCDF	J	3.45	19 +/- 18
2,3,4,6,7,8-HXCDF		52.5	54 +/- 6
1,2,3,4,6,7,8-HPCDF		1050	1000 +/- 100
1,2,3,4,7,8,9-HPCDF	J	40.8	40 +/- 6
OCDF		1090	1000 +/- 100

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL; X = result reported separately.
(2) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form8G.xsl; Created: 13-Sep-2010 12:06:30; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_WG33742-104_Form8G_SJ1188689.html; Workgroup: WG33742; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 8G

PCDD/PCDF CERTIFIED REFERENCE MATERIAL (CRM) REPORT FOR NIST SRM 1944

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Lab Sample I.D.:**	WG33742-104
Matrix:	SOLID	**Sample Size:**	1.22 g (dry)
Extraction Date:	25-Aug-2010	**Initial Calibration Date:**	24-Aug-2010
Analysis Date:	10-Sep-2010 **Time:** 03:09:34	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB225
Injection Volume (uL):	2.0	**CRM Data Filename:**	**DB03_131 S: 13**
Dilution Factor:	N/A	**Blank Data Filename:**	DB03_128 S: 5
Concentration Units:	pg/g (dry weight basis)	**Cal. Ver. Data Filename:**	DB03_131 S: 2

COMPOUND	LAB FLAG [1]	DETERMINED	CERTIFIED / REFERENCE
2,3,7,8-TCDF		29.7	39 +/- 15

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Brian Watson________

For Axys Internal Use Only [XSL Template: Form8G.xsl; Created: 13-Sep-2010 12:08:35; Application: XMLTransformer-1.10.26; Report Filename: 1613_DIOXINS_1613DB225_WG33742-104_Form8G_SJ1190327.html; Workgroup: WG33742; Design ID: 699]

BATCH SUMMARY

Batch ID: WG33891	***Date:*** 15-Sep-2010
Analysis Type: Dioxin/Furan	***Matrix Type:*** Solid

BATCH MAKEUP

Contract: 4406

Samples:

L14884-13	SDS-PB-03
L15027-4	10654004

Blank:
WG33891-101

Reference or Spike:
WG33891-102
WG33891-104

Duplicate:
WG33891-103

Comments:

1- Data are not blank corrected
2- Concentrations of tetrafurans and pentafurans in the procedural blank are above the method control limits. The sample analyte concentrations are not blank corrected; the results should be interpreted with consideration of the blank.
3- The duplication between 10654004 and its duplicate (Axys IDs: L15027-4 and WG33891-103) was outside method specifications for 1,2,3,7,8,9 HXCDF. All calculations and chromatography were reviewed for possible error and the concentrations in each sample were confirmed. The variability may be due to the matrix, which is solid (marine sediment).

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-PB-03
Sample Collection:
07-Jun-2010 14:07

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-13 R
Matrix:	SOLID	**Sample Size:**	9.80 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	11-Sep-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	14-Sep-2010 **Time:** 01:50:25	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_214A S: 7**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_214A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_214A S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	49.0

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	B J	0.257	0.0510	0.66	1.001
1,2,3,7,8-PECDD [3]	J	0.570	0.0510	0.57	1.001
1,2,3,4,7,8-HXCDD	J	0.465	0.0510	1.19	1.000
1,2,3,6,7,8-HXCDD	J	2.71	0.0510	1.28	1.000
1,2,3,7,8,9-HXCDD	J	2.07	0.0510	1.16	1.010
1,2,3,4,6,7,8-HPCDD		17.8	0.0995	1.05	1.000
OCDD	B	97.4	0.0510	0.90	1.000
2,3,7,8-TCDF	B	2.63	0.0510	0.79	1.001
1,2,3,7,8-PECDF	K B J	0.315	0.0510	2.05	1.000
2,3,4,7,8-PECDF	B J	0.611	0.0510	1.51	1.000
1,2,3,4,7,8-HXCDF	B J	0.464	0.0565	1.29	1.000
1,2,3,6,7,8-HXCDF	B J	0.289	0.0565	1.14	1.000
1,2,3,7,8,9-HXCDF	U		0.0565		
2,3,4,6,7,8-HXCDF	K B J	0.324	0.0565	0.88	1.000
1,2,3,4,6,7,8-HPCDF	J	4.04	0.0510	0.98	1.000
1,2,3,4,7,8,9-HPCDF	J	0.235	0.0510	0.90	1.000
OCDF	J	7.16	0.0510	0.88	1.002
TOTAL TETRA-DIOXINS		6.96	0.0510		
TOTAL PENTA-DIOXINS		8.89	0.0510		
TOTAL HEXA-DIOXINS		25.2	0.0510		
TOTAL HEPTA-DIOXINS		45.5	0.0995		
TOTAL TETRA-FURANS	B	11.4	0.0510		
TOTAL PENTA-FURANS	B	5.20	0.0510		
TOTAL HEXA-FURANS	B	6.58	0.0565		
TOTAL HEPTA-FURANS		10.6	0.0510		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 16-Sep-2010 08:23:03; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L14884-13_Form1A_DX0B_214AS7_SJ1190750.html; Workgroup: WG33891; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-PB-03
Sample Collection:
07-Jun-2010 14:07

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14884-13 R
Matrix:	SOLID	**Sample Size:**	9.80 g (dry)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	11-Sep-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	13-Sep-2010 **Time:** 21:11:39	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_134C S: 5**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_134C S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_134C S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	49.0

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	1.25	0.0510	0.71	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 16-Sep-2010 08:22:47; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_L14884-13_Form1A_DB03_134CS5_SJ1190864.html; Workgroup: WG33891; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654004
Sample Collection:
03-Sep-2008 14:14

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L15027-4 R (A)
Matrix:	SOLID	**Sample Size:**	10.4 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	11-Sep-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	14-Sep-2010 **Time:** 02:45:13	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_214A S: 8**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_214A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_214A S: 1
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	56.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	B J	0.662	0.0481	0.80	1.001
1,2,3,7,8-PECDD [3]	J	2.92	0.0481	0.64	1.001
1,2,3,4,7,8-HXCDD	J	3.90	0.321	1.22	1.000
1,2,3,6,7,8-HXCDD		22.7	0.321	1.24	1.000
1,2,3,7,8,9-HXCDD		11.9	0.321	1.16	1.010
1,2,3,4,6,7,8-HPCDD		524	0.673	1.06	1.000
OCDD	B	3960	0.0481	0.89	1.000
2,3,7,8-TCDF	B	4.55	0.133	0.83	1.002
1,2,3,7,8-PECDF	B J	1.25	0.0481	1.70	1.000
2,3,4,7,8-PECDF	B J	2.24	0.0481	1.52	1.000
1,2,3,4,7,8-HXCDF	B	5.80	0.0613	1.29	1.001
1,2,3,6,7,8-HXCDF	B J	2.74	0.0613	1.35	1.000
1,2,3,7,8,9-HXCDF	J	0.247	0.0613	1.15	1.000
2,3,4,6,7,8-HXCDF	B J	3.14	0.0613	1.22	1.001
1,2,3,4,6,7,8-HPCDF		142	0.199	1.06	1.000
1,2,3,4,7,8,9-HPCDF		7.14	0.199	1.07	1.000
OCDF		675	0.0481	0.88	1.002
TOTAL TETRA-DIOXINS		30.0	0.0481		
TOTAL PENTA-DIOXINS		43.2	0.0481		
TOTAL HEXA-DIOXINS		206	0.321		
TOTAL HEPTA-DIOXINS		1190	0.673		
TOTAL TETRA-FURANS	B	30.1	0.133		
TOTAL PENTA-FURANS	B	40.8	0.0481		
TOTAL HEXA-FURANS	B	153	0.0613		
TOTAL HEPTA-FURANS		583	0.199		

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 16-Sep-2010 08:23:03; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_L15027-4_Form1A_DX0B_214AS8_SJ1190751.html; Workgroup: WG33891; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654004
Sample Collection:
03-Sep-2008 14:14

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L15027-4 R (A)
Matrix:	SOLID	**Sample Size:**	10.4 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	11-Sep-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	13-Sep-2010 **Time:** 21:48:17	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_134C S: 6**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_134C S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_134C S: 2
Concentration Units:	pg/g (dry weight basis)	**% Moisture:**	56.2

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	1.86	0.0573	0.88	1.002

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Celine Vaillant________

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Report Filename: 1613_DIOXINS_1613DB225_L15027-4_Form1A_DB03_134CS6_SJ1190865.html; Workgroup: WG33891; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654004 (Duplicate)
Sample Collection:
03-Sep-2008 14:14

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	WG33891-103 (DUP L15027-4)
Matrix:	SOLID	**Sample Size:**	10.4 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	11-Sep-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	14-Sep-2010 **Time:** 03:40:05	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_214A S: 9**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_214A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_214A S: 1
Concentration Units:	pg/g (dry weight basis)		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	B J	0.514	0.0480	0.75	1.001
1,2,3,7,8-PECDD [3]	J	2.25	0.0480	0.64	1.001
1,2,3,4,7,8-HXCDD	J	3.21	0.528	1.20	1.000
1,2,3,6,7,8-HXCDD		16.5	0.528	1.39	1.000
1,2,3,7,8,9-HXCDD		8.74	0.528	1.27	1.010
1,2,3,4,6,7,8-HPCDD		370	0.498	1.06	1.000
OCDD	B	2860	0.0812	0.89	1.000
2,3,7,8-TCDF	B	3.81	0.0630	0.75	1.002
1,2,3,7,8-PECDF	B J	1.05	0.0566	1.37	1.000
2,3,4,7,8-PECDF	B J	2.03	0.0566	1.56	1.000
1,2,3,4,7,8-HXCDF	B J	4.44	0.0722	1.26	1.000
1,2,3,6,7,8-HXCDF	B J	2.09	0.0722	1.10	1.000
1,2,3,7,8,9-HXCDF	J	0.158	0.0722	1.21	1.000
2,3,4,6,7,8-HXCDF	B J	2.42	0.0722	1.22	1.000
1,2,3,4,6,7,8-HPCDF		103	0.245	1.05	1.000
1,2,3,4,7,8,9-HPCDF		4.91	0.245	1.11	1.000
OCDF		452	0.0480	0.88	1.002
TOTAL TETRA-DIOXINS		31.5	0.0480		
TOTAL PENTA-DIOXINS		41.9	0.0480		
TOTAL HEXA-DIOXINS		166	0.528		
TOTAL HEPTA-DIOXINS		893	0.498		
TOTAL TETRA-FURANS	B	24.4	0.0630		
TOTAL PENTA-FURANS	B	34.3	0.0566		
TOTAL HEXA-FURANS	B	116	0.0722		
TOTAL HEPTA-FURANS		399	0.245		

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 16-Sep-2010 08:23:03; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_WG33891-103_Form1A_DX0B_214AS9_SJ1190752.html; Workgroup: WG33891; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
10654004 (Duplicate)
Sample Collection:
03-Sep-2008 14:14

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.			FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	WG33891-103 (DUP L15027-4)
Matrix:	SOLID	**Sample Size:**	10.4 g (dry)
Sample Receipt Date:	16-Jul-2010	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	11-Sep-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	13-Sep-2010 **Time:** 22:24:51	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_134C S: 7**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_134C S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_134C S: 2
Concentration Units:	pg/g (dry weight basis)		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	B	1.46	0.0898	0.71	1.001

(1) Where applicable, custom lab flags have been used on this report; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 16-Sep-2010 08:22:47; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_WG33891-103_Form1A_DB03_134CS7_SJ1190866.html; Workgroup: WG33891; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

PCDD/PCDF ANALYSIS REPORT
RELATIVE PERCENT DIFFERENCE

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No. FIDALGO BAY, CUSTOM PLYWOOD DX STUDY

Contract No.: 4406

Client ID: 10654004

Concentration Units: pg/g (dry weight basis)

COMPOUND	L15027-4 (A)		WG33891-103		MEAN	RELATIVE PERCENT DIFFERENCE
	LAB FLAG [1]	CONC. FOUND	LAB FLAG [1]	CONC. FOUND		
2,3,7,8-TCDD	J	0.662	J	0.514	0.588	25.2
1,2,3,7,8-PECDD	J	2.92	J	2.25	2.59	26.0
1,2,3,4,7,8-HXCDD	J	3.90	J	3.21	3.55	19.5
1,2,3,6,7,8-HXCDD		22.7		16.5	19.6	31.3
1,2,3,7,8,9-HXCDD		11.9		8.74	10.3	30.5
1,2,3,4,6,7,8-HPCDD		524		370	447	34.6
OCDD		3960		2860	3410	32.4
2,3,7,8-TCDF		1.86		1.46	1.66	23.8
1,2,3,7,8-PECDF	J	1.25	J	1.05	1.15	17.1
2,3,4,7,8-PECDF	J	2.24	J	2.03	2.14	9.68
1,2,3,4,7,8-HXCDF		5.80	J	4.44	5.12	26.5
1,2,3,6,7,8-HXCDF	J	2.74	J	2.09	2.41	26.9
1,2,3,7,8,9-HXCDF	J	0.247	J	0.158	0.203	44.0
2,3,4,6,7,8-HXCDF	J	3.14	J	2.42	2.78	26.0
1,2,3,4,6,7,8-HPCDF		142		103	122	32.2
1,2,3,4,7,8,9-HPCDF		7.14		4.91	6.03	37.0
OCDF		675		452	563	39.6

(1) Where applicable, custom lab flags have been used on this report; J = concentration less than LMCL.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: RPD.xsl; Created: 16-Sep-2010 08:23:39; Application: XMLTransformer-1.10.26;
Report Filename: RPD_DIOXINS_1613-RPD_WG33891-103_L15027-4_.html; Workgroup: WG33891; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	N/A
		Lab Sample I.D.:	WG33891-101
Matrix:	SOLID	**Sample Size:**	10.0 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	26-Aug-2010
Extraction Date:	11-Sep-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	14-Sep-2010 **Time:** 00:00:37	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0B_214A S: 5**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0B_214A S: 5
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0B_214A S: 1
Concentration Units:	pg/g		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.056	0.0500	0.33	1.002
1,2,3,7,8-PECDD [3]	U		0.0500		
1,2,3,4,7,8-HXCDD	U		0.0500		
1,2,3,6,7,8-HXCDD	U		0.0500		
1,2,3,7,8,9-HXCDD	U		0.0500		
1,2,3,4,6,7,8-HPCDD	U		0.0500		
OCDD	J	0.185	0.0500	0.98	1.000
2,3,7,8-TCDF	J	0.533	0.0500	0.82	1.002
1,2,3,7,8-PECDF	J	0.138	0.0500	1.75	1.000
2,3,4,7,8-PECDF	J	0.306	0.0500	1.55	1.000
1,2,3,4,7,8-HXCDF	K J	0.088	0.0500	1.38	1.000
1,2,3,6,7,8-HXCDF	J	0.063	0.0500	1.08	1.000
1,2,3,7,8,9-HXCDF	U		0.0500		
2,3,4,6,7,8-HXCDF	J	0.059	0.0500	1.13	1.000
1,2,3,4,6,7,8-HPCDF	U		0.0500		
1,2,3,4,7,8,9-HPCDF	U		0.0500		
OCDF	U		0.0696		
TOTAL TETRA-DIOXINS	U		0.0500		
TOTAL PENTA-DIOXINS	U		0.0500		
TOTAL HEXA-DIOXINS	U		0.0500		
TOTAL HEPTA-DIOXINS	U		0.0500		
TOTAL TETRA-FURANS		1.61	0.0500		
TOTAL PENTA-FURANS		0.759	0.0500		
TOTAL HEXA-FURANS		0.210	0.0500		
TOTAL HEPTA-FURANS	U		0.0500		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 16-Sep-2010 08:23:03; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_WG33891-101_Form1A_DX0B_214AS5_SJ1190747.html; Workgroup: WG33891; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	N/A
		Lab Sample I.D.:	WG33891-101
Matrix:	SOLID	**Sample Size:**	10.0 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	24-Aug-2010
Extraction Date:	11-Sep-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	13-Sep-2010 **Time:** 20:24:25	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_134C S: 4**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DB03_134C S: 4
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_134C S: 2
Concentration Units:	pg/g		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	J	0.307	0.0500	0.68	1.000

(1) Where applicable, custom lab flags have been used on this report; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 16-Sep-2010 08:22:47; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_WG33891-101_Form1A_DB03_134CS4_SJ1190862.html; Workgroup: WG33891; Design ID: 699]

Form 8A

PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**OPR Data Filename:**	**DX0B_214A S: 2**
Matrix:	SOLID	**Lab Sample I.D.:**	WG33891-102
Extraction Date:	11-Sep-2010	**Analysis Date:**	13-Sep-2010 **Time:** 21:15:59

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 20 uL EXTRACT VOLUME.

COMPOUND	LAB FLAG [1]	ION ABUND. RATIO [2]	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS [3] (ng/mL)	% RECOVERY
2,3,7,8-TCDD		0.80	10.0	10.1	6.70 - 15.8	101
1,2,3,7,8-PECDD [4]		0.61	52.0	51.1	36.4 - 73.8	98.2
1,2,3,4,7,8-HXCDD		1.24	56.5	54.8	39.6 - 92.7	97.0
1,2,3,6,7,8-HXCDD		1.25	55.5	56.1	42.2 - 74.4	101
1,2,3,7,8,9-HXCDD		1.26	54.0	55.4	34.6 - 87.5	103
1,2,3,4,6,7,8-HPCDD		1.07	47.5	48.7	33.3 - 66.5	102
OCDD		0.89	100	95.1	78.0 - 144	95.1
2,3,7,8-TCDF		0.80	10.7	11.1	8.03 - 16.9	104
1,2,3,7,8-PECDF		1.55	46.0	47.1	36.8 - 61.6	102
2,3,4,7,8-PECDF		1.56	47.0	49.2	32.0 - 75.2	105
1,2,3,4,7,8-HXCDF		1.26	50.0	49.8	36.0 - 67.0	99.5
1,2,3,6,7,8-HXCDF		1.27	47.5	44.8	39.9 - 61.8	94.4
1,2,3,7,8,9-HXCDF		1.24	52.5	51.9	41.0 - 68.3	98.9
2,3,4,6,7,8-HXCDF		1.27	53.0	52.0	37.1 - 82.7	98.1
1,2,3,4,6,7,8-HPCDF		1.05	50.0	51.0	41.0 - 61.0	102
1,2,3,4,7,8,9-HPCDF		1.06	50.0	48.7	39.0 - 69.0	97.5
OCDF		0.89	104	102	65.5 - 177	98.5

(1) Where applicable, custom lab flags have been used on this report.
(2) Contract-required Ion Abundance Ratios are specified in Table 9, Method 1613.
(3) Contract-required concentration range as determined from the percent of the test concentration in Table 6, Method 1613, under OPR.
(4) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: Form8A.xsl; Created: 16-Sep-2010 08:23:03; Application: XMLTransformer-1.10.26; Report Filename: 1613_DIOXINS_1613DB5_WG33891-102_Form8A_SJ1190743.html; Workgroup: WG33891; Design ID: 699]

AXYS METHOD MLA-017 Rev 19

Form 8G

PCDD/PCDF CERTIFIED REFERENCE MATERIAL (CRM) REPORT FOR NIST SRM 1944

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Lab Sample I.D.:**	WG33891-104
Matrix:	SOLID	**Sample Size:**	1.24 g (dry)
Extraction Date:	11-Sep-2010	**Initial Calibration Date:**	26-Aug-2010
Analysis Date:	14-Sep-2010 **Time:** 04:34:58	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB5
Injection Volume (uL):	1.0	**CRM Data Filename:**	**DX0B_214A S: 10**
Dilution Factor:	N/A	**Blank Data Filename:**	DX0B_214A S: 5
Concentration Units:	pg/g (dry weight basis)	**Cal. Ver. Data Filename:**	DX0B_214A S: 1

COMPOUND	LAB FLAG [1]	DETERMINED	CERTIFIED / REFERENCE
2,3,7,8-TCDD		190	133 +/- 9
1,2,3,7,8-PECDD [2]	J	23.5	19 +/- 2
1,2,3,4,7,8-HXCDD	J	35.1	26 +/- 3
1,2,3,6,7,8-HXCDD		80.7	56 +/- 6
1,2,3,7,8,9-HXCDD		87.5	53 +/- 7
1,2,3,4,6,7,8-HPCDD		900	800 +/- 70
OCDD		5460	5800 +/- 700
2,3,7,8-TCDF	X		
1,2,3,7,8-PECDF		47.0	45 +/- 7
2,3,4,7,8-PECDF		52.8	45 +/- 4
1,2,3,4,7,8-HXCDF		212	220 +/- 30
1,2,3,6,7,8-HXCDF		96.7	90 +/- 10
1,2,3,7,8,9-HXCDF	J	3.43	19 +/- 18
2,3,4,6,7,8-HXCDF		57.8	54 +/- 6
1,2,3,4,6,7,8-HPCDF		964	1000 +/- 100
1,2,3,4,7,8,9-HPCDF		43.2	40 +/- 6
OCDF		1020	1000 +/- 100

(1) Where applicable, custom lab flags have been used on this report; J = concentration less than LMCL; X = result reported separately.
(2) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: Form8G.xsl; Created: 16-Sep-2010 08:23:03; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB5_WG33891-104_Form8G_SJ1190753.html; Workgroup: WG33891; Design ID: 699]

Form 8G

PCDD/PCDF CERTIFIED REFERENCE MATERIAL (CRM) REPORT FOR NIST SRM 1944

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Lab Sample I.D.:**	WG33891-104
Matrix:	SOLID	**Sample Size:**	1.24 g (dry)
Extraction Date:	11-Sep-2010	**Initial Calibration Date:**	24-Aug-2010
Analysis Date:	14-Sep-2010 **Time:** 10:49:56	**Instrument ID:**	HR GC/MS
Extract Volume (uL):	20	**GC Column ID:**	DB225
Injection Volume (uL):	2.0	**CRM Data Filename:**	**DB03_135 S: 5**
Dilution Factor:	N/A	**Blank Data Filename:**	DB03_134C S: 4
Concentration Units:	pg/g (dry weight basis)	**Cal. Ver. Data Filename:**	DB03_135 S: 2

COMPOUND	LAB FLAG [1]	DETERMINED	CERTIFIED / REFERENCE
2,3,7,8-TCDF		29.7	39 +/- 15

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Celine Vaillant________

For Axys Internal Use Only [XSL Template: Form8G.xsl; Created: 16-Sep-2010 08:22:47; Application: XMLTransformer-1.10.26;
Report Filename: 1613_DIOXINS_1613DB225_WG33891-104_Form8G_SJ1190889.html; Workgroup: WG33891; Design ID: 699]

BATCH SUMMARY

Batch ID:	WG33443	***Date:*** 03-Sep-2010
Analysis Type:	Dioxin/Furan	***Matrix Type:*** Tissue

BATCH MAKEUP

Contract: 4406

Samples:

L14872-1	SDS-CT-01A
L14872-2	SDS-CT-01B
L14872-3	SDS-CT-02
L14872-4	SDS-CT-03
L14872-5	SDS-CT-04
L14872-6	SDS-CT-05

Blank:
WG33443-101

Reference or Spike:
WG33443-102

Duplicate:
WG33443-103

Comments:

1. Data are not blank corrected.

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-01A
Sample Collection:
14-Jun-2010 10:47

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14872-1 L
Matrix:	TISSUE	**Sample Size:**	10.3 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 04:44:08	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_114 S: 11**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_114 S: 1
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	84.3 1.00

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.109	0.0582	0.51	1.001
1,2,3,7,8-PECDD [3]	K J	0.212	0.0572	0.42	1.002
1,2,3,4,7,8-HXCDD	J	0.246	0.0486	1.25	1.001
1,2,3,6,7,8-HXCDD	J	1.23	0.0486	1.34	1.000
1,2,3,7,8,9-HXCDD	J	0.695	0.0486	1.17	1.000
1,2,3,4,6,7,8-HPCDD	B	26.8	0.138	0.98	1.000
OCDD	B	221	0.116	0.86	1.000
2,3,7,8-TCDF	B J	0.593	0.0486	0.81	1.002
1,2,3,7,8-PECDF	K B J	0.088	0.0683	1.23	1.001
2,3,4,7,8-PECDF	K B J	0.213	0.0683	1.93	1.001
1,2,3,4,7,8-HXCDF	J	0.312	0.0755	1.15	1.001
1,2,3,6,7,8-HXCDF	K J	0.168	0.0755	1.03	1.001
1,2,3,7,8,9-HXCDF	J	0.105	0.0755	1.15	1.004
2,3,4,6,7,8-HXCDF	J	0.223	0.0755	1.28	1.001
1,2,3,4,6,7,8-HPCDF		5.75	0.0736	0.90	1.000
1,2,3,4,7,8,9-HPCDF	B J	0.305	0.0736	1.17	1.001
OCDF		17.9	0.0486	0.89	1.002
TOTAL TETRA-DIOXINS		1.16	0.0582		
TOTAL PENTA-DIOXINS	J	1.40	0.0572		
TOTAL HEXA-DIOXINS		12.1	0.0486		
TOTAL HEPTA-DIOXINS		72.5	0.138		
TOTAL TETRA-FURANS	B	1.98	0.0486		
TOTAL PENTA-FURANS		8.84	0.0683		
TOTAL HEXA-FURANS		7.24	0.0755		
TOTAL HEPTA-FURANS		20.9	0.0736		

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:33:39; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14872-1_Form1A_DX0M_114S11_SJ1185857.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CT-01A
Sample Collection:
14-Jun-2010 10:47

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14872-1
Matrix:	TISSUE	**Sample Size:**	10.3 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Aug-2010 **Time:** 11:59:57	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_101 S: 8**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_101 S: 2
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	84.3 1.00

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	K J	0.202	0.103	0.39	1.002

(1) Where applicable, custom lab flags have been used on this report; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: ________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:17:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14872-1_Form1A_DB03_101S8_SJ1186100.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-01B
Sample Collection:
14-Jun-2010 11:15

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14872-2 LW
Matrix:	TISSUE	**Sample Size:**	10.2 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 08:33:25	**GC Column ID:**	DB5
Extract Volume (uL):	100	**Sample Data Filename:**	**DX0M_114 S: 15**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	5	**Cal. Ver. Data Filename:**	DX0M_114 S: 12
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	83.8 1.30

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U D		0.0925		
1,2,3,7,8-PECDD [3]	K D J	0.150	0.107	0.84	1.001
1,2,3,4,7,8-HXCDD	K D J	0.898	0.217	0.61	1.004
1,2,3,6,7,8-HXCDD	U D		0.217		
1,2,3,7,8,9-HXCDD	U D		0.217		
1,2,3,4,6,7,8-HPCDD	K B D J	5.00	0.150	0.79	1.001
OCDD	B D J	27.4	0.354	0.99	1.000
2,3,7,8-TCDF	B D J	0.320	0.146	0.82	1.001
1,2,3,7,8-PECDF	U D		0.0968		
2,3,4,7,8-PECDF	K B D J	0.131	0.0968	0.96	1.002
1,2,3,4,7,8-HXCDF	K D J	0.155	0.138	2.22	1.000
1,2,3,6,7,8-HXCDF	U D		0.138		
1,2,3,7,8,9-HXCDF	U D		0.138		
2,3,4,6,7,8-HXCDF	U D		0.138		
1,2,3,4,6,7,8-HPCDF	K D J	0.632	0.173	2.36	1.000
1,2,3,4,7,8,9-HPCDF	U D		0.173		
OCDF	K D J	2.11	0.133	1.30	1.002
TOTAL TETRA-DIOXINS	U D		0.0925		
TOTAL PENTA-DIOXINS	U D		0.107		
TOTAL HEXA-DIOXINS	D	1.67	0.217		
TOTAL HEPTA-DIOXINS	D	7.96	0.150		
TOTAL TETRA-FURANS	B D	0.320	0.146		
TOTAL PENTA-FURANS	U D		0.0968		
TOTAL HEXA-FURANS	U D		0.138		
TOTAL HEPTA-FURANS	U D		0.173		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; D = dilution data; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:33:39; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14872-2_Form1A_DX0M_114S15_SJ1185993.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-01B
Sample Collection:
14-Jun-2010 11:15

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14872-2
Matrix:	TISSUE	**Sample Size:**	10.2 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Aug-2010 **Time:** 12:36:30	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_101 S: 9**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_101 S: 2
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	83.8 1.30

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.536		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:17:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14872-2_Form1A_DB03_101S9_SJ1186101.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-02
Sample Collection:
14-Jun-2010 11:47

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14872-3 L
Matrix:	TISSUE	**Sample Size:**	10.3 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 11:18:26	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_114 S: 18**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_114 S: 12
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	84.3 1.05

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	K J	0.054	0.0488	0.22	1.000
1,2,3,7,8-PECDD [3]	U		0.0488		
1,2,3,4,7,8-HXCDD	U		0.0488		
1,2,3,6,7,8-HXCDD	J	0.155	0.0488	1.12	1.000
1,2,3,7,8,9-HXCDD	K J	0.095	0.0488	0.59	1.000
1,2,3,4,6,7,8-HPCDD	B J	1.69	0.0726	1.01	1.000
OCDD	B J	9.84	0.0652	0.89	1.000
2,3,7,8-TCDF	B J	0.255	0.0488	0.82	1.002
1,2,3,7,8-PECDF	U		0.0488		
2,3,4,7,8-PECDF	K B J	0.079	0.0488	2.27	1.000
1,2,3,4,7,8-HXCDF	K J	0.058	0.0488	1.71	1.001
1,2,3,6,7,8-HXCDF	U		0.0488		
1,2,3,7,8,9-HXCDF	U		0.0488		
2,3,4,6,7,8-HXCDF	K J	0.056	0.0488	2.04	1.001
1,2,3,4,6,7,8-HPCDF	K J	0.639	0.0488	0.79	1.000
1,2,3,4,7,8,9-HPCDF	U		0.0488		
OCDF	J	1.56	0.0488	0.91	1.002
TOTAL TETRA-DIOXINS		0.075	0.0488		
TOTAL PENTA-DIOXINS	U		0.0488		
TOTAL HEXA-DIOXINS		1.06	0.0488		
TOTAL HEPTA-DIOXINS		4.09	0.0726		
TOTAL TETRA-FURANS	B	0.457	0.0488		
TOTAL PENTA-FURANS	U		0.0488		
TOTAL HEXA-FURANS		0.304	0.0488		
TOTAL HEPTA-FURANS		1.34	0.0488		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:33:39; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14872-3_Form1A_DX0M_114S18_SJ1185996.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-02
Sample Collection:
14-Jun-2010 11:47

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14872-3
Matrix:	TISSUE	**Sample Size:**	10.3 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Aug-2010 **Time:** 13:13:05	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_101 S: 10**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_101 S: 2
Concentration Units:	pg/g (wet weight basis)	**% Moisture:**	84.3
		% Lipid:	1.05

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.101		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:17:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14872-3_Form1A_DB03_101S10_SJ1186102.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CT-03
Sample Collection:
14-Jun-2010 12:30

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14872-4 L (A)
Matrix:	TISSUE	**Sample Size:**	10.3 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 09:28:22	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_114 S: 16**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_114 S: 12
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	84.3 1.11

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		0.0486		
1,2,3,7,8-PECDD [3]	K J	0.066	0.0486	0.38	1.001
1,2,3,4,7,8-HXCDD	J	0.064	0.0588	1.35	1.000
1,2,3,6,7,8-HXCDD	J	0.196	0.0588	1.11	1.000
1,2,3,7,8,9-HXCDD	K J	0.153	0.0588	1.55	1.001
1,2,3,4,6,7,8-HPCDD	B J	1.83	0.0486	0.94	1.000
OCDD	B J	8.90	0.115	0.87	1.000
2,3,7,8-TCDF	B J	0.299	0.0486	0.71	1.001
1,2,3,7,8-PECDF	U		0.0486		
2,3,4,7,8-PECDF	B J	0.092	0.0486	1.57	1.001
1,2,3,4,7,8-HXCDF	U		0.0533		
1,2,3,6,7,8-HXCDF	U		0.0533		
1,2,3,7,8,9-HXCDF	U		0.0533		
2,3,4,6,7,8-HXCDF	U		0.0533		
1,2,3,4,6,7,8-HPCDF	K J	0.343	0.0486	0.68	1.000
1,2,3,4,7,8,9-HPCDF	K B J	0.051	0.0486	0.40	1.000
OCDF	J	1.31	0.0486	0.90	1.002
TOTAL TETRA-DIOXINS		0.152	0.0486		
TOTAL PENTA-DIOXINS		0.130	0.0486		
TOTAL HEXA-DIOXINS		0.841	0.0588		
TOTAL HEPTA-DIOXINS		4.67	0.0486		
TOTAL TETRA-FURANS	B	0.474	0.0486		
TOTAL PENTA-FURANS		0.092	0.0486		
TOTAL HEXA-FURANS		0.391	0.0533		
TOTAL HEPTA-FURANS	U		0.0486		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:33:39; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14872-4_Form1A_DX0M_114S16_SJ1185994.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CT-03
Sample Collection:
14-Jun-2010 12:30

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	L14872-4 (A)
Matrix:	TISSUE	**Sample Size:**	10.3 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Aug-2010 **Time:** 13:49:39	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_101 S: 11**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_101 S: 2
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	84.3 1.11

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.0951		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:17:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14872-4_Form1A_DB03_101S11_SJ1186103.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CT-04
Sample Collection:
14-Jun-2010 13:31

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.			FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14872-5 L
Matrix:	TISSUE	**Sample Size:**	9.86 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 12:13:28	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_114 S: 19**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_114 S: 12
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	83.9 1.03

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	J	0.053	0.0507	0.67	1.000
1,2,3,7,8-PECDD [3]	U		0.0507		
1,2,3,4,7,8-HXCDD	U		0.0507		
1,2,3,6,7,8-HXCDD	J	0.113	0.0507	1.09	1.001
1,2,3,7,8,9-HXCDD	U		0.0507		
1,2,3,4,6,7,8-HPCDD	B J	1.00	0.0507	1.11	1.000
OCDD	B J	4.93	0.0507	0.90	1.000
2,3,7,8-TCDF	K B J	0.233	0.0507	0.65	1.001
1,2,3,7,8-PECDF	U		0.0507		
2,3,4,7,8-PECDF	K B J	0.057	0.0507	2.16	1.001
1,2,3,4,7,8-HXCDF	U		0.0507		
1,2,3,6,7,8-HXCDF	U		0.0507		
1,2,3,7,8,9-HXCDF	U		0.0507		
2,3,4,6,7,8-HXCDF	U		0.0507		
1,2,3,4,6,7,8-HPCDF	K J	0.398	0.0582	0.70	1.000
1,2,3,4,7,8,9-HPCDF	U		0.0582		
OCDF	J	0.537	0.0507	0.80	1.002
TOTAL TETRA-DIOXINS		0.053	0.0507		
TOTAL PENTA-DIOXINS		0.069	0.0507		
TOTAL HEXA-DIOXINS		1.15	0.0507		
TOTAL HEPTA-DIOXINS		2.73	0.0507		
TOTAL TETRA-FURANS	B	0.322	0.0507		
TOTAL PENTA-FURANS		0.148	0.0507		
TOTAL HEXA-FURANS		0.131	0.0507		
TOTAL HEPTA-FURANS	U		0.0582		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:33:39; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14872-5_Form1A_DX0M_114S19_SJ1185997.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CT-04
Sample Collection:
14-Jun-2010 13:31

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14872-5
Matrix:	TISSUE	**Sample Size:**	9.86 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Aug-2010 **Time:** 15:02:48	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_101 S: 13**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_101 S: 2
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	83.9 1.03

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.0610		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:17:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14872-5_Form1A_DB03_101S13_SJ1186105.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-05
Sample Collection:
14-Jun-2010 13:06

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14872-6 L
Matrix:	TISSUE	**Sample Size:**	9.99 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 13:18:37	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_114 S: 20**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_114 S: 12
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	82.2 3.17

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		0.0501		
1,2,3,7,8-PECDD [3]	U		0.0501		
1,2,3,4,7,8-HXCDD	U		0.0501		
1,2,3,6,7,8-HXCDD	K J	0.060	0.0501	0.94	1.000
1,2,3,7,8,9-HXCDD	U		0.0501		
1,2,3,4,6,7,8-HPCDD	B J	0.772	0.0501	1.13	1.000
OCDD	B J	5.15	0.0503	0.86	1.000
2,3,7,8-TCDF	K B J	0.215	0.0501	1.01	1.002
1,2,3,7,8-PECDF	U		0.0501		
2,3,4,7,8-PECDF	B J	0.106	0.0501	1.41	1.002
1,2,3,4,7,8-HXCDF	U		0.0501		
1,2,3,6,7,8-HXCDF	U		0.0501		
1,2,3,7,8,9-HXCDF	U		0.0501		
2,3,4,6,7,8-HXCDF	U		0.0501		
1,2,3,4,6,7,8-HPCDF	K J	0.210	0.0501	0.26	1.000
1,2,3,4,7,8,9-HPCDF	U		0.0501		
OCDF	J	0.599	0.0501	0.86	1.002
TOTAL TETRA-DIOXINS	U		0.0501		
TOTAL PENTA-DIOXINS	U		0.0501		
TOTAL HEXA-DIOXINS	U		0.0501		
TOTAL HEPTA-DIOXINS		2.25	0.0501		
TOTAL TETRA-FURANS	B	0.172	0.0501		
TOTAL PENTA-FURANS		0.194	0.0501		
TOTAL HEXA-FURANS	U		0.0501		
TOTAL HEPTA-FURANS		0.354	0.0501		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:33:39; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_L14872-6_Form1A_DX0M_114S20_SJ1185998.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-05
Sample Collection:
14-Jun-2010 13:06

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	L14872-6
Matrix:	TISSUE	**Sample Size:**	9.99 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Aug-2010 **Time:** 15:39:21	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_101 S: 14**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_101 S: 2
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	82.2 3.17

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.102		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:17:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_L14872-6_Form1A_DB03_101S14_SJ1186106.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

Form 1A

PCDD/PCDF ANALYSIS REPORT

CLIENT SAMPLE NO.
SDS-CT-03 (Duplicate)
Sample Collection:
14-Jun-2010 12:30

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
Contract No.:	4406	**Lab Sample I.D.:**	WG33443-103 L (DUP L14872-4)
Matrix:	TISSUE	**Sample Size:**	10.2 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 10:23:24	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_114 S: 17**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_114 S: 12
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	84.3 1.18

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		0.0490		
1,2,3,7,8-PECDD [3]	U		0.0490		
1,2,3,4,7,8-HXCDD	U		0.0597		
1,2,3,6,7,8-HXCDD	K	0.173	0.0597	1.05	1.001
1,2,3,7,8,9-HXCDD	K	0.070	0.0597	2.53	1.001
1,2,3,4,6,7,8-HPCDD	K B	1.72	0.0727	0.64	1.000
OCDD	B	9.22	0.0749	0.94	1.000
2,3,7,8-TCDF	B	0.351	0.0490	0.75	1.001
1,2,3,7,8-PECDF	U		0.0523		
2,3,4,7,8-PECDF	K B	0.088	0.0523	0.58	1.001
1,2,3,4,7,8-HXCDF	K	0.094	0.0490	1.99	1.001
1,2,3,6,7,8-HXCDF	U		0.0490		
1,2,3,7,8,9-HXCDF	U		0.0490		
2,3,4,6,7,8-HXCDF	K	0.064	0.0490	0.32	1.001
1,2,3,4,6,7,8-HPCDF		0.645	0.0490	1.14	1.000
1,2,3,4,7,8,9-HPCDF	U		0.0490		
OCDF	K	0.939	0.195	1.25	1.002
TOTAL TETRA-DIOXINS		0.100	0.0490		
TOTAL PENTA-DIOXINS	U		0.0490		
TOTAL HEXA-DIOXINS		0.126	0.0597		
TOTAL HEPTA-DIOXINS	U		0.0727		
TOTAL TETRA-FURANS	B	0.475	0.0490		
TOTAL PENTA-FURANS	U		0.0523		
TOTAL HEXA-FURANS		0.319	0.0490		
TOTAL HEPTA-FURANS		1.68	0.0490		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; B = analyte found in sample and the associated blank.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:33:39; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33443-103_Form1A_DX0M_114S17_SJ1185995.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
SDS-CT-03 (Duplicate)
Sample Collection:
14-Jun-2010 12:30

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	FIDALGO BAY, CUSTOM PLYWOOD DX STUDY
		Lab Sample I.D.:	WG33443-103 (DUP L14872-4)
Matrix:	TISSUE	**Sample Size:**	10.2 g (wet)
Sample Receipt Date:	17-Jun-2010	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Aug-2010 **Time:** 14:26:13	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_101 S: 12**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_101 S: 2
Concentration Units:	pg/g (wet weight basis)	**% Moisture:** **% Lipid:**	84.3 1.18

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.128		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:17:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_WG33443-103_Form1A_DB03_101S12_SJ1186104.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

PCDD/PCDF ANALYSIS REPORT
RELATIVE PERCENT DIFFERENCE

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No. FIDALGO BAY, CUSTOM PLYWOOD DX STUDY

Contract No.: 4406

Client ID: SDS-CT-03

Concentration Units: pg/g (wet weight basis)

COMPOUND	L14872-4 (A)		WG33443-103		MEAN	RELATIVE PERCENT DIFFERENCE
	LAB FLAG [1]	CONC. FOUND	LAB FLAG [1]	CONC. FOUND		
2,3,7,8-TCDD	U		U			
1,2,3,7,8-PECDD	K J	0.066	U			
1,2,3,4,7,8-HXCDD	J	0.064	U			
1,2,3,6,7,8-HXCDD	J	0.196	K	0.173		
1,2,3,7,8,9-HXCDD	K J	0.153	K	0.070		
1,2,3,4,6,7,8-HPCDD	J	1.83	K	1.72		
OCDD	J	8.90		9.22	9.06	3.53
2,3,7,8-TCDF	U		U			
1,2,3,7,8-PECDF	U		U			
2,3,4,7,8-PECDF	J	0.092	K	0.088		
1,2,3,4,7,8-HXCDF	U		K	0.094		
1,2,3,6,7,8-HXCDF	U		U			
1,2,3,7,8,9-HXCDF	U		U			
2,3,4,6,7,8-HXCDF	U		K	0.064		
1,2,3,4,6,7,8-HPCDF	K J	0.343		0.645		
1,2,3,4,7,8,9-HPCDF	K J	0.051	U			
OCDF	J	1.31	K	0.939		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: RPD.xsl; Created: 03-Sep-2010 14:34:56; Application: XMLTransformer-1.10.25;
Report Filename: RPD_DIOXINS_1613-RPD_WG33443-103_L14872-4_.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

Form 1A
PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	N/A
		Lab Sample I.D.:	WG33443-101 L:5PT
Matrix:	CANOLA OIL	**Sample Size:**	10.0 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	30-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	27-Aug-2010 **Time:** 00:08:57	**GC Column ID:**	DB5
Extract Volume (uL):	20	**Sample Data Filename:**	**DX0M_114 S: 6**
Injection Volume (uL):	1.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DX0M_114 S: 1
Concentration Units:	pg/g		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDD	U		0.0500		
1,2,3,7,8-PECDD [3]	U		0.0500		
1,2,3,4,7,8-HXCDD	U		0.0711		
1,2,3,6,7,8-HXCDD	U		0.0711		
1,2,3,7,8,9-HXCDD	U		0.0711		
1,2,3,4,6,7,8-HPCDD	K J	0.060	0.0500	1.59	1.000
OCDD	K J	0.224	0.0500	2.09	1.000
2,3,7,8-TCDF	K J	0.191	0.0500	0.41	1.001
1,2,3,7,8-PECDF	K J	0.050	0.0500	0.24	1.001
2,3,4,7,8-PECDF	K J	0.057	0.0500	0.98	1.002
1,2,3,4,7,8-HXCDF	U		0.0516		
1,2,3,6,7,8-HXCDF	U		0.0516		
1,2,3,7,8,9-HXCDF	U		0.0516		
2,3,4,6,7,8-HXCDF	U		0.0516		
1,2,3,4,6,7,8-HPCDF	U		0.0500		
1,2,3,4,7,8,9-HPCDF	K J	0.060	0.0500	0.37	1.001
OCDF	U		0.140		
TOTAL TETRA-DIOXINS	U		0.0500		
TOTAL PENTA-DIOXINS	U		0.0500		
TOTAL HEXA-DIOXINS	U		0.0711		
TOTAL HEPTA-DIOXINS	U		0.0500		
TOTAL TETRA-FURANS	J	0.085	0.0500		
TOTAL PENTA-FURANS	U		0.0500		
TOTAL HEXA-FURANS	U		0.0516		
TOTAL HEPTA-FURANS	U		0.0500		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.
(3) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.
Signed: _________Bryan Alonzo_________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:33:39; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33443-101_Form1A_DX0M_114S6_SJ1185863.html; Workgroup: WG33443; Design ID: 883]

AXYS METHOD MLA-017 Rev 17

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

Form 1A

PCDD/PCDF ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**Project No.**	N/A
		Lab Sample I.D.:	WG33443-101
Matrix:	CANOLA OIL	**Sample Size:**	10.0 g
Sample Receipt Date:	N/A	**Initial Calibration Date:**	13-Jul-2010
Extraction Date:	23-Jul-2010	**Instrument ID:**	HR GC/MS
Analysis Date:	04-Aug-2010 **Time:** 10:10:14	**GC Column ID:**	DB225
Extract Volume (uL):	20	**Sample Data Filename:**	**DB03_101 S: 5**
Injection Volume (uL):	2.0	**Blank Data Filename:**	DX0M_114 S: 6
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	DB03_101 S: 2
Concentration Units:	pg/g		

COMPOUND	LAB FLAG [1]	CONCENTRATION FOUND	DETECTION LIMIT	ION ABUND. RATIO [2]	RRT [2]
2,3,7,8-TCDF	U		0.103		

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) Contract-required limits for RRTs and ion abundance ratios are specified in Tables 2 and 9, respectively, Method 1613.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form1A.xsl; Created: 03-Sep-2010 14:17:30; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB225_WG33443-101_Form1A_DB03_101S5_SJ1180936.html; Workgroup: WG33443; Design ID: 883]

Form 8A
PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4406	**OPR Data Filename:**	**DX0M_114 S: 3**
Matrix:	TISSUE	**Lab Sample I.D.:**	WG33443-102 L:5PT
Extraction Date:	23-Jul-2010	**Analysis Date:**	26-Aug-2010 **Time:** 21:23:46

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 20 uL EXTRACT VOLUME.

COMPOUND	LAB FLAG [1]	ION ABUND. RATIO [2]	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	OPR CONC. LIMITS [3] (ng/mL)	% RECOVERY
2,3,7,8-TCDD		0.75	10.6	9.99	7.10 - 16.7	94.2
1,2,3,7,8-PECDD [4]		0.61	56.6	48.9	39.6 - 80.4	86.4
1,2,3,4,7,8-HXCDD		1.19	59.2	57.6	41.4 - 97.1	97.3
1,2,3,6,7,8-HXCDD		1.24	51.8	56.4	39.4 - 69.4	109
1,2,3,7,8,9-HXCDD		1.19	56.7	48.9	36.3 - 91.9	86.2
1,2,3,4,6,7,8-HPCDD		1.04	50.0	45.8	35.0 - 70.0	91.5
OCDD		0.84	108	95.5	84.2 - 155	88.5
2,3,7,8-TCDF		0.72	10.9	10.9	8.18 - 17.2	100
1,2,3,7,8-PECDF		1.49	50.0	46.2	40.0 - 67.0	92.4
2,3,4,7,8-PECDF		1.43	50.0	47.4	34.0 - 80.0	94.7
1,2,3,4,7,8-HXCDF		1.20	54.4	49.8	39.2 - 72.9	91.6
1,2,3,6,7,8-HXCDF		1.19	50.0	49.3	42.0 - 65.0	98.7
1,2,3,7,8,9-HXCDF		1.15	50.0	53.4	39.0 - 65.0	107
2,3,4,6,7,8-HXCDF		1.20	53.1	53.5	37.2 - 82.8	101
1,2,3,4,6,7,8-HPCDF		0.99	50.0	53.8	41.0 - 61.0	108
1,2,3,4,7,8,9-HPCDF		0.98	50.0	49.6	39.0 - 69.0	99.1
OCDF		0.86	109	99.8	68.4 - 185	91.9

(1) Where applicable, custom lab flags have been used on this report.
(2) Contract-required Ion Abundance Ratios are specified in Table 9, Method 1613.
(3) Contract-required concentration range as determined from the percent of the test concentration in Table 6, Method 1613, under OPR.
(4) Alternate confirmation and quantitation ions used for native and labeled PECDD.

These data are validated and reported as accurate, true and compliant with AXYS Analytical Services Ltd. quality assurance processes.

Signed: _________Bryan Alonzo________

For Axys Internal Use Only [XSL Template: Form8A.xsl; Created: 03-Sep-2010 14:33:39; Application: XMLTransformer-1.10.25;
Report Filename: 1613_DIOXINS_1613DB5_WG33443-102_Form8A_SJ1185859.html; Workgroup: WG33443; Design ID: 883]

Appendix C-2
Chain-of-Custody Forms

RA17

SAIC From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Chris Hunt
Client Name: Ecology

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	TOC	Total Solids	Total Sulfides	Archive						Comments
SDS-PB-01	0-10cm	Sed	6/7/10	1307	4	X	X	X	X	X						
SDS-PB-02	0-10cm	Sed	6/7/10	1345	4	X	X	X	X	X						
SDS-PB-03	0-10cm	Sed	6/7/10	1407	4	X	X	X	X	X						
SDS-PB-04	0-10cm	Sed	6/7/10	1434	4	X	X	X	X	X						
SDS-PB-05	0-10cm	Sed	6/7/10	1450	4	X	X	X	X	X						
SDS-PB-05-D	0-10cm	Sed	6/7/10	1450	3	X	X	X	X							
SDS-PB-05-T	0-10cm	Sed	6/7/10	1450	3	X	X	X	X							
SDS-PB-06	0-10cm	Sed	6/7/10	1524	4	X	X	X	X	X						
SDS-PB-07	0-10cm	Sed	6/7/10	1550	4	X	X	X	X	X						

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:10	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

8

SAIC® From Science to Solutions
18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Julie Wartes
Client Name: Ecology

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	TOC	Total Solids	Total Sulfides	Archive						Comments
SDS-PB-08	0-10cm	sed	6/8/10	1521	4	X	X	X	X	X						
SDS-PB-09	0-10cm	sed	6/8/10	1558	4	X	X	X	X	X						
SDS-PB-10	0-10cm	sed	~~6/4/~~ 6/8/10	1620	4	X	X	X	X	X						
SDS-FB-01	0-10cm	sed	6/8/10	1003	4	X	X	X	X	X						
SDS-FB-02	0-10cm	sed	6/8/10	1021	4	X	X	X	X	X						
SDS-FB-03	0-10cm	sed	6/8/10	1052	4	X	X	X	X	X						
SDS-FB-04	0-10cm	sed	6/8/10	1152	4	X	X	X	X	X						
SDS-FB-05	0-10cm	sed	6/8/10	1348	4	X	X	X	X	X						
SDS-FB-06	0-10cm	sed	6/8/10	1114	4	X	X	X	X	X						
SDS-PB-07	0-10cm	sed	6/8/10	1045	4	X	X	X	X	X						
SDS-PB-07-D	0-10cm	sed	6/8/10	1045	3	X	X	X	X							
SDS-PB-07-T	0-10cm	sed	6/8/10	1045	3	X	X	X	X							

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:00	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

SAIC
From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Julie Wartes
Client Name: Ecology

Analyses / Tests

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	TOC	Total Solids	Total Sulfides	Archive						Comments
SDS-FB-08	0-10cm	Sed	6/8/10	1133	4	X	X	X	X	X						
SDS-FB-09	0-10cm	sed	6/8/10	1435	4	X	X	X	X	X						
SDS-FB-10	0-10cm	sed	6/8/10	1453	4	X	X	X	X	X						

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:10	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation:	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

RA31

SAIC
From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Chris Hunt
Client Name: Ecology

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	TOC	Total Solids	Total Sulfides	Archive						Comments
SDS-CPD-01	0-10cm	Sed	6/9/10	940	4	X	X	X	X	X						
SDS-CPD-02	0-10cm	Sed	6/9/10	1001	4	X	X	X	X	X						
SDS-CPD-03	0-10cm	Sed	6/9/10	1046	4	X	X	X	X	X						
SDS-CPD-04	0-10cm	Sed	6/9/10	1107	4	X	X	X	X	X						
SDS-CPD-07	0-10cm	Sed	6/9/10	1135	4	X	X	X	X	X						
SDS-CPD-08	0-10cm	Sed	6/9/10	1146	4	X	X	X	X	X						
SDS-CPD-08-D	0-10cm	Sed	6/9/10	1146	3	X	X	X	X							
SDS-CPD-08-T	0-10cm	Sed	6/9/10	1146	3	X	X	X	X							
SDS-CPD-10	0-10cm	Sed	6/9/10	1312	4	X	X	X	X	X						
SDS-CPD-13	0-10cm	Sed	6/9/10	1320	4	X	X	X	X	X						
SDS-CPD-16	0-10cm	Sed	6/9/10	1331	4	X	X	X	X	X						
SDS-CPD-17	0-10cm	Sed	6/9/10	1343	4	X	X	X	X	X						

Shipping Information
Number of Shipping Containers:
Date Shipped:
Carrier:
Waybill No.:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:10	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

RA17:00010

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TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay Custom Plywood D/O/M Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Chris Hunt
Client Name: Ecology

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	TOC	Total Solids	Total Sulfides	Archive						Comments
SDS-CPD-18	0-10cm	Sed	6/9/10	1400	4	X	X	X	X	X						
SDS-CPD-19	0-10cm	Sed	6/9/10	1411	4	X	X	X	X	X						
SDS-CPD-20	0-10cm	Sed	6/9/10	1425	4	X	X	X	X	X						
SDS-CPD-21	0-10cm	Sed	6/9/10	1440	4	X	X	X	X	X						

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:10	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

RA17:00011

RA23

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CHAIN OF CUSTODY RECORD

Project No.: ______ **Project Mgr:** Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Tim Hammermeister Will Hafner Julie Wartes
Client Name: Ecology

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	TOC	Total Solids	Total Sulfides	Archive						Comments
SDS-CPD-05	0-10cm	Sed	6/10/10	1057	4	X	X	X	X	X						
SDS-CPD-06	0-10cm	Sed	6/10/10	1116	4	X	X	X	X	X						
SDS-CPD-09	0-10cm	Sed	6/10/10	1130	4	X	X	X	X	X						
SDS-CPD-11	0-10cm	Sed	6/10/10	1144	4	X	X	X	X	X						
SDS-CPD-12	0-10cm	Sed	6/10/10	1200	4	X	X	X	X	X						
SDS-CPD-14	0-10cm	Sed	6/10/10	1212	4	X	X	X	X	X						
SDS-CPD-15	0-10cm	Sed	6/10/10	1223	4	X	X	X	X	X						

Shipping Information

Number of Shipping Containers:

Date Shipped:

Carrier:

Waybill No.:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 6/11/10 10:10	Date/Time: 6/11/10 1010	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: ARI	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

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CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: WH CH AW JW DK
Client Name: Ecology

Sample ID	Depth	Matrix	Date	Time	# of Containers	Grain Size	Total Sulfides	TOC	Total Solids	Archive					
SDS-CT-01A	0-10cm	sed	6/14/10	1047	4	X	X	X	X	X					
SDS-CT-01B	0-10cm	sed	6/14/10	1115	4	X	X	X	X	X					
SDS-CT-02	0-10cm	sed	6/14/10	1147	4	X	X	X	X	X					
SDS-CT-03	0-10cm	sed	6/14/10	1230	4	X	X	X	X	X					
SDS-CT-04	0-10cm	sed	6/14/10	1331	4	X	X	X	X	X					
SDS-CT-05	0-10cm	sed	6/14/10	1306	4	X	X	X	X	X					

Shipping Information

Number of Shipping Containers: 1
Date Shipped: 6/15/10
Carrier: SAIC
Waybill No.:

Comments

RELINQUISHED BY:
Signature: [signature]
Date/Time: 06/15/2010 1405
Affiliation: SAIC

RECEIVED BY:
Signature: [signature]
Date/Time: 6/15/10 1405
Affiliation: ARI

RELINQUISHED BY:
Signature:
Date/Time:
Affiliation:

RECEIVED BY:
Signature:
Date/Time:
Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

Contact: analytical@axys.com

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SAIC From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.: ____ Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Chris Hunt
Client Name: Ecology

Shipping Information

Number of Shipping Containers: 4
Date Shipped: 6/16/10
Carrier: Fedex
Waybill No.:

Analyses / Tests: Dioxin/Furan Congeners

Sample ID	Depth	Matrix	Date	Time	# of Containers	Dioxin/Furan Congeners										Comments
SDS-PB-01	0-10cm	sed	6/7/10	1307	1	X										L14884-11
SDS-PB-02	0-10cm	sed	6/7/10	1345	1	X										-12
SDS-PB-03	0-10cm	sed	6/7/10	1407	1	X										-13
SDS-PB-04	0-10cm	sed	6/7/10	1434	1	X										-14
SDS-PB-05	0-10cm	sed	6/7/10	1450	1	X										-15
SDS-PB-05-D	0-10cm	sed	6/7/10	1450	1	X										-16
SDS-PB-06	0-10cm	sed	6/7/10	1524	1	X										-17
SDS-PB-07	0-10cm	sed	6/7/10	1550	1	X										-18

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: M. Maslin	Signature:	Signature:
Date/Time: 6/16/10	Date/Time: 17Jun10 10:40	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: AXYS	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

Contact: analytical@axys.com

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From Science to Solutions

18912 North Creek Parkway, Suite 101
Bothell, Washington 98011
TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr.: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Julie Wartes
Client Name: Ecology

Analyses / Tests

Number of Shipping Containers:
Date Shipped: 6/16/2010
Carrier: Fedex
Waybill No.: —

Sample ID	Depth	Matrix	Date	Time	# of Containers	Dioxin / Furan Congeners									Comments
SDS-PB-08	0-10cm	Sed	6/8/10	1521	1	X									L14884-37
SDS-PB-09	0-10cm	Sed	6/8/10	1558	1	X									-38
SDS-PB-10	0-10cm	Sed	6/8/10	1620	1	X									-39
SDS-PB-~~09~~-ER		Water	6/8/10	1620	1	X					L14873-3				Sample name SDS-PB-ER
SDS-FB-01	0-10cm	Sed	6/8/10	1003	1	X									L14884-40
SDS-FB-02	0-10cm	Sed	6/8/10	1021	1	X									-41
SDS-FB-03	0-10cm	Sed	6/8/10	1052	1	X									-42
SDS-FB-04	0-10cm	Sed	6/8/10	1152	1	X									-43
SDS-FB-05	0-10cm	Sed	6/8/10	1348	1	X									-44
SDS-FB-06	0-10cm	Sed	6/8/10	1114	1	X									-45
SDS-FB-07	0-10cm	Sed	6/8/10	1045	1	X									-46
SDS-FB-07-D	0-10cm	Sed	6/8/10	1045	1	X									-47

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: N. Moss	Signature:	Signature:
Date/Time: 6/16/10 14:10 PST	Date/Time: 17 Jun 10 10:40	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: AXYS	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

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TEL: 425.485.5800 • FAX: 425.485.5566

CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner, Julie Wartes, Tim Hammermeister
Client Name: Ecology

Shipping Information

Number of Shipping Containers: 4
Date Shipped: 6/16/10
Carrier: Fedex
Waybill No.:

Analyses / Tests: Dioxin / Furan Congeners

Sample ID	Depth	Matrix	Date	Time	# of Containers	Dioxin / Furan Congeners									Comments
SDS-FB-08	0-10cm	Sed	6/8/10	1133	1	X									L14884-48
SDS-FB-09	0-10cm	Sed	6/8/10	1435	1	X									-49
SDS-FB-10	0-10cm	Sed	6/8/10	1453	1	X									-50
SDS-FB-ER		Water	6/8/10	1200	1	X									L14873-2
SDS-FB-RB		Water	6/8/10	1155	1	X									-1

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: M. Mason	Signature:	Signature:
Date/Time: 6/16/10 2:10pm	Date/Time: 17 Jun 10 10:40	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: AXYS	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

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CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Tim Hammermeister Will Hafner Chris Hunt
Client Name: Ecology

Shipping Information

Number of Shipping Containers: 4
Date Shipped: 6/16/10
Carrier: Fedex
Waybill No.:

Sample ID	Depth	Matrix	Date	Time	# of Containers	Dioxin / Furan Congeners									Comments
SDS-CPD-01	0-10cm	Sed	6/9/10	940	1	X									L14884-1
SDS-CPD-02	0-10cm	Sed	6/9/10	1001	1	X									-2
SDS-CPD-03	0-10cm	Sed	6/9/10	1046	1	X									-3
SDS-CPD-04	0-10cm	Sed	6/9/10	1107	1	X									-4
SDS-CPD-07	0-10cm	Sed	6/9/10	1135	1	X									-5
SDS-CPD-08	0-10cm	Sed	6/9/10	1148	1	X									-6
SDS-CPD-08-D	0-10cm	Sed	6/9/10	1148	1	X									-7
~~SDS-CPD-08-F~~															
SDS-CPD-ER		Water	6/9/10	1208	1	X									L14873-4.
SDS-CPD-TO	0-10cm	Sed	6/9/10	1312	1	X									L14884-8
SDS-CPD-13	0-10cm	Sed	6/9/10	1320	1	X									-9
SDS-CPD-16	0-10cm	Sed	6/9/10	1331	1	X									-10

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: M. Mass	Signature:	Signature:
Date/Time: 6/16/10	Date/Time: 17Jun10 10:40	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: AXYS	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

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CHAIN OF CUSTODY RECORD

Project No.: Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Will Hafner Tim Hammermeister Chris Hunt
Client Name: Ecology

Shipping Information

Number of Shipping Containers: 4
Date Shipped: 6/16/10
Carrier: Fedex
Waybill No.:

Analyses / Tests: Dioxin/Furan Congeners

Sample ID	Depth	Matrix	Date	Time	# of Containers	Dioxin/Furan Congeners										Comments
SDS-CPD-17	0-10cm	Sed	6/9/10	1343	1	X										L14884-32
SDS-CPD-18	0-10cm	Sed	6/9/10	1400	1	X										-33
SDS-CPD-19	0-10cm	Sed	6/9/10	1411	1	X										-34
SDS-CPD-20	0-10cm	Sed	6/9/10	1425	1	X										-35
SDS-CPD-21	0-10cm	Sed	6/9/10	1440	1	X										-36

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: M. Maas [signature]	Signature:	Signature:
Date/Time: 6/16/10 1410	Date/Time: 17 Jun 10 10:40	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: AXYS	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

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CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr.: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: Tim Hammermeister Will Hafner Julie Wartes
Client Name: Ecology

Analyses / Tests: Dioxin/Furan Congeners

Shipping Information
Number of Shipping Containers: 4
Date Shipped: 6/16/10
Carrier: Fedex
Waybill No.:

Sample ID	Depth	Matrix	Date	Time	# of Containers	Dioxin/Furan Congeners										Comments
SDS-CPD-05	0-10cm	Sed	6/10/10	1057	1	X					L14884-19					
SDS-CPD-06	0-10cm	Sed	6/10/10	1116	1	X									-20	
SDS-CPD-09	0-10cm	Sed	6/10/10	1130	1	X									-21	
SDS-CPD-~~09~~ 11	0-10cm	Sed	6/10/10	1144	1	X									-22	ID: SDS-CPD-11
SDS-CPD-12	0-10cm	Sed	6/10/10	1200	1	X									-23	ID: SDS-CPD-12
SDS-CPD-14	0-10cm	Sed	6/10/10	1212	1	X									-24	
SDS-CPD-15	0-10cm	Sed	6/10/10	1223	1	X									-25	

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: M. Mast[illegible]	Signature:	Signature:
Date/Time: 6/16/10 1410	Date/Time: 17Jun10 10:40	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: AXYS.	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

Contact: analytical@axys.com

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CHAIN OF CUSTODY RECORD

Project No.:
Project Mgr.: Tim Hammermeister
Project Name: Fidalgo Bay / Custom Plywood Dioxin Study
Project Location: Fidalgo Bay
Sample Collectors: WH JW AW CH DK
Client Name: Ecology

Shipping Information

Number of Shipping Containers: 4
Date Shipped: 6/16/10
Carrier: Fedex
Waybill No.:

Analyses / Tests: Dioxin/Furan Congeners; Lipids

Sample ID	Depth	Matrix	Date	Time	# of Containers	Dioxin/Furan Congeners	Lipids		Lab ID	Comments
SDS-CT-01A	0-10cm	Sed	6/14/10	1047	1	X			L14884-26	
SDS-CT-01B	0-10cm	Sed	6/14/10	1115	1	X			-27	
SDS-CT-02	0-10cm	Sed	6/14/10	1147	1	X			-28	
SDS-CT-03	0-10cm	Sed	6/14/10	1230	1	X			-29	
SDS-CT-04	0-10cm	Sed	6/14/10	1331	1	X			-30	
SDS-CT-05	0-10cm	Sed	6/14/10	1306	1	X			-31	
SDS-CT-01A		Tissue	6/14/10	1047	1	X	X		L14872-1	Macoma sp.
SDS-CT-01B		Tissue	6/14/10	1115	1	X	X		-2	Protothaca sp.
SDS-CT-02		Tissue	6/14/10	1147	1	X	X		-3	Protothaca sp.
SDS-CT-03		Tissue	6/14/10	1230	1	X	X		-4	Protothaca sp.
SDS-CT-04		Tissue	6/14/10	1331	1	X	X		-5	Protothaca sp.
SDS-CT-05		Tissue	6/14/10	1306	1	X	X		-6	Protothaca sp.

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: M. Nash	Signature:	Signature:
Date/Time: 6/16/10	Date/Time: 17 Jun 10 10:40	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: AXYS	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

Contact: analytical@axys.com

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CHAIN OF CUSTODY RECORD

Project No.: 191427
Project Mgr: Tim Hammermeister
Project Name: Fidalgo Bay/Custom Plywood Sediment Dioxin Study
Project Location: Anacortes, WA
Sample Collectors: GEOMATRIX
Client Name: Washington State Department of Ecology

Shipping Information

Number of Shipping Containers: 1
Date Shipped: 7/16/10
Carrier: hand - carried
Waybill No.: n/a

Sample ID	Depth	Matrix	Date	Time	# of Containers	Dioxin/Furan Congeners	Analyses / Tests	Comments
10654001	0-10	SED	9/8	–	1	X	L15027-1	samples were
10654002				–	1	X	-2	archived at
10654003				–	1	X	-3	ARI laboratory
10654004				–	1	X	-4	in Tukwila, WA
10654008				–	1	X	-5	
10654009				–	1	X	-6	
10654011				–	1	X	-7	
10654013				–	1	X	-8	
10654015				–	1	X	-9	
10654021				–	1	X	-10	
10654022				–	1	X	-11	
10654026				–	1	X	-12	

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]	Signature:	Signature:
Date/Time: 7/16/10 1415	Date/Time: 16-JUL-10 2:15PM	Date/Time:	Date/Time:
Affiliation: SAIC	Affiliation: AXYS ANALYTICAL	Affiliation:	Affiliation:

• White: Lab Returns to Originator Upon Receipt of Samples • Canary: Lab Retains • Pink: Lab Returns to Project Manager with Final Report • Goldenrod: Retained by Sampler

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CUSTODY TRANSFER
Printed: 07/15/10
ARI Job No: NP13

ANALYTICAL RESOURCES INCORPORATED
4611 South 134th Place, Suite 100
Tukwila WA 98168
206-695-6200 206-695-6201 (fax)

ARI Project Manager: Mark Harris	Client Contact: Kathleen Goodman	Sampling Event: 10654.001	Samples Received: 09/12/08
	Client: Geomatrix, Inc.	Project: FORMER CUSTOM PLYWOOD SITE	Sample Site: NA

LOGNUM ARI ID	CLIENT ID	MATRIX	# CONTAINERS	ANALYTICAL REQUEST	ANALYTICAL REQUEST	ANALYTICAL REQUEST	COMMENTS
08-23964 NP13Q	10654031	Sediment	1				
~~08-23965 NP13R~~	~~10654032~~	~~Sediment~~	1				
~~08-23966 NP13S~~	~~10654033~~	~~Sediment~~	1				

Comments/Special Instructions:	Relinquished By:	Received by: (Signature)	Relinquished By:	Received by: (Signature)
	Printed Name: Jennifer Millsap	Printed Name: Tim Hammermeister	Printed Name: Tim Hammermeister	Printed Name: Paul Miller
	Company: ARI	Company: SAIC	Company: SAIC	Company: AXYS Analytical
	Date/Time: 7/15/10 1450	Date/Time: 7/15/10 1455	Date/Time: 7/16/10 1415	Date/Time: 2:15PM 16-JUL-10

CUSTODY TRANSFER
Printed: 07/15/10
ARI Job No: NP12

4406

ANALYTICAL RESOURCES INCORPORATED
4611 South 134th Place, Suite 100
Tukwila WA 98168
206-695-6200 206-695-6201 (fax)

ARI Project Manager: Mark Harris	Client Contact: Kathleen Goodman	Sampling Event: 10654.001	Samples Received: 09/12/08
	Client: Geomatrix, Inc.	Project: FORMER CUSTOM PLYWOOD SITE	Sample Site: NA

LOGNUM ARI ID	CLIENT ID	MATRIX	# CONTAINERS	ANALYTICAL REQUEST	ANALYTICAL REQUEST	ANALYTICAL REQUEST	COMMENTS
08-23934 NP12A	10654001	Sediment	1				L15027 -1
08-23935 NP12B	10654002	Sediment	1				-2
08-23936 NP12C	10654003	Sediment	1				-3
08-23937 NP12D	10654004	Sediment	1				-4
08-23938 ~~NP12E~~	~~10654005~~	~~Sediment~~	~~1~~				
08-23939 ~~NP12F~~	~~10654006~~	~~Sediment~~	~~1~~				
08-23941 NP12H	10654008	Sediment	1				-5
08-23942 NP12I	10654009	Sediment	1				-6
08-23943 ~~NP12J~~	~~10654010~~	~~Sediment~~	~~1~~				
08-23944 NP12K	10654011	Sediment	1				-7
08-23945 ~~NP12L~~	~~10654012~~	~~Sediment~~	~~1~~				
08-23946 NP12M	10654013	Sediment	1				-8

Comments/Special Instructions:	Relinquished By:	Received by: (Signature)	Relinquished By:	Received by: (Signature)
	Printed Name: Jennifer Millsap	Printed Name: Tim Hammermeister	Printed Name: Tim Hammermeister	Printed Name: PAUL MILLER
	Company: ARI	Company: SAIC	Company: SAIC	Company: AXYS ANALYTICAL
	Date/Time: 7/15/10 1450	Date/Time: 7/15/10 1455	Date/Time: 7/16/10 1415	Date/Time: 2:15 PM 16-JUL

CUSTODY TRANSFER
Printed: 07/15/10
ARI Job No: NP13

4406

ANALYTICAL RESOURCES INCORPORATED
4611 South 134th Place, Suite 100
Tukwila WA 98168
206-695-6200 206-695-6201 (fax)

ARI Project Manager: Mark Harris	Client Contact: Kathleen Goodman	Sampling Event: 10654.001	Samples Received: 09/12/08
	Client: Geomatrix, Inc.	Project: FORMER CUSTOM PLYWOOD SITE	Sample Site: NA

LOGNUM ARI ID	CLIENT ID	MATRIX	# CONTAINERS	ANALYTICAL REQUEST	ANALYTICAL REQUEST	ANALYTICAL REQUEST	COMMENTS
08-23948 NP13A	10654015	Sediment	1				45027-9
~~08-23949 NP13B~~	~~10654016~~	~~Sediment~~	~~1~~				
~~08-23950 NP13C~~	~~10654017~~	~~Sediment~~	~~1~~				
~~08-23952 NP13E~~	~~10654019~~	~~Sediment~~	~~1~~				
~~08-23953 NP13F~~	~~10654020~~	~~Sediment~~	~~1~~				
08-23954 NP13G	10654021	Sediment	1				-10
08-23955 NP13H	10654022	Sediment	1				-11
~~08-23956 NP13I~~	~~10654023~~	~~Sediment~~	~~1~~				
~~08-23957 NP13J~~	~~10654024~~	~~Sediment~~	~~1~~				
~~08-23958 NP13K~~	~~10654025~~	~~Sediment~~	~~1~~				
08-23959 NP13L	10654026	Sediment	1				-12
~~08-23960 NP13M~~	~~10654027~~	~~Sediment~~	~~1~~				
~~08-23961 NP13N~~	~~10654028~~	~~Sediment~~	~~1~~				
~~08-23962 NP13O~~	~~10654029~~	~~Sediment~~	~~1~~				
~~08-23963 NP13P~~	~~10654030~~	~~Sediment~~	~~1~~				

APPENDIX D
TERRESTRIAL ECOLOGICAL EVALUATION AND SOIL BIOASSAY RESULTS

(APPENDIX ON DVD ATTACHED TO INSIDE OF REPORT COVER)

Appendix D
Data Validation Report

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

Washington Department of Ecology Toxics Cleanup Program
Fidalgo Bay Sediment Investigation - Anacortes, Washington
Custom Plywood Mill

Prepared for:

SAIC
18912 North Creek Parkway, Suite 101
Bothell, Washington 98011

Prepared by:

EcoChem, Inc.
710 Second Avenue, Suite 660
Seattle, Washington 98104

EcoChem Project: C4125-3

September 27, 2010

Approved for Release

Christine Ransom
Project Manager
EcoChem, INC.

INTRODUCTION

Basis for the Data Validation

This report summarizes the results of the validation performed on sediment, tissue, and quality control (QC) sample data for the Washington Department of Ecology Sediment Investigation at Fidalgo Bay, Custom Plywood Mill, Anacortes, Washington. A complete list of samples is provided in the **Sample Index**. Analytical Resources, Inc, Tukwila, Washington performed the conventionals analyses. Dioxin & furan compounds were analyzed by Axys Analytical Services, Sidney, British Columbia. The analytical methods and EcoChem project chemists are listed below.

Analysis	Method of Analysis	Primary Review	Secondary Review
Conventionals: Grain Size, Total Organic Carbon, Sulfide, Total Solids, Preserved Total Solids	PSEP 1986, Plumb 1981, EPA 376.2, 160.3	Jeremy Maute	Christine Ransom
Dioxin & Furan Compounds	EPA 1613B	Melissa Swanson	Christina Mott

The data validation is based on QC criteria documented in the above listed methods, the *Supplementary Fidalgo Bay and Custom Plywood Mill Sediment Dioxin Study, Anacortes, Washington Quality Assurance Project Plan (QAPP), (May 28, 2010)*; *USEPA National Functional Guidelines for Chlorinated Dioxin/Furan Data Review* (2002); and *USEPA National Functional Guidelines for Inorganic Data Review (1992, 2004)*. The QC criteria are summarized in **Appendix A.**

EcoChem's goal in assigning data validation qualifiers is to assist in proper data interpretation. If values are estimated (assigned a J), data may be used for site evaluation purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. Values with no data qualifier meet all data quality goals as outlined in the EPA Functional Guidelines.

Data qualifier definitions and Data Validation Criteria Tables are included as **Appendix A**. **Appendix B** contains the Qualified Data Summary Table. Data validation worksheets are kept on file at EcoChem. A qualified laboratory electronic data deliverable (EDD) is also submitted with this report.

SAMPLE INDEX
Fidalgo Bay Custom Plywood

ARI SDG	Sample ID	Laboratory ID	TOC	Sulfide	Total Solids	Preserved Total Solids	Grain Size
RA17	SDS-PB-01	RA17A	✓	✓	✓	✓	✓
	SDS-PB-02	RA17B	✓	✓	✓	✓	✓
	SDS-PB-03	RA17C	✓	✓	✓	✓	✓
	SDS-PB-04	RA17D	✓	✓	✓	✓	✓
	SDS-PB-05	RA17E	✓	✓	✓	✓	✓
	SDS-PB-05-D	RA17F	✓	✓	✓	✓	✓
	SDS-PB-05-T	RA17G	✓	✓	✓	✓	✓
	SDS-PB-06	RA17H	✓	✓	✓	✓	✓
	SDS-PB-07	RA17I	✓	✓	✓	✓	✓
RA18	SDS-PB-08	RA18A	✓	✓	✓	✓	✓
	SDS-PB-09	RA18B	✓	✓	✓	✓	✓
	SDS-PB-10	RA18C	✓	✓	✓	✓	✓
	SDS-FB-01	RA18D	✓	✓	✓	✓	✓
	SDS-FB-02	RA18E	✓	✓	✓	✓	✓
	SDS-FB-03	RA18F	✓	✓	✓	✓	✓
	SDS-FB-04	RA18G	✓	✓	✓	✓	✓
	SDS-FB-05	RA18H	✓	✓	✓	✓	✓
	SDS-FB-06	RA18I	✓	✓	✓	✓	✓
	SDS-FB-07	RA18J	✓	✓	✓	✓	✓
	SDS-FB-07-D	RA18K	✓	✓	✓	✓	✓
	SDS-FB-07-T	RA18L	✓	✓	✓	✓	✓
	SDS-FB-08	RA18M	✓	✓	✓	✓	✓
	SDS-FB-09	RA18N	✓	✓	✓	✓	✓
	SDS-FB-10	RA18O	✓	✓	✓	✓	✓
RA23	SDS-CPD-05	RA23A	✓	✓	✓	✓	✓
	SDS-CPD-06	RA23B	✓	✓	✓	✓	✓
	SDS-CPD-09	RA23C	✓	✓	✓	✓	✓
	SDS-CPD-11	RA23D	✓	✓	✓	✓	✓
	SDS-CPD-12	RA23E	✓	✓	✓	✓	✓
	SDS-CPD-14	RA23F	✓	✓	✓	✓	✓
	SDS-CPD-15	RA23G	✓	✓	✓	✓	✓
RA31	SDS-CPD-01	RA31A	✓	✓	✓	✓	✓
	SDS-CPD-02	RA31B	✓	✓	✓	✓	✓
	SDS-CPD-03	RA31C	✓	✓	✓	✓	✓
	SDS-CPD-04	RA31D	✓	✓	✓	✓	✓
	SDS-CPD-07	RA31E	✓	✓	✓	✓	✓
	SDS-CPD-08	RA31F	✓	✓	✓	✓	✓
	SDS-CPD-08-D	RA31G	✓	✓	✓	✓	✓
	SDS-CPD-08-T	RA31H	✓	✓	✓	✓	✓
	SDS-CPD-10	RA31I	✓	✓	✓	✓	✓
	SDS-CPD-13	RA31J	✓	✓	✓	✓	✓
	SDS-CPD-16	RA31K	✓	✓	✓	✓	✓
	SDS-CPD-17	RA31L	✓	✓	✓	✓	✓
	SDS-CPD-18	RA31M	✓	✓	✓	✓	✓
	SDS-CPD-19	RA31N	✓	✓	✓	✓	✓
	SDS-CPD-20	RA31O	✓	✓	✓	✓	✓
	SDS-CPD-21	RA31P	✓	✓	✓	✓	✓
RA55	SDS-CT-01A	RA55A	✓	✓	✓	✓	✓
	SDS-CT-01B	RA55B	✓	✓	✓	✓	✓
	SDS-CT-02	RA55C	✓	✓	✓	✓	✓
	SDS-CT-03	RA55D	✓	✓	✓	✓	✓
	SDS-CT-04	RA55E	✓	✓	✓	✓	✓
	SDS-CT-05	RA55F	✓	✓	✓	✓	✓

SAMPLE INDEX
Fidalgo Bay Custom Plywood

AXYS SDG	Sample ID	Laboratory ID	Dioxins
WG33418	SDS-PB-01	L14884-11 (A)	✓
	SDS-PB-04	L14884-14 i	✓
	SDS-PB-05	L14884-15 i	✓
	SDS-PB-06	L14884-17	✓
	SDS-PB-07	L14884-18	✓
	SDS-CPD-05	L14884-19	✓
	SDS-CPD-15	L14884-25	✓
	SDS-CPD-04	L14884-4	✓
WG33419	SDS-CT-01B	L14884-27	✓
	SDS-CT-03	L14884-29	✓
	SDS-CT-04	L14884-30	✓
	SDS-CPD-17	L14884-32	✓
	SDS-PB-08	L14884-37	✓
	SDS-PB-09	L14884-38 (A)	✓
	SDS-FB-01	L14884-40	✓
	SDS-FB-02	L14884-41 L	✓
	SDS-FB-06	L14884-45	✓
WG33420	SDS-FB-10	L14884-50 i2	✓
	10654021	L15027-10 W	✓
	10654022	L15027-11 W	✓
	10654011	L15027-7	✓
	10654015	L15027-9 L	✓
WG33443	SDS-CT-01A	L14872-1 L	✓
	SDS-CT-01B	L14872-2 LW	✓
	SDS-CT-02	L14872-3 L	✓
	SDS-CT-03	L14872-4 L (A)	✓
	SDS-CT-04	L14872-5 L	✓
	SDS-CT-05	L14872-6 L	✓
WG33444	SDS-FB-RB	L14873-1	✓
	SDS-FB-ER	L14873-2	✓
	SDS-PB-ER	L14873-3	✓
	SDS-CPD-ER	L14873-4 i	✓
WG33623	SDS-CPD-01	L14884-1 R	✓
	SDS-CPD-16	L14884-10 R	✓
	SDS-PB-02	L14884-12 Ri	✓
	SDS-PB-05-D	L14884-16 R	✓
	SDS-CPD-09	L14884-21 R	✓
	SDS-CPD-12	L14884-23 R	✓
	SDS-CPD-03	L14884-3 R	✓
WG33704	SDS-FB-RB	L14873-1	✓
	SDS-FB-ER	L14873-2	✓
	SDS-PB-ER	L14873-3	✓
	SDS-CPD-ER	L14873-4 i	✓

SAMPLE INDEX
Fidalgo Bay Custom Plywood

AXYS SDG	Sample ID	Laboratory ID	Dioxins
WG33742	SDS-CT-01A	L14884-26 Ri	✓
	SDS-CT-02	L14884-28 Ri	✓
	SDS-CT-05	L14884-31 Ri	✓
	SDS-PB-10	L14884-39 Ri	✓
	SDS-FB-03	L14884-42 Ri	✓
	SDS-FB-04	L14884-43 Ri	✓
	SDS-FB-05	L14884-44 Ri2 (A)	✓
	SDS-FB-07	L14884-46 Ri	✓
	SDS-FB-07-D	L14884-47 Ri	✓
	SDS-FB-08	L14884-48 Ri	✓
	SDS-FB-09	L14884-49 Ri	✓
	10654001	L15027-1 Ri2	✓
	10654026	L15027-12 Ri	✓
	10654002	L15027-2 Ri2	✓
	10654003	L15027-3 Ri2	✓
	10654008	L15027-5 Ri	✓
	10654009	L15027-6 Ri	✓
	10654013	L15027-8 Ri	✓
WG33891	SDS-PB-03	L14884-13 R	✓
	10654004	L15027-4 R (A)	✓

DATA VALIDATION REPORT
Fidalgo Bay Sediment Investigation - Custom Plywood
Dioxin & Furan Compounds
Axys Method MLA-017 (EPA 1613B)

This report documents the review of analytical data from the analyses of tissue and sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Axys Analytical Services, Ltd. of Sidney, British Columbia, Canada. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
WG33418	8 Sediment	Stage 4 (QA2)
WG33419	9 Sediment	Stage 4 (QA2)
WG33420	5 Sediment	Stage 4 (QA2)
WG33443	6 Tissue	Stage 4 (QA2)
WG33444	4 Equipment Blank	Screening
WG33704	4 Equipment Blank	Screening
WG33623	7 Sediment	Stage 4 (QA2)
WG33742	18 Sediment	Stage 4 (QA2)
WG33891	2 Sediment	Stage 4 (QA2)

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	1	Matrix Spike/Matrix Spike Duplicates (MS/MSD)
	Initial Calibration (ICAL)		Ongoing Precision and Recovery (OPR)
	Continuing Calibration (CCAL)	2	Standard Reference Material (SRM)
2	Laboratory Blanks	2	Field Duplicates
1	Field Blanks	2	Compound Identification
2	Labeled Compounds		Reported Results
2	Laboratory Duplicates	1	Calculation Verification

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 2° to 6°C. Several sample coolers were received at the laboratory at a temperature of 1°C. These temperature outliers did not impact data quality and no action was taken.

The QAPP stated hold time for dioxin and furan compounds is 14 days from collection to extraction and 30 days from extraction to analysis. The latest version of the DMMP states a holding time for extraction of up to one year if the samples are stored frozen. Method 1613 states that sample extracts can be store for up to one year if kept in the dark at a temperature <10°C. All samples and extracts met these storage criteria; therefore the extended holding times were used to evaluate the field samples.

Laboratory Blanks

In order to assess the impact of blank contamination on the reported sample results, action levels at five times the blank concentrations are established. If the concentrations in the associated field samples are less than the action levels, the results are qualified as not detected (U-7).

The laboratory assigned K-flags to dioxin values when a peak was detected but did not meet identification criteria. These values cannot be considered as positive identifications, but are "estimated maximum possible concentrations". When these occurred in the method blank the results were considered as false positives. No action levels were established for these analytes.

Method blanks were analyzed at the appropriate frequency. Various target analytes were detected in the method blanks; however, only the following analytes required qualification in one or more samples.

SDG WG33419: 2,3,4,7,8-PeCEDF (2 result)

SDG WG33444: OCDD (1 result)

SDG WG33623: 1,2,3,4,6,7,8-HpCDD (1 result), 2,3,7,8-TCDF (5 results), 2,3,4,7,8-PeCDF (6 results), 1,2,3,4,7,8-HxCDF (2 results), 2,3,4,6,7,8-HxCDF (2 results)

SDG WG33742: 2,3,7,8-TCDF (12 results), 1,2,3,4,7,8-HxCDF (2 results)

SDG WG33891: 2,3,7,8-TCDF (1 results), 2,3,4,7,8-PeCDF (1 result), 1,2,3,6,7,8-HxCDF (1 result)

Field Blanks

Laboratory blanks are used to evaluate all associated field blanks. Any remaining positive results in the field blank are then used to evaluate all associated samples.

SDG WG33444, WG33704: Field blanks SDS-SPD-ER, SDS-FB-ER, SDS-FB-RB, and SDS-PB-ER were submitted with these SDGs. No target analytes were detected in these blanks after qualifiers based on method blank contamination were issued.

Labeled Compounds

SDG WG33418: The percent recovery (%R) values for $^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF and $^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF in Sample SDS-PB-06 were less than the lower control limit. The associated analytes were estimated (UJ-13) to indicate a potential low bias. The %R value for $^{13}C_{12}$-2,3,7,8-TCDF in Sample SDS-CPD-15 was less than the lower control limit. The associated analyte was estimated (UJ-13).

SDG WG33420: The %R values for $^{13}C_{12}$-2,3,7,8-TCDF, $^{13}C_{12}$-1,2,3,4,7,8-HxCDD, and $^{13}C_{12}$-1,2,3,7,8,9-HxCDF in Sample 10654015 were less than the lower control limit. The associated analytes were estimated (J/UJ-13) in this sample.

Laboratory Duplicates

The relative percent difference (RPD) control limit is 30% for sample results greater than five times the reporting limit (RL). For results less the 5X the RL, the difference between the sample and duplicate must be less the 2X the RL.

SDG WG33443: Sample SDS-CT-03 was analyzed in duplicate. The RPD values for 1,2,3,4,6,7,8-HpCDF and OCDF were greater than the control limit. Results for these analytes were estimated (J/UJ-9) in the parent sample.

SDG WG33742: Sample SDS-FB-05 was analyzed in duplicate. The RPD value for 2,3,7,8-TCDF was greater than the control limit; results for this analyte were estimated (UJ-9) in the parent sample.

SDG WG33891: Sample 10654004 was analyzed in duplicate. The RPD values for 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 1,2,3,4,6,7,8-HpCDD, OCDD, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, and OCDF were greater than the control limit; results for these analytes were estimated (J-9) in the parent sample.

Matrix Spike/Matrix Spike Duplicates

No matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed. Accuracy and precision were assessed using labeled compound recovery, ongoing precision and recovery (OPR) samples and laboratory duplicate samples.

Standard Reference Material

The laboratory extracted and analyzed the NIST standard reference material SRM-1944 with the sediment samples. The recovery criterion is ±20% of the 95% confidence interval of the certified value.

SDG WG33418: The result for 1,2,3,7,8,9-HxCDD was greater than the upper control limit. Positive results for this compound were estimated (J-12) to indicate a potential high bias.

SDG WG33742: The results for 2,3,7,8-TCDD and 1,2,3,7,8,9-HxCDD were greater than the upper control limit. Positive results for these compounds were estimated (J-12) to indicate a potential high bias.

SDG WG33891: The results for 2,3,7,8-TCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, and 1,2,3,7,8,9-HxCDD were greater than the upper control limit. Positive results for these compounds were estimated (J-12) to indicate a potential high bias.

Field Duplicates

The RPD control limit is 50% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the difference between the sample and duplicate must be less than 2x the RL.

SDGs WG33418 & WG33623: One set of field duplicates, SDS-PB-05 and SDS-PB-05-D, were submitted in these SDGs. The RPD values for 2,3,7,8-TCDF, 2,3,4,7,8-PeCDF, and 1,2,3,4,6,7,8-HpCDF were greater than the control limit. Results for these analytes were estimated (J/UJ-9) in the parent and duplicate samples.

SDG WG33742: One set of field duplicates, SDS-FB-07 and SDS-FB-07-D, were submitted. All field precision criteria were met.

Compound Identification

The laboratory assigned a" K" flag to one or more analytes in all samples to indicate the ion ratio criterion were not met. Since the ion abundance ratio is the primary identification criterion for high resolution mass spectroscopy, an outlier indicates that the reported result may be a false positive. Due to this, these results were qualified as not detected (U-22) at the reported concentration.

SDG WG33418: Lock mass interferences were present in Sample SDS-PB01, the method blank, the OPR sample, and the SRM which affected the quantitation and/or resolution of 1,2,3,7,8-PeCDD and 13C-1,2,3,7,8-PeCDD. The result for 1,2,3,7,8-PeCDD in Sample SDS-PB-01 was previously qualified as not-detected as the ion ratio did not meet the identification criterion. No qualification was necessary. No qualifiers were assigned to labeled compounds or QC samples.

SDG WG33419: Lock mass interferences were present in Sample SDS-FB-02 which affected the quantitation and/or resolution of 1,2,3,7,8-PeCDD and 13C-1,2,3,7,8-PeCDD. The positive result for 1,2,3,7,8-PeCDD in Sample SDS-FB-02 was estimated (J-14).

Reported Results

Several samples were re-analyzed at dilution because of results that exceeded the calibration range of the instrument. In each case the laboratory reported only the most appropriate result for each compound from either the original analysis or the dilution.

SDG WG33418: The $^{13}C_{12}$-2,3,7,8-TCDD recoveries were very low in eight samples. These samples were re-extracted and reported in SDGs WG33742 and WG33891.

SDG WG33419: The labeled compound $^{13}C_{12}$-2,3,7,8-TCDD was not recovered in the method blank. Samples with a positive result for 2,3,7,8-TCDD were re-extracted and reported in SDGs WG33742 and WG33891.

SDG WG33420: Several samples were re-extracted due to very low labeled compound recoveries. The re-analyses were reported in SDGs WG33742 and WG33891.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the labeled compound and OPR recoveries, with the exceptions noted above. Precision was acceptable as demonstrated by the laboratory and field duplicate RPD values, with the exceptions previously noted.

Detection limits were elevated based on ion ratio criteria outliers and method blank contamination. Data were estimated due to laboratory and field duplicate precision outliers, labeled compound %R outliers, and lock mass interferences.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Fidalgo Bay Sediment Investigation - Custom Plywood
Conventional Analyses

This report documents the review of analytical data from the analysis of sediment samples and the associated laboratory and field quality control (QC) samples. Analytical Resources, Incorporated, Tukwila, Washington, analyzed the samples. Refer to the **Sample Index** for a list of the individual samples.

SDG	Number of Samples	Validation Level
RA17	9 Sediment	Stage 3 (QA2)
RA18	15 Sediment	Stage 3 (QA2)
RA23	7 Sediment	Stage 3 (QA2)
RA31	16 Sediment	Stage 3 (QA2)
RA55	6 Sediment	Stage 3 (QA2)

The analytical tests that were performed are summarized below:

Parameter	Method
Grain Size	PSEP, 1986
Total Organic Carbon	Plumb, 1981
Sulfide	EPA 376.2
Total Solids	EPA 160.3
Preserved Total Solids	EPA 160.3

I. DATA PACKAGE COMPLETENESS

The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative. The laboratory submitted all necessary deliverables for a full validation.

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverables (EDD) results was performed by comparison to the hardcopy laboratory data package. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed in the following table.

1	Sample Receipt, Preservation, and Holding Times	2	Matrix Spikes (MS)
	Initial Calibration		Laboratory Duplicates
	Calibration Verification	1	Field Replicates
	Laboratory Blanks		Reporting Limits
	Laboratory Control Samples (LCS)	1	Calculation Verification

[1] Quality control results are discussed below, but no data were qualified.
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 2° to 6°C. The laboratory received one sample cooler with a temperature less than the lower limit, at 1.9°C. This outlier did not impact data quality; therefore no qualifiers were assigned.

Matrix Spikes

SDG RA23: The matrix spike (MS) recovery for sulfide was greater than the upper control limit. Positive results in the associated samples were estimated (J-8) to indicate a potential high bias.

SDG RA31: The MS recovery for sulfide was less than the lower control limit. All associated results were estimated (J-8) to indicate a potential low bias.

Field Replicates

SDG RA17: The data for one set of field triplicates were submitted: SDS-PB-05, SDS-PB-05D, and SDS-PB-05T. All percent relative standard deviation (%RSD) values were less than the control limit of 50%.

SDG RA18: The data for one set of field triplicates were submitted: SDS-FB-07, SDS- FB-07D, and SDS- FB-07T. All %RSD values were less than the control limit of 50%.

SDG RA31: The data for one set of field triplicates were submitted: SDS-CPD-08, SDS-CPD-08D, and SDS-CPD-08T. All %RSD values were less than the control limit of 50%.

Reported Results

SDG RA17: There was insufficient sample to perform the hydrometer portion of the grain size analysis for samples SDS-PB-02, SDS-PB-04, and SDS-PB-06. All fractions with phi scale greater than 4 are reported as total fines (silt/clay).

SDG RA18: There was insufficient sample to perform the hydrometer portion of the grain size analysis for Sample SDS-PB-09. All fractions with phi scale greater than 4 are reported as total fines (silt/clay).

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the laboratory control sample and MS recoveries. Precision was acceptable as demonstrated by the relative percent difference and relative standard deviation values associated with the laboratory and field replicate samples.

Data were qualified due to MS recovery outliers.

All data, as qualified, are acceptable for use.

EcoChem, INC.
Environmental Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS
REASON CODES
AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

1	Holding Time/Sample Preservation
2	Chromatographic pattern in sample does not match pattern of calibration standard.
3	Compound Confirmation
4	Tentatively Identified Compound (TIC) (associated with NJ only)
5A	Calibration (initial)
5B	Calibration (continuing)
6	Field Blank Contamination
7	Lab Blank Contamination (e.g., method blank, instrument, etc.)
8	Matrix Spike(MS & MSD) Recoveries
9	Precision (all replicates)
10	Laboratory Control Sample Recoveries
11	A more appropriate result is reported (associated with "R" and "DNR" only)
12	Reference Material
13	Surrogate Spike Recoveries (a.k.a., labeled compounds & recovery standards)
14	Other (define in validation report)
15	GFAA Post Digestion Spike Recoveries
16	ICP Serial Dilution % Difference
17	ICP Interference Check Standard Recovery
18	Trip Blank Contamination
19	Internal Standard Performance (e.g., area, retention time, recovery)
20	Linear Range Exceeded
21	Potential False Positives
22	Elevated Detection Limit Due to Interference (i.e., laboratory, chemical and/or matrix)

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler/Storage Temperature	Waters/Solids < 4°C Tissues <-10°C	EcoChem PJ, see TM-05	1
Holding Time	Extraction - Water: 30 days from collection *Note:* Under CWA, SDWA, and RCRA the HT for H2O is 7 days* Extraction - Soil: 30 days from collection Analysis: 40 days from extraction	J(+)/UJ(-) if ext > 30 days J(+)/UJ(-) if analysis > 40 Days EcoChem PJ, see TM-05	1
Mass Resolution	>=10,000 resolving power at m/z 304.9824 Exact mass of m/z 380.9760 w/in 5 ppm of theoretical value (380.97410 to 380.97790) . Analyzed prior to ICAL and at the start and end of each 12 hr. shift	R(+/-) if not met	14
Window Defining Mix and Column Performance Mix	Window defining mixture/Isomer specificity std run before ICAL and CCAL Valley < 25% (valley = (x/y)*100%) x = ht. of TCDD y = baseline to bottom of valley For all isomers eluting near 2378-TCDD/TCDF isomers (TCDD only for 8290)	J(+) if valley > 25%	5A (ICAL) 5B (CCAL
Initial Calibration	Minimum of five standards %RSD < 20% for native compounds %RSD <30% for labeled compounds (%RSD <35% for labeled compounds under 1613b)	J(+) natives if %RSD > 20%	5A
	Abs. RT of $^{13}C_{12}$-1234-TCDD >25 min on DB5 >15 min on DB-225	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10 for all native and labeled compounds in CS1 std.	If <10, elevate Det. Limit or R(-)	

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Continuing Calibration	Analyzed at the start and end of each 12 hour shift. %D+/-20% for native compounds %D +/-30% for labeled compounds (Must meet limits in Table 6, Method 1613B) (If %Ds in the closing CCAL are w/in 25%/35% the avg RF from the two CCAL may be used to calculate samples per Method 8290, Section 8.3.2.4)	Do not qualify labeled compounds. Narrate in report for labeled compound %D outliers. For native compound %D outliers: 8290: J(+)/UJ(-) if %D = 20% - 75% J(+)/R(-) if %D > 75% 1613: J(+)/UJ(-) if %D is outside Table 6 limits J(+)/R(-) if %D is +/- 75% of Table 6 limit	5B
	Abs. RT of $^{13}C_{12}$-1234-TCDD and ^{13}C12-123789-HxCDD +/- 15 sec of ICAL.	EcoChem PJ, see ICAL section of TM-05	
	RRT of all other compounds must meet Table 2 of 1613B.	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10	If <10, elevate Det. Limit or R(-)	
Method Blank	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	7
Field Blanks (Not Required)	No positive results	If sample result <5X action level, qualify U at reported value.	6
LCS / OPR	Concentrations must meet limits in Table 6, Method 1613B or lab limits.	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
MS/MSD (recovery)	May not analyze MS/MSD %R should meet lab limits.	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	May not analyze MS/MSD RPD < 20%	J(+) in parent sample if RPD > CL	9

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Lab Duplicate	RPD <25% if present.	J(+)/UJ(-) if outside limts	9
Labeled Compounds / Internal Standards	*Method 8290:* %R = 40% - 135% in all samples ------ *Method 1613B:* %R must meet limits specified in Table 7, Method 1613	J(+)/UJ(-) if %R = 10% to LCL J(+) if %R > UCL J(+)/R(-) if %R < 10%	13
Quantitation/ Identification	Ions for analyte, IS, and rec. std. must max w/in 2 sec. S/N >2.5 IA ratios meet limits in Table 9 of 1613B or Table 8 of 8290 RRTs w/in limits in Table 2 of 1613B	If RT criteria not met, use PJ (see TM-05) If S/N criteria not met, J(+). if unlabelled ion abundance not met, change to EMPC If labelled ion abundance not met, J(+).	21
EMPC (estimated maximum possible concentration)	If quantitation idenfication criteria are not met, laboratory should report an EMPC value.	If laboratory correctly reported an EMPC value, qualify with U to indicate that the value is a detection limit.	14
Interferences	PCDF interferences from PCDPE	If both detected, change PCDF result to EMPC	14
Second Column Confirmation	All 2378-TCDF hits must be confirmed on a DB-225 (or equiv) column. All QC specs in this table must be met for the confirmation analysis.	Report lower of the two values. If not performed use PJ (see TM-05).	3
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
Two analyses for one sample	Report only one result per analyte	"DNR" results that should not be used	11

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler Temperature 4°C ±2°C Preservation: Method Specific	Use Professional Judgment to qualify based to qualify for coole temp outliers J(+)/UJ(-) if preservation requirements not met	1
Holding Time	Method Specific	Professional Judgment J(+)/UJ(-) if holding time exceeded J(+)/R(-) if HT exceeded by > 3X	1
Initial Calibration	Method specific r>0.995	Use professional judgment J(+)/UJ(-) for r < 0.995	5A
Initial Calibration Verification (ICV)	Where applicable to method Independent source analyzed immediately after calibration %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5A
Continuing Cal Verification (CCV)	Where applicable to method Every ten samples, immed. following ICV/ICB and end of run %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5B

Initial and Continuing Cal Blanks (ICB/CCB)	Where applicable to method
	After each ICV and CCV every ten samples and end of run
	| blank| < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Method Blank	One per matrix per batch
	(not to exceed 20 samples)
	blank < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blk value, U(+) results < action level
		For (-) blk value, J(+)/UJ(-) results < action level
			7

Laboratory Control Sample	Waters: One per matrix per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soils: One per matrix per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Matrix Spike	One per matrix per batch; 5% frequency 75-125% for samples less than 4 x spike level	J(+) if %R > 125% or < 75% UJ(-) if %R = 30-74% R(+/-) results < IDL if %R < 30%	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5X RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff<RL Solid: Diff < 2X RL	J(+)/UJ(-) in parent samples only	9

EcoChem, INC.
Environmental Data Quality

APPENDIX B

QUALIFIED DATA SUMMARY TABLE

QUALIFIED DATA SUMMARY TABLE
Fidalgo Bay Custom Plywood

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validation Qualifier	Validation Reason
RA23	SDS-CPD-05	RA23A	EPA376.2	Sulfide	461	mg/kg		J	8
RA23	SDS-CPD-06	RA23B	EPA376.2	Sulfide	27.4	mg/kg		J	8
RA23	SDS-CPD-09	RA23C	EPA376.2	Sulfide	24.6	mg/kg		J	8
RA23	SDS-CPD-11	RA23D	EPA376.2	Sulfide	28.1	mg/kg		J	8
RA23	SDS-CPD-12	RA23E	EPA376.2	Sulfide	27.5	mg/kg		J	8
RA23	SDS-CPD-14	RA23F	EPA376.2	Sulfide	30.7	mg/kg		J	8
RA23	SDS-CPD-15	RA23G	EPA376.2	Sulfide	506	mg/kg		J	8
RA31	SDS-CPD-01	RA31A	EPA376.2	Sulfide	508	mg/kg		J	8
RA31	SDS-CPD-02	RA31B	EPA376.2	Sulfide	318	mg/kg		J	8
RA31	SDS-CPD-03	RA31C	EPA376.2	Sulfide	562	mg/kg		J	8
RA31	SDS-CPD-04	RA31D	EPA376.2	Sulfide	326	mg/kg		J	8
RA31	SDS-CPD-07	RA31E	EPA376.2	Sulfide	606	mg/kg		J	8
RA31	SDS-CPD-08	RA31F	EPA376.2	Sulfide	382	mg/kg		J	8
RA31	SDS-CPD-08-D	RA31G	EPA376.2	Sulfide	317	mg/kg		J	8
RA31	SDS-CPD-08-T	RA31H	EPA376.2	Sulfide	335	mg/kg		J	8
RA31	SDS-CPD-10	RA31I	EPA376.2	Sulfide	407	mg/kg		J	8
RA31	SDS-CPD-13	RA31J	EPA376.2	Sulfide	391	mg/kg		J	8
RA31	SDS-CPD-16	RA31K	EPA376.2	Sulfide	845	mg/kg		J	8
RA31	SDS-CPD-17	RA31L	EPA376.2	Sulfide	515	mg/kg		J	8
RA31	SDS-CPD-18	RA31M	EPA376.2	Sulfide	475	mg/kg		J	8
RA31	SDS-CPD-19	RA31N	EPA376.2	Sulfide	861	mg/kg		J	8
RA31	SDS-CPD-20	RA31O	EPA376.2	Sulfide	529	mg/kg		J	8
RA31	SDS-CPD-21	RA31P	EPA376.2	Sulfide	721	mg/kg		J	8
WG33418	SDS-PB-01	L14884-11 (A)	E1613	1,2,3,4,6,7,8-HPCDF	0.821	PG/G	K J	U	22
WG33418	SDS-PB-01	L14884-11 (A)	E1613	1,2,3,6,7,8-HXCDF	0.084	PG/G	K J	U	22
WG33418	SDS-PB-01	L14884-11 (A)	E1613	1,2,3,7,8,9-HXCDD	0.423	PG/G	K J	U	22
WG33418	SDS-PB-01	L14884-11 (A)	E1613	1,2,3,4,7,8-HXCDD	0.096	PG/G	K J	U	22
WG33418	SDS-PB-01	L14884-11 (A)	E1613	1,2,3,7,8-PECDD	0.089	PG/G	K J	U	22
WG33418	SDS-PB-01	L14884-11 (A)	E1613	2,3,7,8-TCDD	0.074	PG/G	K B J	U	22
WG33418	SDS-PB-04	L14884-14 i	E1613	1,2,3,6,7,8-HXCDF	0.049	PG/G	K J	U	22
WG33418	SDS-PB-04	L14884-14 i	E1613	1,2,3,6,7,8-HXCDD	0.117	PG/G	K J	U	22
WG33418	SDS-PB-04	L14884-14 i	E1613	1,2,3,4,6,7,8-HPCDD	0.428	PG/G	K B J	U	22
WG33418	SDS-PB-04	L14884-14 i	E1613	OCDD	2.07	PG/G	K B J	U	22
WG33418	SDS-PB-04	L14884-14 i	E1613	2,3,7,8-TCDD	0.069	PG/G	K B J	U	22
WG33418	SDS-PB-04	L14884-14 i	E1613	2,3,4,7,8-PECDF	0.08	PG/G	K B J	U	22
WG33418	SDS-PB-04	L14884-14 i	E1613	OCDF	0.15	PG/G	K J	U	22
WG33418	SDS-PB-04	L14884-14 i	E1613	2,3,4,6,7,8-HXCDF	0.05	PG/G	K J	U	22
WG33418	SDS-PB-04	L14884-14 i	E1613	1,2,3,7,8-PECDF	0.053	PG/G	K J	U	22
WG33418	SDS-PB-05	L14884-15	E1613	2,3,7,8-TCDF	0.45	PG/G	J	J	9
WG33418	SDS-PB-05	L14884-15 i	E1613	2,3,7,8-TCDD	0.157	PG/G	K B J	U	22
WG33418	SDS-PB-05	L14884-15 i	E1613	1,2,3,7,8,9-HXCDD	0.582	PG/G	J	J	12
WG33418	SDS-PB-05	L14884-15 i	E1613	1,2,3,7,8-PECDF	0.078	PG/G	K J	U	22
WG33418	SDS-PB-05	L14884-15 i	E1613	2,3,4,7,8-PECDF	0.181	PG/G	K B J	UJ	9,22
WG33418	SDS-PB-05	L14884-15 i	E1613	1,2,3,4,7,8-HXCDF	0.152	PG/G	K J	U	22

QUALIFIED DATA SUMMARY TABLE
Fidalgo Bay Custom Plywood

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validation Qualifier	Validation Reason
WG33418	SDS-PB-05	L14884-15 i	E1613	2,3,4,6,7,8-HXCDF	0.134	PG/G	K J	U	22
WG33418	SDS-PB-05	L14884-15 i	E1613	1,2,3,4,6,7,8-HPCDF	2.07	PG/G	J	J	9
WG33418	SDS-PB-05	L14884-15 i	E1613	1,2,3,4,7,8,9-HPCDF	0.074	PG/G	K J	U	22
WG33418	SDS-PB-05	L14884-15 i	E1613	1,2,3,6,7,8-HXCDD	0.853	PG/G	K J	U	22
WG33418	SDS-PB-06	L14884-17	E1613	1,2,3,7,8-PECDD	0.073	PG/G	K J	U	22
WG33418	SDS-PB-06	L14884-17	E1613	1,2,3,4,7,8,9-HPCDF	0.0507	PG/G	U	UJ	13
WG33418	SDS-PB-06	L14884-17	E1613	1,2,3,4,6,7,8-HPCDD	0.463	PG/G	K B J	U	22
WG33418	SDS-PB-06	L14884-17	E1613	2,3,7,8-TCDD	0.076	PG/G	K B J	U	22
WG33418	SDS-PB-06	L14884-17	E1613	1,2,3,4,6,7,8-HPCDF	0.105	PG/G	K J	UJ	13,22
WG33418	SDS-PB-07	L14884-18	E1613	2,3,7,8-TCDD	0.092	PG/G	K B J	U	22
WG33418	SDS-PB-07	L14884-18	E1613	2,3,4,6,7,8-HXCDF	0.055	PG/G	K J	U	22
WG33418	SDS-PB-07	L14884-18	E1613	1,2,3,4,7,8-HXCDF	0.056	PG/G	K J	U	22
WG33418	SDS-PB-07	L14884-18	E1613	1,2,3,7,8-PECDF	0.061	PG/G	K J	U	22
WG33418	SDS-PB-07	L14884-18	E1613	1,2,3,4,6,7,8-HPCDD	1.8	PG/G	K B J	U	22
WG33418	SDS-PB-07	L14884-18	E1613	1,2,3,7,8,9-HXCDD	0.217	PG/G	J	J	12
WG33418	SDS-PB-07	L14884-18	E1613	1,2,3,4,7,8-HXCDD	0.061	PG/G	K J	U	22
WG33418	SDS-PB-07	L14884-18	E1613	1,2,3,7,8-PECDD	0.114	PG/G	K J	U	22
WG33418	SDS-CPD-05	L14884-19	E1613	2,3,7,8-TCDF	0.98	PG/G	K J	U	22
WG33418	SDS-CPD-05	L14884-19	E1613	2,3,7,8-TCDD	0.253	PG/G	K B J	U	22
WG33418	SDS-CPD-05	L14884-19	E1613	1,2,3,7,8-PECDD	0.761	PG/G	K J	U	22
WG33418	SDS-CPD-05	L14884-19	E1613	1,2,3,4,7,8-HXCDD	0.731	PG/G	K J	U	22
WG33418	SDS-CPD-05	L14884-19	E1613	1,2,3,7,8,9-HXCDD	1.9	PG/G	J	J	12
WG33418	SDS-CPD-05	L14884-19	E1613	1,2,3,4,7,8,9-HPCDF	0.418	PG/G	K J	U	22
WG33418	SDS-CPD-15	L14884-25	E1613	1,2,3,4,7,8,9-HPCDF	0.454	PG/G	K J	U	22
WG33418	SDS-CPD-15	L14884-25	E1613	2,3,7,8-TCDF	0.908	PG/G	K J	UJ	13,22
WG33418	SDS-CPD-15	L14884-25	E1613	1,2,3,7,8,9-HXCDD	2.2	PG/G	J	J	12
WG33418	SDS-CPD-15	L14884-25	E1613	2,3,7,8-TCDD	0.194	PG/G	K B J	U	22
WG33418	SDS-CPD-15	L14884-25	E1613	1,2,3,4,7,8-HXCDF	0.607	PG/G	K J	U	22
WG33418	SDS-CPD-15	L14884-25	E1613	1,2,3,6,7,8-HXCDF	0.32	PG/G	K J	U	22
WG33418	SDS-CPD-15	L14884-25	E1613	1,2,3,7,8-PECDF	0.336	PG/G	K J	U	22
WG33418	SDS-CPD-04	L14884-4	E1613	1,2,3,7,8-PECDD	0.714	PG/G	K J	U	22
WG33418	SDS-CPD-04	L14884-4	E1613	1,2,3,7,8,9-HXCDD	2.52	PG/G	J	J	12
WG33418	SDS-CPD-04	L14884-4	E1613	1,2,3,6,7,8-HXCDF	0.471	PG/G	K J	U	22
WG33418	SDS-CPD-04	L14884-4	E1613	2,3,7,8-TCDD	0.22	PG/G	K B J	U	22
WG33419	SDS-CT-01B	L14884-27	E1613	2,3,7,8-TCDD	0.39	PG/G	K J	U	22
WG33419	SDS-CT-01B	L14884-27	E1613	1,2,3,7,8,9-HXCDF	0.169	PG/G	K J	U	22
WG33419	SDS-CT-03	L14884-29	E1613	2,3,7,8-TCDD	0.139	PG/G	K J	U	22
WG33419	SDS-CT-03	L14884-29	E1613	1,2,3,7,8-PECDD	0.562	PG/G	K J	U	22
WG33419	SDS-CT-03	L14884-29	E1613	1,2,3,7,8,9-HXCDF	0.111	PG/G	K J	U	22
WG33419	SDS-CT-03	L14884-29 i	E1613	2,3,7,8-TCDF	0.317	PG/G	K J	U	22
WG33419	SDS-CT-04	L14884-30	E1613	2,3,4,7,8-PECDF	0.199	PG/G	K B J	U	22
WG33419	SDS-CT-04	L14884-30	E1613	2,3,7,8-TCDD	0.1	PG/G	K J	U	22
WG33419	SDS-CT-04	L14884-30 i	E1613	2,3,7,8-TCDF	0.237	PG/G	K J	U	22
WG33419	SDS-CPD-17	L14884-32	E1613	2,3,7,8-TCDD	0.281	PG/G	K J	U	22

QUALIFIED DATA SUMMARY TABLE
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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validation Qualifier	Validation Reason
WG33419	SDS-PB-08	L14884-37	E1613	2,3,4,6,7,8-HXCDF	0.087	PG/G	K J	U	22
WG33419	SDS-PB-08	L14884-37	E1613	1,2,3,7,8-PECDD	0.118	PG/G	K J	U	22
WG33419	SDS-PB-08	L14884-37	E1613	1,2,3,4,7,8-HXCDD	0.143	PG/G	K J	U	22
WG33419	SDS-PB-08	L14884-37	E1613	1,2,3,6,7,8-HXCDD	0.427	PG/G	K J	U	22
WG33419	SDS-PB-08	L14884-37	E1613	1,2,3,7,8,9-HXCDD	0.378	PG/G	K J	U	22
WG33419	SDS-PB-08	L14884-37	E1613	1,2,3,7,8-PECDF	0.077	PG/G	K J	U	22
WG33419	SDS-PB-08	L14884-37	E1613	2,3,4,7,8-PECDF	0.126	PG/G	K B J	U	22
WG33419	SDS-PB-08	L14884-37	E1613	1,2,3,6,7,8-HXCDF	0.068	PG/G	K J	U	22
WG33419	SDS-PB-08	L14884-37	E1613	1,2,3,4,7,8,9-HPCDF	0.09	PG/G	K J	U	22
WG33419	SDS-PB-08	L14884-37	E1613	2,3,7,8-TCDD	0.083	PG/G	K J	U	22
WG33419	SDS-PB-08	L14884-37	E1613	1,2,3,4,7,8-HXCDF	0.112	PG/G	K J	U	22
WG33419	SDS-PB-08	L14884-37 i	E1613	2,3,7,8-TCDF	0.198	PG/G	K J	U	22
WG33419	SDS-PB-09	L14884-38 (A)	E1613	1,2,3,6,7,8-HXCDD	0.103	PG/G	K J	U	22
WG33419	SDS-PB-09	L14884-38 (A)	E1613	1,2,3,7,8,9-HXCDD	0.102	PG/G	K J	U	22
WG33419	SDS-PB-09	L14884-38 (A)	E1613	2,3,4,7,8-PECDF	0.056	PG/G	B J	U	7
WG33419	SDS-PB-09	L14884-38 (A)	E1613	2,3,4,6,7,8-HXCDF	0.057	PG/G	K J	U	22
WG33419	SDS-FB-01	L14884-40	E1613	2,3,4,6,7,8-HXCDF	0.081	PG/G	K J	U	22
WG33419	SDS-FB-01	L14884-40	E1613	2,3,7,8-TCDD	0.081	PG/G	K J	U	22
WG33419	SDS-FB-01	L14884-40	E1613	1,2,3,7,8-PECDD	0.144	PG/G	K J	U	22
WG33419	SDS-FB-01	L14884-40	E1613	1,2,3,4,7,8-HXCDD	0.129	PG/G	K J	U	22
WG33419	SDS-FB-01	L14884-40	E1613	1,2,3,6,7,8-HXCDD	0.691	PG/G	K J	U	22
WG33419	SDS-FB-01	L14884-40	E1613	1,2,3,7,8-PECDF	0.063	PG/G	K J	U	22
WG33419	SDS-FB-01	L14884-40	E1613	2,3,4,7,8-PECDF	0.12	PG/G	B J	U	7
WG33419	SDS-FB-01	L14884-40	E1613	1,2,3,6,7,8-HXCDF	0.071	PG/G	K J	U	22
WG33419	SDS-FB-01	L14884-40	E1613	1,2,3,4,7,8,9-HPCDF	0.089	PG/G	K J	U	22
WG33419	SDS-FB-01	L14884-40 i	E1613	2,3,7,8-TCDF	0.201	PG/G	K J	U	22
WG33419	SDS-FB-02	L14884-41 L	E1613	1,2,3,4,6,7,8-HPCDF	1.05	PG/G	K J	U	22
WG33419	SDS-FB-02	L14884-41 L	E1613	1,2,3,4,7,8-HXCDF	0.174	PG/G	K J	U	22
WG33419	SDS-FB-02	L14884-41 L	E1613	1,2,3,7,8-PECDF	0.221	PG/G	K J	U	22
WG33419	SDS-FB-02	L14884-41 L	E1613	1,2,3,4,7,8-HXCDD	0.129	PG/G	K J	U	22
WG33419	SDS-FB-02	L14884-41 L	E1613	1,2,3,7,8-PECDD	0.107	PG/G	K J G	UJ	14,22
WG33419	SDS-FB-02	L14884-41 L	E1613	OCDF	3.89	PG/G	K B J	U	22
WG33419	SDS-FB-02	L14884-41 L	E1613	1,2,3,4,7,8,9-HPCDF	0.208	PG/G	K J	U	22
WG33419	SDS-FB-02	L14884-41 L	E1613	2,3,7,8-TCDD	0.087	PG/G	K J	U	22
WG33419	SDS-FB-06	L14884-45	E1613	2,3,7,8-TCDD	0.12	PG/G	K J	U	22
WG33419	SDS-FB-06	L14884-45	E1613	1,2,3,7,8-PECDD	0.157	PG/G	K J	U	22
WG33419	SDS-FB-06	L14884-45	E1613	1,2,3,7,8,9-HXCDD	0.365	PG/G	K J	U	22
WG33419	SDS-FB-06	L14884-45	E1613	1,2,3,4,7,8-HXCDF	0.093	PG/G	K J	U	22
WG33419	SDS-FB-06	L14884-45	E1613	2,3,4,6,7,8-HXCDF	0.051	PG/G	K J	U	22
WG33419	SDS-FB-06	L14884-45	E1613	1,2,3,4,7,8,9-HPCDF	0.096	PG/G	K J	U	22
WG33419	SDS-FB-06	L14884-45	E1613	2,3,4,7,8-PECDF	0.127	PG/G	K B J	U	22
WG33420	SDS-FB-10	L14884-50	E1613	2,3,7,8-TCDF	0.84	PG/G	K J	U	22
WG33420	SDS-FB-10	L14884-50 i2	E1613	1,2,3,7,8-PECDF	0.205	PG/G	K J	U	22
WG33420	SDS-FB-10	L14884-50 i2	E1613	1,2,3,6,7,8-HXCDF	0.344	PG/G	K J	U	22

QUALIFIED DATA SUMMARY TABLE
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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validation Qualifier	Validation Reason
WG33420	SDS-FB-10	L14884-50 i2	E1613	1,2,3,4,7,8,9-HPCDF	0.475	PG/G	K B J	U	22
WG33420	SDS-FB-10	L14884-50 i2	E1613	1,2,3,4,7,8-HXCDD	0.649	PG/G	K J	U	22
WG33420	10654021	L15027-10 W	E1613	2,3,4,6,7,8-HXCDF	2.9	PG/G	K B D J	U	22
WG33420	10654021	L15027-10 W	E1613	1,2,3,4,7,8-HXCDF	4.25	PG/G	K D J	U	22
WG33420	10654022	L15027-11	E1613	2,3,7,8-TCDF	1.16	PG/G	K	U	22
WG33420	10654022	L15027-11 W	E1613	1,2,3,4,7,8,9-HPCDF	2.18	PG/G	K B D J	U	22
WG33420	10654022	L15027-11 W	E1613	1,2,3,6,7,8-HXCDD	4.68	PG/G	K D J	U	22
WG33420	10654011	L15027-7	E1613	1,2,3,4,7,8,9-HPCDF	4.36	PG/G	K B J	U	22
WG33420	10654011	L15027-7	E1613	1,2,3,6,7,8-HXCDF	1.75	PG/G	K J	U	22
WG33420	10654011	L15027-7	E1613	1,2,3,7,8-PECDF	0.777	PG/G	K J	U	22
WG33420	10654011	L15027-7	E1613	2,3,7,8-TCDD	0.392	PG/G	K J	U	22
WG33420	10654015	L15027-9	E1613	2,3,7,8-TCDF	1.09	PG/G		J	13
WG33420	10654015	L15027-9 L	E1613	1,2,3,4,7,8-HXCDD	1.73	PG/G	J	J	13
WG33420	10654015	L15027-9 L	E1613	1,2,3,6,7,8-HXCDF	0.836	PG/G	K J	U	22
WG33420	10654015	L15027-9 L	E1613	1,2,3,7,8,9-HXCDF	0.83	PG/G	U	UJ	13
WG33420	10654015	L15027-9 L	E1613	2,3,4,6,7,8-HXCDF	1.32	PG/G	K B J	U	22
WG33443	SDS-CT-01A	L14872-1	E1613	2,3,7,8-TCDF	0.202	PG/G	K J	U	22
WG33443	SDS-CT-01A	L14872-1 L	E1613	1,2,3,7,8-PECDD	0.212	PG/G	K J	U	22
WG33443	SDS-CT-01A	L14872-1 L	E1613	1,2,3,7,8-PECDF	0.088	PG/G	K B J	U	22
WG33443	SDS-CT-01A	L14872-1 L	E1613	1,2,3,6,7,8-HXCDF	0.168	PG/G	K J	U	22
WG33443	SDS-CT-01A	L14872-1 L	E1613	2,3,4,7,8-PECDF	0.213	PG/G	K B J	U	22
WG33443	SDS-CT-01A	L14872-1 L	E1613	2,3,7,8-TCDD	0.109	PG/G	K J	U	22
WG33443	SDS-CT-01B	L14872-2 LW	E1613	1,2,3,7,8-PECDD	0.15	PG/G	K D J	U	22
WG33443	SDS-CT-01B	L14872-2 LW	E1613	1,2,3,4,7,8-HXCDD	0.898	PG/G	K D J	U	22
WG33443	SDS-CT-01B	L14872-2 LW	E1613	2,3,4,7,8-PECDF	0.131	PG/G	K B D J	U	22
WG33443	SDS-CT-01B	L14872-2 LW	E1613	1,2,3,4,7,8-HXCDF	0.155	PG/G	K D J	U	22
WG33443	SDS-CT-01B	L14872-2 LW	E1613	1,2,3,4,6,7,8-HPCDF	0.632	PG/G	K D J	U	22
WG33443	SDS-CT-01B	L14872-2 LW	E1613	OCDF	2.11	PG/G	K D J	U	22
WG33443	SDS-CT-01B	L14872-2 LW	E1613	1,2,3,4,6,7,8-HPCDD	5	PG/G	K B D J	U	22
WG33443	SDS-CT-02	L14872-3 L	E1613	1,2,3,7,8,9-HXCDD	0.095	PG/G	K J	U	22
WG33443	SDS-CT-02	L14872-3 L	E1613	2,3,7,8-TCDD	0.054	PG/G	K J	U	22
WG33443	SDS-CT-02	L14872-3 L	E1613	2,3,4,7,8-PECDF	0.079	PG/G	K B J	U	22
WG33443	SDS-CT-02	L14872-3 L	E1613	1,2,3,4,7,8-HXCDF	0.058	PG/G	K J	U	22
WG33443	SDS-CT-02	L14872-3 L	E1613	2,3,4,6,7,8-HXCDF	0.056	PG/G	K J	U	22
WG33443	SDS-CT-02	L14872-3 L	E1613	1,2,3,4,6,7,8-HPCDF	0.639	PG/G	K J	U	22
WG33443	SDS-CT-03	L14872-4 L (A)	E1613	OCDF	1.31	PG/G	J	J	9
WG33443	SDS-CT-03	L14872-4 L (A)	E1613	1,2,3,7,8-PECDD	0.066	PG/G	K J	U	22
WG33443	SDS-CT-03	L14872-4 L (A)	E1613	1,2,3,7,8,9-HXCDD	0.153	PG/G	K J	U	22
WG33443	SDS-CT-03	L14872-4 L (A)	E1613	1,2,3,4,6,7,8-HPCDF	0.343	PG/G	K J	UJ	9,22
WG33443	SDS-CT-03	L14872-4 L (A)	E1613	1,2,3,4,7,8,9-HPCDF	0.051	PG/G	K B J	U	22
WG33443	SDS-CT-04	L14872-5 L	E1613	1,2,3,4,6,7,8-HPCDF	0.398	PG/G	K J	U	22
WG33443	SDS-CT-04	L14872-5 L	E1613	2,3,4,7,8-PECDF	0.057	PG/G	K B J	U	22
WG33443	SDS-CT-05	L14872-6 L	E1613	1,2,3,4,6,7,8-HPCDF	0.21	PG/G	K J	U	22
WG33443	SDS-CT-05	L14872-6 L	E1613	1,2,3,6,7,8-HXCDD	0.06	PG/G	K J	U	22

QUALIFIED DATA SUMMARY TABLE
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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validation Qualifier	Validation Reason
WG33444	SDS-FB-RB	L14873-1	E1613	OCDD	1.8	PG/L	K B J	U	22
WG33444	SDS-FB-RB	L14873-1	E1613	OCDF	1.08	PG/L	K B J	U	22
WG33444	SDS-FB-ER	L14873-2	E1613	OCDD	1.19	PG/L	B J	U	7
WG33444	SDS-PB-ER	L14873-3	E1613	OCDD	1.03	PG/L	K B J	U	22
WG33444	SDS-CPD-ER	L14873-4 i	E1613	OCDD	3.47	PG/L	K B J	U	22
WG33623	SDS-CPD-01	L14884-1 R	E1613	2,3,4,7,8-PECDF	0.66	PG/G	B J	U	7
WG33623	SDS-CPD-01	L14884-1 R	E1613	2,3,7,8-TCDF	1.19	PG/G	B	U	7
WG33623	SDS-CPD-01	L14884-1 R	E1613	2,3,7,8-TCDD	0.238	PG/G	K B J	U	22
WG33623	SDS-CPD-16	L14884-10 R	E1613	1,2,3,4,7,8,9-HPCDF	1.15	PG/G	K J	U	22
WG33623	SDS-CPD-16	L14884-10 R	E1613	2,3,4,7,8-PECDF	0.703	PG/G	B J	U	7
WG33623	SDS-CPD-16	L14884-10 R	E1613	2,3,7,8-TCDD	0.282	PG/G	K B J	U	22
WG33623	SDS-PB-02	L14884-12 R	E1613	2,3,7,8-TCDF	0.615	PG/G	K B J	U	22
WG33623	SDS-PB-02	L14884-12 Ri	E1613	2,3,7,8-TCDD	0.054	PG/G	K B J	U	22
WG33623	SDS-PB-02	L14884-12 Ri	E1613	1,2,3,4,7,8-HXCDD	0.049	PG/G	K J	U	22
WG33623	SDS-PB-02	L14884-12 Ri	E1613	1,2,3,6,7,8-HXCDD	0.088	PG/G	K B J	U	22
WG33623	SDS-PB-02	L14884-12 Ri	E1613	1,2,3,7,8,9-HXCDD	0.081	PG/G	K B J	U	22
WG33623	SDS-PB-02	L14884-12 Ri	E1613	1,2,3,4,6,7,8-HPCDD	0.369	PG/G	B J	U	7
WG33623	SDS-PB-02	L14884-12 Ri	E1613	2,3,4,7,8-PECDF	0.298	PG/G	B J	U	7
WG33623	SDS-PB-02	L14884-12 Ri	E1613	2,3,4,6,7,8-HXCDF	0.055	PG/G	B J	U	7
WG33623	SDS-PB-02	L14884-12 Ri	E1613	OCDF	0.15	PG/G	K B J	U	22
WG33623	SDS-PB-02	L14884-12 Ri	E1613	1,2,3,4,7,8-HXCDF	0.052	PG/G	B J	U	7
WG33623	SDS-PB-05-D	L14884-16 R	E1613	1,2,3,4,7,8-HXCDF	0.194	PG/G	B J	U	7
WG33623	SDS-PB-05-D	L14884-16 R	E1613	2,3,4,6,7,8-HXCDF	0.151	PG/G	B J	U	7
WG33623	SDS-PB-05-D	L14884-16 R	E1613	1,2,3,6,7,8-HXCDF	0.117	PG/G	K J	U	22
WG33623	SDS-PB-05-D	L14884-16 R	E1613	2,3,4,7,8-PECDF	0.331	PG/G	B J	UJ	7,9
WG33623	SDS-PB-05-D	L14884-16 R	E1613	1,2,3,7,8-PECDF	0.168	PG/G	K B J	U	22
WG33623	SDS-PB-05-D	L14884-16 R	E1613	2,3,7,8-TCDF	0.647	PG/G	B J	UJ	7,9
WG33623	SDS-PB-05-D	L14884-16 R	E1613	1,2,3,7,8-PECDD	0.162	PG/G	K B J	U	22
WG33623	SDS-PB-05-D	L14884-16 R	E1613	2,3,7,8-TCDD	0.089	PG/G	K B J	U	22
WG33623	SDS-PB-05-D	L14884-16 R	E1613	1,2,3,4,6,7,8-HPCDF	1.46	PG/G	J	J	9
WG33623	SDS-CPD-09	L14884-21 R	E1613	2,3,7,8-TCDD	0.225	PG/G	K B J	U	22
WG33623	SDS-CPD-09	L14884-21 R	E1613	1,2,3,7,8,9-HXCDF	0.053	PG/G	K J	U	22
WG33623	SDS-CPD-09	L14884-21 R	E1613	2,3,4,7,8-PECDF	0.692	PG/G	K B J	U	22
WG33623	SDS-CPD-09	L14884-21 Ri	E1613	2,3,7,8-TCDF	1.13	PG/G	B	U	7
WG33623	SDS-CPD-12	L14884-23 R	E1613	2,3,7,8-TCDD	0.169	PG/G	K B J	U	22
WG33623	SDS-CPD-12	L14884-23 R	E1613	2,3,4,7,8-PECDF	0.563	PG/G	B J	U	7
WG33623	SDS-CPD-12	L14884-23 Ri	E1613	2,3,7,8-TCDF	0.957	PG/G	B J	U	7
WG33623	SDS-CPD-03	L14884-3 R	E1613	2,3,7,8-TCDF	1.04	PG/G	B	U	7
WG33623	SDS-CPD-03	L14884-3 R	E1613	2,3,7,8-TCDD	0.306	PG/G	K B J	U	22
WG33623	SDS-CPD-03	L14884-3 R	E1613	2,3,4,7,8-PECDF	0.991	PG/G	B J	U	7
WG33742	SDS-CT-01A	L14884-26 Ri	E1613	2,3,7,8-TCDD	3.01	PG/G		J	12
WG33742	SDS-CT-01A	L14884-26 Ri	E1613	1,2,3,7,8,9-HXCDD	50.8	PG/G	B	J	12
WG33742	SDS-CT-01A	L14884-26 Ri	E1613	1,2,3,7,8,9-HXCDF	1.05	PG/G	K B J	U	22
WG33742	SDS-CT-02	L14884-28 R	E1613	2,3,7,8-TCDF	0.874	PG/G	B J	U	7

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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validation Qualifier	Validation Reason
WG33742	SDS-CT-02	L14884-28 Ri	E1613	2,3,7,8-TCDD	0.453	PG/G	K J	U	22
WG33742	SDS-CT-02	L14884-28 Ri	E1613	1,2,3,7,8,9-HXCDD	7.64	PG/G	B	J	12
WG33742	SDS-CT-05	L14884-31 R	E1613	2,3,7,8-TCDF	0.52	PG/G	B J	U	7
WG33742	SDS-CT-05	L14884-31 Ri	E1613	1,2,3,4,7,8,9-HPCDF	0.556	PG/G	K J	U	22
WG33742	SDS-CT-05	L14884-31 Ri	E1613	1,2,3,6,7,8-HXCDF	0.315	PG/G	K J	U	22
WG33742	SDS-CT-05	L14884-31 Ri	E1613	2,3,4,7,8-PECDF	0.427	PG/G	K B J	U	22
WG33742	SDS-CT-05	L14884-31 Ri	E1613	1,2,3,7,8-PECDF	0.136	PG/G	K J	U	22
WG33742	SDS-CT-05	L14884-31 Ri	E1613	2,3,7,8-TCDD	0.083	PG/G	K J	U	22
WG33742	SDS-CT-05	L14884-31 Ri	E1613	1,2,3,7,8,9-HXCDD	1.45	PG/G	B J	J	12
WG33742	SDS-PB-10	L14884-39 R	E1613	2,3,7,8-TCDF	0.626	PG/G	B J	U	7
WG33742	SDS-PB-10	L14884-39 Ri	E1613	1,2,3,4,7,8,9-HPCDF	0.201	PG/G	K J	U	22
WG33742	SDS-PB-10	L14884-39 Ri	E1613	1,2,3,4,6,7,8-HPCDF	1.92	PG/G	K B J	U	22
WG33742	SDS-PB-10	L14884-39 Ri	E1613	2,3,4,6,7,8-HXCDF	0.189	PG/G	K B J	U	22
WG33742	SDS-PB-10	L14884-39 Ri	E1613	1,2,3,4,7,8-HXCDF	0.208	PG/G	B J	U	7
WG33742	SDS-PB-10	L14884-39 Ri	E1613	1,2,3,7,8-PECDF	0.063	PG/G	K J	U	22
WG33742	SDS-PB-10	L14884-39 Ri	E1613	1,2,3,7,8,9-HXCDD	0.859	PG/G	K B J	U	22
WG33742	SDS-PB-10	L14884-39 Ri	E1613	1,2,3,7,8-PECDD	0.152	PG/G	K J	U	22
WG33742	SDS-PB-10	L14884-39 Ri	E1613	2,3,7,8-TCDD	0.052	PG/G	K J	U	22
WG33742	SDS-PB-10	L14884-39 Ri	E1613	1,2,3,6,7,8-HXCDF	0.133	PG/G	K J	U	22
WG33742	SDS-FB-03	L14884-42 R	E1613	2,3,7,8-TCDF	0.547	PG/G	B J	U	7
WG33742	SDS-FB-03	L14884-42 Ri	E1613	1,2,3,4,7,8-HXCDF	0.186	PG/G	B J	U	7
WG33742	SDS-FB-03	L14884-42 Ri	E1613	1,2,3,4,7,8-HXCDD	0.196	PG/G	K J	U	22
WG33742	SDS-FB-03	L14884-42 Ri	E1613	2,3,7,8-TCDD	0.066	PG/G	K J	U	22
WG33742	SDS-FB-03	L14884-42 Ri	E1613	1,2,3,6,7,8-HXCDF	0.111	PG/G	K J	U	22
WG33742	SDS-FB-03	L14884-42 Ri	E1613	1,2,3,7,8,9-HXCDD	0.469	PG/G	B J	J	12
WG33742	SDS-FB-03	L14884-42 Ri	E1613	1,2,3,7,8-PECDF	0.102	PG/G	K J	U	22
WG33742	SDS-FB-03	L14884-42 Ri	E1613	2,3,4,6,7,8-HXCDF	0.134	PG/G	K B J	U	22
WG33742	SDS-FB-03	L14884-42 Ri	E1613	1,2,3,4,7,8,9-HPCDF	0.056	PG/G	K J	U	22
WG33742	SDS-FB-04	L14884-43 R	E1613	2,3,7,8-TCDF	0.923	PG/G	B J	U	7
WG33742	SDS-FB-04	L14884-43 Ri	E1613	1,2,3,4,7,8,9-HPCDF	0.234	PG/G	K J	U	22
WG33742	SDS-FB-04	L14884-43 Ri	E1613	2,3,7,8-TCDD	0.19	PG/G	K J	U	22
WG33742	SDS-FB-04	L14884-43 Ri	E1613	1,2,3,7,8,9-HXCDD	1.27	PG/G	B J	J	12
WG33742	SDS-FB-04	L14884-43 Ri	E1613	2,3,4,7,8-PECDF	0.381	PG/G	K B J	U	22
WG33742	SDS-FB-04	L14884-43 Ri	E1613	1,2,3,6,7,8-HXCDF	0.265	PG/G	K J	U	22
WG33742	SDS-FB-05	L14884-44 R (A)	E1613	2,3,7,8-TCDF	0.493	PG/G	B J	UJ	7,9
WG33742	SDS-FB-05	L14884-44 Ri2 (A)	E1613	2,3,7,8-TCDD	0.086	PG/G	K J	U	22
WG33742	SDS-FB-05	L14884-44 Ri2 (A)	E1613	1,2,3,7,8-PECDD	0.135	PG/G	K J	U	22
WG33742	SDS-FB-05	L14884-44 Ri2 (A)	E1613	1,2,3,7,8,9-HXCDD	0.71	PG/G	B J	J	12
WG33742	SDS-FB-05	L14884-44 Ri2 (A)	E1613	1,2,3,7,8-PECDF	0.107	PG/G	K J	U	22
WG33742	SDS-FB-05	L14884-44 Ri2 (A)	E1613	2,3,4,7,8-PECDF	0.201	PG/G	K B J	U	22
WG33742	SDS-FB-05	L14884-44 Ri2 (A)	E1613	1,2,3,4,7,8-HXCDF	0.102	PG/G	K B J	U	22
WG33742	SDS-FB-05	L14884-44 Ri2 (A)	E1613	1,2,3,4,7,8,9-HPCDF	0.105	PG/G	K J	U	22
WG33742	SDS-FB-05	L14884-44 Ri2 (A)	E1613	1,2,3,4,7,8-HXCDD	0.156	PG/G	K J	U	22
WG33742	SDS-FB-07	L14884-46 R	E1613	2,3,7,8-TCDF	0.785	PG/G	B J	U	7

QUALIFIED DATA SUMMARY TABLE
Fidalgo Bay Custom Plywood

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validation Qualifier	Validation Reason
WG33742	SDS-FB-07	L14884-46 Ri	E1613	1,2,3,7,8,9-HXCDD	1.33	PG/G	B J	J	12
WG33742	SDS-FB-07	L14884-46 Ri	E1613	1,2,3,7,8-PECDF	0.093	PG/G	K J	U	22
WG33742	SDS-FB-07	L14884-46 Ri	E1613	1,2,3,4,7,8-HXCDF	0.368	PG/G	K B J	U	22
WG33742	SDS-FB-07	L14884-46 Ri	E1613	1,2,3,6,7,8-HXCDF	0.222	PG/G	K J	U	22
WG33742	SDS-FB-07	L14884-46 Ri	E1613	2,3,4,6,7,8-HXCDF	0.207	PG/G	K B J	U	22
WG33742	SDS-FB-07	L14884-46 Ri	E1613	1,2,3,6,7,8-HXCDD	1.51	PG/G	K J	U	22
WG33742	SDS-FB-07	L14884-46 Ri	E1613	1,2,3,7,8-PECDD	0.337	PG/G	K J	U	22
WG33742	SDS-FB-07	L14884-46 Ri	E1613	2,3,7,8-TCDD	0.113	PG/G	K J	U	22
WG33742	SDS-FB-07-D	L14884-47 R	E1613	2,3,7,8-TCDF	0.969	PG/G	B	U	7
WG33742	SDS-FB-07-D	L14884-47 Ri	E1613	1,2,3,7,8-PECDF	0.175	PG/G	K J	U	22
WG33742	SDS-FB-07-D	L14884-47 Ri	E1613	1,2,3,4,7,8,9-HPCDF	0.188	PG/G	K J	U	22
WG33742	SDS-FB-07-D	L14884-47 Ri	E1613	2,3,4,6,7,8-HXCDF	0.246	PG/G	K B J	U	22
WG33742	SDS-FB-07-D	L14884-47 Ri	E1613	1,2,3,6,7,8-HXCDF	0.121	PG/G	K J	U	22
WG33742	SDS-FB-07-D	L14884-47 Ri	E1613	1,2,3,4,7,8-HXCDF	0.291	PG/G	K B J	U	22
WG33742	SDS-FB-07-D	L14884-47 Ri	E1613	2,3,4,7,8-PECDF	0.413	PG/G	K B J	U	22
WG33742	SDS-FB-07-D	L14884-47 Ri	E1613	2,3,7,8-TCDD	0.13	PG/G	J	J	12
WG33742	SDS-FB-07-D	L14884-47 Ri	E1613	1,2,3,7,8,9-HXCDD	0.998	PG/G	B J	J	12
WG33742	SDS-FB-07-D	L14884-47 Ri	E1613	1,2,3,6,7,8-HXCDD	1.36	PG/G	K J	U	22
WG33742	SDS-FB-07-D	L14884-47 Ri	E1613	1,2,3,4,7,8-HXCDD	0.269	PG/G	K J	U	22
WG33742	SDS-FB-08	L14884-48 R	E1613	2,3,7,8-TCDF	0.706	PG/G	B J	U	7
WG33742	SDS-FB-08	L14884-48 Ri	E1613	2,3,4,7,8-PECDF	0.316	PG/G	K B J	U	22
WG33742	SDS-FB-08	L14884-48 Ri	E1613	2,3,7,8-TCDD	0.132	PG/G	K J	U	22
WG33742	SDS-FB-08	L14884-48 Ri	E1613	1,2,3,4,7,8-HXCDD	0.284	PG/G	K J	U	22
WG33742	SDS-FB-08	L14884-48 Ri	E1613	1,2,3,6,7,8-HXCDD	1.27	PG/G	K J	U	22
WG33742	SDS-FB-08	L14884-48 Ri	E1613	1,2,3,7,8,9-HXCDD	0.879	PG/G	K B J	U	22
WG33742	SDS-FB-08	L14884-48 Ri	E1613	1,2,3,7,8-PECDF	0.11	PG/G	K J	U	22
WG33742	SDS-FB-08	L14884-48 Ri	E1613	1,2,3,4,7,8-HXCDF	0.254	PG/G	K B J	U	22
WG33742	SDS-FB-09	L14884-49 R	E1613	2,3,7,8-TCDF	0.973	PG/G	B	U	7
WG33742	SDS-FB-09	L14884-49 Ri	E1613	2,3,7,8-TCDD	0.155	PG/G	K J	U	22
WG33742	SDS-FB-09	L14884-49 Ri	E1613	1,2,3,7,8,9-HXCDD	1.34	PG/G	B J	J	12
WG33742	SDS-FB-09	L14884-49 Ri	E1613	1,2,3,4,7,8,9-HPCDF	0.259	PG/G	K J	U	22
WG33742	10654001	L15027-1 Ri2	E1613	2,3,7,8-TCDD	0.608	PG/G	J	J	12
WG33742	10654001	L15027-1 Ri2	E1613	1,2,3,7,8-PECDF	0.953	PG/G	K J	U	22
WG33742	10654001	L15027-1 Ri2	E1613	1,2,3,7,8,9-HXCDD	10.8	PG/G	B	J	12
WG33742	10654026	L15027-12 Ri	E1613	1,2,3,4,7,8-HXCDF	0.815	PG/G	K B J	U	22
WG33742	10654026	L15027-12 Ri	E1613	1,2,3,7,8-PECDF	0.267	PG/G	K J	U	22
WG33742	10654026	L15027-12 Ri	E1613	1,2,3,7,8,9-HXCDD	2.34	PG/G	B J	J	12
WG33742	10654026	L15027-12 Ri	E1613	2,3,7,8-TCDD	0.194	PG/G	K J	U	22
WG33742	10654026	L15027-12 Ri	E1613	1,2,3,6,7,8-HXCDF	0.552	PG/G	K J	U	22
WG33742	10654002	L15027-2 Ri2	E1613	2,3,7,8-TCDD	0.276	PG/G	K J	U	22
WG33742	10654002	L15027-2 Ri2	E1613	1,2,3,7,8,9-HXCDD	4.24	PG/G	B J	J	12
WG33742	10654002	L15027-2 Ri2	E1613	1,2,3,7,8-PECDF	0.434	PG/G	K J	U	22
WG33742	10654002	L15027-2 Ri2	E1613	1,2,3,4,7,8-HXCDF	1.64	PG/G	K B J	U	22
WG33742	10654002	L15027-2 Ri2	E1613	1,2,3,7,8,9-HXCDF	0.112	PG/G	K B J	U	22

QUALIFIED DATA SUMMARY TABLE
Fidalgo Bay Custom Plywood

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validation Qualifier	Validation Reason
WG33742	10654002	L15027-2 Ri2	E1613	1,2,3,4,7,8,9-HPCDF	1.78	PG/G	K J	U	22
WG33742	10654003	L15027-3 Ri2	E1613	1,2,3,7,8,9-HXCDD	2.15	PG/G	B J	J	12
WG33742	10654003	L15027-3 Ri2	E1613	2,3,7,8-TCDD	0.197	PG/G	K J	U	22
WG33742	10654003	L15027-3 Ri2	E1613	1,2,3,4,7,8-HXCDD	0.837	PG/G	K J	U	22
WG33742	10654003	L15027-3 Ri2	E1613	2,3,4,7,8-PECDF	0.525	PG/G	K B J	U	22
WG33742	10654003	L15027-3 Ri2	E1613	2,3,4,6,7,8-HXCDF	0.567	PG/G	K B J	U	22
WG33742	10654003	L15027-3 Ri2	E1613	1,2,3,4,7,8,9-HPCDF	1.18	PG/G	K J	U	22
WG33742	10654003	L15027-3 Ri2	E1613	1,2,3,7,8-PECDD	0.89	PG/G	K J	U	22
WG33742	10654008	L15027-5 Ri	E1613	2,3,7,8-TCDD	0.626	PG/G	J	J	12
WG33742	10654008	L15027-5 Ri	E1613	1,2,3,7,8,9-HXCDD	9.9	PG/G	B	J	12
WG33742	10654008	L15027-5 Ri	E1613	1,2,3,7,8,9-HXCDF	0.218	PG/G	K B J	U	22
WG33742	10654009	L15027-6 Ri	E1613	1,2,3,7,8,9-HXCDF	0.19	PG/G	K B J	U	22
WG33742	10654009	L15027-6 Ri	E1613	2,3,7,8-TCDD	0.529	PG/G	J	J	12
WG33742	10654009	L15027-6 Ri	E1613	1,2,3,7,8,9-HXCDD	8.89	PG/G	B J	J	12
WG33742	10654009	L15027-6 Ri	E1613	1,2,3,7,8-PECDF	0.52	PG/G	K J	U	22
WG33742	10654009	L15027-6 Ri	E1613	1,2,3,4,7,8,9-HPCDF	4.58	PG/G	K J	U	22
WG33742	10654013	L15027-8 R	E1613	2,3,7,8-TCDF	0.946	PG/G	B J	U	7
WG33742	10654013	L15027-8 Ri	E1613	2,3,7,8-TCDD	0.237	PG/G	K J	U	22
WG33742	10654013	L15027-8 Ri	E1613	1,2,3,7,8,9-HXCDD	2.25	PG/G	B J	J	12
WG33742	10654013	L15027-8 Ri	E1613	1,2,3,4,7,8-HXCDF	0.852	PG/G	K B J	U	22
WG33742	10654013	L15027-8 Ri	E1613	1,2,3,6,7,8-HXCDF	0.477	PG/G	K J	U	22
WG33742	10654013	L15027-8 Ri	E1613	1,2,3,7,8,9-HXCDF	0.062	PG/G	K B J	U	22
WG33742	10654013	L15027-8 Ri	E1613	2,3,4,7,8-PECDF	0.704	PG/G	K B J	U	22

APPENDIX B
MITIGATION MEMOS

APPENDIX B-1
CONCEPTUAL WETLAND MITIGATION PLAN
FOR THE CUSTOM PLYWOOD INTERIM REMEDIAL ACTION

HARTCROWSER

MEMORANDUM

DATE: September 9, 2011

TO: Hun Seak Park, PE

FROM: Celina Abercrombie
Jason Stutes, PhD
Rick Moore, LHG

RE: **Appendix B-1 - Conceptual Wetland Mitigation Plan for the Custom Plywood Interim Remedial Action**
17330-27

The Custom Plywood Site (Figure 1) contains five freshwater and estuarine wetlands totaling 11,910 square feet (sf) that would be impacted by proposed remediation activities on the property. Wetlands A, B, C, and D are isolated wetlands that will be impacted during the Phase I upland remediation. Wetland E is connected to state and navigable waters, and the U.S. Army Corps of Engineers (USACE) has determined that Wetland E is federally regulated. Wetland E will be impacted during the Phase II in-water remediation. These five wetlands will be consolidated into one large estuarine wetland and restored on site as agreed upon by applicable regulatory agencies. The restored wetland will: (1) replace the impacted wetland areas; and (2) improve the functions provided by the existing wetlands.

Off-site mitigation options, such as the Ship Harbor site in Anacortes, were given consideration as compensatory mitigation for on-site wetland impacts resulting from the cleanup. Based on the timing and feasibility of an off-site mitigation option, on-site wetland mitigation was determined to be to a preferable alternative that provides adequate compensation for impacts to existing wetlands and serves as an integrated habitat improvement piece within the larger project.

A summary of the key elements associated with proposed on-site mitigation activities for the Custom Plywood Site is provided below.

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WETLAND MITIGATION AREA

The restored estuarine wetland would be a minimum of 12,000 sf in area (Figure 2). The wetland mitigation area would be constructed landward of the Ordinary High Water (OHW) line. During Phase I upland remediation activities, a bench would be excavated and graded at suitable elevations for the establishment of estuarine wetland vegetation. The wetland edge would be constructed to provide sinuosity between the wetland and the transition to the upland buffer. A protective berm would be created at and landward of the OHW line to prevent contaminant migration into the restored wetland during in-water construction as part of Phase II. The width of the berm would be approximately 10 feet, and the height of the berm would be approximately 10.5 feet Mean Lower Low Water (MLLW) or at the height of the existing shoreline berm. Near the completion of the in-water work, the protective berm would be removed and the area covered by the berm would be graded to appropriate elevations that allow for tidal connection of the wetland to Fidalgo Bay and for installation of native plantings.

Colonization of wetland vegetation would occur between elevations of 7 feet MLLW and Mean Higher High Water (MHHW), which is 8.6 feet for the Custom Plywood Site. It is anticipated that a larger area between MHHW and OHW (about 9.2 feet MLLW) would colonize with a variety of saltmarsh vegetation. The wetland would be planted and naturally colonize with native saltmarsh vegetation, including, but not limited to pickleweed (*Salicornia virginica*), saltgrass (*Distichlis spicata*), and seacoast bulrush (*Scirpus maritimus*). The restored wetland area would provide a moderate to high level of function, and support other aquatic habitats and species such as juvenile salmon rearing and migration.

A vegetated buffer would be provided around the restored wetland totaling approximately 26,000 sf. The buffer along the Tommy Thompson Trail would measure 50 feet in width and the remainder of the buffer would measure 75 feet in width as agreed upon by applicable regulatory agencies. Installation of a variety of native tree and shrub plantings may include, but is not limited to big-leaf maple (*Acer macrophyllum*), shore pine (*Pinus contorta*), black cottonwood (*Populus balsamifera*), Sitka spruce (*Picea sitchensis*), Douglas fir (*Pseudotsuga menziesii*), paper birch (*Betula paperifera*), Pacific crabapple (*Malus fusca*), salmonberry (*Rubus spectabilis*), salal (*Gaultheria shallon*), oceanspray (*Holodiscus discolor*), snowberry (*Symphoricarpos albus*), red elderberry (*Sambucus racemosa*), Indian plum (*Oemleria cerasiformis*), serviceberry (*Amelanchier alnifolia*), Nootka rose (*Rosa nutkana*), thimbleberry (*Rubus parviflorus*), red-flowering currant (*Ribes sanguineum*), dunegrass (*Leymus mollis*), coastal strawberry (*Fragaria chiloensis*), and kinnikinnick (*Arctostaphylos uva-ursi*). Following removal of the protective shoreline berm, dunegrass would be planted within the buffer along the shoreline and as a transition species between the wetland and the upland buffer. Trees would be planted 10 to 12 feet on center and shrubs would be planted 5 to 7 feet on center throughout the upland buffer. Emergent and groundcover vegetation would be planted 1 to

3 feet and 3 to 5 feet on center throughout the wetland and buffer, depending on the species designated for installation in each area. Tables 1 and 2 show the plant schedule for the wetland and buffer planting areas. In addition to native plantings, large woody debris and other habitat structures would be installed in the dunegrass and upland buffer planting areas.

A temporary fence fitted with light reduction slats would be installed along the upland extent of the wetland buffer to deter human access and protect against light and noise pollution. In addition, barrier plantings of rose (*Rosa* sp.) and Douglas hawthorne (*Crataegus douglasii*) would be densely planted along the outer perimeter of the wetland buffer and would develop into a thicket replacing the function of the temporary fence over time. The barrier planting area would measure approximately 6 to 8 feet in width. The temporary fence would be removed once the barrier plantings become established. Critical/sensitive area signs may also be installed along the edge of the buffer.

Additionally, a public access easement would be provided along the beach and possibly within the upland buffer of the mitigation area as well as a beach access area at the southern landward tip of the site. The general locations of a beach access and the buffer trail are shown on Figure 2. The final configuration of these features has not yet been determined and is ultimately subject to an agreement between the City of Anacortes and the property owner. A conceptual design is planned concurrent with the design for the Phase II in-water remediation. The final aquatic permitting required for the beach access component will also be included with Phase ii. Final design and field construction are currently planned to be completed in coordination with the City of Anacortes and the property owner. Public access to a wetland buffer trail would occur following a required 10-year wetland/buffer monitoring period after construction. Access to the public beach area may require, at a minimum, completion of the Phase II aquatic cleanup.

A plan view of the wetland mitigation area is provided on Figure 2 and a cross section is provided on Figure 3.

SITE GRADING AND CONSTRUCTION

Current site elevations over much of the area of the planned wetland mitigation area vary from about 10 to 11 feet MLLW. Although these elevations are slightly above the estuarine wetlands zone, it is desirable to further elevate the adjacent buffer area to protect buffer vegetation from damage during high tides. Typical high tides near Anacortes range between about elevation 9.2 to 10 feet MLLW. Therefore, it is desirable to raise site grades in the mitigation buffer area to about 12 feet to provide a suitable level of protection and a factor of safety. This bench would also provide sufficient elevation for constructing a stormwater conveyance system and treatment swale, as described in the Stormwater section below.

Construction of the mitigation area is planned for the southern property corner landward of the OHW line and extending to the north and west. Following excavation related to site cleanup in the wetland and buffer areas, the buffer adjacent to the southern property line along the Tommy Thompson Trail would be backfilled and the grade raised to an appropriate elevation for the establishment of the buffer plantings. Construction would then extend north into the restored wetland area.

The wetland area would be excavated an additional 3 feet beyond the proposed bottom elevation of approximately 7 feet MLLW and a layer of sand would be placed within this additional excavation area to serve as a planting medium for emergent wetland plantings (to be installed during Phase II following tidal connection to Fidalgo Bay) and to prevent vertical migration of remaining clean wood waste located on the Site. This sand layer would cover the 12,000 sf wetland mitigation area and extend landward into the buffer where dunegrass plantings are proposed. A low-gradient transition between the wetland and tree and shrub planting area would be provided. Large woody debris and dunegrass would be installed throughout this zone to mimic a more natural shoreline. Woody debris placement and dunegrass plantings would coincide with planting activities in the tree and shrub planting area.

During excavation and grading activities in the restored wetland, a temporary berm would be placed along the opening of the wetland at and landward of the OHW line. This berm is intended to protect the mitigation area from migrating contaminated sediment until in-water construction is underway and the area waterward of the mitigation area is remediated. The berm would be constructed from a combination of quarry spalls and sand. A geotextile fabric may be placed between the existing substrate along the OHW line and the quarry spalls to provide additional stability and filtration of sediments that may be present in the water column. Additional design details would be developed during the construction design process. This feature is intended to be temporary and would be removed from the existing beach during Phase II to protect the previously installed wetland area. Potential damage to this temporary berm may occur from winter storm surges but are not anticipated given the existing in-water structures will remain in-place until Phase II construction. In the event of a large storm event, a site visit would be conducted to evaluate potential damage and develop a remedy for re-stabilizing this feature. Possible remedies include, but are not limited to, repositioning of the geotextile fabric and installation of additional quarry spalls or similar material. During or following removal of the temporary berm, the wetland area would be planted as described in the Wetland Mitigation Area section.

Following excavation and backfilling of sand in the wetland area, the remaining upland buffer to the west and north of the wetland would be backfilled with a clean fill material. The upland planting area would be graded and lightly compacted for structural stability. In addition, the buffer would be graded to provide microtopography and a somewhat undulating surface. Compost would be applied and tilled into the soil throughout the tree and shrub planting area. Then a layer of mulch would be placed throughout this area for weed control and water retention. Following mulch placement, large woody debris would also be placed throughout the buffer for habitat value. Trees, shrubs, and groundcover species would be installed per the planting details previously described. A 5- to 6-foot-wide area would be retained for future public access. A geotextile fabric would be placed over the ground surface and mulch placed over the top until designs and construction details for this area are developed. Care would be taken to avoid disturbing the existing buffer during installation of the public access features. A fence would be constructed around the mitigation area during or immediately following plant installation to prevent human access during the plant establishment and monitoring period.

STORMWATER

Swale Concept

A stormwater swale located outside of the wetland buffer has been designed to treat stormwater currently routed onto the property through a City of Anacortes conveyance (Figure 2). The swale is designed and sized per the Washington State Department of Ecology's 2005 Stormwater Management Manual (SWMM) for Western Washington to provide water quality treatment. No infiltration is assumed as a conservative assumption based on subsurface soil and groundwater conditions. Infiltration that does occur provides additional stormwater management control.

The swale includes the following elements and target design dimensions:

- Size: Approximately 788 sf at the base
- Flow path length: Minimum 175 linear feet
- Side slopes: 5H:1V
- Depth: Minimum of 10 inches
- Slope: Approximately 2 percent

A combination of native trees, shrubs, and groundcover species would be planted around the perimeter of the swale.

Stormwater Routing

Stormwater from the existing 18-inch City of Anacortes conveyance pipe to Wetland D would be routed through a control box structure to control flow and provide settling in a 48-inch catch basin (Figure 4). Flow from the control box would discharge through a higher elevation outlet in the box to provide necessary elevation and gradient for downstream flow management. Specific components of the routing system downstream of the control box include:

- An approximately 50-foot-long, 18-inch-diameter conveyance pipe sloped at 2 percent grade between the control box outlet and the swale inlet;
- An in-line settling/treatment structure between the control box and the swale;
- A possible gravel pad or other energy dissipation feature at the swale inlet to accommodate a 0.5-foot drop from the upstream conveyance pipe as a required design feature;
- An approximately 175-foot-long, vegetation-lined treatment swale to manage SWMM design flow as described above;
- An approximately 45-foot swale discharge conveyance channel sloped at 0.5 percent grade between the swale outlet and the estuarine wetland complex; and
- A level spreader or energy dissipater, such as quarry spalls or a similar material, to connect the swale discharge channel to the estuarine wetland complex.

The swale and conveyance corridor would be vegetated with a standard grass seed mix to filter and remove sediment and particulates from the stormwater. The swale would provide basic treatment prior to entering a vegetated conveyance corridor that would route the treated stormwater from the swale into the restored wetland area. The conveyance corridor would be designed to meander through the restored buffer area to provide additional treatment and infiltration as well as a more natural channel configuration. The swale would also be protected with a low berm and backflow preventer at the outlet to avoid inundation during high tides.

Target design elevations at various points in the stormwater routing system are as follows, subject to continuing design analysis.

- Discharge Elevation at Estuarine Wetland: 8.6 feet
- Swale Outlet Elevation: 9.5 feet
- Swale Inlet Elevation: 13.0 feet
- Control Box Outlet Elevation: 14.5 feet
- Control Box Inlet Elevation: 10.7 feet (surveyed elevation)

To optimize the grades and locations of the stormwater and bioswale features, several factors were considered to balance the elevation of the control box outlet with the discharge point at the edge of the estuarine wetland. The discharge point at the wetland edge was set at 8.6 feet (approximately MHHW) as an optimal design target. A lower elevation for discharge to the wetland would require deeper incising of the conveyance channel from the swale outlet (approximately 9.5 feet) into the new topographic bench to be established at approximately 12 feet. A higher discharge elevation would result in progressively higher upstream elevations for the swale and control box outlet, which would be undesirable.

MONITORING ACTIVITIES

Monitoring Schedule

Monitoring of the mitigation areas would be conducted for 10 years following construction. Following upland remediation and debris removal (summer 2012), a report would be prepared to summarize the constructed conditions of the restored wetland and buffer, including, but not limited to site grading, and berm location, prior to tidal connection. Formal monitoring of the wetland and buffer areas would not begin until the completion of the Phase II in-water work and connection of the wetland to Fidalgo Bay. At this time, a formal as-built report would be prepared and monitoring would begin.

Site inspections and reporting would occur on an annual basis. The following schedule would be used for project monitoring reports:

- At time of construction/As-built (Year 0);
- Year 1: detailed annual report;
- Year 2: detailed annual report;
- Year 3: detailed annual report;
- Year 4: reconnaissance level report;
- Year 5: detailed annual report;
- Year 6: reconnaissance level report;
- Year 7: detailed annual report;

- Year 8: reconnaissance level report;
- Year 9: reconnaissance level report; and
- Year 10/Final: detailed annual report

Following construction, an as-built report would be submitted by the project applicant to the applicable federal, state, and local government agencies within approximately 30 days after completion of plant installation in both the wetland and buffer areas. The report would document mitigation site conditions at completion of plant installation and would be used as a baseline for future monitoring events. Annual detailed monitoring reports would be submitted to the appropriate regulatory agencies by December 31 of each calendar year.

GOALS AND PERFORMANCE STANDARDS

Project goals include restoring wetland areas through the creation of appropriate elevations and installation of native vegetation, restoring buffer areas through the installation of native vegetation, and maintaining invasive vegetation at low levels within the wetland and buffer areas. Performance requirements for the mitigation area would include:

Goal 1: Restore Wetland Areas through Installation of Native Vegetation

Performance Standards:

a) Survival of planted native vegetation would be monitored for two years.

- Year 1: 90 percent survival of installed plants visually estimated
- Year 2: 80 percent survival of installed plants visually estimated

b) Areal coverage of native shrubs and emergent vegetation would be a minimum of 80 percent after 10 years.

- Year 1: 20 percent cover
- Year 2: 30 percent cover
- Year 3: 40 percent cover
- Year 5: 50 percent cover
- Year 7: 60 percent cover
- Year 10: 80 percent cover

Goal 2: Restore Buffer Areas through Installation of Native Vegetation

Performance Standards:

a) Survival of planted native vegetation would be monitored for two years.

- Year 1: 90 percent survival of installed plants
- Year 2: 80 percent survival of installed plants

b) Areal coverage of native tree, shrub, and groundcover species would be a minimum of 80 percent after 10 years.

- Year 1: 20 percent cover
- Year 2: 30 percent cover
- Year 3: 40 percent cover
- Year 5: 50 percent cover
- Year 7: 60 percent cover
- Year 10: 80 percent cover

Goal 3: Control Invasive Plant Species within the Wetland and Buffer Areas

a) Invasive plant areal coverage would be less than 10 percent after 10 years.

- Years 1 through 10: 10 percent or less coverage of invasive plants

Goal 4: Provide Adequate Hydrologic Connection for Restored Wetland

a) Visual observation of tidal inundation during a normal tidal cycle each year.

- Years 1 through 10: 100 percent coverage of marsh mitigation area by tidal waters at tidal elevation of approximately MHHW

b) Documented coverage (in square feet) of emergent estuarine plant species using a global positioning system during Years 1, 5, and 10.

- Years 1, 5, and 10: 12,000 sf or greater cover of native estuarine plant species

A total of 12,000 sf or more of wetland would be maintained throughout the 10-year monitoring period. Monitoring would include qualitative observations on vegetation (cover, density, survival, and natural colonization) and wildlife, and quantitative data collection (species composition and percentage cover, total percentage plant cover, percentage cover of volunteer plants, and percentage cover of invasive species) using a sample plot method. In addition, permanent photo points would be established within the wetland and buffer mitigation areas to supplement the qualitative data.

Vegetation

The project biologist or mitigation specialist conducting monitoring activities would make a number of qualitative observations on vegetation and wildlife during quantitative data collection. Qualitative data on plant cover, density, survival and naturally colonizing plants would be collected. In addition, observations of wildlife use, including birds, amphibians, reptiles, and small mammals would be recorded during each monitoring visit.

Wetland and buffer plant communities would be sampled along permanent vegetation transects using a circular quadrat (1-meter radius). A minimum of two transects would be established in the wetland and buffer restoration areas for minimum total of four transects throughout the mitigation area. Transect lengths would range between 100 and 200 feet, depending on the as-built conditions at the site. A minimum of five permanent quadrats would be established along each transect. To ensure the same locations are monitored each year, permanent markers would be established at the ends of each transect and at each quadrat sampling point (either PVC, wood lathe, or a combination of PVC and rebar). A map of the transect and sample plot locations would be created for use during monitoring events.

Wetland and buffer plantings would be visually evaluated along each transect to determine the rate of survival, health, and vigor. Plants would be recorded as live, stressed, or dead/dying. For the first year of monitoring, plant survival would be calculated by dividing the number of installed plants still living by the number of initially installed plants.

The percent cover of individual plant species present within each quadrat would be visually estimated. Data collection would consist of species composition and percent cover, total percent plant cover, percent cover of volunteer plants, and percent cover of invasive species, including, but not limited to, Himalayan blackberry (*Rubus armeniacus*), English ivy (*Hedera helix*), Scot's broom (*Cytisus scoparius*), nightshade (*Solanum* sp.), Canada thistle (*Cirsium arvense*), and reed canarygrass (*Phalaris arundinacea*). Species coverage values would be summed to determine the total areal coverage in each quadrat.

Photo Points

Permanent photo points would be established within the wetland and buffer mitigation areas to supplement the qualitative data. Photo points would be established at topographic vantage points that provide complete views of the mitigation area, if possible. Photos would document relative changes in plant cover, density, and height. Permanent markers would be established at each photo point (either PVC, wood lathe, or a combination of PVC and rebar) or the photo points would correspond with permanent site features meeting the above requirements.

MAINTENANCE AND CONTINGENCY ACTIONS

Maintenance and contingency actions would include, but are not limited to, irrigation, pruning, replacement of dead/dying or undesirable transplants with the appropriate vegetation, substitution of plant species, regular weeding and removal of noxious and invasive weeds, and installation of plant protective devices. No post-planting applications of fertilizer are anticipated. Irrigation would be provided for the first two years following construction to aid in establishing native plantings within the buffer area.

If the mitigation area is not providing the required cover of native estuarine wetland area by the end of Year 3, adaptive management approaches and additional contingency measures would be evaluated to determine whether waiting a longer period for the desired vegetation establishment is warranted, regrading or deepening of the wetland area is needed, replanting of vegetation or other measures are necessary to meet the project’s performance requirements. In addition, contingency measures would be evaluated during each monitoring event to help ensure that the proposed mitigation is successful.

Attachments:
Table 1 – Plant Schedule for Wetland Mitigation Planting Area
Table 2 – Plant Schedule for Buffer Planting Area
Figure 1 – Vicinity Map
Figure 2 – Wetland Mitigation Plan
Figure 3 – Wetland Mitigation Cross Section
Figure 4 – Conceptual Stormwater Drainage Conveyance and Swale Profile
Isolated Wetlands Information Sheet
Wetland Rating Form - Western Washington

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TABLES

Table 1 - Plant Schedule for Wetland Mitigation Planting Area

Common Name	Scientific Name	Condition	Minimum Spacing (on center in feet)	Planting Notes	Quantity
Emergents					
Pickleweed	*Salicornia virginica*	Division or plug	1 to 3	Plant in groups of 10 to 15	880
Saltgrass	*Distichlis spicata*	Division or plug	1 to 3	Plant in groups of 10 to 15	880
Seacoast bulrush	*Scirpus maritimus*	Division or plug	1 to 3	Plant in groups of 10 to 15	880
Total Emergents					**2,640**

Note: Plant species and quantities are subject to change.

Table 2 - Plant Schedule for Buffer Planting Area

Common Name	Scientific Name	Condition	Minimum Spacing (on center in feet)	Planting Notes	Quantity
Trees					
Douglas fir	*Pseudotsuga menziesii*	1 gallon	10 to 12	Plant individually	55
Shore pine	*Pinus contorta*	1 gallon	10 to 12	Plant individually	55
Black cottonwood	*Populus balsamifera*	1 gallon	10 to 12	Plant individually	55
Big-leaf maple	*Acer macrophyllum*	1 gallon	10 to 12	Plant individually	55
Total Trees					**220**
Shrubs					
Oceanspray	*Holodiscus discolor*	1 gallon	5 to 7	Plant in groups of 4 to 8	110
Vine maple	*Acer circinatum*	1 gallon	5 to 7	Plant in groups of 4 to 8	110
Red elderberry	*Sambucus racemosa*	1 gallon	5 to 7	Plant in groups of 4 to 8	110

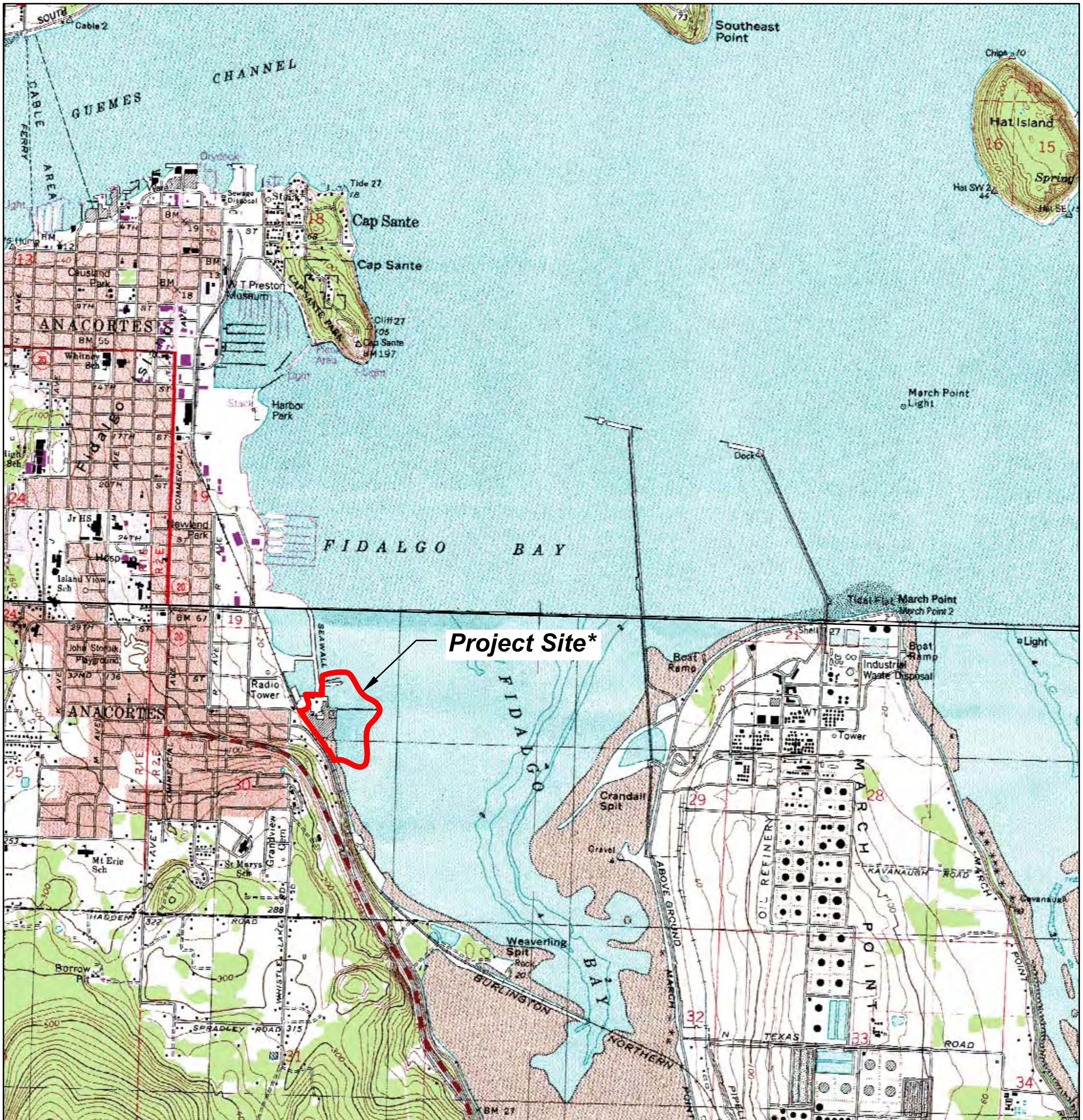
Common Name	Scientific Name	Condition	Minimum Spacing (on center in feet)	Planting Notes	Quantity
Nootka rose	*Rosa nutkana*	1 gallon	5 to 7	Plant in groups of 4 to 8	110
Red-flowering currant	*Ribes sanguineum*	1 gallon	5 to 7	Plant in groups of 4 to 8	110
Snowberry	*Symphoricarpos albus*	1 gallon	5 to 7	Plant in groups of 4 to 8	110
Thimbleberry	*Rubus parviflorus*	1 gallon	5 to 7	Plant in groups of 4 to 8	110
Salal	*Gaultheria shallon*	1 gallon	5 to 7	Plant in groups of 4 to 8	110
Douglas hawthorne [a]	*Crataegus douglasii*	1 gallon	3 to 5	Plant individually in alternating rows	110
Rose (to be determined) [a]	*Rosa* sp.	1 gallon	3 to 5	Plant individually in alternating rows	110
Total Shrubs					**1,100**
Herbs					
Dunegrass [b]	*Leymus mollis*	Division or plug	1 to 3	Plant in groups of 10 to 15	660
Coastal strawberry	*Fragaria chiloensis*	4-inch	3 to 5	Plant in groups of 4 to 8	605
Kinnikinnick	*Arctorstaphylos uva-ursi*	4-inch	3 to 5	Plant in groups of 4 to 8	605
Total Herbs					**1,870**

Note: Plant species and quantities are subject to change.

[a] For installation as a barrier planting along the perimeter of the buffer only.

[b] For installation along the shoreline and slope between wetland and buffer only.

FIGURES



Source: Base map prepared from USGS 7.5-Minute Series Topographic Map, Anacortes North and Anacortes South Quadrangles.

* Represents upland and aquatic portions of the site included with current Feasibility Study.

N

0 0.5 1

Scale in Miles

Custom Plywood Site
Anacortes, Washington

Vicinity Map

17330-27 (B-1) 2/11

HARTCROWSER

Figure

1

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Note: See Figure 4 for stormwater conveyance and swale details.

Source: Aerial photo courtesy of City of Anacortes, 2003.

Custom Plywood Site
Anacortes, Washington

Wetland Mitigation Plan

17330-27 (B-1) 9/11

HARTCROWSER

Figure
2

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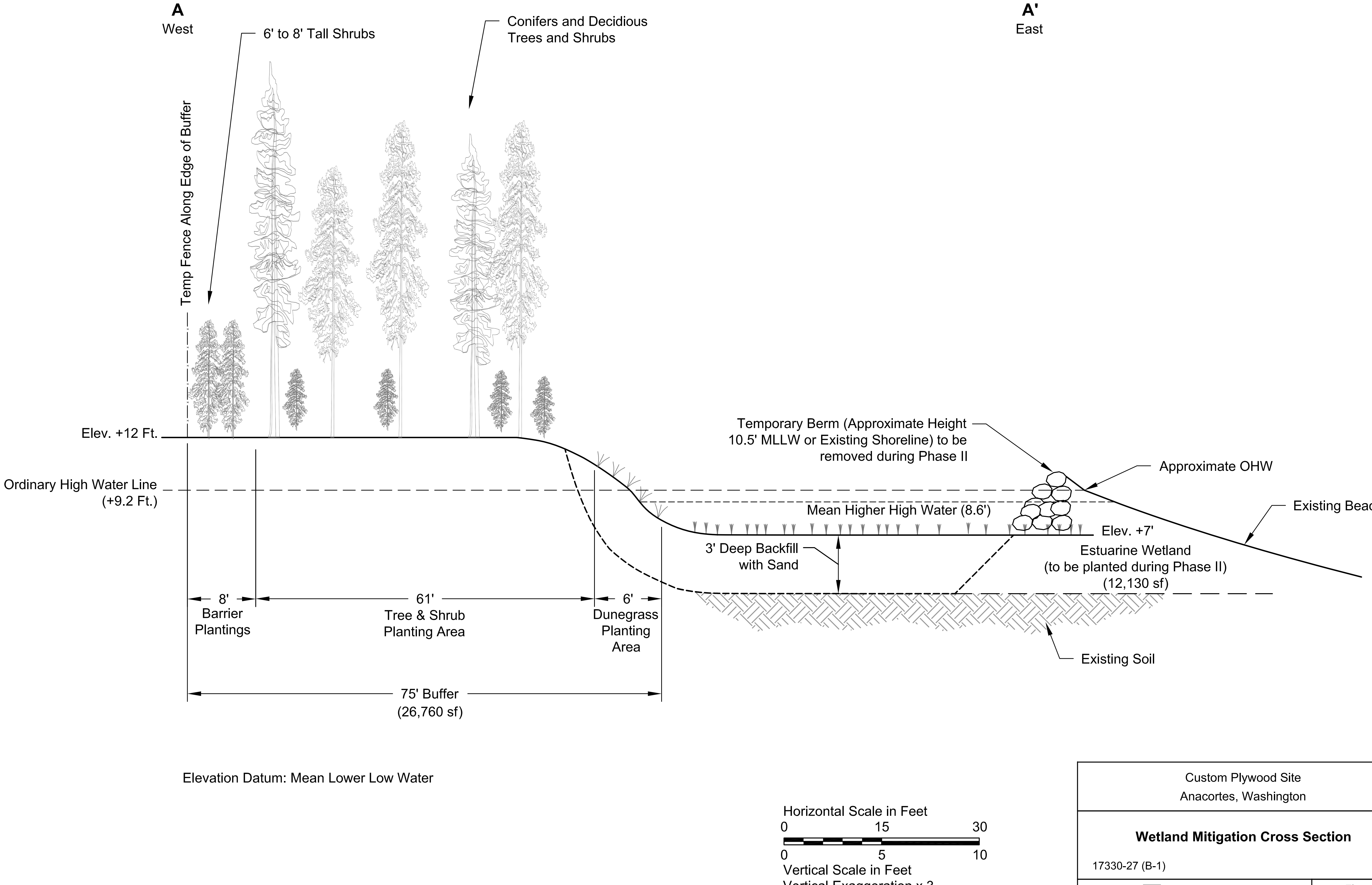

Custom Plywood Site
Anacortes, Washington

Wetland Mitigation Cross Section

17330-27 (B-1) 9/11

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Figure
3

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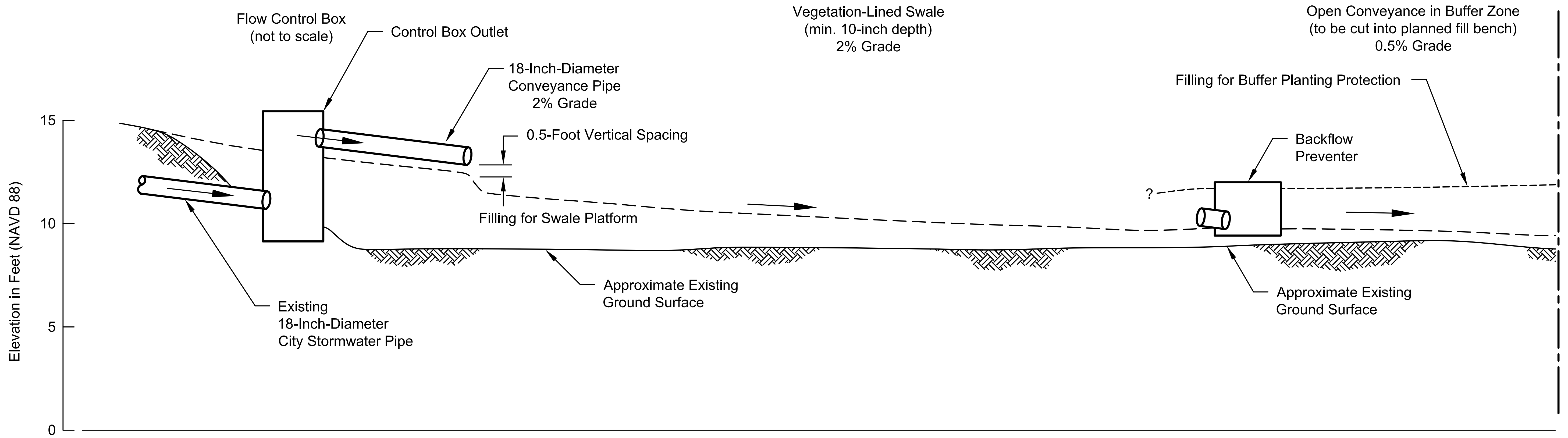
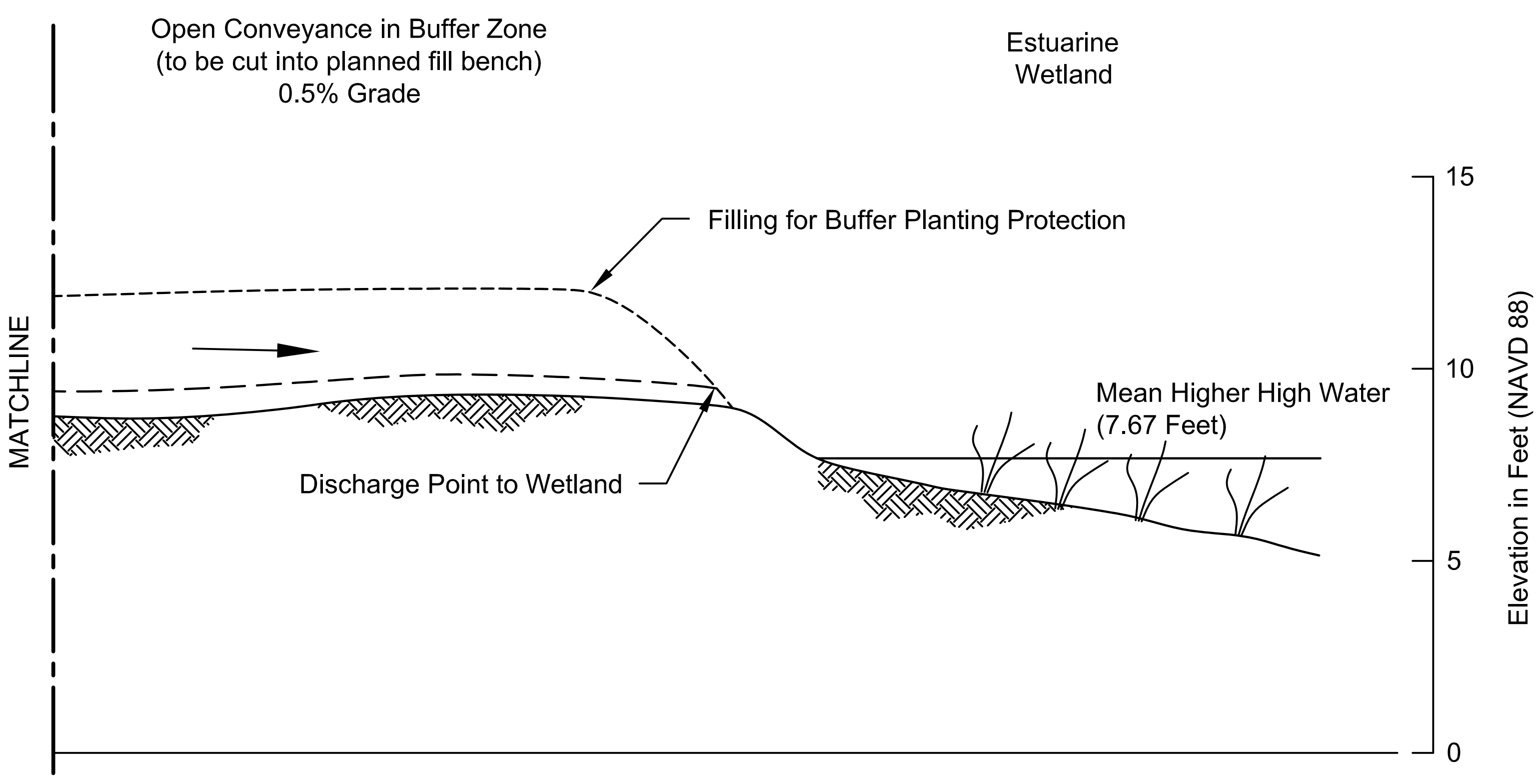




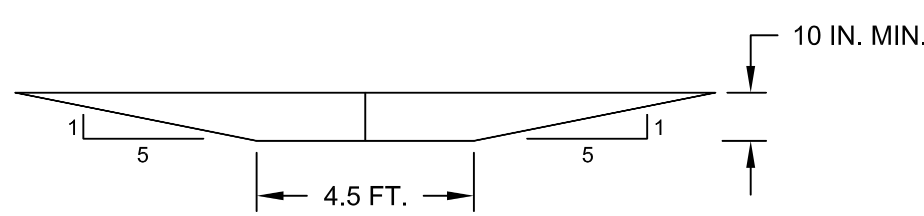
Target Design Elevations

City Stormwater Pipe Invert Elevation at Control Box: 10.14 Feet (Surveyed)
Control Box Outlet Elevation: 13.9 Feet
Swale Inlet Elevation: 12.4 Feet
Swale Outlet Elevation: 8.9 Feet
Discharge Elevation at Estuarine Wetland: 8.0 Feet

Notes:

→ Stormwater Flow Direction

Not Shown for Clarity:
- In-line treatment/settling structure between control box and swale inlet
- Energy dissipation structure at swale inlet
- Level spreader at wetland discharge point



CONCEPTUAL SWALE CROSS SECTION

Horizontal Scale in Feet
0 25 50
0 5 10
Vertical Scale in Feet
Vertical Exaggeration x 5

Custom Plywood Site
Anacortes, Washington

Conceptual Stormwater Drainage Conveyance and Swale Profile

17330-27 (B-1) 2/11

HARTCROWSER

Figure
4

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ISOLATED WETLANDS INFORMATION SHEET

DEPARTMENT OF ECOLOGY
State of Washington

Isolated Wetlands Information Sheet

If you are proposing to fill or otherwise alter an isolated wetland, you will need to obtain authorization from Ecology through an administrative order. To help expedite review of your project, you can provide the information requested below. Answer the following questions to the best of your ability and attach any reports or documents that provide supporting information. This information can also augment information provided in a Joint Aquatic Resources Permit Application[1]. You may need to hire a qualified wetland professional[2] to assist you. Failure to provide this information may result in delays in review of your project.

1.	**Wetland Area and Location (provide a delineation report, including data sheets--see 5a below)**
	a. How large (in acres or square feet) is the wetland or wetlands (including contiguous portions offsite)? Wetland A = 120 sf Wetland B = 124 sf Wetland C = 367 sf Wetland D = 9,910 sf Total (Wetlands A, B, C and D) = 10,521 sf
	b. How far is the wetland(s) from the nearest surface water body (lake, river, wetland, etc.)? All wetlands are located within approximately 250 feet of the shoreline of Fidalgo Bay and within approximately 150 feet of one another.
	c. Is the wetland(s) within a FEMA-mapped 100-year floodplain? No.
2.	**Wetland Rating** (http://www.ecy.wa.gov/programs/sea/wetlands/ratingsystems/)
	What is the category(ies) of the wetland(s) according to the Washington State Wetland Rating System (eastern or western Washington version as appropriate)? Wetland A = Category 4 Wetland B = Category 4 Wetland C = Category 2 Wetland D = Category 3

[1] The Joint Aquatic Resource Application (JARPA) is available on the web at: http://www.epermitting.wa.gov/.
[2] For more information on how to hire a qualified wetland professional go to: http://www.ecy.wa.gov/programs/sea/wetlands/professional.html.

3.	**Cowardin Classification**
	Describe the Cowardin[3] vegetation class(es) in the wetland (for example, emergent, scrub/shrub, forested, open water, etc.), and list the dominant plant species in each class.

Cowardin Class	**Dominant Plant Species**
Wetland A = PEM Wetland B = PEM Wetland C = EEM Wetland D = PEM	Wetland A = Typha latifolia Wetland B = Typha latifolia Wetland C = Scirpus maritimus and Distichlis spicata Wetland D = Festuca sp., Chenopodium album, Rumex occidentalis, Equisetum arvense, and Rubus armeniacus

4.	**Wetland Impacts**
	How much wetland area (in acres or square feet) is proposed to be:
	a. Filled? 10,521 sf
	b. Excavated? 10,521 sf
	c. Drained?
	d. Flooded?
	e. Cleared, vegetation altered? 10,521 sf
	f. Other? (list)
5.	**Please provide copies of the following information if available:**
	a. Wetland delineation report, including data sheets (http://www.ecy.wa.gov/programs/sea/wetlands/delineation.html)
	b. Photographs of wetland
	c. Wetland rating form (http://www.ecy.wa.gov/programs/sea/wetlands/ratingsystems/)
	d. Wetland function assessment report
	e. Project plans, including grading plan
	f. Erosion control and stormwater control plans, and reports
	g. Wetland mitigation plan (http://www.ecy.wa.gov/programs/sea/wetlands/mitigation/guidance/)

[3] Refers to the U.S. Fish and Wildlife Service's classification system (Cowardin et al, *Classification of Wetlands and Deepwater Habitats of the United States*, 1979).

WETLAND RATING FORM - WESTERN WASHINGTON

Wetland name or number D

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): D - Custom Plywood Date of site visit: 8/9/10

Rated by C. Abercrombie Trained by Ecology? Yes X No___ Date of training 4/05

SEC: 30 TWNSHP: 35N RNGE: 2E Is S/T/R in Appendix D? Yes___ No X

Map of wetland unit: Figure —— Estimated size 9,900 sf.

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III X IV___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	16
Score for Hydrologic Functions	20
Score for Habitat Functions	10
TOTAL score for Functions	46

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ **Does not Apply** X

Final Category **(choose the "highest" category from above)** III

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		**Depressional**	X
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number D

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		X
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		X
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number D

Classification of Wetland Units in Western Washington

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 (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe** **NO – Saltwater Tidal Fringe (Estuarine)**

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 rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

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 both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (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**?
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 <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

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 two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

NO - go to 6 **YES** – The wetland class is **Riverine**

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 clases. 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 your wetland. 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 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	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still 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 D

	D Depressional and Flats Wetlands HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	Points (only 1 score per box)
	D 3. Does the wetland unit have the potential to reduce flooding and erosion?	*(see p.46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) points = 4 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 *(If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)* points = 0	4
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a "headwater" wetland" points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	3
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire unit is in the FLATS class points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	10
D	**D 4. Does the wetland unit have the opportunity to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* — Wetland is in a headwater of a river or stream that has flooding problems — Wetland drains to a river or stream that has flooding problems — Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems — Other Limited downslope resources **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 49)* multiplier 2?
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	20

Possibly 100 times AREA of unit

Wetland development is A result of stormwater routed onto the property.

Wetland name or number D

D	Depressional and Flats Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	Points (only 1 score per box)
D	**D 1. Does the wetland unit have the potential to improve water quality?**	*(see p.38)*
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 3 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)* points = 1 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 *(If ditch is not permanently flowing treat unit as "intermittently flowing")* Provide photo or drawing	Figure ___ 3
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure ___ 3
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0 Map of Hydroperiods	Figure ___ 2
D	**Total for D 1** *Add the points in the boxes above*	8
D	**D 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150 ft X Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging X Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other___ **YES** multiplier is 2 **NO** multiplier is **1**	*(see p. 44)* multiplier 2
D	**TOTAL - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	16

Grasses Weedy

Wetland name or number D

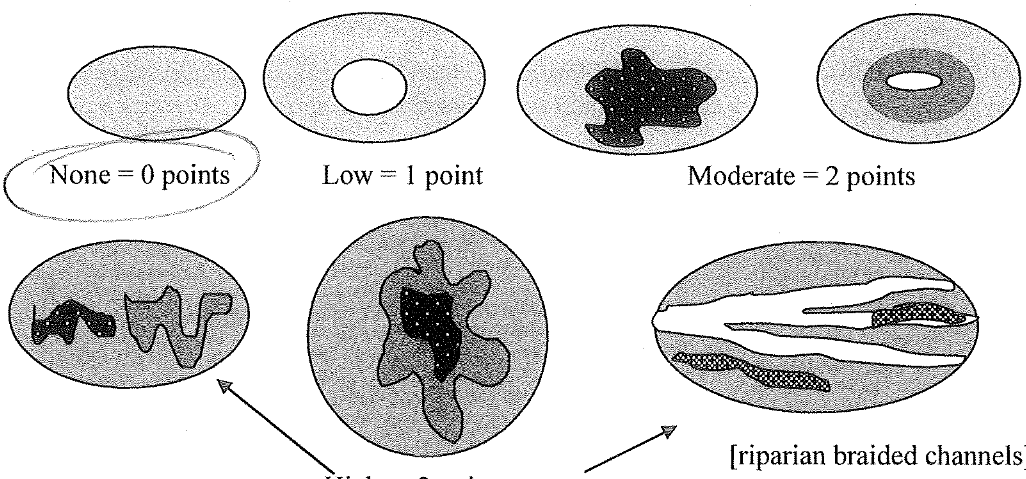
These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed X Emergent plants ____Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 Map of Cowardin vegetation classes — 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0	Figure ___ Ø
H 1.2. <u>Hydroperiods</u> ***(see p. 73)*** *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 acre to count. (see text for descriptions of hydroperiods)* ____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 — point = 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** Map of hydroperiods	Figure ___ Ø
H 1.3. <u>Richness of Plant Species</u> ***(see p. 75)*** 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)* *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 *List species below if you want to:* 5 - 19 species — points = 1 < 5 species — points = 0 Rumex Chenopodium Typha Epilobium Festuca Equisetum	1

Total for page 1

Wetland name or number D

H 1.4. Interspersion of habitats *(see p. 76)* | **Figure ___**

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.



NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

Ø

H 1.5. Special Habitat Features: *(see p. 77)*

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).

____Standing snags (diameter at the bottom > 4 inches) in the wetland

____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)

____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)*

____At least ¼ acre of thin-stemmed persistent vegetation 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 each stratum of plants

NOTE: The 20% stated in early printings of the manual on page 78 is an error.

Ø

H 1. TOTAL Score - potential for providing habitat
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5 | 1

Comments

Wetland name or number D

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** X — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	**Figure** ___ Disturbed buffers 2
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	1

Total for page 3

Wetland name or number D

H 2.3 Near or adjacent to other priority habitats listed by WDFW ***(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report** http://wdfw.wa.gov/hab/phslist.htm)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre). X **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 p. 152*). ____**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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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:** Woodlands 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*). ____**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*). ____**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. X **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: pp. 167-169 and glossary in Appendix A).* ____**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 7.6 m (25 ft) high and occurring below 5000 ft. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), 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 > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has **3 or more** priority habitats = **4 points** If wetland has 2 priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	3

Wetland name or number D

H 2.4 Wetland Landscape *(choose the* ***one*** *description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	9
TOTAL for H 1 from page 14	1
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	10

Wetland name or number D

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

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 *(see p. 86)* Does the wetland unit 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 X	
SC 1.1 Is the wetland unit 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 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — 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 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number D

SC 2.0 Natural Heritage Wetlands *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D X or accessed from WNHP/DNR web site X YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO X SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO X not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs *(see p. 87)* Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 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" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No X Is not a bog for purpose of rating	**Cat. I**

Wetland name or number D

SC 4.0 Forested Wetlands *(see p. 90)*	
Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the 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/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO X not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons ***(see p. 91)*** 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 surface 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 X not a wetland in a coastal lagoon SC 5.1 Does the wetland meets 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 invasive plant species (see list of invasive species on p. 74). — 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 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

Wetland name or number D

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO X not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its 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 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	N/A

APPENDIX B-2
ALTERNATIVES TO PROTECT THE CUSTOM PLYWOOD INTERIM REMEDIATION ACTION AND IMPROVE NEARSHORE HABITAT

HARTCROWSER

MEMORANDUM

DATE: September 27, 2011

TO: Hun Seak Park, P.E.

FROM: Celina Abercrombie MS
Jason Stutes, PhD
Steven Hoffman, P.E.
Rick Moore, LHG

RE: **Appendix B-2 - Alternatives to Protect the Custom Plywood Interim Remediation Action and Improve Nearshore Habitat**

This memorandum presents an expanded description of conceptual habitat mitigation alternatives for the Custom Plywood remediation project located in Anacortes, Washington. These alternatives supplement the wetland mitigation plan presented in Appendix B-1. As an **integrated approach**, the mitigation alternatives presented in this revised memorandum address impacts to forage fish spawning and eelgrass habitat; these alternatives will also enhance juvenile salmonid foraging habitat.

Coastal protective features are also discussed as **necessary components of the remediation action.** These features will serve to protect and maintain the nearshore against erosion. Documented active shoreline erosion could expose residual contaminants (mainly wood debris and soil contaminants) remaining in place in the upland, resulting in transport of debris to the aquatic environment. The protective features also serve a broader purpose: to create a suitable environment for restoration of forage fish spawning habitat. The spit and jetty extension further support other aquatic functions, such as juvenile salmon rearing and along-shore migration. These protective feature concepts are included as part of mitigation Alternative 1. This alternative also includes placing habitat mix on the southern face of the City of Anacortes rip rap jetty located to the north of the Custom Plywood site to provide additional habitat enhancement for forage fish and juvenile salmonids. In response to agency comments, two additional mitigation approaches are presented that would involve creation of a pocket beach/estuary internal to the existing site land area. Alternative 2 incorporates hard armoring for estuary and shoreline protection, and Alternative 3 incorporates soft armoring approach for shoreline protection. Eelgrass mitigation for subtidal remediation activities is presented in this memorandum and does not vary between the alternatives.

This memorandum is organized to present background and current site conditions, and summarize three conceptual alternative designs which protect the remediation of the Site by **preventing shoreline erosion while simultaneously mitigating for impacts and restoring multiple habitats** impacted by remediation activities. The revised concepts are intended to address agency comments and inform discussions for selecting a consolidated mitigation approach compatible with site remediation objectives. We note that this consolidated approach must adequately account for the cleanup objectives and diverse mitigation/restoration objectives of all the affected habitats. A related objective is to provide sufficient detail to move forward with a preferred mitigation approach to supplement the overall site feasibility study and related design documents of which this is an appendix. As such, other details responding to the agency review comments will be addressed as project design progresses, and substantive permit support documents are prepared.

CURRENT SITE CONDITION SUMMARY

Upland Area

The existing upland of the Custom Plywood property is characterized as a heavily disturbed site containing former foundations and structures, concrete, creosote pilings, and wood debris (mainly sawdust), vegetation (native and non-native), and wetland. The vegetation is dominated by a mixture of native and non-native vegetation consisting of grasses (fescue, ryegrass, dunegrass, and other grasses), Canada thistle, wild carrot, teasel, sweet white-clover, poison hemlock, tansy, and other weedy species. No trees are present on the property.

Nearshore and Intertidal Area

The shoreline of the Custom Plywood property contains significant quantities of large woody debris (naturally occurring). Woody debris ranges in size from small to exceptionally large. Active erosion is occurring along the northeast and central portion of the property where storm events and long period waves have locally destabilized the shoreline. Within the central portion of the shoreline, ecology blocks covered in a geotextile fabric and concrete/debris have been placed near the Mean Higher High Water (MHHW) line as part of an emergency erosion control action following a high wave and storm event in the winter of 2010. The southernmost tip of the property is armored with rip rap, which extends off site to the south.

The intertidal zone contains former concrete structures supported by creosote-treated piles, individual pilings, considerable quantities of wood waste embedded in the substrate, and structural debris from previous buildings on site (Photos 1 through -5). Surf smelt spawning has been documented along the shoreline of the property. However, given the chemical contamination and the amount of wood and other debris in the shoreline and intertidal area, it is questionable whether deposited spawn would be viable along the northern and central portions of the intertidal zone. Hydrogen sulfide odor is also notable along portions of the shoreline. Existing site conditions show an actively eroding shoreline in which ecology blocks and rubble have been placed to help stabilize the shoreline and prevent or slow further erosion. The existing in-water structures currently provide some protection from wind and wave energy. Coastal wave modeling for the site shows that a majority of the strongest and most damaging wave energy propagates from the northeast which is aligned with the longest fetch but juxtaposed to the predominant wind pattern. This suggests that the beach face is subject to acute and episodic erosion events where predominant conditions support a smaller stable grain size, but storm events undermine the beach face and causing significant erosion.

Subtidal Area

The immediate subtidal portion of the property is a low slope mudflat that contains large amounts of wood debris, sawdust, and overwater structures. This heavily impacted zone contains macroalgae (*Ulva* spp.) and an abundance of cyanobacteria and reducing bacteria (likely *Beggiatoa* sp.) indicative of sulfide-rich sediments. This apparent reducing layer is present at the surface at several locations on this mudflat. Deeper in the subtidal zone, extensive eelgrass beds are documented on and adjacent to the Custom Plywood property. These beds tie into the larger Fidalgo Bay eelgrass population. The condition of the shoreward limits of the bed appeared good but was clearly limited by the presence of wood debris and possibly by sulfide conditions.

Nature and Extent of Contamination

Documented chemical contamination and wood waste affect the upland, intertidal, and subtidal portions of the site, and are the focus of planned remedial actions. Remediation methods being evaluated for the upland and intertidal zones include excavation/removal, and capping or backfilling with clean substrate. Existing in-water structures and debris will also be removed as part of site remediation. A key consideration is the protection from shoreline erosion and preservation of existing natural resources and habitat, or restoration where such features are unavoidably impacted by remediation. As an example, excavation of wetlands in the uplands and sediment removal in some forage fish spawning habitat areas in the intertidal zone are anticipated to be necessary to accomplish remediation. As an integrative approach to remediation, this will require mitigation actions to compensate for the unavoidable impacts to site resources and ecological functions. To provide for this, candidate in-water structure concepts (for mitigation and shoreline protection) for Alternatives 1, 2, and 3 along with the wave/erosion modeling results are summarized below.

SHORELINE PROTECTION AND HABITAT MITIGATION ALTERNATIVES EVALUATED

The following sections present an overview of three conceptual alternative designs for mitigating and enhancing impacted habitats at the Custom Plywood site.

Each of these concepts includes as a minimum 12,000+ square feet (sf) of restored estuarine wetland. Restored wetland vegetation will occur between elevations of about 7 feet Mean Lower Low Water (MLLW) (equivalent to 7.83 feet NAVD 88) and Ordinary High Water (OHW) (about 10.33 feet NAVD 88). The wetland will be planted and is also expected to naturally colonize with native saltmarsh vegetation. This wetland will provide a moderate to high level of function and will support other aquatic habitats and species, as previously described in the Conceptual Wetland Mitigation Plan (Appendix B-1). A 75-foot (reduced to 50 feet adjacent to the Tommy Thompson Trail) buffer will be provided around the restored wetland area. The buffer will be planted with a variety of native trees and shrubs, and barrier plantings along the edge of the buffer.

In addition to the restored wetland, the concepts will include provisions and enhancements for forage fish spawning habitat and juvenile salmonid foraging habitat. Both of these habitat types are documented on the site and currently function at a presumed low to moderate level. The design goal of each of the concepts is to increase the coverage and functionality of each of the habitat types. Finally, a universal eelgrass mitigation concept will be presented to address unavoidable impacts to existing eelgrass habitat from subtidal clean-up actions for dioxin.

Detailed hydrodynamic modeling was conducted to re-evaluate the three alternatives presented herein. The results of wave modeling and sediment stability analysis conducted by Coast and Harbor Engineering (CHE) are included as technical memoranda attached to this document. The criteria developed in Technical Memorandum 1 (Memo 1) were confirmed in Technical Memorandum 2 (Memo 2) after an additional source for meteorological data was identified near the Custom Plywood Site.

The preliminary analysis (Memo 1) took into account the most prevalent wind patterns which were primarily from the southeasterly direction and modeled wave energy produced by these wind patterns. The new data provided by the Samish tribe from a weather station located at Weaverling spit (1.1 mi southward) were added to the previous wave analysis and the results presented the second memorandum May 2011. This additional data confirmed the previous modeling results and the design constraints including the baseline orientation, sizing, and structural design concepts. Various detailed refinements such as surface particle size still need to be evaluated and considered during the final design phase.

Based on comparative analyses CHE specifically concluded the following in Memo 2:

- The Bellingham Airport wind data previously applied for design criteria continue to represent the conditions at the Custom Plywood Mill site.

- Wind data collected from Weaverling Spit station is a valuable addition to the existing wind database and provides new data that improves the knowledge of wind conditions in Fidalgo Bay.

- Wind data collected from Weaverling Spit confirms wind speed and direction criteria previously developed and the recommendations for wind-wave design criteria developed previously by CHE are valid and do not need any modifications at this time.

In addition, CHE's statement that "*The comparative analysis shows that wind roses are similar for all three stations. All three stations show a majority of winds blowing from the SE to SSE*" is still valid.

Lastly CHE re-evaluated and confirmed that the wave statistical analysis and modeling shows that the largest (or strongest) wave storm (wave height and wave period) at the project site is from NE direction, not from SE direction. It does not conflict with the statement that majority of winds are blowing from SE direction. Because of the longer fetch from the NE direction, smaller wind speeds from this (NE) direction may generate larger waves. For example, a wind speed 38.2 miles per hour from NE direction may generate wave height at the project site of 3.5 ft. while a wind speed of 46.3 miles per hour from SE direction would generate wave height at the project site of only 2.0 ft. Winds may blow more frequently and with stronger speeds from SE, however wave heights at the project site are larger when strong wind is blowing from NE.

Therefore to assure stability of coastal elements of the project (those subjected to wave impact), the design storm for the project was determined to be those approaching from NE direction.

Alternative 1 – Spit/Jetty-Extension Concept

The spit concept is illustrated on Figure 1. This concept would provide habitat for forage fish and juvenile salmon, and would include estuarine wetland and associated buffer. The spit would be optimally configured to maximize protection of the shoreline from erosive wave action, create a stable nearshore habitat on the shoreward side, and establish emergent vegetation along the crest and on part of the landward side of the spit. This would likely be smaller emergent species such as seashore saltgrass (*Distichlis spicata*) and pickleweed (*Salicornia virginica*). In addition, the spit would serve as a protective feature for remediation activities, such as capping of contaminated intertidal substrate and protecting the beach face on the southern portion of the site.

The spit would feature a gravelly sand core with a coarser habitat friendly material on the seaward face that would be stable in the modeled wave environment yet still provide habitat enhancement potential over armoring with a larger material. To achieve this, the seaward face would be sloped at a 9H:1V ratio to help dissipate wave energy and reduce the size of armoring needed (Figure 2). The shoreward face would be designed at a 5H:1V slope with sandy substrate suitable for forage fish spawning habitat as well for epibenthic crustaceans and other fauna that are beneficial to foraging juvenile salmonids. The crest of the spit is shown as an 8-foot-wide bench at an elevation (above 8 feet MLLW) that would support colonization and growth of emergent estuarine vegetation.

Other types and configurations of protective barriers were considered, but these either did not provide as much benefit, or were more intrusive in the aquatic environment. Similarly, moving the spit feature to other locations along the shoreline would result in a larger footprint to achieve the same protective benefit and require additional maintenance.

In addition to the spit, a second protective structure was developed to provide protection to the northern portion of the shoreline as an alternative to hard armoring (Figure 1). An extension off the existing jetty north of the site positioned perpendicular to the predominant wave energy would allow the stable particle size along the northern beach face to be reduced from 8 to 10 inches to 2 to 3 inches, which would support foraging habitat for migrating juvenile salmon (Memo 1). A breach between the existing jetty and the extension would maintain the existing salmonid migratory pathway (Figure 2). Finally, the shoreward side of the jetty extension and the southern face of the existing City jetty would be enhanced with sandy substrate (Figure 3) suitable for forage fish spawning habitat and foster epibenthic crustaceans and other fauna, which are beneficial to foraging juvenile salmonids. Wave energy analysis indicates that this particle size would be stable here (Memo 1).

The wetland portion of this concept would be phased in order to accommodate remediation activities. The wetland mitigation area would be constructed landward of the present (OHW) line initially. During Phase I upland remediation activities, a bench would be excavated and graded at suitable elevations for the establishment of estuarine wetland vegetation. The wetland edge would be constructed to provide sinuosity between the wetland and the transition to the upland buffer. A protective berm would be created at and landward of the OHW line to prevent contaminant migration into the restored wetland during in-water construction. Near the completion of the in-water work (Phase II), the protective berm would be removed and the area covered by the berm would be graded to appropriate elevations that allow for tidal connection of the wetland to Fidalgo Bay and for installation of native plantings.

Alternative 2 – Pocket Beach/Estuary Concept (Hard Armoring)

The pocket beach concept is illustrated on Figure 4. A preliminary version of this concept was presented to the resource agencies in December 2009 (see further discussion in the Response to Agency Comments section of this memo). The 2009 concept included a pocket beach, rather than an estuary. However, to address agency comments related to the feasibility of a landward habitat restoration feature, our discussion below describes a beach/estuary feature at a conceptual level. The jetty extension is retained from the previous concept and maintains shoreline protection for the northern portion of the shoreline.

This concept would involve excavating a bowl-shaped feature into the uplands of the property and would not use a protective spit as a shoreline protection feature. As a consequence, a protective barrier with rock armor (using 6- to 10-inch angular rock) would separate the pocket beach/estuary from Fidalgo Bay to protect against erosion as a result of predicted wind and wave energy (Figure 4). Within the excavated bowl, at lower elevations (below 7 feet MLLW) habitat mix would be placed to provide forage fish habitat. Elevations of 7 feet MLLW to MHHW would be planted and expected to colonize with native saltmarsh vegetation; elevations between approximately MHHW and OHW would be planted with dunegrass and transition to an upland buffer planted with trees and shrubs above the OHW line. The pocket beach/estuary would provide shelter and rearing opportunities for juvenile salmon utilizing the nearshore environment.

The pocket beach/estuary would naturally evolve into estuarine habitat with a mudflat bottom (however, this habitat would not be conducive to forage fish spawning) and silty intertidal beach face as a result of accumulation of detritus from wetland vegetation and limited tidal exchange. This feature would not have a consistent freshwater source and therefore will not provide the freshwater and saltwater exchange typical of estuaries in the Puget Sound.

Alternative 3 – Habitat Mix Soft Armoring Shoreline Protection Concept

This concept is similar to the Alternative 1 concept in approach to providing wetland enhancement but differs conceptually in providing shoreline protection. This concepts substitutes a shallow slope beach face placed from OHW down to approximately -2.0 feet MLLW as a nearshore protection feature using distance and slope to dissipate wind and wave energy that is directed at the Custom Plywood Site (Figure 5). Softer sediment (a mix of gravel graded from 2-inch to sand, consistent with habitat mix specifications) would extend a considerable distance (as much as 250 feet) into low-gradient subtidal habitat associated with the site to provide a sufficiently flat slope for wave attenuation (greater than 9H:1V). Consequently, this necessary wave attenuation apron would encroach on existing eelgrass and other soft sediment habitats and alter existing bathymetry of the site. This encroachment could displace otherwise healthy eelgrass habitat initially or as beach material redistributes deeper over time as indicated by initial wave analysis.

Longshore drift has been modeled at the Custom Plywood site and generally flows from north to south along the intertidal reach of the site. Currently, this drift cell is of little consequence to the site because there is no viable particle source. The beach face is composed of larger particles (2- to 4-inch gravel) and the existing rock jetty north of the site blocks sediment from entering the site from the north. The soft armoring solution would introduce a substantial sediment source to the site that would be subject to longshore drift. This could have two consequences relevant to this restoration concept. First, material would likely migrate beyond the boundaries of the Site, which could impact existing habitat that has developed in the relatively stable sediment environment. Second, material that has migrated due to longshore drift will have to be periodically replaced to maintain the protective function of the soft armoring concept, resetting the biology of the system each time. This addition of fresh beach material will bury infauna (e.g., bivalves), dilute organic material that has accumulated, and will take time to re-sort to the energy environment present at the site. This indicates and describes a system that is periodically disturbed which may lower overall habitat value.

Eelgrass Mitigation Concept

For shallow subtidal habitat, identified remediation alternatives involve either Thin Layer Capping (TLC) or dredging to remediate dioxin-contaminated sediment. Both of these remedies could and would impact existing eelgrass habitat associated with interim remediation action. According to recent surveys of the Site (performed in 2007) and broader historical surveys of Fidalgo Bay (Skagit County nearshore survey preformed in 1997), approximately 4,300 sf of eelgrass would be directly impacted by dredging activities and as much as 11 acres might undergo capping.

As mentioned above, much of the acreage identified for TLC is covered by eelgrass. Eelgrass response to burial, even by a few inches of sediment, is largely unknown in Puget Sound. A pilot study examining TLC methods and impacts is recommended prior to proposed remediation to determine the tolerance of eelgrass to various capping procedures. Four test plots of approximately 0.1 acre would be delineated, three experimental and one reference. Three different capping procedures would be developed employing from four individually placed thin layers to a single thin layer of equal thickness. A sufficient period of time would be allowed between cap layers for eelgrass recovery (based on published impact data for the species). Capped plots would be compared to the uncapped reference plot to determine whether eelgrass shoot densities and relative health are changed by the test capping regimes. This could include examination of shoot demography through examination of horizontal root structures to reconstruct growth dynamics. From these data, a preferred capping procedure would be chosen. Overall, impacts to eelgrass within the TLC area are expected to be minimal and short in duration. Impacted eelgrass areas should recover quickly through recruitment from nearby meadows.

In areas designated to be dredged (generally where total dioxin TEC is greater than 25 ppt), impacts to existing eelgrass are unavoidable. It is estimated that approximately 4,300 sf of eelgrass would be displaced by dredging activities. A combination of advanced and restoration plantings are recommended as mitigation for this displacement. As other subtidal areas that could, but do not now, support eelgrass are remediated within the project area, they could be planted with donor stock from the areas that will be dredged to serve as advanced mitigation plots, if cross contamination could be avoided. One such area that could be targeted for this advanced mitigation lies south of the proposed jetty extension (Figure 1). Approximately 2,200 sf of shallow subtidal habitat would be targeted for advanced plantings in the early stages of in-water remediation. This area would be subject to remediation in early phases and newly planted eelgrass would benefit from the protection of the jetty extension maximizing recruitment success and growth potential. Contaminants left in place after remediation are not expected to affect eelgrass restoration success as concentrations will be reduced by one to two orders of magnitude from present concentrations. Wood debris is the only perceived material on site presently limiting eelgrass growth and recruitment through displacement or generation of sulfur compounds in the sediment.

Once the subtidal areas containing elevated dioxin levels have been remediated (dredged and backfilled with clean material), targeted planting could occur using donor eelgrass from surrounding areas within the project boundaries (while not reducing standing stock density more than 5 percent). These plantings will help facilitate recovery of the dredged areas that once supported eelgrass, reducing recruitment time by an order of magnitude. These targeted plantings, as well as the advanced mitigation plots, would help produce a final areal coverage of eelgrass that is 1.5 times greater than the originally impacted area by Year 10 after remediation (approximately 6,500 sf). By creating more habitat than was displaced originally, the combined mitigation action should make up for temporal losses of productivity during the recovery phase. A mitigation plan along with a developed 10-year monitoring plan, will be developed and submitted with the JARPA package for agency review and public comment. This plan will address mitigation action design, timeline, performance criteria, and adaptive management procedures in detail and will be developed in concert with natural resource agencies to address these impacts in a comprehensive way while integrating these actions into the overall habitat enhancement scheme.

Simultaneous Considerations of Wave Erosion and Habitat Restoration

As described above, the existing shoreline is actively eroding and temporary stabilization measures (hard armoring and the use of ecology blocks) have been implemented along the shoreline. Coast and Harbor Engineering (CHE) modeled wave and wind energy along the Custom Plywood shoreline before and after existing in-water structure removal to gain a better understanding of the forces influencing cleanup activities and habitat restoration. Wind and wave modeling demonstrated that erosion would increase along the shoreline after in-water structures and piling fields are removed. As for other near-shore aquatic cleanup projects, erosion protection for permanent remediation features such as armored caps must be integrated with considerations for habitat restoration.

Given the project goals of remediating upland and in-water portions of the site, and providing long-term, permanent protection, an integrated solution must provide:

1 Suitable protection of remediated areas to prevent shoreline erosion that will expose residual contaminants to the aquatic environment;

2 Minimal use of rock armoring as practicable;

3 Adequate area for wetland restoration (area and function) including a functioning buffer;

4 Restored forage fish spawning habitat at higher area and quality than is not present on the site; and

5 Habitat for other nearshore marine species, e.g., to enhance juvenile salmonid foraging and the quality of the nearshore migration corridor.

The Alternative 1 spit/jetty-extension concept, in contrast to the pocket beach concept (Alternative 2) and the soft armoring concept (Alternative 3), meets the above goals. A pocket estuary could provide adequate wetland and habitat for salmon, but only limited forage fish habitat due to coastal processes. In time, sand placed around the shores of the pocket estuary would be covered by mud and converted to mudflat. This short-term restored habitat would not meet our understanding of the agency and project goals. The softened shoreline, designed to provide habitat for salmon and forage fish spawning will likely have to be nourished to maintain adequate shoreline protection effectiveness which may reduce overall habitat function as previously described under Alternative 3. In addition to this, migrating sediments will have some level of affect on habitats downshore due to longshore drift. The magnitudes of these issues are uncertain but are likely to occur and will hinder habitat enhancement potential and performance.

While the spit itself would not include plantings of dunegrass, the wetland restoration area along the existing shoreline would provide a dunegrass planting area between the wetland and the forested upland buffer to attenuate energy and provide additional habitat for shorebirds and other species.

Large wood and other features to enhance connectivity between upland and intertidal habitat were also considered as part of the Alternative 1 spit/jetty extension concept, and are planned to be further developed during design and the in-water permitting process. They were not considered as shoreline stabilization features, since they are not suitable for erosion control based on the wave energy analysis.

RESPONSE TO AGENCY'S GENERAL COMMENTS

The remediation actions at the site under the Model Toxics Control Act (MTCA – Chapter 173-340 WAC) would meet the substantive requirements for federal, state, and local government regulations. Detailed plans and designs will be provided during the design phase of this project. This section of the memo covers the technical requirements put forth by resource agencies that are a part of the substantive requirements.

Permitting and Project Phasing

The project will be completed in two phases – upland remediation and in-water remediation. However, mitigation/restoration seaward of MHHW is planned to be completed during the in-water phase of the project given the water-dependency (estuarine wetland, forage fish, salmon habitat) of the restored habitats. This would take into account unknown variables that could occur during the in-water work.

As discussed with the SEA Program of Ecology, temporal loss of the low-quality upland (Category III and IV) and small, low-to-moderate quality estuarine (Category II) wetlands would be allowed, because of the substantial increase in function by consolidating the on-site wetlands into a high-quality estuarine (Category II) wetland. In additions to this, a 1-to-1 restoration ratio would be allowed because the wetland impacts would be associated with cleanup activities, which will ultimately improve conditions on and adjacent to the site. The U.S. Army Corps of Engineers has agreed to this mitigation scheme for the one federally regulated wetland on the site (Wetland E, Figure 1).

Preliminary Pocket Beach Concept Presented in December 2009

In December 2009, a preliminary pocket beach concept was presented as the wetland mitigation alternative at an interagency meeting. This concept included a presentation slide depicting a triangle-shaped pocket beach totaling approximately 17,000 sf in area. This concept was presented as a pocket beach rather than a pocket estuary. It is important to note that these features function in different ways. In addition, supplemental information would be necessary to more fully describe and evaluate the feasibility of the pocket beach concept: 1) extent of vegetated buffers, 2) quantification and distinction of vegetated wetland area versus open water (i.e., contours within the site, 3) restoration of other affected habitats and compatibility with the pocket beach concept, 4) wave energy analysis to support the feasibility of the concept, 5) stormwater management issues, 6) shoreline erosion and control measures, and 7) provide context for the pocket beach within overall cleanup activities, specifically addressing feasibility.

Upland Buffer Requirements to Accommodate Wetland Mitigation Area

Buffer widths were also discussed with the SEA Program. State guidance identifies a 150-foot buffer for Category II estuarine wetlands in a high-intensity land use area (industrial and other high-intensity uses), and a 110-foot buffer for Category II wetlands in a moderate-intensity area. Given the industrial zoning for the project, it would fall into a high-intensity land use area. State guidance also provides for reduction of buffers from high intensity to moderate intensity widths if measures and practices are implemented to minimize impacts to wetlands. Examples of minimization measures include, but are not limited to: directing lights away from wetlands, locating noise-generating activities away from wetlands, stormwater retrofits, infiltrating and treating runoff from impervious surfaces, and fencing and planting of dense vegetation to discourage human and pet use. The current wetland mitigation proposal discusses installation of a temporary fence fitted with light-reducing slats. It also includes a densely planted barrier strip along the outer edge of the buffer to reduce light and noise pollution, and to discourage human and pet access into the restored buffer except on the proposed Public Access Pathway. It is expected that once the buffer matures, the tall trees, understory vegetation, and barrier plantings would provide adequate protection for the restored wetland.

Given the historical placement of fill in intertidal areas to create the existing Custom Plywood property, natural contours do not exist. Cleanup activities will also result in excavation and replacement of material throughout the upland portion of the property. Furthermore, existing soil and substrate is not suitable for the establishment of many upland trees and shrubs as evidenced by the lack of native vegetation currently at the site. Upland fill will support the establishment of buffer plantings and mimic a more natural shoreline topography observed in undeveloped areas.

Given the above measures and practices, the revised wetland mitigation plan includes a 75-foot vegetated buffer with a reduction to 50 feet on the side parallel to the Tommy Thomson Trail.

Fill Activities below Ordinary High Water (OHW)

To properly remediate the site, remediation must include excavation of upland and in-water material. Excavation and filling both above and below OHW will be required as part of the remediation. If selected, the Alternative 1 spit and jetty extension would be incorporated as a key remediation component to provide additional capping benefit and shoreline protection along with nearshore habitat enhancement.

Stormwater Features

Potential options to modify the swale discharge channel and include a meandering and more natural channel will be evaluated during the design phase of the project. Swale configuration concepts will be developed in conjunction with proposed re-grading of the site. A working example of the concept is presented in Figure 6. Storm basin verification, sizing, backflow prevention, the need for additional treatment, and general conveyance will also be further evaluated during the design phase. The stormwater swale will provide treatment of stormwater from the City outfall and comply with State stormwater requirements and design criteria. Options for a meandering conveyance channel to provide additional treatment and infiltration of stormwater will be evaluated. Limited quantities of treated stormwater are expected to enter the restored wetland and critical saltwater habitats. The degree of stormwater entering the restored wetland will vary depending on many factors including variations in seasonal flow and the amount of infiltration.

Monitoring and Maintenance

A formal wetland mitigation plan will be prepared to support the design component of upland phase of the project. The plan will address required elements for a 10-year monitoring period. The final plan will include detailed performance standards for plant survival, cover and hydrology, and plant survival will be monitored for the first 2 years following construction. Performance standards for in-water habitat restoration features will be developed in concert with natural resource agencies during subsequent phases of the project for submission with a JARPA package.

Public Access

Following cleanup and restoration activities at the site, the City in conjunction with the property owner could potentially develop plans to provide public access to the nearshore and wetland buffer. Initial suggestions include a Public Beach Access Facility at the southern end of the property. This facility is proposed to be located downslope of the existing picnic area and is planned to include a potential kayak landing. The proposed preliminary locations for these features are shown on Figures 1 and 5. Details for the public access features will be further developed during Phase II of the project. If future site use of the property continues to be industrial in nature, public safety and security of private property will need to be further evaluated in future public access concepts.

Attachments:
Figure 1– Restoration Alternative including Conceptual Spit and Jetty Extension
Figure 2 – Conceptual Spit Cross Section A-A'
Figure 3 – Breakwater Extension Cross Section B-B'
Figure 4 – Restoration Alternative including Conceptual Pocket Estuary and Hard Armoring
Figure 5 – Habitat Mix Soft Armoring Shoreline Protection Option
Figure 6 – Conceptual Stormwater Drainage Conveyance and Swale Profile
Memo 1– CHE Technical Memorandum, Former Custom Plywood Mill Site Cleanup Project, Hydrodynamic Modeling and Coastal Engineering Analysis, November 9, 2010
Memo 2 – CHE Technical Memorandum-Draft, Former Custom Plywood Mill Site Cleanup Project, Verification of Wind-Wave Design Criteria, May 12, 2011
Photos 1 through 5 - Intertidal Area

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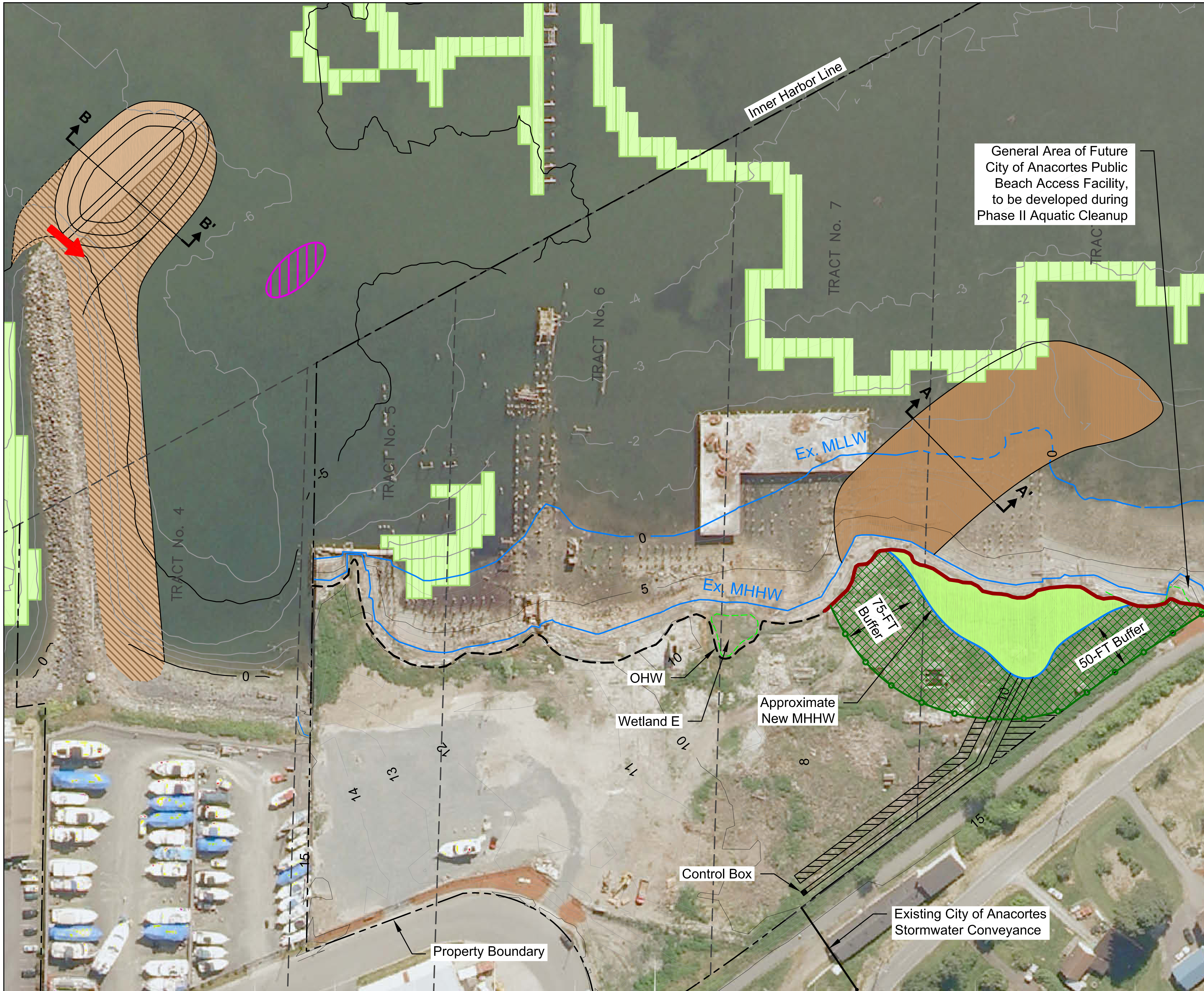

Eelgrass Advanced Mitigation (2,200 sf)

Estuarine Wetland (12,050 sf)

Buffer (26840 sf)

Spit Construction Materials

Jetty Extension Materials

Habitat Mix

Approximate Extent of Eelgrass Beds

Swale and Conveyance

Temporary Fencing and Barrier Plantings

Temporary Shoreline Berm

Stormwater Plantings

Juvenile Salmonid Corridor

A A'

Cross Section Location and Designation

Notes:

1. See Figure 5 for stormwater conveyance and swale details.
2. See Figure 2 for spit cross section.
3. Wetland E is a federally regulated wetland.

N

0 100 200

Scale in Feet

Source: Aerial photo courtesy of City of Anacortes, 2003.

Custom Plywood Site
Anacortes, Washington

Restoration Alternative including Conceptual Spit and Jetty Extension

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Figure

1

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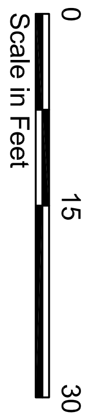

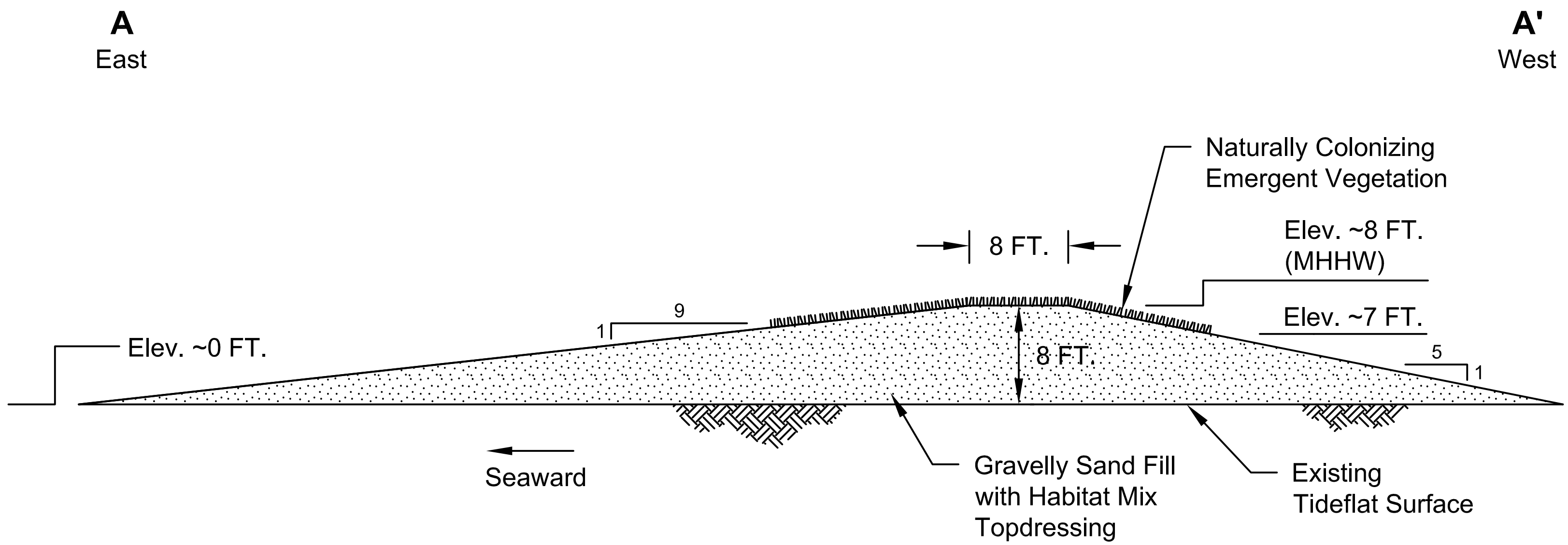

Elevation Datum: Mean Lower Low Water

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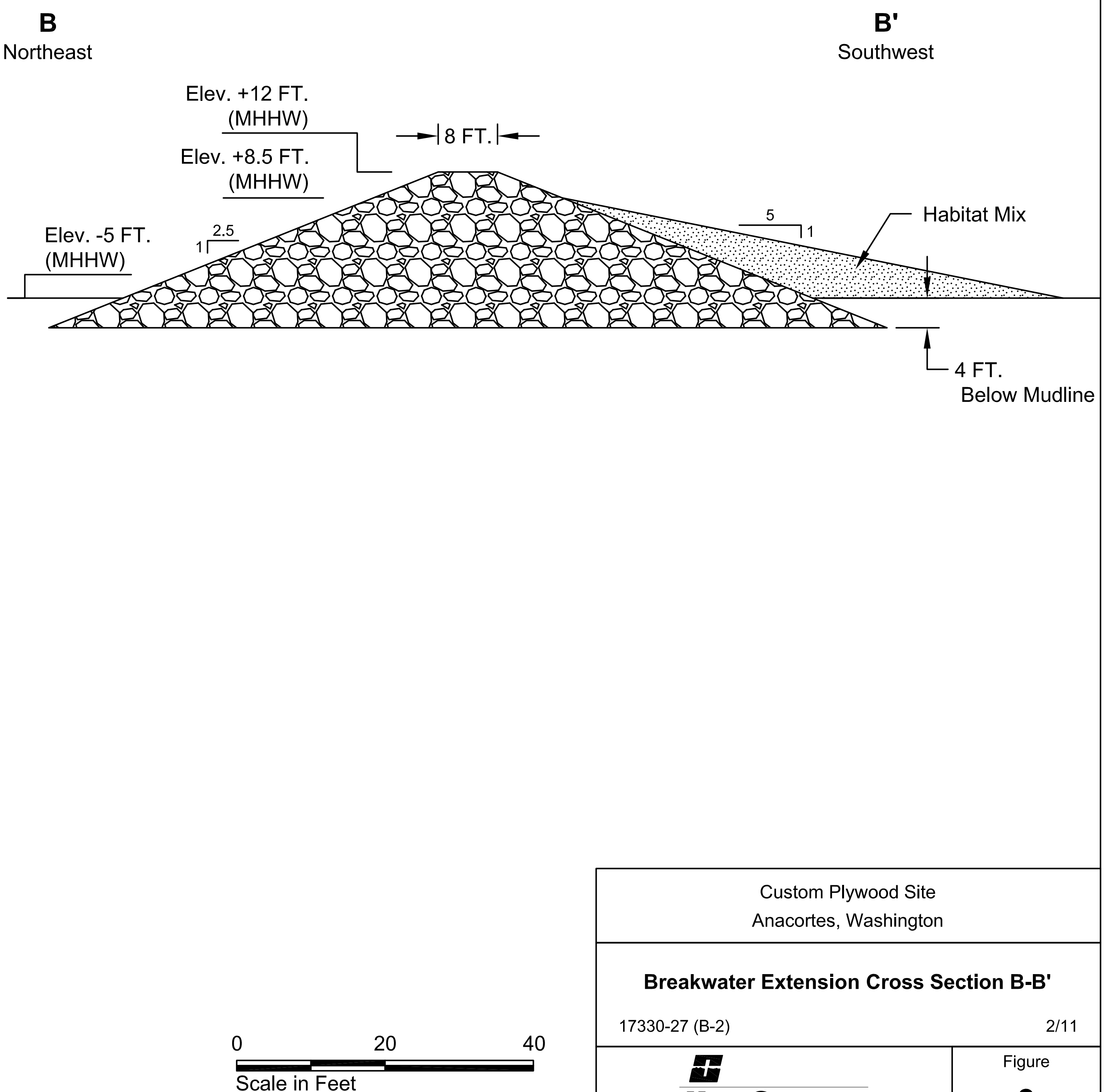
17330-27 (B-2)

2/11

Conceptual Spit Cross Section A-A'

Custom Plywood Site
Anacortes, Washington

Figure
2



Custom Plywood Site
Anacortes, Washington

Breakwater Extension Cross Section B-B'

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Figure
3

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- Estuarine Wetland (12,305 sf)
- Buffer (26,840 sf)
- Jetty Extension Materials
- Habitat Mix
- Swale and Conveyance
- Temporary Fencing and Barrier Plantings
- Stormwater Plantings
- Juvenile Salmonid Corridor

Notes:

1. See Figure 6 for stormwater conveyance and swale details.
2. Wetland E is a federally regulated wetland.

N

0 100 200

Scale in Feet

Source: Aerial photo courtesy of City of Anacortes, 2003.

Custom Plywood Site
Anacortes, Washington

Restoration Alternative including Conceptual Pocket Estuary and Hard Armoring

17330-27 (B-2) 2/11

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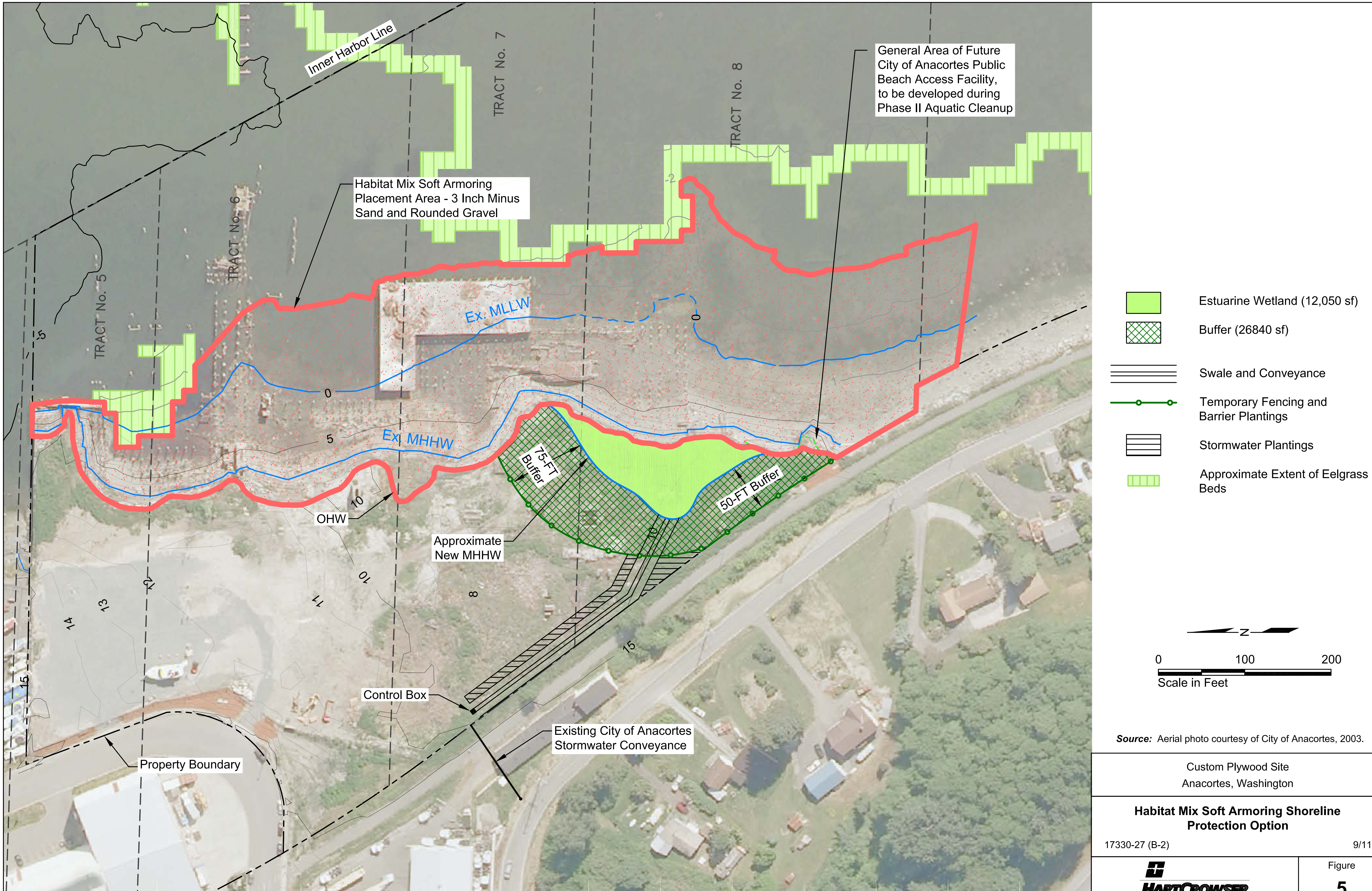
Figure

4

EAL 01/31/11 1733027-B-2-004.dwg



Source: Aerial photo courtesy of City of Anacortes, 2003.

Custom Plywood Site
Anacortes, Washington

Habitat Mix Soft Armoring Shoreline Protection Option

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HARTCROWSER

Figure
5

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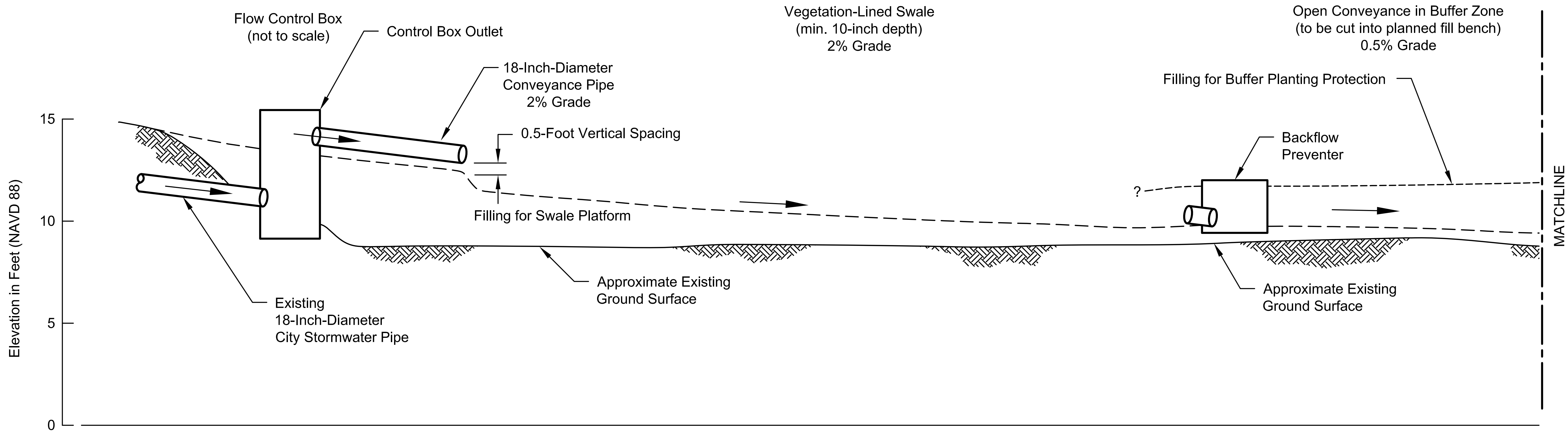
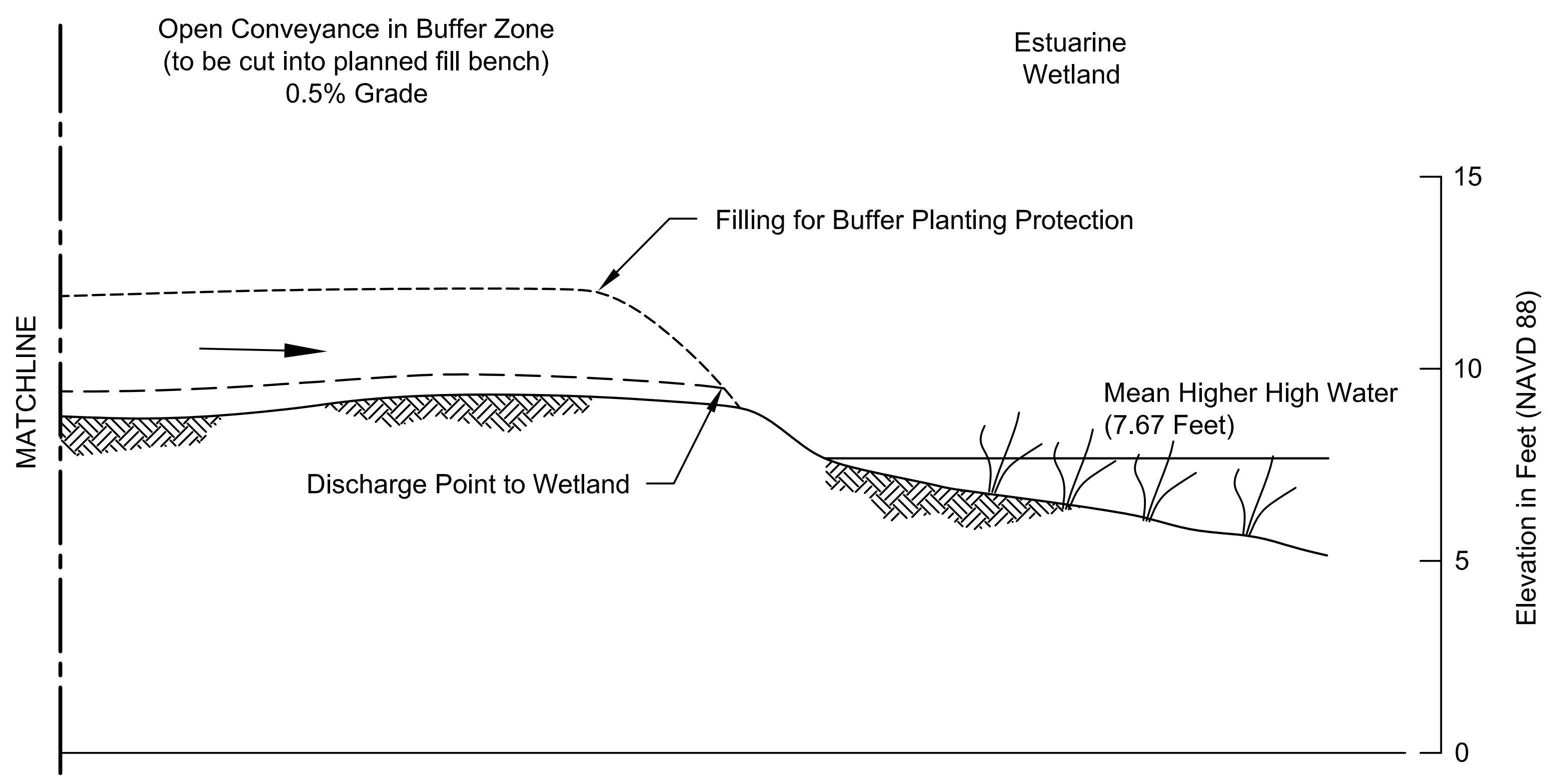




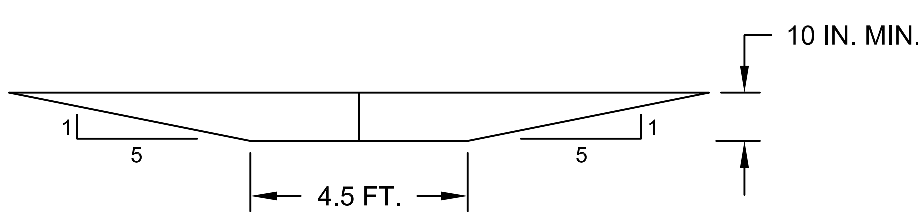
Target Design Elevations

City Stormwater Pipe Invert Elevation at Control Box: 10.14 Feet (Surveyed)
Control Box Outlet Elevation: 13.9 Feet
Swale Inlet Elevation: 12.4 Feet
Swale Outlet Elevation: 8.9 Feet
Discharge Elevation at Estuarine Wetland: 8.0 Feet

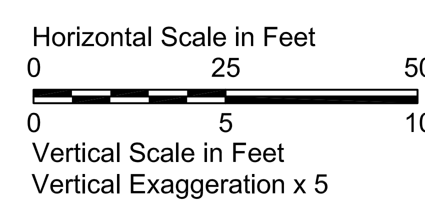
Notes:

Stormwater Flow Direction

Not Shown for Clarity:
- In-line treatment/settling structure between control box and swale inlet
- Energy dissipation structure at swale inlet
- Level spreader at wetland discharge point



CONCEPTUAL SWALE CROSS SECTION



Custom Plywood Site
Anacortes, Washington

Conceptual Stormwater Drainage Conveyance and Swale Profile

17330-27 (B-2) 2/11

HARTCROWSER

Figure
6

EAL 01/31/11 1733027-B-2-006.dwg

Technical Memorandum

Former Custom Plywood Mill Site Cleanup Project
Hydrodynamic Modeling and Coastal Engineering Analysis

This Technical Memorandum presents the results of wave modeling and sediment stability analysis conducted by Coast and Harbor Engineering (CHE) for the former Custom Plywood Mill Site Cleanup Project. The information in the following report represents the conditions at the project site without any protection measure, removal of the existing old pier, piles, and debris.

The recommendations presented herein are developed at preliminary level and shall be revised during preliminary and final engineering design.

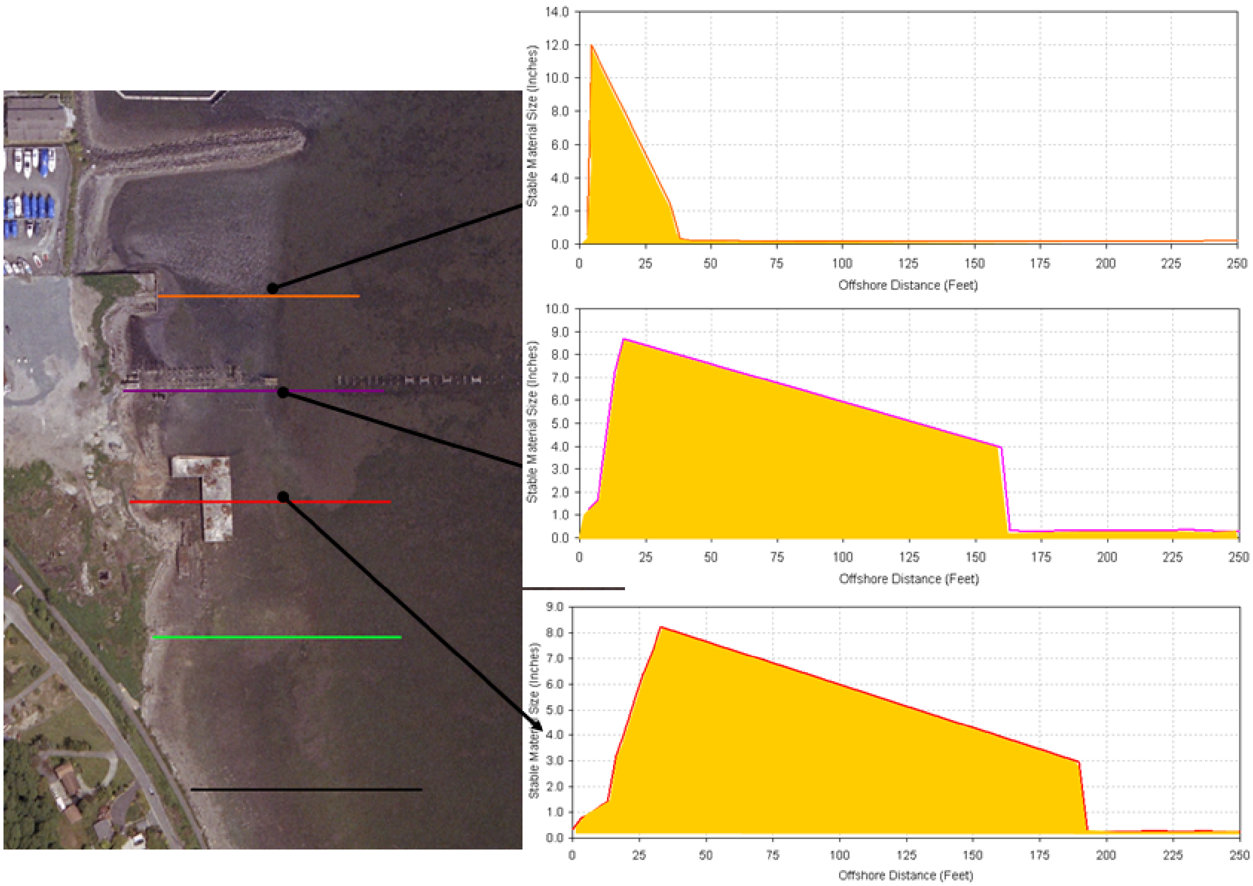


Figure 1. Computed size of material at different transects along the shoreline resulted from the 25-year return period condition for MLLW and MHHW

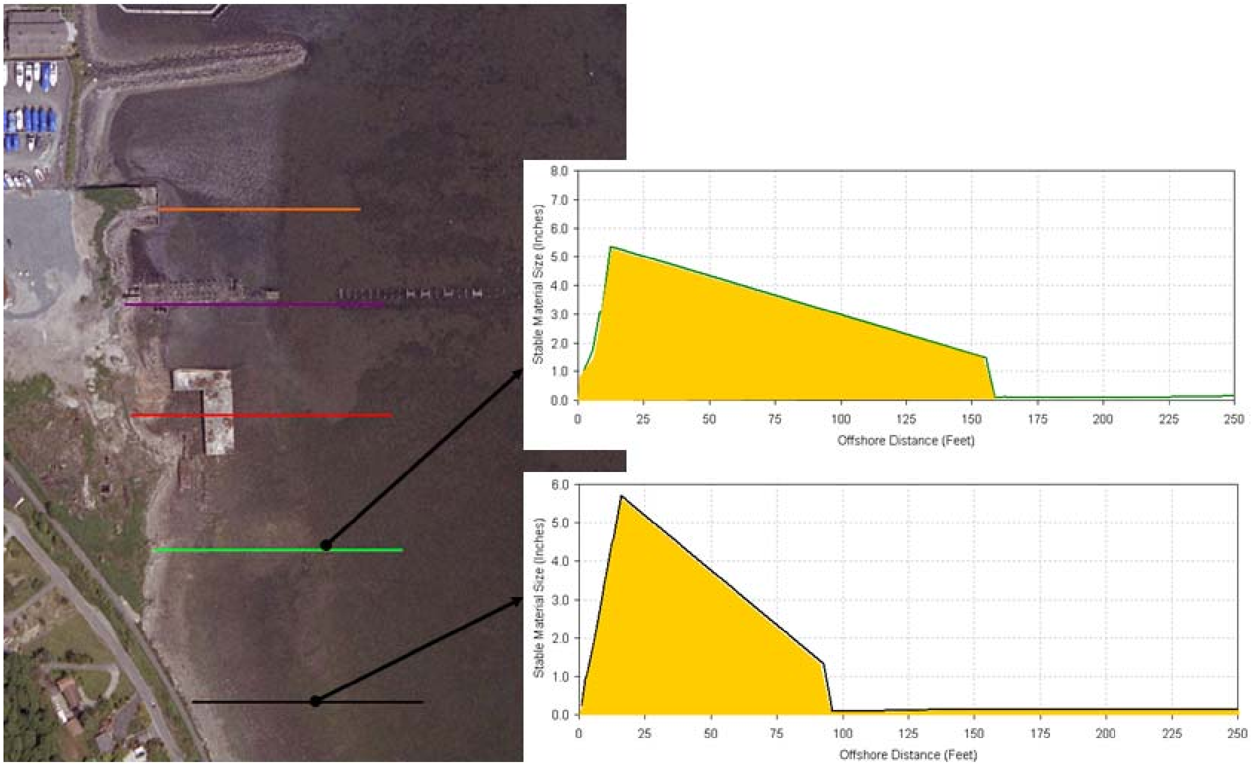


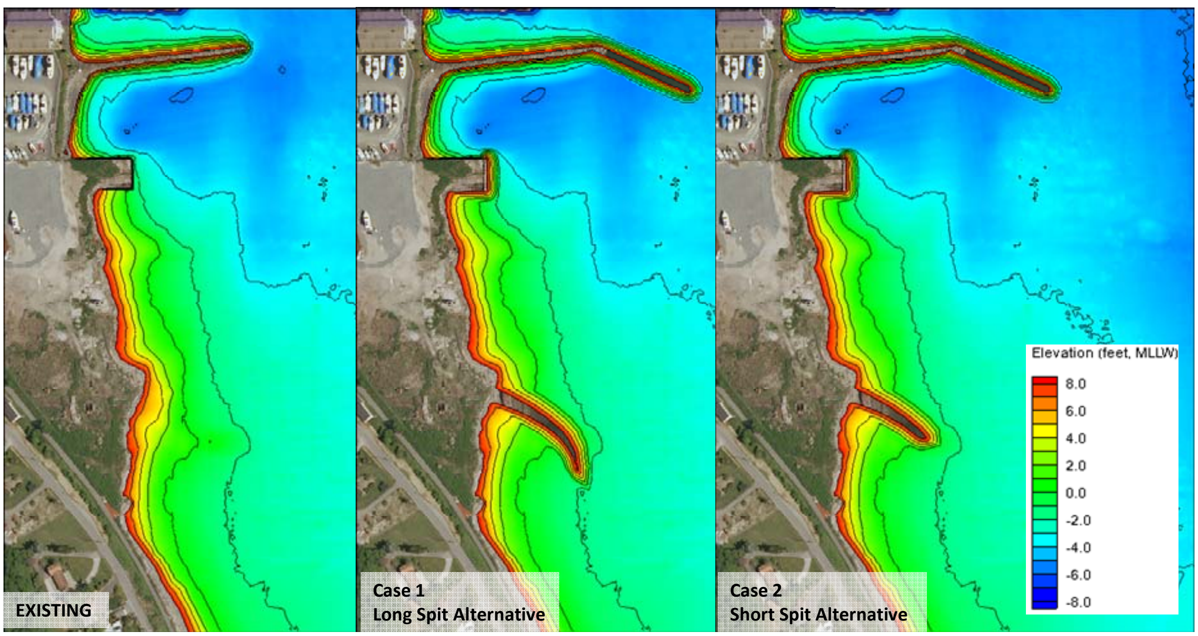
Figure 2. Computed size of material at different transects along the shoreline resulted from the 25-year return period condition for MLLW and MHHW

Technical Memorandum

Former Custom Plywood Mill Site Cleanup Project
Hydrodynamic Modeling and Coastal Engineering Analysis

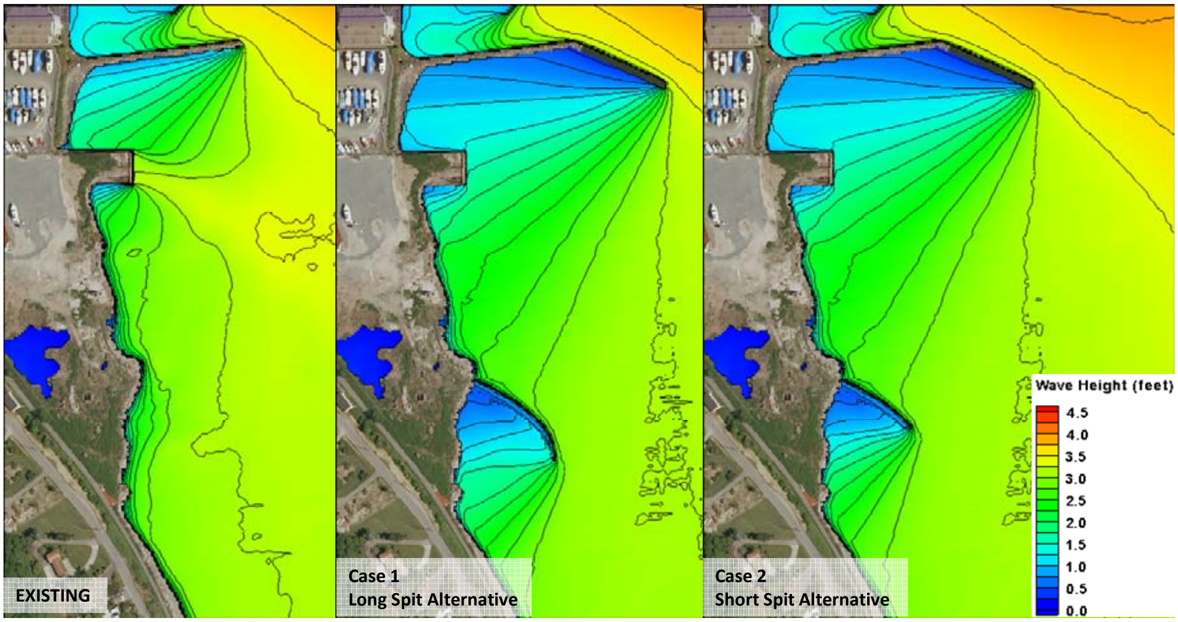
This Technical Memorandum presents the results of wave modeling and sediment stability analysis conducted by Coast and Harbor Engineering (CHE) for the former Custom Plywood Mill Site Cleanup Project. Technical information and recommendations presented herein are developed at preliminary level and shall be revised during preliminary and final engineering design.

Figure 1, Bathymetry in the Modeling Domain



COAST & HARBOR ENGINEERING

Figure 2, Wave Modeling Results, Wave Heights NE - MHHW



COAST & HARBOR ENGINEERING

Figure 3, Wave Modeling Results, Wave Heights NE - MLLW

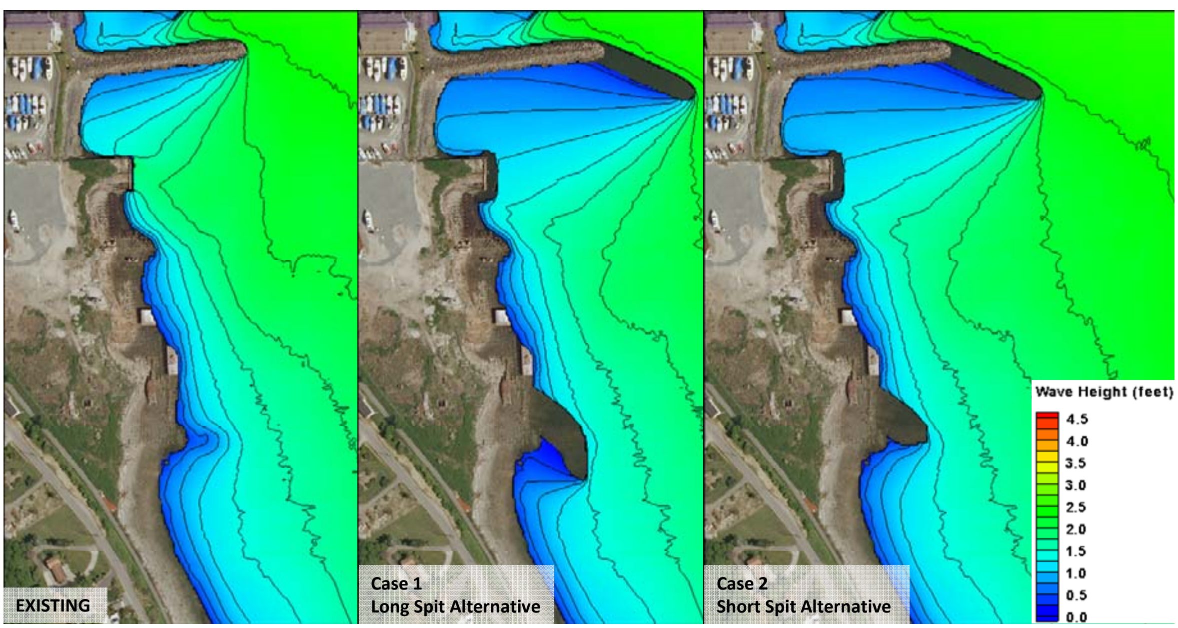


Figure 4, Case 2, Stable Material Along Cross Sections

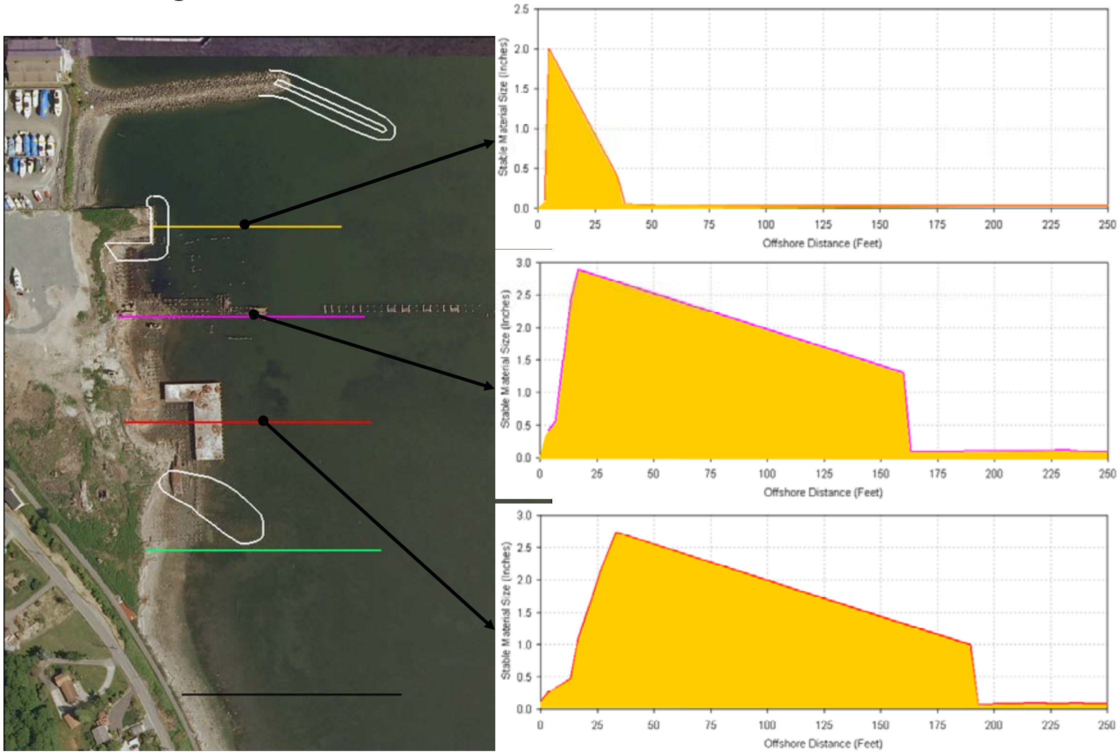


Figure 5, Case 2, Stable Material Along Cross Sections

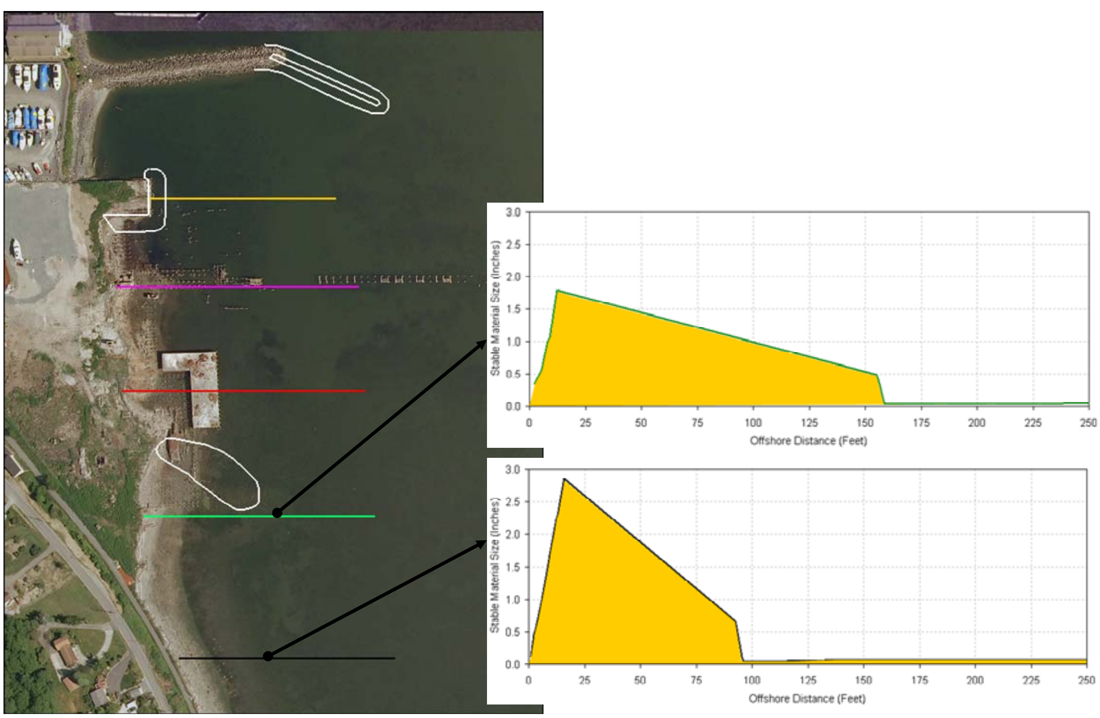


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Figure 6, Existing Material

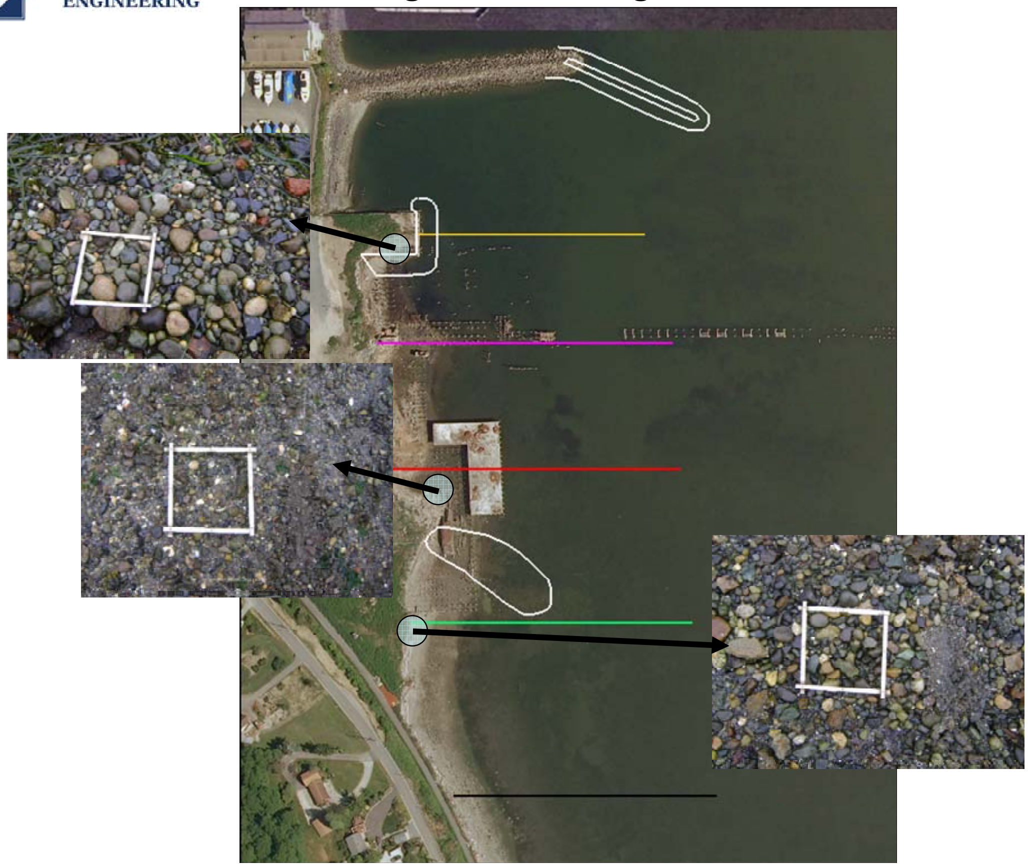

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Figure 7, Spit: Size Seaward Slope Material

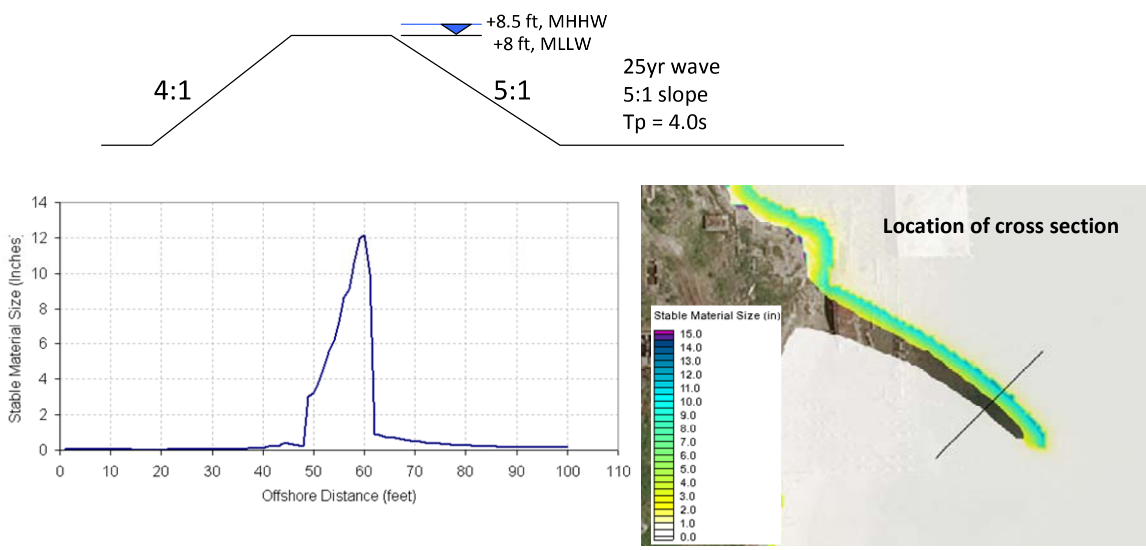
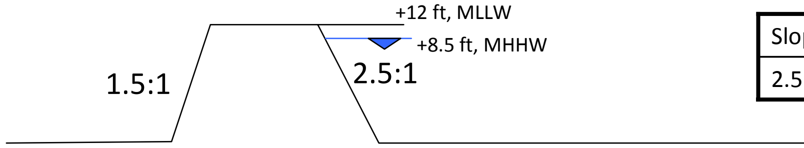
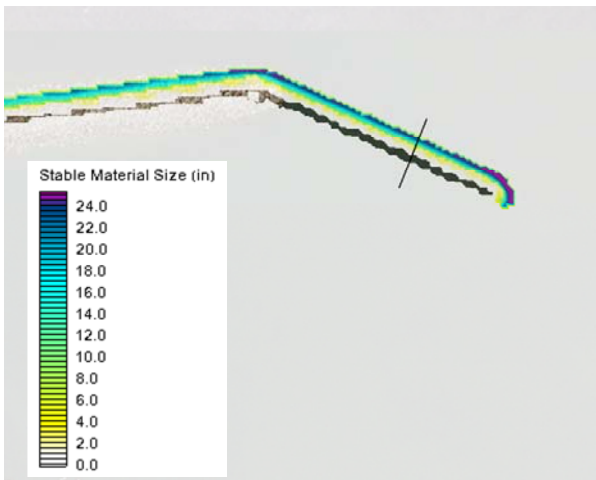


Figure 8, Breakwater Extension: Seaward Slope Material



Slope	D50
2.5:1	19 in



COAST & HARBOR ENGINEERING

Technical Memorandum

Former Custom Plywood Mill Site Cleanup Project
Verification of Wind-Wave Design Criteria

This Technical Memorandum presents the results of comparative analysis of wind data from the previous Coast & Harbor Engineering, Inc. (CHE) study at the Former Custom Plywood Mill site and new data (unknown during a previous CHE study) obtained from the Samish Indian Nation on May 6, 2011. Based on comparative analysis, a conclusion was made regarding the validity of CHE's recommendations for wind-wave design criteria.

During the previous CHE wind study, wind statistics and recommendations for the design criteria were developed based on long-term Bellingham Airport wind data (1973-2006) and validation-adjustments of these data at Padilla Bay Farm wind data (2007-2011). The new wind data that were provided by Samish Indian Nation were collected at Weaverling Spit during the period from 2006 to 2011. Figure 1 shows the location of wind stations that were used for comparative analysis. The figure also shows the location of the former Custom Plywood mill site.

Figure 1. Regional map of wind stations and former Custom Plywood site

The Bellingham Airport station is located approximately 1.25 miles from the shoreline and is operated by the Federal Aviation Administration. Wind measurements are made each hour for a 2-minute wind duration from a height of 32.8 ft above ground level. The station has no wind obstructions from any direction.

Padilla Bay Farm station is located approximately 0.2 mile from the shoreline at the southeastern end of Padilla Bay. The station is operated by the National Oceanic and Atmospheric Administration (NOAA). Wind measurements are taken every 15 minutes for a 15-minute wind duration at a height of 10 ft above ground level. There are no obstructions from wind, but the SSE to NNW orientation of the bay and higher terrain along the eastern and western shores likely influence wind directions measured by the station.

Weaverling Spit station is located approximately 1.1 mile SSE of the project site, and provides a local wind record for the south end of Fidalgo Bay. The Samish Indian Nation operates the station. Wind measurements are made every hour for the average wind speed and direction for the preceding hour at a height of 31 ft above ground level. The Weaverling Spit station is flanked by nearby 250- to 300-ft high terrain to the west, and so has wind blockage from the SW to NNW but is unobstructed for winds from the north to south sector.

For compatibility of analysis, the wind data measured at Padilla Bay Farm and Weaverling Spit stations[1] were transformed to industry standards with regard to duration of measurements and anemometer height above the water surface elevation. The 1.0 hr. wind speeds at Weaverling Spit were transformed to 2-minute duration wind speeds[2]. The 15-minute duration winds at 10 ft above ground for Padilla Bay were adjusted to 2-minute duration and the standard measuring height of 32.8 ft above ground.

Comparative analysis of wind data was conducted with two methods: 1- wind roses; and 2- time series of maximum winds. Wind roses provide overall statistical information on distributions of wind speeds and directions. Time series of wind data demonstrates the relationship between wind speed and directions at specific maximum wind events.

Wind data were statistically processed and annual wind roses were constructed for all three datasets for the period 2007-2010. Figure 3 compares plotted wind roses at three stations: Bellingham, Padilla Bay Farm, and Weaverling Spit. The roses were constructed based on complete yearly data (January-December) to ensure that the wind roses are not biased by data from different time periods.

The comparative analysis shows that wind roses are similar for all three stations. All three stations show a majority of winds blowing from the SE to SSE. Weaverling Spit and Padilla Bay Farm roses show slightly larger occurrences of north winds from the NW-NNW relative to BLI data from the NNE. It is likely that the effect of increased occurrence of NW-NNW winds at these stations is due to topography around Weaverling Spit and Padilla Bay Farm that accentuates the NW to NNW winds sector at these sites.

A comparison of time series of maximum annual wind speeds was also conducted for the period 2007-2010 for all wind directions. Figure 3 shows the results of this comparison.

[1] No corrections were required for the winds at Bellingham Airport.
[2] No adjustment was necessary for anemometer height above ground, as the correction would be insignificant for transforming wind speeds at 31 ft to those at 32.8 ft above ground.

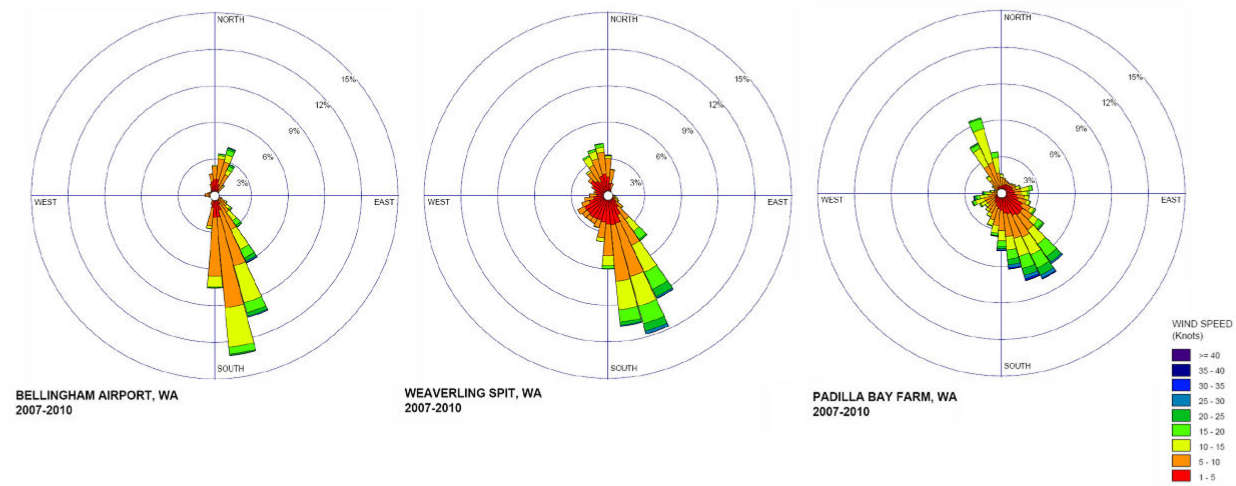


Figure 2. Annual wind rose for Bellingham Airport (BLI), Weaverling Spit (WSPIT), and station Padilla Bay Farm (PADBAY) station

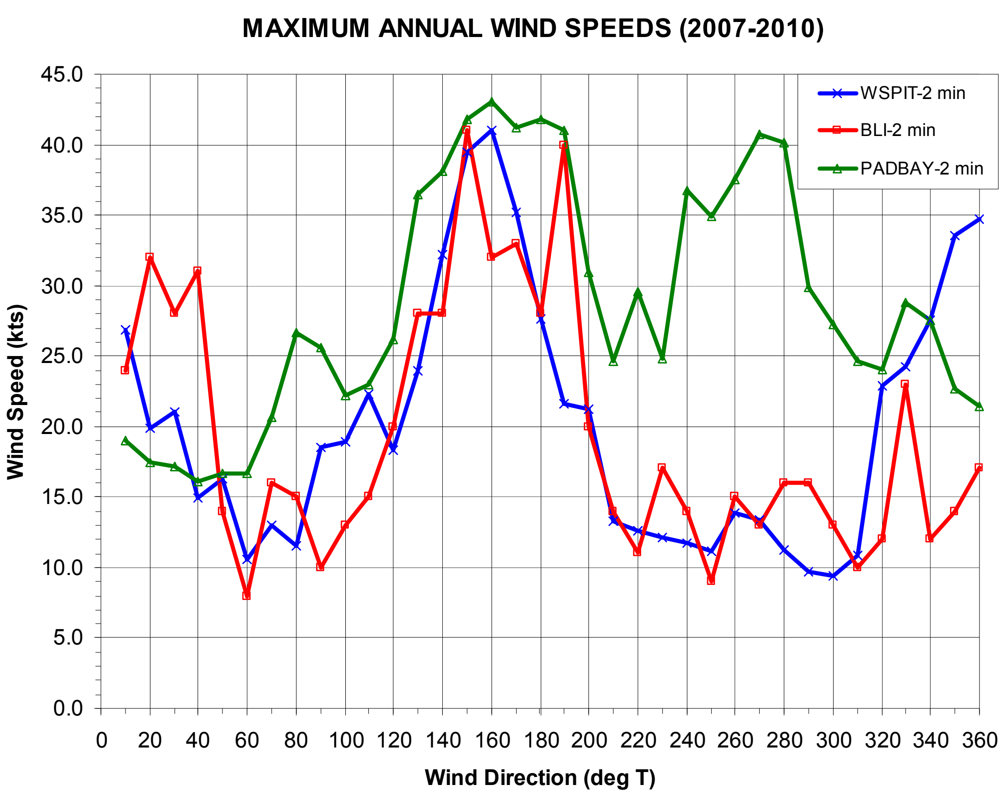


Figure 3. Maximum annual wind speeds for Weaverling Spit (WSPIT), Bellingham Airport (BLI), and Padilla Bay Farm (PADBAY)

The comparative analysis shows a similarity of maximum wind speeds and corresponding directions between Bellingham Airport and Weaverling Spit stations. For most directions, except NNW-NW, Padilla Bay Farm station maximum wind speeds coincide with Bellingham Airport and Weaverling Spit stations. This anomaly is likely due to exposure of the Padilla Bay Farm station to winds from the Strait of Juan de Fuca.

Conclusions

Based on comparative analyses of wind roses and maximum annual wind speeds, the Bellingham Airport wind data previously applied for design criteria very well represent the project site conditions at the Former Custom Plywood Mill.

- Wind data from Weaverling Spit station is a valuable addition to the existing wind database that will provide new data and improve the knowledge of wind conditions in Fidalgo Bay.
- Weaverling Spit data confirm wind speed and direction criteria previously applied.
- The recommendations for wind-wave design criteria developed previously by CHE are valid and do not need any modifications at this time.

Photo 1: Intertidal Area

Photo 2: Intertidal Area


Photo 3: Intertidal Area


Photo 4: Intertidal Area


Photo 5: Intertidal Area

APPENDIX B-3
CONCEPTUAL HABITAT MITIGATION ALTERNATIVES
DEVELOPMENT TIMELINE

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
P.O. Box 47600 • Olympia, Washington 98504-7600
(360) 407-6000 • TDD Only (Hearing Impaired) (360) 407-6006

MEMORANDUM

DATE: December 21, 2010

TO: Resource Agencies and Interested Parties

FROM: Hun Seak Park, P.E.

RE: **Appendix B-3: Conceptual Habitat Mitigation Alternatives Development Timeline for the Custom Plywood Interim Remediation Action**
17330-27

The purpose of this memo is to document the evolution of the mitigation concepts brought forward for the Custom Plywood Interim Remediation Action focusing on interactions with the various resource agencies that regulate the natural resources associated with the remediation area defined in Sections 2.1 of the Feasibility Study (FS). Though remediation actions are procedurally exempt from obtaining permits from state and local governments under MTCA, substantive requirements are required to be met. Previous memos cover in detail the conceptual design elements as well as the technical information that lead to their development (Refer to Appendices B-1 and B-2). The guiding principles and relevant state and federal regulations are listed in Section 4.2 of the FS.

Just as the goal of the remediation action is to improve site conditions from a contamination perspective, the goal of the natural resource managers is to enhance, restore, or mitigate for impacts to natural resources present within the remediation area. In an area such as Fidalgo Bay where there are several natural resources that need to be considered within an overall remediation action, addressing all regulatory mandates can be challenging and requires a significant amount of coordination effort in order to come to a preferred action to address all natural resource concerns.

The following table provides a summary of discussions with federal, state and local government agencies related to the restoration and mitigation requirements for the Custom Plywood project located in Anacortes, Washington. Communication between the involved parties has been through email, conference calls, meetings in person, and presentations.

Date	Agency[1]	Summary of Discussion and Outcome
12/9/2009	SEA, WDFW, City, NOAA	Initial concept for consolidating wetlands at the southern end of the Custom Plywood property in a pocket estuary is put forward as a solution for mitigating for loss of wetlands present on the property while enhancing forage fish spawning and juvenile salmonid foraging habitat.
8/1/2010	TCP	TCP/HC begins developing mitigation concepts based on RI information and the initial concept previously brought forward.
8/18/2010	SEA, City	Initial draft wetland and bioswale concept plan is submitted for review.
8/19/2010	SEA	Bioswale not acceptable mitigation for Wetland D. Consolidated wetland (freshwater and estuarine) mitigation. Mitigation in form of estuary per December 2009 presentation is supported. Estuary construction simultaneously done with upland cleanup.
8/20/2010	SEA, City	1:1 mitigation ratio acceptable to SEA. Need buy-off from Corps on 1:1 ratio and temporal loss. Complete Isolated Wetlands Worksheet for non-federal jurisdictional wetland impacts. 110-ft buffer required for restored wetland. Need to confirm ordinary high water (OHW) line (use 9.5 ft MHHW or complete study to verify).
8/27/2010	SEA	Bioswale is seen as a desirable feature for stormwater treatment as long as it adheres to the current Ecology Stormwater Manual.
8/30/2010	SEA	Given site constraints, bioswale may be placed within wetland buffer.
9/2/2010	SEA	Stormwater treatment required before entering Fidalgo Bay. Routing treated stormwater through mitigation area is desirable. Bioswale is desirable for stormwater treatment but is not appropriate as wetland mitigation (two separate elements on site plan). Verify 9.5 ft elevation of OHW line with WDFW and Corps.
9/3/2010	WDFW	The OHW mark is approximately +9.2 to +10 feet for the Custom Plywood site and coincides with the top of the sand berm paralleling the shoreline and the established vegetation line.

[1] NOAA: National Oceanic and Atmospheric Administration Fisheries/National Marine Fisheries Service
USACE: U.S. Army Corps of Engineers
USFW: U.S. Fish and Wildlife Service
TCP: Washington State Department of Ecology Toxics Control Program
SEA: Washington State Department of Ecology Shorelands and Environmental Assistance
WDFW: Washington State Department of Fish and Wildlife
City: City of Anacortes
GBH: GBH Investments, LLC. - current site/property owner

Date	Agency[1]	Summary of Discussion and Outcome
9/17/2010 9/23/2010	USACE	For Section 404 jurisdictional line is the line of mean higher high water (MHHW) and Wetland E, and for Section 10 of the Rivers and Harbors Act, the jurisdictional boundary is the line of mean high water (MHW). A USACE permit will only be required if fill material (dirt, rock, gravel, etc.) is placed water-ward of the MHHW line, in Wetland E, or if any work (dredging, structures, etc.) is done water-ward of the MHW line.
9/28/2010	SEA	WDFW placed OHW line between 9.2 ft and 10 ft MHHW (consistent with SEA determination of 9.5 ft). Adequate mitigation is a single 12,000 sf estuarine wetland.150-ft buffer required for Category II estuarine wetland and can be reduced to 110 ft using minimization measures. Bioswale preferred stormwater treatment. Impacts to Wetlands A to D authorized through administrative order (AO), and impacts to Wetland E authorized separately (use JARPA). Conceptual mitigation submitted not adequate for approval – need detailed plan, drawings and performance standards. Send SEA detailed mitigation design (including bioswale) at least two months prior to construction (need 30-60 days to review and issue AO).
10/25/2010	WDFW, SEA, NOAA, City, Corps	Conceptual wetland mitigation memo is presented to the resource agencies with in-water protective features (intertidal spit and extension of City jetty).
10/29/2010	WDFW	No justification for intertidal spit concept. Construct mitigation landward of existing shoreline. Use soft shore approach to stabilize shoreline. Anchor woody debris and plant dune grass.
11/1/2010	SEA	Reconfigure mitigation area to avoid filling below OHW and MHHW. Scaled back version of pocket estuary more appropriate than spit. Provide 150-ft buffer, which can be reduced to 110 ft. Meander swale. Provide a 10 yr monitoring period and provide measurable performance standards. Show OHW and MHHW on figure.
11/2/2010	NOAA	Does not support fill for spit concept.
11/4/2010	City	Revise mitigation plan to: 1) address Shoreline Master Program (SMP) and 2:1 mitigation ratio for Category III wetlands, 2) consider soft-shore armoring techniques, 3) include a fish and wildlife habitat conservation area (FWHCA) habitat assessment and address consistency with SMP, 4) address shoreline inventory, project impacts on ecological function, special management recommendations, etc., 5) provide public access, 6) address stormwater and FWHCA impacts, 7) consider alternative

Date	Agency[1]	Summary of Discussion and Outcome
		techniques for protection of buffer plantings rather than upland fill and maintain natural contours, 8)address property ownership adjacent to Tommy Thompson trail, 9) address archaeological/areas of special interest, 10) update monitoring/contingency plan, 11) discuss 12-inch storm line under Tommy Thompson trail, 12) verify storm system sizing, and 13) discuss silt buildup prevention in existing storm line.
11/16/2010	SEA, WDFW, City, NOAA	HC and TCP presented three habitat mitigation concepts that contained both upland and in-water components. Concepts mitigated for/enhanced habitat for existing wetlands, forage fish spawning habitat, and juvenile salmonid foraging habitat. TCP requested formal comments from agencies. NOAA does not support spit concept. SEA will allow 40-50 ft buffer on trail side.
12/2/2010	USFW, WDFW, and NOAA	Agree that in-water protection measures (jetty extension and spit) will reduce the need for hard armoring of the shoreline and have several positive habitat enhancement features most prominent of these is providing foragefish spawning habitat. Advised that hard armoring is not an option and that all efforts should be made to soften any remediation protection measures.
12/3/2010	SEA	Wetland mitigation should be designed to avoid in-water fill. Mitigation may be required for spit, jetty extension and armoring. Permitting complicated by in-water work – remove from wetland mitigation plan. Construct estuarine wetland mitigation in Phase 1 and connection to bay in Phase 2. Do not support hard armoring of shoreline.
12/3/2010	TCP	Responds to comments from SEA and requests clarification on wetland buffer requirements as discussed during the 11/16 presentation.
12/7/2010	SEA	SEA program documents their agreement to allow 40-50 ft buffer on trail side and a 75-foot buffer between the created wetland and the portion of the site that will subsequently be developed and review in-water habitat enhancements in subsequent phases of the project. The wetland mitigation concept can not be fully developed for public comment.
12/10/2010	USACE	USACE documents their jurisdictional area and authority in regulating Wetland E. They agree to consolidate all wetlands (including Wetland E) into the mitigation area. They agree to review in-water structures and fill in subsequent phases as they pertain to Sec. 10 and 404 requirements.
12/15/2010	GBH	Via conference call with the TCP, GBH agrees to develop plans to install a public access at the southeast corner of the property to

Date	Agency[1]	Summary of Discussion and Outcome
		the shoreline.
12/16/2010	City	The City provides positive preliminary comments on Jetty breakwater extension concept. Benefits of increased habitat and public access opportunities were discussed. The city agreed the concept of the city-owned Jetty extension and spit in-water structures for the maximum improvement of existing habitat areas along the site shoreline protection. The city advises TCP to consider adding public access to the proposed Jetty extension area.

Given the interactions detailed above, TCP is moving forward with the preferred mitigation alternatives described in Appendices B-1 and B-2 for the FS. The consolidated wetland concept will be implemented during the upland remediation phase while in-water habitat enhancement pieces will be implemented in subsequent phases. In-water enhancement pieces will still require federal concurrence before they can be implemented.

Summary of agency abbreviations and representatives involved:

- National Oceanic and Atmospheric Administration Fisheries/National Marine Fisheries Service – NOAA (Joel Moribe)
- U.S. Army Corps of Engineers – USACE (Randel Perry)
- U.S. Fish and Wildlife Service – USFWS (Andrea LaTier)
- Washington State Department of Ecology Toxics Control Program – TCP (Hun Seak Park, Peter Adolphson, and Sandra Caldwell)
- Washington State Department of Ecology Shorelands and Environmental Assistance – SEA (Paul Anderson and Rebekah Padgett)
- Washington State Department of Fish and Wildlife – WDFW (Doug Thompson)
- City of Anacortes – City (Don Measamer and Ryan Larson)
- Hart Crowser – HC (Jason Stutes, Rick Moore, Celina Abercrombie, and Jon Houghton)
- GBH Investments, LLC. - Current PLP and property owner (Richard LeMieux)

APPENDIX C
REMEDIATION ALTERNATIVES PRELIMINARY COST ESTIMATES

Table C-U1: Upland Remediation Alternative U-1 Estimated Cost Summary
Excavate soil to human health POC and long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$50,000	$50,000	Preliminary estimate. Includes well abandonment, setup of construction area (fencing, entrance, signage), removal of impacted water from press pit area.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Site Preparation, Mobilization/Demobilization Subtotal				**$125,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	14,000	ton	$70	$980,000	Assume removal of top 2 feet of debris from excavation areas, transportation, and off-site disposal.
Concrete Structure Demolition and Recycling	1,750	CY	$57	$100,000	Demolition of existing slabs and structures. Crush and reuse concrete on site as part of backfill material. Includes mobilization, temporary stockpiling, rehandling, and backfill placement cost.
Piling Removal	970	each	$250	$243,000	Excavation areas only. Assume complete removal of piling.
Piling Transport and Disposal	970	each	$100	$97,000	
Demolition, Debris and Piling Removal Subtotal				**$1,420,000**	
Excavation and Backfilling					
Excavation and Direct Loading - Dry Soil	16,200	BCY	$10	$162,000	Excavation areas and depths shown on Figure 8-1. Cost excludes contingency deep excavation dewatering (preliminary estimate approx. $75,000).
Excavation, Stockpiling, and Loading - Wet Soil	2,600	BCY	$15	$39,000	
Transport and Disposal	28,200	ton	$60	$1,692,000	Cost dependent on material acceptability, disposal site location, and transport distance. Assume Subtitle D landfill disposal.
Import and Place Backfill Material	28,800	LCY	$25	$720,000	Imported material quantity reduced by using recycled concrete from demolition of aboveground structures. Includes nominal compaction.
Construction Erosion and Sediment Control	1	LS	$25,000	$25,000	Preliminary estimate.
Post-Construction Stabilization	12,800	SY	$2	$26,000	Stabilization of backfilled excavation areas outside of wetland mitigation and stormwater swale areas.
Excavation and Backfilling Cost Subtotal				**$2,664,000**	
Construction Cost Subtotal				**$4,209,000**	
Contingency	25%	--	--	**$1,052,000**	Scope 15%, bid 10%.
Non-Construction Costs					
Permitting	1	LS	$25,000	$25,000	
Remedial Design	8%	--	--	$421,000	EPA 2000.
Construction Management	6%	--	--	$316,000	EPA 2000.
Project Management	5%	--	--	$263,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$50,000	$50,000	Sample collection and testing.
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Non-Construction Cost Subtotal				**$1,100,000**	
Mitigation and Shoreline Protection					
Temporary Shoreline Protection	1	LS	$10,000	$10,000	Temporary rock or other protection to be determined. Permanent shoreline protection features to be completed during in-water phase of work.
Wetland Mitigation	1	LS	$624,000	$624,000	
Stormwater Swale Installation	1	LS	$70,000	$70,000	
Mitigation and Shoreline Protection Subtotal				**$704,000**	

Table C-U1: Upland Remediation Alternative U-1 Estimated Cost Summary
Excavate soil to human health POC and long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Long-Term Monitoring	1	LS	$261,000	**$261,000**	Annual groundwater monitoring (assume 9 wells) and reporting. Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009).
Alternative U-1 Total Estimated Cost				**$7,326,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-U2: Upland Remediation Alternative U-2 Estimated Cost Summary
Excavate soil to ecological POC and long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$50,000	$50,000	Preliminary estimate. Includes well abandonment, setup of construction area (fencing, entrance, signage), removal of impacted water from press pit area.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Site Preparation, Mobilization/Demobilization Subtotal				**$125,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	14,000	ton	$70	$980,000	Assume removal of top 2 feet of debris from excavation areas, transportation, and off-site disposal.
Concrete Structure Demolition and Recycling	1,750	CY	$57	$100,000	Demolition of existing slabs and structures. Crush and reuse concrete on site as part of backfill material. Includes mobilization, temporary stockpiling, rehandling, and backfill placement cost.
Piling Removal	970	each	$250	$243,000	Excavation areas only. Assume complete removal of piling.
Piling Transport and Disposal	970	each	$100	$97,000	Contractor quote.
Demolition, Debris and Piling Removal Subtotal				**$1,420,000**	
Excavation and Backfilling					
Excavation and Direct Loading - Dry Soil	15,000	BCY	$10	$150,000	Excavation areas and depths shown on Figure 8-2. Cost excludes contingency deep excavation dewatering (preliminary estimate approx. $75,000).
Excavation, Stockpiling, and Loading - Wet Soil	2,000	BCY	$15	$30,000	
Transport and Disposal	22,500	ton	$60	$1,350,000	Cost dependent on material acceptability, disposal site location, and transport distance. Assume Subtitle D landfill disposal.
Import and Place Backfill Material	27,300	LCY	$25	$683,000	Imported material quantity reduced by using recycled concrete from demolition of above-ground structures. Includes nominal compaction.
Construction Erosion and Sediment Control	1	LS	$25,000	$25,000	
Post-Construction Stabilization	12,800	SY	$2	$26,000	Stabilization of backfilled excavation areas outside of wetland mitigation and stormwater swale areas.
Excavation and Backfilling Cost Subtotal				**$2,264,000**	
Construction Cost Subtotal				**$3,809,000**	
Contingency	25%	--	--	**$952,000**	Scope 15%, bid 10%.
Non-Construction Costs					
Permitting	1	LS	$25,000	$25,000	
Remedial Design	8%	--	--	$381,000	EPA 2000.
Construction Management	6%	--	--	$286,000	EPA 2000.
Project Management	5%	--	--	$238,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$50,000	$50,000	Sample collection and testing.
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Non-Construction Cost Subtotal				**$1,005,000**	
Mitigation and Shoreline Protection					
Temporary Shoreline Protection	1	LS	$10,000	$10,000	Temporary rock or other protection to be determined. Permanent shoreline protection features to be completed during in-water phase of work.
Wetland Mitigation	1	LS	$624,000	$624,000	
Stormwater Swale Installation	1	LS	$70,000	$70,000	
Mitigation and Shoreline Protection Subtotal				**$704,000**	

Table C-U2: Upland Remediation Alternative U-2 Estimated Cost Summary
Excavate soil to ecological POC and long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Long-Term Monitoring	1	LS	$261,000	**$261,000**	Annual groundwater monitoring (9 wells) and reporting. Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009).
Alternative U-2 Total Estimated Cost				**$6,731,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-U3: Upland Remediation Alternative U-3 Estimated Cost Summary
Excavate soil to human health POC in shoreline protection zone and to ecological POC elsewhere, with long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$50,000	$50,000	Preliminary estimate. Includes well abandonment, setup of construction area (fencing, entrance, signage), removal of impacted water from press pit area.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Site Preparation, Mobilization/Demobilization Subtotal				**$125,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	14,200	ton	$70	$994,000	Assume removal of top 2 feet of debris from excavation areas, transportation, and off-site disposal.
Concrete Structure Demolition and Recycling	1,750	CY	$57	$100,000	Demolition of existing slabs and structures. Crush and reuse concrete on site as part of backfill material. Includes mobilization, temporary stockpiling, rehandling, and backfill placement cost.
Piling Removal	970	each	$250	$243,000	Excavation areas only. Assume complete removal of piling.
Piling Transport and Disposal	970	each	$100	$97,000	
Demolition, Debris and Piling Removal Subtotal				**$1,434,000**	
Excavation and Backfilling					
Excavation and Direct Loading - Dry Soil	15,100	BCY	$10	$151,000	Excavation areas and depths shown on Figure 8-2. Cost excludes contingency deep excavation dewatering (preliminary estimate approx. $75,000).
Excavation, Stockpiling, and Loading - Wet Soil	2,100	BCY	$15	$32,000	
Transport and Disposal	22,700	ton	$60	$1,362,000	Cost dependent on material acceptability, disposal site location, and transport distance. Assume Subtitle D landfill disposal.
Import and Place Backfill Material	27,200	LCY	$25	$680,000	Imported material quantity reduced by using recycled concrete from demolition of above-ground structures. Includes nominal compaction.
Construction Erosion and Sediment Control	1	LS	$25,000	$25,000	
Post-Construction Stabilization	12,800	SY	$2.00	$26,000	Stabilization of backfilled excavation areas outside of wetland mitigation and stormwater swale areas.
Excavation and Backfilling Cost Subtotal				**$2,276,000**	
Construction Cost Subtotal				**$3,835,000**	
Contingency	25%	--	--	**$959,000**	Scope 15%, bid 10%.
Non-Construction Costs					
Permitting	1	LS	$25,000	$25,000	
Remedial Design	8%	--	--	$384,000	EPA 2000.
Construction Management	6%	--	--	$288,000	EPA 2000.
Project Management	5%	--	--	$240,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$50,000	$50,000	Sample collection and testing.
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Non-Construction Cost Subtotal				**$1,012,000**	
Mitigation and Shoreline Protection					
Temporary Shoreline Protection	1	LS	$10,000	$10,000	Temporary rock or other protection to be determined. Permanent shoreline protection features to be completed during in-water phase of work.
Wetland Mitigation	1	LS	$624,000	$624,000	
Stormwater Swale Installation	1	LS	$70,000	$70,000	
Mitigation and Shoreline Protection Subtotal				**$704,000**	

Table C-U3: Upland Remediation Alternative U-3 Estimated Cost Summary
Excavate soil to human health POC in shoreline protection zone and to ecological POC elsewhere, with long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Long-Term Monitoring	1	LS	$261,000	**$261,000**	Annual groundwater monitoring (9 wells) and reporting. Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009).
Alternative U-3 Total Estimated Cost				**$6,771,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-U4: Upland Remediation Alternative U-4 Estimated Cost Summary
Containment cap installation, excavation, and long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$50,000	$50,000	Preliminary estimate. Includes well abandonment, setup of construction area (fencing, entrance, signage), removal of impacted water from press pit area.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Site Preparation, Mobilization/Demobilization Subtotal				**$125,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	6,800	ton	$70	$476,000	Assume removal of top 2 feet of debris from excavation areas, transportation, and off-site disposal.
Concrete Structure Demolition	1,400	CY	$62	$86,000	Demolition of existing slabs and structures. Crush and reuse concrete on site as part of backfill material. Includes mobilization, temporary stockpiling, rehandling, and backfill placement cost.
Piling Removal	169	each	$250	$42,000	Excavation areas only. Assume complete removal of piling.
Piling Transport and Disposal	169	each	$100	$17,000	
Demolition, Debris and Piling Removal Subtotal				**$621,000**	
Excavation and Backfilling					
Excavation and Direct Loading - Dry Soil	2,800	BCY	$10	$28,000	Excavation areas and depths shown on Figure 8-2 - wetland mitigation area only. Cost excludes contingency
Excavation, Stockpiling, and Loading - Wet Soil	500	BCY	$15	$8,000	deep excavation dewatering (preliminary estimate approx. $75,000).
Transport and Disposal	4,200	ton	$60	$252,000	Cost dependent on material acceptability, disposal site location, and transport distance. Assume Subtitle D landfill disposal.
Import and Place Backfill Material	6,200	LCY	$25	$155,000	Includes wetlands mitigation area only. Imported material quantity reduced by using recycled concrete from demolition of above-ground structures. Includes nominal compaction.
Construction Erosion and Sediment Control	1	LS	$25,000	$25,000	
Post-Construction Stabilization				$0	Assume stabilization of excavation areas completed as part of wetland mitigation and stormwater swale implementation.
Excavation and Backfilling Subtotal				**$468,000**	
Containment Cap Installation					
Purchase, Transport, and Place Fill Material	13,900	BCY	$18	$256,000	To raise grade average of 2 ft.
Subgrade Preparation	20,900	SY	$1.81	$37,800	Prepare and compact fill material for placement of base course and asphalt.
Purchase, Transport, and Place Cap Materials	20,900	SY	$22	$461,000	Assume 6-in base course layer and 2-in asphalt layer.
Cap Installation Quality Control	5%	--	--	$37,700	Assume 5% of cap installation cost.
Drainage Control Installation	1	LS	$111,000	$111,000	Drainage system for asphalt cap. Includes catchbasins, storm pipe, tide gate, and scour protection.
Containment Cap Installation Subtotal				**$903,500**	
Construction Cost Subtotal				**$2,117,500**	
Contingency	20%	--	--	**$424,000**	Scope 10%, bid 10%.

Table C-U4: Upland Remediation Alternative U-4 Estimated Cost Summary
Containment cap installation, excavation, and long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Non-Construction Costs					
Permitting	1	LS	$25,000	$25,000	
Remedial Design	8%	--	--	$203,000	EPA 2000.
Construction Management	6%	--	--	$152,000	EPA 2000.
Project Management	5%	--	--	$127,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$50,000	$50,000	Sample collection and testing.
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Non-Construction Cost Subtotal				**$582,000**	
Mitigation and Shoreline Protection					
Temporary Shoreline Protection	1	LS	$10,000	$10,000	Temporary rock or other protection to be determined. Permanent shoreline protection features to be completed during in-water phase of work.
Wetland Mitigation	1	LS	$624,000	$624,000	
Stormwater Swale Installation	1	LS	$70,000	$70,000	
Mitigation and Shoreline Protection Subtotal				**$704,000**	
Annual and Periodic Costs					
Long-Term Monitoring	1	LS	$365,000	$365,000	Annual groundwater monitoring (9 wells), cap inspection, and reporting. Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009).
Periodic Cap Maintenance/Repair	1	LS	$454,000	$454,000	Assume 5% of cap repaired every 2 years. Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009).
Annual and Periodic Cost Subtotal				**$819,000**	
Alternative U-4 Total Estimated Cost				**$4,647,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-A1: Aquatic Remediation Alternative A-1 Estimated Cost Summary
Deep nearshore and offshore excavation/dredging, ENR, and long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$100,000	$100,000	Setup of construction area (fencing, entrance, signage) and preliminary estimate to set up upland sediment dewatering cell.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Access Road and Crane Pads	1	LS	$154,000	$154,000	Assumes subsequent removal of quarry spall material and reuse on site as backfill in nearshore excavation areas.
Site Preparation, Mobilization/Demobilization Subtotal				**$329,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	7,100	ton	$70	$497,000	Assume removal of top 2 feet of debris from excavation areas and off-site disposal. 1 cy = 1.5 tons
Concrete Pier Demolition	1	LS	$394,000	$394,000	Includes demolition, piling removal and disposal, and debris curtain.
Bulkhead Demolition	1	LS	$112,000	$112,000	Includes demolition and debris curtain.
Intertidal Piling Removal	765	each	$375	$287,000	Assume removal of entire piling.
Subtidal Piling Removal	345	each	$600	$207,000	Assume removal of entire piling.
Piling Transport and Disposal	1,110	each	$100	$111,000	
Demolition, Debris and Piling Removal Subtotal				**$1,608,000**	
Excavation/Dredging					
Nearshore Excavation and Rehandling in Upland Staging Area for Disposal Transport	9,400	CY	$15	$141,000	Assume up to 6-ft excavation depth in near-shore area. Assumes shoring not needed.
Offshore Dredging, Barge Dewatering, and Rehandling in Upland Staging Area for Disposal Transport	35,800	CY	$15	$537,000	Assume up 6-ft offshore dredging depth.
Sediment Dewatering	860,000	gal	$0.20	$172,000	Assumes dewatering of sediment in temporary holding cell, nominal solids settling, and discharge to Fidalgo Bay under Water Quality Cert. Assumes 0.3 porosity of total excavated/dredged sediment volume. Preliminary unit cost estimate. Solids disposed with dredged material.
Transport and Disposal	67,800	ton	$60	$4,068,000	Assume Subtitle D landfill disposal. 1 cy = 1.5 tons
Environmental Controls	1	LS	$100,000	$100,000	Water quality controls for duration of project.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-dredging record surveys. Excludes contractor progress surveys. Preliminary estimate.
Excavation/Dredging Subtotal				**$5,068,000**	
Excavation/Dredge Backfilling					
Purchase, Transport, and Place Backfill Material	43,000	CY	$30	$1,290,000	Assume temporary road and crane pad quarry spalls reused as part of backfill material in nearshore area. Quarry spall volume deducted from imported backfill volume.
Environmental Controls				$0	Included with dredging cost.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-capping record surveys.
Excavation/Dredge Backfilling Subtotal				**$1,340,000**	
ENR Thin-Layer Cap (TLC) Placement					
Purchase, Transport, and Place TLC Material	18,900	CY	$25	$473,000	
Environmental Controls					Included with dredging cost.
Bathymetric Surveys					Included with excavation/dredge surveys.
ENR Thin-Layer Cap (TLC) Placement Subtotal				**$473,000**	

Table C-A1: Aquatic Remediation Alternative A-1 Estimated Cost Summary
Deep nearshore and offshore excavation/dredging, ENR, and long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Shoreline Protection Features					
Jetty Extension	1	LS	$1,068,000	$1,068,000	Includes material and placement.
Protective Spit	1	LS	$296,000	$296,000	Includes material and placement.
Shoreline Protection Features Subtotal				**$1,364,000**	
Construction Cost Subtotal				**$10,182,000**	
Contingency	30%	--	--	**$3,054,600**	
Non-Construction Costs					
Eelgrass TLC Pilot Test	1	LS	$100,000	$100,000	Preliminary placeholder estimate.
Dredge Prism Material/Chemical Characterization	1	LS	$50,000	$50,000	Preliminary estimate (if required).
Eelgrass Bed Mitigation	4,300	SF	$17	$73,000	Typical replanting cost.
Permitting	1	LS	$50,000	$50,000	
Remedial Design	6%	--	--	$794,000	EPA 2000.
Construction Management	6%	--	--	$794,000	EPA 2000.
Project Management	5%	--	--	$662,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$100,000	$100,000	
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Subtotal Non-Construction Costs				**$2,648,000**	
Periodic Costs					
Long-Term Monitoring	1	LS	$309,000	$309,000	Sediment monitoring, cap inspection, and reporting. Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009). Assumes $80,000 per event and up to 6 events over 30 years. Up to 10 samples including reference. Includes sample collection, testing, reporting. Samples analyzed for SMS constituents, bioassays, and dioxins.
Periodic Cap Maintenance/Repair	1	LS	$386,000	$386,000	Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009). Assumes $100,000 per event and up to 6 events over 30 years.
Periodic Cost Subtotal				**$695,000**	
Alternative A-1 Total Estimated Cost				**$16,580,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-A2: Aquatic Remediation Alternative A-2 Estimated Cost Summary
Shallow nearshore and offshore excavation/dredging, ENR, and long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$100,000	$100,000	Setup of construction area (fencing, entrance, signage) and preliminary estimate to set up upland sediment dewatering cell.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Access Road and Crane Pads	1	LS	$154,000	$154,000	Assumes subsequent removal of quarry spall material and reuse on site as backfill in nearshore excavation areas.
Site Preparation, Mobilization/Demobilization Subtotal				**$329,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	7,100	ton	$70	$497,000	Assume removal of top 2 feet of debris from excavation areas and off-site disposal. 1 cy = 1.5 tons
Concrete Pier Demolition	1	LS	$394,000	$394,000	Includes demolition, piling removal and disposal, and debris curtain.
Bulkhead Demolition	1	LS	$112,000	$112,000	Includes demolition and debris curtain.
Intertidal Piling Removal	765	each	$375	$287,000	Assume removal of entire piling.
Subtidal Piling Removal	345	each	$600	$207,000	Assume removal of entire piling.
Piling Transport and Disposal	1,110	each	$100	$111,000	
Demolition, Debris and Piling Removal Subtotal				**$1,608,000**	
Excavation/Dredging					
Nearshore Excavation and Rehandling in Upland Staging Area for Disposal Transport	1,400	CY	$15	$21,000	Assume 2-ft excavation depth in nearshore area and 6-ft depth where dioxin concentration > 25 ppt. Assumes shoring not needed.
Offshore Dredging, Barge Dewatering, and Rehandling in Upland Staging Area for Disposal Transport	13,300	CY	$15	$200,000	Assume 2-ft offshore dredging depth and 6-ft depth where dioxin concentration > 25 ppt.
Sediment Dewatering	380,000	gal	$0.20	$76,000	Assumes dewatering of sediment in temporary holding cell, nominal solids settling, and discharge to Fidalgo Bay under Water Quality Cert. Assumes 0.3 porosity of total excavated/dredged sediment volume. Preliminary unit cost estimate. Solids disposed with dredged material.
Transport and Disposal	22,050	ton	$60	$1,323,000	Assume Subtitle D landfill disposal. 1 cy = 1.5 tons
Environmental Controls	1	LS	$100,000	$100,000	Water quality controls for duration of project.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-dredging record surveys. Excludes contractor progress surveys. Preliminary estimate.
Excavation/Dredging Subtotal				**$1,770,000**	
Excavation/Dredge Backfilling					
Purchase, Transport, and Place TLC Material	12,500	CY	$25	$313,000	Assume temporary road and crane pad quarry spalls reused as part of backfill material in nearshore area. Quarry spall volume deducted from imported backfill volume.
Environmental Controls					Included with dredging cost.
Bathymetric Surveys					Included with excavation/dredge surveys.
Excavation/Dredge Backfilling Subtotal				**$313,000**	

Table C-A2: Aquatic Remediation Alternative A-2 Estimated Cost Summary
Shallow nearshore and offshore excavation/dredging, ENR, and long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
ENR Thin-Layer Cap (TLC) Placement					
Purchase and Transport TLC Material	18,900	CY	$10	$189,000	
Place TLC Material	18,900	CY	$20	$378,000	
Environmental Controls	1	LS	$75,000	$75,000	Water quality controls.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-capping record surveys.
ENR Thin-Layer Cap (TLC) Placement Subtotal				**$692,000**	
Shoreline Protection Features					
Jetty Extension	1	LS	$1,068,000	$1,068,000	Includes material and placement.
Protective Spit	1	LS	$296,000	$296,000	Includes material and placement.
Shoreline Protection Features Subtotal				**$1,364,000**	
Construction Cost Subtotal				**$6,076,000**	
Contingency	30%	--	--	**$1,822,800**	
Non-Construction Costs					
Eelgrass TLC Pilot Test	1	LS	$100,000	$100,000	Preliminary placeholder estimate.
Dredge Prism Material/Chemical Characterization	1	LS	$75,000	$75,000	Preliminary estimate (if required).
Eelgrass Bed Mitigation	4,300	SF	$17	$73,000	Typical replanting cost.
Permitting	1	LS	$50,000	$50,000	
Remedial Design	8%	--	--	$632,000	EPA 2000.
Construction Management	6%	--	--	$474,000	EPA 2000.
Project Management	5%	--	--	$395,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$100,000	$100,000	
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Subtotal Non-Construction Costs				**$1,924,000**	
Periodic Costs					
Long-Term Monitoring	1	LS	$309,000	$309,000	Sediment monitoring, cap inspection, and reporting. Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009). Assumes $80,000 per event and up to 6 events over 30 years. Up to 10 samples including reference. Includes sample collection, testing, reporting. Samples analyzed for SMS constituents, bioassays, and dioxins.
Periodic Cap Maintenance/Repair	1	LS	$386,000	$386,000	Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009). Assumes $100,000 per event and up to 6 events over 30 years.
Periodic Cost Subtotal				**$695,000**	
Alternative A-2 Total Estimated Cost				**$10,518,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-A3-1a: Aquatic Remediation Alternative A-3 Estimated Cost Summary
Deep nearshore and shallow offshore excavation/dredging, ENR, and long-term monitoring
(30-Year Operational Duration with Net Present Value)

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$100,000	$100,000	Setup of construction area (fencing, entrance, signage) and preliminary estimate to set up upland sediment dewatering cell.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Access Road and Crane Pads	1	LS	$154,000	$154,000	Assumes subsequent removal of quarry spall material and reuse on site as backfill in nearshore excavation areas.
Site Preparation, Mobilization/Demobilization Subtotal				**$329,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	7,100	ton	$70	$497,000	Assume removal of top 2 feet of debris from excavation areas and off-site disposal. 1 cy = 1.5 tons.
Concrete Pier Demolition	1	LS	$394,000	$394,000	Includes demolition, piling removal and disposal, and debris curtain.
Bulkhead Demolition	1	LS	$112,000	$112,000	Includes demolition and debris curtain.
Intertidal Piling Removal	765	each	$375	$287,000	Assume removal of entire piling.
Subtidal Piling Removal	345	each	$600	$207,000	Assume removal of entire piling.
Piling Transport and Disposal	1,110	each	$100	$111,000	
Demolition, Debris and Piling Removal Subtotal				**$1,608,000**	
Excavation/Dredging					
Nearshore Excavation and Rehandling in Upland Staging Area for Disposal Transport	9,400	CY	$15	$141,000	Assume 6-ft excavation depth in nearshore area. Assumes shoring not needed.
Offshore Dredging, Barge Dewatering, and Rehandling in Upland Staging Area for Disposal Transport	13,300	CY	$15	$200,000	Assume 2-ft offshore dredging depth and 6-ft depth where dioxin concentration > 25 ppt. Assumes shoring not needed.
Sediment Dewatering	860,000	gal	$0.20	$172,000	Assumes dewatering of sediment in temporary holding cell, nominal solids settling, and discharge to Fidalgo Bay under Water Quality Cert. Assumes 0.3 porosity of total excavated/dredged sediment volume. Preliminary unit cost estimate. Solids disposed with dredged material.
Transport and Disposal	34,050	ton	$60	$2,043,000	Assume Subtitle D landfill disposal. 1 cy = 1.5 tons.
Environmental Controls	1	LS	$100,000	$100,000	Water quality controls for duration of project.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-dredging record surveys. Excludes contractor progress surveys. Preliminary estimate.
Excavation/Dredging Subtotal				**$2,706,000**	
Excavation/Dredge Backfilling					
Purchase and Transport Backfill Material	20,500	CY	$25	$513,000	Assume temporary road and crane pad quarry spalls reused as part of backfill material in nearshore area. Quarry spall volume deducted from imported backfill volume.
Environmental Controls				$0	Included with dredging cost.
Bathymetric Surveys					Included with excavation/dredge surveys.
Excavation/Dredge Backfilling Subtotal				**$513,000**	

Table C-A3-1a: Aquatic Remediation Alternative A-3 Estimated Cost Summary
Deep nearshore and shallow offshore excavation/dredging, ENR, and long-term monitoring
(30-Year Operational Duration with Net Present Value)

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
ENR Thin-Layer Cap (TLC) Placement					
Purchase and Transport TLC Material	18,900	CY	$10	$189,000	
Place TLC Material	18,900	CY	$20	$378,000	
Environmental Controls	1	LS	$75,000	$75,000	Water quality controls.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-capping record surveys.
ENR Thin-Layer Cap (TLC) Placement Subtotal				**$692,000**	
Shoreline Protection Features					
Jetty Extension	1	LS	$1,068,000	$1,068,000	Includes material and placement.
Protective Spit	1	LS	$296,000	$296,000	Includes material and placement.
Shoreline Protection Features Subtotal				**$1,364,000**	
Construction Cost Subtotal				**$7,212,000**	
Contingency	30%	--	--	**$2,163,600**	
Non-Construction Costs					
Eelgrass TLC Pilot Test	1	LS	$100,000	$100,000	Preliminary placeholder estimate.
Dredge Prism Material/Chemical Characterization	1	LS	$75,000	$75,000	Preliminary estimate (if required).
Eelgrass Bed Mitigation	4,300	SF	$17	$73,000	Typical replanting cost.
Permitting	1	LS	$50,000	$50,000	
Remedial Design	8%	--	--	$750,000	EPA 2000.
Construction Management	6%	--	--	$563,000	EPA 2000.
Project Management	5%	--	--	$469,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$100,000	$100,000	
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Subtotal Non-Construction Costs				**$2,205,000**	
Periodic Costs					
Long-Term Monitoring	1	LS	$309,000	$309,000	Sediment monitoring, cap inspection, and reporting. Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009). Assumes $80,000 per event and up to 6 events over 30 years. Up to 10 samples including reference. Includes sample collection, testing, reporting. Samples analyzed for SMS constituents, bioassays, and dioxins.
Periodic Cap Maintenance/Repair	1	LS	$386,000	$386,000	Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009). Assumes $100,000 per event and up to 6 events over 30 years.
Periodic Cost Subtotal				**$695,000**	
Alternative A-3 Total Estimated Cost				**$12,276,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-A3-1b: Aquatic Remediation Alternative A-3 Estimated Cost Summary
Deep nearshore and shallow offshore excavation/dredging, ENR, and long-term monitoring
(200-Year Operational Duration with Net Present Value)

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$100,000	$100,000	Setup of construction area (fencing, entrance, signage) and preliminary estimate to set up upland sediment dewatering cell.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Access Road and Crane Pads	1	LS	$154,000	$154,000	Assumes subsequent removal of quarry spall material and reuse on site as backfill in nearshore excavation areas.
Site Preparation, Mobilization/Demobilization Subtotal				**$329,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	7,100	ton	$70	$497,000	Assume removal of top 2 feet of debris from excavation areas and off-site disposal. 1 cy = 1.5 tons.
Concrete Pier Demolition	1	LS	$394,000	$394,000	Includes demolition, piling removal and disposal, and debris curtain.
Bulkhead Demolition	1	LS	$112,000	$112,000	Includes demolition and debris curtain.
Intertidal Piling Removal	765	each	$375	$287,000	Assume removal of entire piling.
Subtidal Piling Removal	345	each	$600	$207,000	Assume removal of entire piling.
Piling Transport and Disposal	1,110	each	$100	$111,000	
Demolition, Debris and Piling Removal Subtotal				**$1,608,000**	
Excavation/Dredging					
Nearshore Excavation and Rehandling in Upland Staging Area for Disposal Transport	9,400	CY	$15	$141,000	Assume 6-ft excavation depth in nearshore area. Assumes shoring not needed.
Offshore Dredging, Barge Dewatering, and Rehandling in Upland Staging Area for Disposal Transport	13,300	CY	$15	$200,000	Assume 2-ft offshore dredging depth and 6-ft depth where dioxin concentration > 25 ppt. Assumes shoring not needed.
Sediment Dewatering	860,000	gal	$0.20	$172,000	Assumes dewatering of sediment in temporary holding cell, nominal solids settling, and discharge to Fidalgo Bay under Water Quality Cert. Assumes 0.3 porosity of total excavated/dredged sediment volume. Preliminary unit cost estimate. Solids disposed with dredged material.
Transport and Disposal	34,050	ton	$60	$2,043,000	Assume Subtitle D landfill disposal. 1 cy = 1.5 tons.
Environmental Controls	1	LS	$100,000	$100,000	Water quality controls for duration of project.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-dredging record surveys. Excludes contractor progress surveys. Preliminary estimate.
Excavation/Dredging Subtotal				**$2,706,000**	
Excavation/Dredge Backfilling					
Purchase and Transport Backfill Material	20,500	CY	$25	$513,000	Assume temporary road and crane pad quarry spalls reused as part of backfill material in nearshore area. Quarry spall volume deducted from imported backfill volume.
Environmental Controls				$0	Included with dredging cost.
Bathymetric Surveys					Included with excavation/dredge surveys.
Excavation/Dredge Backfilling Subtotal				**$513,000**	

Table C-A3-1b: Aquatic Remediation Alternative A-3 Estimated Cost Summary
Deep nearshore and shallow offshore excavation/dredging, ENR, and long-term monitoring
(200-Year Operational Duration with Net Present Value)

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
ENR Thin-Layer Cap (TLC) Placement					
Purchase and Transport TLC Material	18,900	CY	$10	$189,000	
Place TLC Material	18,900	CY	$20	$378,000	
Environmental Controls	1	LS	$75,000	$75,000	Water quality controls.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-capping record surveys.
ENR Thin-Layer Cap (TLC) Placement Subtotal				**$692,000**	
Shoreline Protection Features					
Jetty Extension	1	LS	$1,068,000	$1,068,000	Includes material and placement.
Protective Spit	1	LS	$296,000	$296,000	Includes material and placement.
Shoreline Protection Features Subtotal				**$1,364,000**	
Construction Cost Subtotal				**$7,212,000**	
Contingency	30%	--	--	**$2,163,600**	
Non-Construction Costs					
Eelgrass TLC Pilot Test	1	LS	$100,000	$100,000	Preliminary placeholder estimate.
Dredge Prism Material/Chemical Characterization	1	LS	$75,000	$75,000	Preliminary estimate (if required).
Eelgrass Bed Mitigation	4,300	SF	$17	$73,000	Typical replanting cost.
Permitting	1	LS	$50,000	$50,000	
Remedial Design	8%	--	--	$750,000	EPA 2000.
Construction Management	6%	--	--	$563,000	EPA 2000.
Project Management	5%	--	--	$469,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$100,000	$100,000	
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Subtotal Non-Construction Costs				**$2,205,000**	
Periodic Costs					
Long-Term Monitoring	1	LS	$559,000	$559,000	Sediment monitoring, cap inspection, and reporting. Present value analysis assumes 200-year period and 2.7% discount rate (OMB 2009). Assumes $80,000 per event and up to 40 events over 200 years. Up to 10 samples including reference. Includes sample collection, testing, reporting. Samples analyzed for SMS constituents, bioassays, and dioxins.
Periodic Cap Maintenance/Repair	1	LS	$698,000	$698,000	Present value analysis assumes 200-year period and 2.7% discount rate (OMB 2009). Assumes $100,000 per event and up to 40 events over 200 years.
Periodic Cost Subtotal				**$1,257,000**	
Alternative A-3 Total Estimated Cost				**$12,838,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-A3-1c: Aquatic Remediation Alternative A-3 Estimated Cost Summary
Deep nearshore and shallow offshore excavation/dredging, ENR, and long-term monitoring
(200-Year Operational Duration, No Discount)

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$100,000	$100,000	Setup of construction area (fencing, entrance, signage) and preliminary estimate to set up upland sediment dewatering cell.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Access Road and Crane Pads	1	LS	$154,000	$154,000	Assumes subsequent removal of quarry spall material and reuse on site as backfill in nearshore excavation areas.
Site Preparation, Mobilization/Demobilization Subtotal				**$329,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	7,100	ton	$70	$497,000	Assume removal of top 2 feet of debris from excavation areas and off-site disposal. 1 cy = 1.5 tons.
Concrete Pier Demolition	1	LS	$394,000	$394,000	Includes demolition, piling removal and disposal, and debris curtain.
Bulkhead Demolition	1	LS	$112,000	$112,000	Includes demolition and debris curtain.
Intertidal Piling Removal	765	each	$375	$287,000	Assume removal of entire piling.
Subtidal Piling Removal	345	each	$600	$207,000	Assume removal of entire piling.
Piling Transport and Disposal	1,110	each	$100	$111,000	
Demolition, Debris and Piling Removal Subtotal				**$1,608,000**	
Excavation/Dredging					
Nearshore Excavation and Rehandling in Upland Staging Area for Disposal Transport	9,400	CY	$15	$141,000	Assume 6-ft excavation depth in nearshore area. Assumes shoring not needed.
Offshore Dredging, Barge Dewatering, and Rehandling in Upland Staging Area for Disposal Transport	13,300	CY	$15	$200,000	Assume 2-ft offshore dredging depth and 6-ft depth where dioxin concentration > 25 ppt. Assumes shoring not needed.
Sediment Dewatering	860,000	gal	$0.20	$172,000	Assumes dewatering of sediment in temporary holding cell, nominal solids settling, and discharge to Fidalgo Bay under Water Quality Cert. Assumes 0.3 porosity of total excavated/dredged sediment volume. Preliminary unit cost estimate. Solids disposed with dredged material.
Transport and Disposal	34,050	ton	$60	$2,043,000	Assume Subtitle D landfill disposal. 1 cy = 1.5 tons.
Environmental Controls	1	LS	$100,000	$100,000	Water quality controls for duration of project.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-dredging record surveys. Excludes contractor progress surveys. Preliminary estimate.
Excavation/Dredging Subtotal				**$2,706,000**	
Excavation/Dredge Backfilling					
Purchase and Transport Backfill Material	20,500	CY	$25	$513,000	Assume temporary road and crane pad quarry spalls reused as part of backfill material in nearshore area. Quarry spall volume deducted from imported backfill volume.
Environmental Controls				$0	Included with dredging cost.
Bathymetric Surveys					Included with excavation/dredge surveys.
Excavation/Dredge Backfilling Subtotal				**$513,000**	

Table C-A3-1c: Aquatic Remediation Alternative A-3 Estimated Cost Summary
Deep nearshore and shallow offshore excavation/dredging, ENR, and long-term monitoring
(200-Year Operational Duration, No Discount)

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
ENR Thin-Layer Cap (TLC) Placement					
Purchase and Transport TLC Material	18,900	CY	$10	$189,000	
Place TLC Material	18,900	CY	$20	$378,000	
Environmental Controls	1	LS	$75,000	$75,000	Water quality controls.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-capping record surveys.
ENR Thin-Layer Cap (TLC) Placement Subtotal				**$692,000**	
Shoreline Protection Features					
Jetty Extension	1	LS	$1,068,000	$1,068,000	Includes material and placement.
Protective Spit	1	LS	$296,000	$296,000	Includes material and placement.
Shoreline Protection Features Subtotal				**$1,364,000**	
Construction Cost Subtotal				**$7,212,000**	
Contingency	30%	--	--	**$2,163,600**	
Non-Construction Costs					
Eelgrass TLC Pilot Test	1	LS	$100,000	$100,000	Preliminary placeholder estimate.
Dredge Prism Material/Chemical Characterization	1	LS	$75,000	$75,000	Preliminary estimate (if required).
Eelgrass Bed Mitigation	4,300	SF	$17	$73,000	Typical replanting cost.
Permitting	1	LS	$50,000	$50,000	
Remedial Design	8%	--	--	$750,000	EPA 2000.
Construction Management	6%	--	--	$563,000	EPA 2000.
Project Management	5%	--	--	$469,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$100,000	$100,000	
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Subtotal Non-Construction Costs				**$2,205,000**	
Periodic Costs					
Long-Term Monitoring	40	each	$80,000	$3,200,000	Sediment monitoring, cap inspection, and reporting. Assumes 200-year period and constant-dollar estimate without discounting. Assumes $80,000 per event and up to 40 events over 200 years. Up to 10 samples including reference. Includes sample collection, testing, reporting. Samples analyzed for SMS constituents, bioassays, and dioxins.
Periodic Cap Maintenance/Repair	40	each	$100,000	$4,000,000	Assumes 200-year period and constant-dollar estimate without discounting. Assumes $100,000 per event and up to 40 events over 200 years.
Periodic Cost Subtotal				**$7,200,000**	
Alternative A-3 Total Estimated Cost				**$18,781,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-A3-2a: Aquatic Remediation Alternative A-3 Estimated Cost Summary
Deep nearshore and shallow offshore excavation/dredging, ENR, and long-term monitoring
(Soft Armor Option, 200-Year Operational Duration with Net Present Value)

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$100,000	$100,000	Setup of construction area (fencing, entrance, signage) and preliminary estimate to set up upland sediment dewatering cell.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Access Road and Crane Pads	1	LS	$154,000	$154,000	Assumes subsequent removal of quarry spall material and reuse on site as backfill in nearshore excavation areas.
Site Preparation, Mobilization/Demobilization Subtotal				**$329,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	7,100	ton	$70	$497,000	Assume removal of top 2 feet of debris from excavation areas and off-site disposal. 1 cy = 1.5 tons.
Concrete Pier Demolition	1	LS	$394,000	$394,000	Includes demolition, piling removal and disposal, and debris curtain.
Bulkhead Demolition	1	LS	$112,000	$112,000	Includes demolition and debris curtain.
Intertidal Piling Removal	765	each	$375	$287,000	Assume removal of entire piling.
Subtidal Piling Removal	345	each	$600	$207,000	Assume removal of entire piling.
Piling Transport and Disposal	1,110	each	$100	$111,000	
Demolition, Debris and Piling Removal Subtotal				**$1,608,000**	
Excavation/Dredging					
Nearshore Excavation and Rehandling in Upland Staging Area for Disposal Transport	9,400	CY	$15	$141,000	Assume 6-ft excavation depth in nearshore area. Assumes shoring not needed.
Offshore Dredging, Barge Dewatering, and Rehandling in Upland Staging Area for Disposal Transport	13,300	CY	$15	$200,000	Assume 2-ft offshore dredging depth and 6-ft depth where dioxin concentration > 25 ppt. Assumes shoring not needed.
Sediment Dewatering	860,000	gal	$0.20	$172,000	Assumes dewatering of sediment in temporary holding cell, nominal solids settling, and discharge to Fidalgo Bay under Water Quality Cert. Assumes 0.3 porosity of total excavated/dredged sediment volume. Preliminary unit cost estimate. Solids disposed with dredged material.
Transport and Disposal	34,050	ton	$60	$2,043,000	Assume Subtitle D landfill disposal. 1 cy = 1.5 tons.
Environmental Controls	1	LS	$100,000	$100,000	Water quality controls for duration of project.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-dredging record surveys. Excludes contractor progress surveys. Preliminary estimate.
Excavation/Dredging Subtotal				**$2,706,000**	
Excavation/Dredge Backfilling					
Purchase and Transport Backfill Material	20,500	CY	$25	$513,000	Assume temporary road and crane pad quarry spalls reused as part of backfill material in nearshore area. Quarry spall volume deducted from imported backfill volume.
Environmental Controls				$0	Included with dredging cost.
Bathymetric Surveys					Included with excavation/dredge surveys.
Excavation/Dredge Backfilling Subtotal				**$513,000**	

Table C-A3-2a: Aquatic Remediation Alternative A-3 Estimated Cost Summary
Deep nearshore and shallow offshore excavation/dredging, ENR, and long-term monitoring
(Soft Armor Option, 200-Year Operational Duration with Net Present Value)

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
ENR Thin-Layer Cap (TLC) Placement					
Purchase and Transport TLC Material	18,900	CY	$10	$189,000	
Place TLC Material	18,900	CY	$20	$378,000	
Environmental Controls	1	LS	$75,000	$75,000	Water quality controls.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-capping record surveys.
ENR Thin-Layer Cap (TLC) Placement Subtotal				**$692,000**	
Shoreline Protection Features					
Soft Armoring	1	LS	$495,000	$495,000	
Shoreline Protection Features Subtotal				**$495,000**	
Construction Cost Subtotal				**$6,343,000**	
Contingency	30%	--	--	**$1,902,900**	
Non-Construction Costs					
Eelgrass TLC Pilot Test	1	LS	$100,000	$100,000	Preliminary placeholder estimate.
Dredge Prism Material/Chemical Characterization	1	LS	$75,000	$75,000	Preliminary estimate (if required).
Eelgrass Bed Mitigation	8,600	SF	$17	$146,000	Typical replanting cost.
Permitting	1	LS	$50,000	$50,000	
Remedial Design	8%	--	--	$660,000	EPA 2000.
Construction Management	6%	--	--	$495,000	EPA 2000.
Project Management	5%	--	--	$412,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$100,000	$100,000	
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Subtotal Non-Construction Costs				**$2,063,000**	
Periodic Costs					
Long-Term Monitoring	1	LS	$559,000	$559,000	Sediment monitoring, cap inspection, and reporting. Present value analysis assumes 200-year period and 2.7% discount rate (OMB 2009). Assumes $80,000 per event and up to 40 events over 200 years. Up to 10 samples including reference. Includes sample collection, testing, reporting. Samples analyzed for SMS constituents, bioassays, and dioxins.
Periodic Cap Maintenance/Repair	1	LS	$698,000	$698,000	Present value analysis assumes 200-year period and 2.7% discount rate (OMB 2009). Assumes $100,000 per event and up to 40 events over 200 years.
Periodic Soft Armoring Maintenance/Replacement	1	LS	$9,004,000	$9,004,000	Assume replacement of soft armoring area. Present value analysis assumes 200-year period and 2.7% discount rate (OMB 2009). Assumes soft armoring installation cost (see above) per event and up to 100 events over 200 years.
Eelgrass Mitigation	1	LS	$2,414,000	$2,414,000	Assume transplanting of eelgrass. Present value analysis assumes 200-year period and 2.7% discount rate (OMB 2009). Assumes eelgrass mitigation unit cost (see above), transplanting 1 acre per event up to 20 events over 200 years.
Periodic Cost Subtotal				**$12,675,000**	
Alternative A-3 Total Estimated Cost				**$22,984,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-A3-2b: Aquatic Remediation Alternative A-3 Estimated Cost Summary
Deep nearshore and shallow offshore excavation/dredging, ENR, and long-term monitoring
(Soft Armor Option, 200-Year Operational Duration with No Discount)

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$100,000	$100,000	Setup of construction area (fencing, entrance, signage) and preliminary estimate to set up upland sediment dewatering cell.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Access Road and Crane Pads	1	LS	$154,000	$154,000	Assumes subsequent removal of quarry spall material and reuse on site as backfill in nearshore excavation areas.
Site Preparation, Mobilization/Demobilization Subtotal				**$329,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	7,100	ton	$70	$497,000	Assume removal of top 2 feet of debris from excavation areas and off-site disposal. 1 cy = 1.5 tons.
Concrete Pier Demolition	1	LS	$394,000	$394,000	Includes demolition, piling removal and disposal, and debris curtain.
Bulkhead Demolition	1	LS	$112,000	$112,000	Includes demolition and debris curtain.
Intertidal Piling Removal	765	each	$375	$287,000	Assume removal of entire piling.
Subtidal Piling Removal	345	each	$600	$207,000	Assume removal of entire piling.
Piling Transport and Disposal	1,110	each	$100	$111,000	
Demolition, Debris and Piling Removal Subtotal				**$1,608,000**	
Excavation/Dredging					
Nearshore Excavation and Rehandling in Upland Staging Area for Disposal Transport	9,400	CY	$15	$141,000	Assume 6-ft excavation depth in nearshore area. Assumes shoring not needed.
Offshore Dredging, Barge Dewatering, and Rehandling in Upland Staging Area for Disposal Transport	13,300	CY	$15	$200,000	Assume 2-ft offshore dredging depth and 6-ft depth where dioxin concentration > 25 ppt. Assumes shoring not needed.
Sediment Dewatering	860,000	gal	$0.20	$172,000	Assumes dewatering of sediment in temporary holding cell, nominal solids settling, and discharge to Fidalgo Bay under Water Quality Cert. Assumes 0.3 porosity of total excavated/dredged sediment volume. Preliminary unit cost estimate. Solids disposed with dredged material.
Transport and Disposal	34,050	ton	$60	$2,043,000	Assume Subtitle D landfill disposal. 1 cy = 1.5 tons.
Environmental Controls	1	LS	$100,000	$100,000	Water quality controls for duration of project.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-dredging record surveys. Excludes contractor progress surveys. Preliminary estimate.
Excavation/Dredging Subtotal				**$2,706,000**	
Excavation/Dredge Backfilling					
Purchase and Transport Backfill Material	20,500	CY	$25	$513,000	Assume temporary road and crane pad quarry spalls reused as part of backfill material in nearshore area. Quarry spall volume deducted from imported backfill volume.
Environmental Controls				$0	Included with dredging cost.
Bathymetric Surveys					Included with excavation/dredge surveys.
Excavation/Dredge Backfilling Subtotal				**$513,000**	

Table C-A3-2b: Aquatic Remediation Alternative A-3 Estimated Cost Summary
Deep nearshore and shallow offshore excavation/dredging, ENR, and long-term monitoring
(Soft Armor Option, 200-Year Operational Duration with No Discount)

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
ENR Thin-Layer Cap (TLC) Placement					
Purchase and Transport TLC Material	18,900	CY	$10	$189,000	
Place TLC Material	18,900	CY	$20	$378,000	
Environmental Controls	1	LS	$75,000	$75,000	Water quality controls.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-capping record surveys.
ENR Thin-Layer Cap (TLC) Placement Subtotal				**$692,000**	
Shoreline Protection Features					
Soft Armoring	1	LS	$495,000	$495,000	
Shoreline Protection Features Subtotal				**$495,000**	
Construction Cost Subtotal				**$6,343,000**	
Contingency	30%	--	--	**$1,902,900**	
Non-Construction Costs					
Eelgrass TLC Pilot Test	1	LS	$100,000	$100,000	Preliminary placeholder estimate.
Dredge Prism Material/Chemical Characterization	1	LS	$75,000	$75,000	Preliminary estimate (if required).
Eelgrass Bed Mitigation	8,600	SF	$17	$146,000	Typical replanting cost.
Permitting	1	LS	$50,000	$50,000	
Remedial Design	8%	--	--	$660,000	EPA 2000.
Construction Management	6%	--	--	$495,000	EPA 2000.
Project Management	5%	--	--	$412,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$100,000	$100,000	
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Subtotal Non-Construction Costs				**$2,063,000**	
Periodic Costs					
Long-Term Monitoring	40	each	$80,000	$3,200,000	Sediment monitoring, cap inspection, and reporting. Present value analysis assumes 200-year period and 2.7% discount rate (OMB 2009). Assumes $80,000 per event and up to 40 events over 200 years. Up to 10 samples including reference. Includes sample collection, testing, reporting. Samples analyzed for SMS constituents, bioassays, and dioxins.
Periodic Cap Maintenance/Repair	40	each	$100,000	$4,000,000	Present value analysis assumes 200-year period and 2.7% discount rate (OMB 2009). Assumes $100,000 per event and up to 40 events over 200 years.
Periodic Soft Armoring Maintenance/Replacement	100	each	$495,000	$49,500,000	Assume replacement of soft armoring area. Present value analysis assumes 200-year period and 2.7% discount rate (OMB 2009). Assumes soft armoring installation cost (see above) per event and up to 100 events over 200 years.
Eelgrass Mitigation	20	each	$741,000	$14,820,000	Assume transplanting of eelgrass. Present value analysis assumes 200-year period and 2.7% discount rate (OMB 2009). Assumes eelgrass mitigation unit cost (see above), transplanting 1 acre per event up to 20 events over 200 years.
Periodic Cost Subtotal				**$71,520,000**	
Alternative A-3 Total Estimated Cost				**$81,829,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-A4: Aquatic Remediation Alternative A-4 Estimated Cost Summary
Deep nearshore and offshore excavation/dredging and long-term monitoring without ENR

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$100,000	$100,000	Setup of construction area (fencing, entrance, signage) and preliminary estimate to set up upland sediment dewatering cell.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Access Road and Crane Pads	1	LS	$154,000	$154,000	Assumes subsequent removal of quarry spall material and reuse on site as backfill in nearshore excavation areas.
Site Preparation, Mobilization/Demobilization Subtotal				**$329,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	7,100	ton	$70	$497,000	Assume removal of top 2 feet of debris from excavation areas and off-site disposal. 1 cy = 1.5 tons.
Concrete Pier Demolition	1	LS	$394,000	$394,000	Includes demolition, piling removal and disposal, and debris curtain.
Bulkhead Demolition	1	LS	$112,000	$112,000	Includes demolition and debris curtain.
Intertidal Piling Removal	765	each	$375	$287,000	Assume removal of entire piling.
Subtidal Piling Removal	345	each	$600	$207,000	Assume removal of entire piling.
Piling Transport and Disposal	1,110	each	$100	$111,000	
Demolition, Debris and Piling Removal Subtotal				**$1,608,000**	
Excavation/Dredging					
Nearshore Excavation and Rehandling in Upland Staging Area for Disposal Transport	9,400	CY	$15	$141,000	Assume 6-ft excavation depth in nearshore area. Assumes shoring not needed.
Offshore Dredging, Barge Dewatering, and Rehandling in Upland Staging Area for Disposal Transport	74,800	CY	$15	$1,122,000	Assume 6-ft offshore dredging depth.
Sediment Dewatering	860,000	gal	$0.20	$172,000	Assumes dewatering of sediment in temporary holding cell, nominal solids settling, and discharge to Fidalgo Bay under Water Quality Cert. Assumes 0.3 porosity of total excavated/dredged sediment volume. Preliminary unit cost estimate. Solids disposed with dredged material.
Transport and Disposal	126,300	ton	$60	$7,578,000	Assume Subtitle D landfill disposal. 1 cy = 1.5 tons.
Environmental Controls	1	LS	$100,000	$100,000	Water quality controls for duration of project.
Bathymetric Surveys	2	each	$50,000	$100,000	Pre- and post-dredging record surveys. Excludes contractor progress surveys. Preliminary estimate.
Excavation/Dredging Subtotal				**$9,213,000**	
Excavation/Dredge Backfilling					
Purchase, Transport, and Place TLC Material	82,000	CY	$25	$2,050,000	Assume temporary road and crane pad quarry spalls reused as part of backfill material in nearshore area. Quarry spall volume deducted from imported backfill volume.
Environmental Controls					Included with dredging cost.
Bathymetric Surveys					Included with excavation/dredge surveys.
Excavation/Dredge Backfilling Subtotal				**$2,050,000**	
ENR Thin-Layer Cap (TLC) Placement					
Purchase and Transport TLC Material	9,200	CY	$10	$92,000	
Place TLC Material	9,200	CY	$20	$184,000	
Environmental Controls	1	LS	$75,000	$75,000	Water quality controls.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-capping record surveys.
ENR Thin-Layer Cap (TLC) Placement Subtotal				**$401,000**	

Table C-A4: Aquatic Remediation Alternative A-4 Estimated Cost Summary
Deep nearshore and offshore excavation/dredging and long-term monitoring without ENR

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Shoreline Protection Features					
Jetty Extension	1	LS	$1,068,000	$1,068,000	Includes material and placement.
Protective Spit	1	LS	$296,000	$296,000	Includes material and placement.
Shoreline Protection Features Subtotal				**$1,364,000**	
Construction Cost Subtotal				**$14,965,000**	
Contingency	30%	--	--	**$4,489,500**	
Non-Construction Costs					
Eelgrass TLC Pilot Test	1	LS	$100,000	$100,000	Preliminary placeholder estimate.
Dredge Prism Material/Chemical Characterization	1	LS	$75,000	$75,000	Preliminary estimate (if required).
Eelgrass Bed Mitigation	4,300	SF	$17	$73,000	Typical replanting cost.
Permitting	1	LS	$50,000	$50,000	
Remedial Design	6%	--	--	$1,167,000	EPA 2000.
Construction Management	6%	--	--	$1,167,000	EPA 2000.
Project Management	5%	--	--	$973,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$100,000	$100,000	
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Subtotal Non-Construction Costs				**$3,730,000**	
Periodic Costs					
Long-Term Monitoring	1	LS	$309,000	$309,000	Sediment monitoring, cap inspection, and reporting. Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009). Assumes $80,000 per event and up to 6 events over 30 years. Up to 10 samples including reference. Includes sample collection, testing, reporting. Samples analyzed for SMS constituents, bioassays, and dioxins.
Periodic Cap Maintenance/Repair	1	LS	$386,000	$386,000	Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009). Assumes $100,000 per event and up to 6 events over 30 years.
Periodic Cost Subtotal				**$695,000**	
Alternative A-4 Total Estimated Cost				**$23,880,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table C-A5: Aquatic Remediation Alternative A-5 Estimated Cost Summary
Shallow nearshore and offshore excavation/dredging and long-term monitoring without ENR

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Site Preparation	1	LS	$100,000	$100,000	Setup of construction area (fencing, entrance, signage) and preliminary estimate to set up upland sediment dewatering cell.
Mobilization/Demobilization	1	LS	$75,000	$75,000	Preliminary estimate.
Access Road and Crane Pads	1	LS	$154,000	$154,000	Assumes subsequent removal of quarry spall material and reuse on site as backfill in nearshore excavation areas.
Site Preparation, Mobilization/Demobilization Subtotal				**$329,000**	
Demolition, Debris and Piling Removal					
Surface Debris Removal and Disposal	7,100	ton	$70	$497,000	Assume removal of top 2 feet of debris from excavation areas and off-site disposal. 1 cy = 1.5 tons.
Concrete Pier Demolition	1	LS	$394,000	$394,000	Includes demolition, piling removal and disposal, and debris curtain.
Bulkhead Demolition	1	LS	$112,000	$112,000	Includes demolition and debris curtain.
Intertidal Piling Removal	765	each	$375	$287,000	Assume removal of entire piling.
Subtidal Piling Removal	345	each	$600	$207,000	Assume removal of entire piling.
Piling Transport and Disposal	1,110	each	$100	$111,000	
Demolition, Debris and Piling Removal Subtotal				**$1,608,000**	
Excavation/Dredging					
Nearshore Excavation and Rehandling in Upland Staging Area for Disposal Transport	1,400	CY	$15	$21,000	Assume 2-ft excavation depth in nearshore area and 6-ft depth where dioxin concentration > 25 ppt. Assumes shoring not needed.
Offshore Dredging, Barge Dewatering, and Rehandling in Upland Staging Area for Disposal Transport	52,300	CY	$15	$785,000	Assume 2-ft offshore dredging depth and 6-ft depth where dioxin concentration > 25 ppt.
Sediment Dewatering	380,000	gal	$0.20	$76,000	Assumes dewatering of sediment in temporary holding cell, nominal solids settling, and discharge to Fidalgo Bay under Water Quality Cert. Assumes 0.3 porosity of total excavated/dredged sediment volume. Preliminary unit cost estimate. Solids disposed with dredged material.
Transport and Disposal	80,550	ton	$60	$4,833,000	Assume Subtitle D landfill disposal. 1 cy = 1.5 tons.
Environmental Controls	1	LS	$100,000	$100,000	Water quality controls for duration of project.
Bathymetric Surveys	2	each	$50,000	$100,000	Pre- and post-dredging record surveys. Excludes contractor progress surveys. Preliminary estimate.
Excavation/Dredging Subtotal				**$5,915,000**	
Excavation/Dredge Backfilling					
Purchase, Transport, and Place TLC Material	51,500	CY	$25	$1,288,000	Assume temporary road and crane pad quarry spalls reused as part of backfill material in nearshore area. Quarry spall volume deducted from imported backfill volume.
Environmental Controls					Included with dredging cost.
Bathymetric Surveys					Included with excavation/dredge surveys.
Excavation/Dredge Backfilling Subtotal				**$1,288,000**	

Table C-A5: Aquatic Remediation Alternative A-5 Estimated Cost Summary
Shallow nearshore and offshore excavation/dredging and long-term monitoring without ENR

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
ENR Thin-Layer Cap (TLC) Placement					
Purchase and Transport TLC Material	9,200	CY	$10	$92,000	
Place TLC Material	9,200	CY	$20	$184,000	
Environmental Controls	1	LS	$75,000	$75,000	Water quality controls.
Bathymetric Surveys	2	each	$25,000	$50,000	Pre- and post-capping record surveys.
ENR Thin-Layer Cap (TLC) Placement Subtotal				**$401,000**	
Shoreline Protection Features					
Jetty Extension	1	LS	$1,068,000	$1,068,000	Includes material and placement.
Protective Spit	1	LS	$296,000	$296,000	Includes material and placement.
Shoreline Protection Features Subtotal				**$1,364,000**	
Construction Cost Subtotal				**$10,905,000**	
Contingency	30%	--	--	**$3,271,500**	
Non-Construction Costs					
Eelgrass TLC Pilot Test	1	LS	$100,000	$100,000	Preliminary placeholder estimate.
Dredge Prism Material/Chemical Characterization	1	LS	$75,000	$75,000	Preliminary estimate (if required).
Eelgrass Bed Mitigation	4,300	SF	$17	$73,000	Typical replanting cost.
Permitting	1	LS	$50,000	$50,000	
Remedial Design	6%	--	--	$851,000	EPA 2000.
Construction Management	6%	--	--	$851,000	EPA 2000.
Project Management	5%	--	--	$709,000	EPA 2000.
Environmental Monitoring During Construction	1	LS	$100,000	$100,000	
Institutional Controls	1	LS	$25,000	$25,000	Preliminary estimate for administrative documentation (follow-on costs not included).
Subtotal Non-Construction Costs				**$2,834,000**	
Periodic Costs					
Long-Term Monitoring	1	LS	$309,000	$309,000	Sediment monitoring, cap inspection, and reporting. Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009). Assumes $80,000 per event and up to 6 events over 30 years. Up to 10 samples including reference. Includes sample collection, testing, reporting. Samples analyzed for SMS constituents, bioassays, and dioxins.
Periodic Cap Maintenance/Repair	1	LS	$386,000	$386,000	Present value analysis assumes 30-year period and 2.7% discount rate (OMB 2009). Assumes $100,000 per event and up to 6 events over 30 years.
Periodic Cost Subtotal				**$695,000**	
Alternative A-5 Total Estimated Cost				**$17,706,000**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

APPENDIX D
PRELIMINARY COST ESTIMATE BACKUP CALCULATIONS

Table D-1: Backup Calculations for Upland Remediation Alternatives

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation					
Well abandonment	1	LS	$5,000	$5,000	11 wells.
Fencing, entrance, signage	1	LS	$15,000	$15,000	
Surface Water Containment	1	LS	$30,000	$30,000	Removal of impacted water in press pit area.
Total				**$50,000**	
Concrete Structure Demolition and On-Site Recycling - Alternatives U-1, U-2, and U-3					
Mobilization/Demobilization	1	LS	$30,000	$30,000	
Demolition	1,750	CY	$15	$26,250	
Crushing	1,750	CY	$15	$26,250	
Stockpiling	1,750	CY	$5	$8,750	Temporarily stockpile until needed for backfilling.
Placement as backfill	1,750	CY	$5	$8,750	Reuse on site as part of backfill material.
Total				**$100,000**	
Total Unit Cost		**CY**	**$57**		
Concrete Structure Demolition and On-Site Recycling - Alternative U-4					
Mobilization/Demobilization	1	LS	$30,000	$30,000	
Demolition	1,389	CY	$15	$20,829	
Crushing	1,389	CY	$15	$20,829	
Stockpiling	1,389	CY	$5	$6,943	Temporarily stockpile until needed for backfilling.
Placement as backfill	1,389	CY	$5	$6,943	Reuse on site as part of backfill material.
Total				**$85,544**	
Total Unit Cost		**CY**	**$62**		
Soil Excavation - Alternative U-1					
Total excavation footprint area	15,430	SY			At ground surface.
Mitigation/stormwater exc. footprint area	2,689	SY			Excavation area located within mitigation/stormwater areas.
Adjusted excavation area for stabilization	12,742	SY			Assumes mitigation/stormwater areas stabilized as part of mitigation implementation.
Surface debris approx. volume	9,323	CY			Based on excavation footprint area and 2-ft depth.
Surface debris approx. bulk density	1.5	ton/CY			
Surface debris approx. mass	13,985	ton			
Total quantity wood pilings	1,650	each			
Wood pilings removed from excavation area	968	each			
Corrected excavation volume	18,636	BCY			See excavation volume sheet for adjustments.
Wet excavation percentage: 4-ft exc.	0%				Assume average 6-ft water table depth.
Wet excavation percentage: 6-ft exc.	14%				
Wet excavation percentage: 8-ft exc.	20%				
Total wet excavation volume	2,518	BCY			
Total dry excavation volume	16,117	BCY			
Soil bulking factor	1.15	LCY/BCY			
Backfill volume correction	-1,472	BCY			
Corrected backfill volume	30,460	LCY			Excavation areas in wetland mitigation area not backfilled. To be completed as part of mitigation work.
Dry excavation & direct loading	16,117	BCY			
Wet excavation & direct loading	2,518	BCY			
Soil Excavation - Alternative U-2					
Total excavation footprint area	15,430	SY			At ground surface.
Mitigation/stormwater exc. footprint area	2,689	SY			Excavation area located within mitigation/stormwater areas.
Adjusted excavation area for stabilization	12,742	SY			Assumes mitigation/stormwater areas stabilized as part of mitigation implementation.
Surface debris approx. volume	9,491	CY			Based on excavation footprint area and 2-ft depth.
Surface debris approx. bulk density	1.5	ton/CY			
Surface debris approx. mass	14,237	ton			
Total quantity wood pilings	1,650	each			
Wood pilings removed from excavation area	968	each			
Corrected excavation volume	16,908	BCY			See excavation volume sheet for adjustments.
Wet excavation percentage: 4-ft exc.	0%				Assume average 6-ft water table depth.
Wet excavation percentage: 6-ft exc.	14%				
Total wet excavation volume	1,982	BCY			
Total dry excavation volume	14,926	BCY			
Soil bulking factor	1.15	LCY/BCY			
Backfill volume correction	-1,168	BCY			
Corrected backfill volume	29,016	LCY			Excavation areas in wetland mitigation area not backfilled. To be completed as part of mitigation work.

Table D-1: Backup Calculations for Upland Remediation Alternatives

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Dry excavation & direct loading	14,926	BCY			
Wet excavation & direct loading	1,982	BCY			
Soil Excavation - Alternative U-3					
Total excavation footprint area	15,430	SY			At ground surface.
Mitigation/stormwater exc. footprint area	2,689	SY			Excavation area located within mitigation/stormwater areas.
Adjusted excavation area for stabilization	12,742	SY			Assumes mitigation/stormwater areas stabilized as part of mitigation implementation.
Surface debris approx. volume	9,449	CY			Based on excavation footprint area and 2-ft depth.
Surface debris approx. bulk density	1.5	ton/CY			
Surface debris approx. mass	14,173	ton			
Total quantity wood pilings	1,650	each			
Wood pilings removed from excavation area	968	each			
Corrected excavation volume	17,120	BCY			See excavation volume sheet for adjustments.
Wet excavation percentage: 4-ft exc.	0%				Assume average 6-ft water table depth.
Wet excavation percentage: 6-ft exc.	14%				
Wet excavation percentage: 8-ft exc.	20%				
Total wet excavation volume	2,045	BCY			
Total dry excavation volume	15,075	BCY			
Soil bulking factor	1.15	LCY/BCY			
Backfill volume correction	-1,472	BCY			
Corrected backfill volume	28,861	LCY			Excavation areas in wetland mitigation area not backfilled. To be completed as part of mitigation work.
Dry excavation & direct loading	15,075	BCY			
Wet excavation & direct loading	2,045	BCY			
Soil Excavation - Alternative U-4					
Total excavation footprint area	2,689	SY			At ground surface.
Surface debris approx. volume	4,481	CY			Based on excavation footprint area and 2-ft depth.
Surface debris approx. bulk density	1.5	ton/CY			
Surface debris approx. mass	6,722	ton			
Total quantity wood pilings	1,650	each			
Wood pilings removed from excavation area	169	each			
Corrected excavation volume	3,154	BCY			See excavation volume sheet for adjustments.
Wet excavation percentage: 4-ft exc.	0%				Assume average 6-ft water table depth.
Wet excavation percentage: 6-ft exc.	14%				
Wet excavation percentage: 8-ft exc.	20%				
Total wet excavation volume	412	BCY			
Total dry excavation volume	2,742	BCY			
Soil bulking factor	1.15	LCY/BCY			
Backfill volume correction	-1,088	BCY			
Corrected backfill volume	7,529	LCY			Excavation areas in wetland mitigation area not backfilled. To be completed as part of mitigation work.
Dry excavation & direct loading	2,742	BCY			
Wet excavation & direct loading	412	BCY			
Containment Capping - Alternative U-4					
Total asphalt cap area	187,808	SF			
Total asphalt cap area	20,868	SY			
Total site area	236,689	SF			
Asphalt cap area percentage of site	79%				
Concrete structure demolition total mass	1,750	CY			Alts. U-1 through U-3. Contractor quote.
Concrete structure demolition for capping	1,389	CY			Alt. U-4. Mass based on ratio of cap area to total property area.
Compaction ratio	75%				Assume 75%.
Imported fill compacted thickness	2	ft			
Aggregate base course compacted thickness	6	in			
Asphalt wearing layer compacted thickness	2	in			
Imported fill volume (loose)	18,549	LCY			
Aggregate base course volume (loose)	4,637	LCY			
Asphalt volume (loose)	1,546	LCY			

Table D-1: Backup Calculations for Upland Remediation Alternatives

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Purchase, Transport, and Place Fill Materials					
Fill material hauling	18,549	LCY	$4.99	$92,559	12 CY trucks, 25 MPH ave., cycle 4 mi. 2010 RSMeans 31 23 23.20 1040.
Purachase and place fill material	13,912	BCY	$11.75	$163,463	Common earth, front-end loader, 3-CY bucket. 2010 RSMeans 31 23 23.15 4070.
Total				**$256,022**	
Total Unit Cost		BCY	**$18.40**		
Subgrade Preparation					
Grading	20,868	SY	$1.01	$21,076	Finish grading. Grade subgrade for base course. 2010 RSMeans 31 22 16.10 1020.
Subgrade preparation	20,868	SY	$0.80	$16,694	Prepare and roll. 2010 RSMeans 32 11 23.23 7000.
Total				**$37,770**	
Total Unit Cost		SY	**$1.81**		
Purchase, Transport, and Place Cap Materials					
Paving materials hauling	6,183	LCY	$4.99	$30,853	12 CY trucks, 25 MPH ave., cycle 4 mi. 2010 RSMeans 31 23 23.20 1040.
Aggregate base course	20,868	SY	$8.75	$182,591	Crushed 3/4-in. stone, compacted, 6 in. deep. 2010 RSMeans 32 11 23.23 0100.
Asphalt wearing layer	20,868	SY	$10.05	$209,719	Wearing course, 2-in. thick. 2010 RSMeans 32 12 16.13 0380.
Sealing	20,868	SY	$1.76	$36,727	Tack coat, emulsion 0.10 gal. per SY. 2010 RSMeans 32 01 13.62 3270.
Total				**$459,890**	
Total Unit Cost		SY	**$22.04**		
Asphalt Cap Drainage					
Treatment catchbasin	4	each	$10,000	$40,000	Contractor quote.
Manhole (junction structure)	3	each	$5,000	$15,000	Contractor quote. 48-in diameter.
Storm pipe	650	LF	$70	$45,500	Contractor quote. 12-in RCP pipe.
Tide gate and scour protection	1	LS	$10,000	$10,000	
Total				**$110,500**	
Stormwater Swale Installation					
Mobilization/demobilization	0	LS	$0	$0	Included as part of general mob/demob.
Biofiltration swale system					
Catch basin	1	each	$7,500	$7,500	48-inch.
Stormwater pipe	10	LF	$80	$800	18-inch.
Biofiltration swale system	175	LF	$200	$35,000	
Subtotal				$43,300	
Pretreatment					
Contech CDS unit or similar device	1	each	$10,000	$10,000	
Stormwater pipe	10	LF	$80	$800	18-inch.
Subtotal				$10,800	
Stormwater plantings	1	LS	$7,440	$7,440	See backup calc worksheet.
Subtotal				$7,440	
Swale tide gate structure					
Tide gate	1	LS	$5,000	$5,000	
Concrete headwall	5	CY	$700	$3,500	
Subtotal				$8,500	
Total				**$70,040**	
Long-Term Monitoring Annual Cost and Net Present Value Analysis					
Total number of wells installed	9	wells			
Total number of wells sampled	9	wells			
Sampling event frequency	1	per year			Assume annual monitoring.
Well installation	9	well	$4,000	$36,000	Well installation, development, and waste disposal.

Table D-1: Backup Calculations for Upland Remediation Alternatives

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Groundwater monitoring					
Monitoring labor					Assume work completed by Hart Crowser.
Sr. Staff	12	hr	$99	$1,188	Assume Hart Crowser labor rates.
Sr. Project	6	hr	$137	$822	
Principal	1	hr	$195	$195	
Labor subtotal				$2,205	
Equipment, supplies, shipping	1	LS	$200	$200	
Laboratory analysis					
TPH-D, TPH-O	9	sample	$75	$675	NWTPH-Dx. OnSite Laboratory price schedule.
As, Cu, Ni, Zn	36	sample	$20	$720	EPA Method 6020/200.8.
cPAHs	9	sample	$190	$1,710	EPA Method 8270D/SIM.
Laboratory subtotal				$3,105	
Subtotal				$5,510	
Data management, reporting	100%	--	--	$5,510	Assume percentage of subtotal.
Subtotal				$11,020	
Cap inspection					
Inspection labor					
Sr. Staff	10	hr	$99	$990	
Sr. Project	2	hr	$137	$274	
Principal	0.5	hr	$195	$98	
Labor subtotal				$1,362	
Equipment, supplies	1	LS	$100	$100	
Subtotal				$1,462	
Data management, reporting	250%	--	--	$3,654	Assume percentage of subtotal.
Subtotal				$5,115	
Total capital costs				$36,000	Well installation
Total annual costs				$16,135	Groundwater and cap monitoring, reporting.
NPV time period	30	yr			
Discount rate	2.7%				Real interest rate, 30-yr treasury bond (http://www.whitehouse.gov/omb/circulars_a094_a94_appx-c/).
Discount factor	20.383				Based on NPV time period and discount rate shown above.
Net Present Value - Alts. U-1, U-2, U-3				**$260,619**	Sum of capital cost and discount factor applied to annual cost. Excludes cap inspection cost.
Net Present Value - Alt. U-4				**$364,883**	Sum of capital cost and discount factor applied to annual cost.

Periodic Cap Maintenance/Repair

Repair extent	5%		Assume percentage of cap installation cost.
Total cap installation cost	$903,500		See Alt. U-4 summary cost table.
Total repair cost per event	$45,175		
Repair frequency	2	yr	Assume repairs completed biannually.
NPV time period	30	yr	
Discount rate	2.7%		

Year	Cost	Discount Factor	Net Present Value
0	--	--	--
2	$45,175	0.948	$42,831
4	$45,175	0.899	$40,608
6	$45,175	0.852	$38,501
8	$45,175	0.808	$36,504
10	$45,175	0.766	$34,609
12	$45,175	0.726	$32,814
14	$45,175	0.689	$31,111
16	$45,175	0.653	$29,497
18	$45,175	0.619	$27,966
20	$45,175	0.587	$26,515
22	$45,175	0.556	$25,139
24	$45,175	0.528	$23,835
26	$45,175	0.500	$22,598
28	$45,175	0.474	$21,425
30	$45,175	0.450	$20,314
Total			**$454,265**

Note:
Estimated quantities and costs are approximate and subject to change during design and construction. Estimated cost assumes an accuracy range of -30 to +50 percent.

Table D-2: Estimated Excavation Volumes for Upland Remediation Alternatives

Area Name/ Designation	Area of Excavation Limits (SF) Bottom	Area of Excavation Limits (SF) Top	Excavation Depth (ft)	Excavation Volume (BCY)	Surface Debris Depth (ft)	Surface Debris Fraction	Surface Debris Volume (BCY)	Excavation Volume Berm Correction (BCY)	OHW Line Area Correction (SF)	OHW Line Volume Correction (BCY)	Alt. U-4 Corrected Area (SF)	Alt. U-4 Corrected Volume (BCY)	Backfill Volume Correction Wetland Area (BCY)
Alternative U-1													
1	1,963	2,642	4	341	2	50%	-171				--	--	
2	1,963	2,642	4	341	2	50%	-171				--	--	
3	911	1,552	4	182	2	50%	-91	29			--	--	
4	6,631	8,060	4	1,088	2	50%	-544		-88	-13	--	--	
5	2,678	4,243	4	513	2	50%	-256	106			--	--	
6	3,183	4,212	4	548	2	50%	-274	40			--	--	
7	155	559	4	53	2	50%	-26	56			--	--	
8	2,398	3,436	4	432	2	50%	-216	74			--	--	
9	859	1,548	4	178	2	50%	-89	59	-605	-45	--	--	
10	684	1,171	4	137	2	50%	-69	38			--	--	
11	3,241	4,270	4	556	2	50%	-278		-800	-59	--	--	-5
12	1,813	2,877	6	521	2	33%	-174		-420	-47	--	--	
13	1,963	3,019	6	554	2	33%	-185				--	--	
14	1,963	3,019	6	554	2	33%	-185		-36	-8	--	--	
15	12,273	16,299	6	3,175	2	33%	-1058	265			--	--	
16	46,738	52,113	6	10,983	2	33%	-3661	104	-600	-67	--	--	-167
17	1,963	3,019	6	554	2	33%	-185		-240	-27	--	--	-527
18	1,182	2,188	8	499	2	25%	-125				--	--	
19	1,963	3,421	8	798	2	25%	-199				--	--	
20	13,424	18,108	8	4,671	2	25%	-1168				--	--	
21	1,963	3,421	8	798	2	25%	-199		-160	-24	--	--	-774
Total	109,911	141,819		27,476			-9,323	771	-2,949	-289	--	--	-1,472
Corrected Total		138,871		18,636							--	--	
Alternative U-2													
1	1,963	2,642	4	341	2	50%	-171				--	--	
2	1,963	2,642	4	341	2	50%	-171				--	--	
3	911	1,552	4	182	2	50%	-91	29			--	--	
4	6,631	8,060	4	1,088	2	50%	-544		-88	-13	--	--	
5	2,678	4,243	4	513	2	50%	-256	99			--	--	
6	3,183	4,212	4	548	2	50%	-274	40			--	--	
7	155	559	4	53	2	50%	-26	54			--	--	
8	2,398	3,436	4	432	2	50%	-216	74			--	--	
9	859	1,548	4	178	2	50%	-89	59	-605	-45	--	--	
10	684	1,171	4	137	2	50%	-69	38			--	--	
11	3,241	4,270	4	556	2	50%	-278		-800	-59	--	--	-5
12	1,813	2,877	6	521	2	33%	-174		-420	-47	--	--	
13	1,963	3,019	6	554	2	33%	-185				--	--	
14	1,182	2,188	6	374	2	33%	-125				--	--	
15	1,963	3,421	6	598	2	33%	-199				--	--	
16	29,087	34,407	6	7,055	2	33%	-2352				--	--	
17	1,963	3,019	6	554	2	33%	-185		-36	-8	--	--	
18	49,848	55,535	6	11,709	2	33%	-3903		-760	-84	--	--	-636
19	1,963	3,019	6	554	2	33%	-185		-240	-27	--	--	-527
Total	114,448	141,820		26,289			-9,491	393	-2,949	-283	--	--	-1,168
Corrected Total		138,872		16,908							--	--	

Table D-2: Estimated Excavation Volumes for Upland Remediation Alternatives

Area Name/ Designation	Area of Excavation Limits (SF) Bottom	Top	Excavation Depth (ft)	Excavation Volume (BCY)	Surface Debris Depth (ft)	Surface Debris Fraction	Surface Debris Volume (BCY)	Excavation Volume Berm Correction (BCY)	OHW Line Area Correction (SF)	OHW Line Volume Correction (BCY)	Alt. U-4 Corrected Area (SF)	Alt. U-4 Corrected Volume (BCY)	Backfill Volume Correction Wetland Area (BCY)
Alternative U-3													
1	1,963	2,642	4	341	2	50%	-171				--	--	
2	1,963	2,642	4	341	2	50%	-171				--	--	
3	911	1,552	4	182	2	50%	-91	29			--	--	
4	6,631	8,060	4	1,088	2	50%	-544		-88	-13	--	--	
5	2,678	4,243	4	513	2	50%	-256	99			--	--	
6	3,183	4,212	4	548	2	50%	-274	40			--	--	
7	155	559	4	53	2	50%	-26	54			--	--	
8	2,398	3,436	4	432	2	50%	-216	74			--	--	
9	859	1,548	4	178	2	50%	-89	59	-605	-45	--	--	
10	684	1,171	4	137	2	50%	-69	38			--	--	
11	3,241	4,270	4	556	2	50%	-278		-800	-59	--	--	-5
12	1,813	2,877	6	521	2	33%	-174		-420	-47	--	--	
13	1,963	3,019	6	554	2	33%	-185				--	--	
14	1,182	2,188	6	374	2	33%	-125				--	--	
15	1,963	3,421	6	598	2	33%	-199				--	--	
16	29,087	34,407	6	7,055	2	33%	-2352				--	--	
17	1,963	3,019	6	554	2	33%	-185		-36	-8	--	--	
18	46,738	52,113	6	10,983	2	33%	-3661	104	-600	-67	--	--	-167
19	1,963	3,019	6	554	2	33%	-185		-240	-27	--	--	-527
20	1,963	3,421	8	798	2	25%	-199		-160	-24	--	--	-774
Total	113,301	141,819		26,361			-9,449	497	-2,949	-289	--	--	-1,472
Corrected Total		138,871		17,120							--	--	
Alternative U-4 (see Alt. U-1 designations)													
9	859	1,548	4	178	2	50%	-89	59	-605	-45	754	83	
10	684	1,171	4	137	2	50%	-69	38			1,054	96	
11	3,241	4,270	4	556	2	50%	-278		-800	-59	3,470	219	-5
16	46,738	52,113	6	10,983	2	33%	-3661	104	-600	-67	12,878	1,840	-167
17	1,963	3,019	6	554	2	33%	-185		-240	-27	2,779	342	-342
21	1,963	3,421	8	798	2	25%	-199		-160	-24	3,261	575	-575
Total	55,448	65,542		13,207			-4,481	201	-2,405	-221	24,197	3,154	-1,088
Corrected Total		24,197		3,154									

Note:
Estimated quantities are approximate and subject to change during design and construction.
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table D-3: Wetland Mitigation Estimated Cost Summary

Provide mitigation for impacted habitats and long-term monitoring

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Site Preparation, Mobilization/Demobilization					
Mobilization/Demobilization	1	LS	$11,000	$11,000	
Site Preparation, Mobilization/Demobilization Subtotal				**$11,000**	
Excavation and Backfilling					
Excavation, Stockpiling, and Loading	3,000	BCY	$15	$45,000	Assumes no dewatering
Transport and Disposal	800	ton	$75	$60,000	
Import and Place Backfill Material	4,200	LCY	$23	$97,000	Clean fill material
Import and Place Backfill Material	690	LCY	$42	$29,000	Sand material
Erosion Control Material and Placement	1	LS	$12,500	$12,500	
Excavation and Backfilling Cost Subtotal				**$243,500**	
Plant Installation					
Plant Material (wetland and buffer)	1	LS	$17,200	$17,200	Plant stock and delivery costs
Topsoil, Compost and Mulch	1	LS	$20,900	$20,900	6" compost and 3" mulch delivered
Plant protective devices	1	LS	$3,300	$3,300	Installed on trees and shrubs
Tractor rental for tilling	3	day	$750	$2,300	Till topsoil/compost in buffer
Habitat features	1	LS	$2,500	$2,500	Logs and bird boxes (may salvage on-site logs)
Labor and Supervision	1	LS	$25,200	$25,200	120 plants/person/day plus supervision, topsoil/compost installation, and salvage of exist. Plants
Fencing and Signage	1	LS	$7,900	$7,900	6-ft chain link with 1 gate and sensitive area signs. Materials and labor. No fencing provided along shoreline and Tommy Thompson trail
Plant Installation Cost Subtotal				**$79,300**	
Irrigation					
Materials and Installation	1	LS	$8,600	$8,600	Not incl. costs for operation and maintenance
Irrigation Cost Subtotal				**$8,600**	
Construction Cost Subtotal				**$342,400**	
Contingency	25%	--	--	**$86,000**	
Non-Construction Costs					
Construction Management	10%	--	--	$43,000	
Project Management	8%	--	--	$34,000	
Reporting	1	LS	$3,500	$4,000	Post-construction reporting
Non-Construction Cost Subtotal				**$81,000**	
Maintenance					
Annual Maintenance	1	LS	$57,400	**$57,400**	Annual maintenance for 10 years, $5,000/ac/yr w/ 2.5% escalator. Not incl. additional materials.
Wetland Mitigation Monitoring					
Annual Monitoring and Reporting	1	LS	$57,400	**$57,400**	Annual monitoring for 10 years w/ 2.5% escalator.
Mitigation Total Estimated Cost				**$624,200**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction.
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table D-4: Backup Calculations for Wetland Mitigation

Excavation and Backfilling

Wetland

Excavation	Location	Area	Depth (ft)	Volume (cf)	Volume (cy)	Cost (cy)	Total
	A1	3,425	8	27,400	1,014	$3.29	$3,335
	A2	2,755	6	16,530	612	$3.29	$2,012
	A3	5,948	6	35,688	1,320	$3.29	$4,344
					2,946		**$9,692**
				Tons	795		

Backfilling	Location	Area	Depth (ft)	Volume (cf)	Volume (cy)	Cost (cy)	Total
Sand	A1	3,425	3	10,275	380	$42	$15,967
Clean fill	A1	3,425	2	6,850	253	$23	$5,829
Sand	A2	2,755	3	8,265	306	$42	$12,844
					939		**$34,641**

Buffer

Backfilling	Location	Area	Depth (ft)	Volume (cf)	Volume (cy)	Cost (cy)	Total
Clean fill	Buffer	26,760	3	80,280	2,970	$23	$68,318
Clean fill	Side slope	6,000	4	24,000	888	$23	$20,424
					3,858		**$88,742**

Backfill Totals	Wetland	Sand			**686**		
		Clean fill			253		
	Buffer	Clean fill			3,858		
					4,112		
Topsoil/Compost	Buffer	26,760	0.5	13,380	495	$30	$14,852
Mulch	Buffer	26,760	0.25	6,690	248	$20	$4,951
	Side slope	6,000	0.25	1,500	55.5	$20	$1,110
					798		**$20,912**

Mob/Demob

	Unit Cost	Duration	Total Cost	Notes
Mob/Demob	$2,500	1	$2,500	
Utility locates	$80	10	$800	$80/hr Call before u dig

Table D-4: Backup Calculations for Wetland Mitigation

Plantings

Wetland and Buffer			
Trees	220	$5.00	$1,100
Shrubs	1,100	$5.00	$5,500
4-inch	1,870	$2.50	$4,675
Emergent	2,640	$2.25	$5,940
	5830		**$17,215**

Protective devices	220	$7.00	$1,540
	1,320	$1.32	$1,742
			$3,282

Labor and Supervision (Plantings)

Labor	Qty plants	Plants/person/day	Days	Work Days (4 people)	Actual Work Days	Cost
Plants (new)	5,830	120	48.6	12.1	12	$25
Plants (salvage)	440	120	3.7	0.92	1	$25

Supervision	Days	Hours	Cost
	13	130	$90

Labor and Supervision	Hours	Cost
	208	**$22,150**

Labor and Supervision (Compost and Mulch)

Labor	Quantity	CY/person/day	Days	Works days (4 people)	Actual Work Days	Cost
	798	125	6.4	1.6	2	$25

Supervision	Days	Hours	Cost
	2	20	$90

Labor and Supervision	Hours	Cost
	71.1	**$3,077**

Total Labor and Supervision **$25,227**

Habitat Features

Logs	10	$245	$2,450	May salvage existing logs
Bird boxes	5	$15	$75	
			$2,525	

Table D-4: Backup Calculations for Wetland Mitigation

Fence and Signage

Fencing	Length (lf)	Cost (lf)	Total	
	400	$19	$7,600	material and labor
Gate	1	$278	$278	
Signage	Qty	Cost		
	10	$3	$25	
			$7,903	

Irrigation

Area (sf)	Cost (sf)	Total
26760	$0.32	**$8,563**

Monitoring ($5,000/yr)

Annual LS	Escalate	Years
$5,000	2.50%	10

Maintenance ($5,000/ac/yr)

Annual LS	Escalate	Years
$5,000	2.50%	10

Periodic Maintenance/maintenance cost: annual

Year 1	$5,000	$5,125
Year 2	$5,125	$5,253
Year 3	$5,253	$5,384
Year 4	$5,384	$5,519
Year 5	$5,519	$5,657
Year 6	$5,657	$5,798
Year 7	$5,798	$5,943
Year 8	$5,943	$6,092
Year 9	$6,092	$6,244
Year 10	$6,244	$6,400
		$57,417

Note:
Estimated quantities and costs are approximate and subject to change during design and construction.
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table D-5: Stormwater Backup Calculations

Compost and Mulch

	Area	Material Depth	Volume (cf)	Volume (cy)	Cost	Total
Topsoil/Compost	3,600	0.5	1800	66.6	$30	$1,998
Mulch	3,600	0.25	900	33.3	$20	$666
				99.9		**$2,664**

Stormwater Plant Material

Trees	60	$5.00	$300
Shrubs	240	$5.00	$1,200
	300		**$1,500**
Protective Devices			
Trees	60	$7.00	$420
Trees and Shrubs	300	$1.32	$396
			$816
Total Plant Material			**$2,316**

Stormwater Planting Labor and Supervision

Labor	Plants	Plants/person/day	Days	Work Days (4 people)	Actual work days	Cost
	300	120	2.5	0.625	1	$25
Supervision	Days	Hours	Cost			
	1	10	$90			
Labor and Supervision		Hours	Cost			
		30	**$1,400**			

Stormwater Compost/Mulch Labor and Supervision

Labor	Quantity	CY/person/day	Days	Works days (4 people)	Actual Work Days	Cost
	100	125	0.8	0.2	1	$25
Supervision	Days	Hours	Cost			
	1	10	$90			
Labor and Supervision		Hours	Cost			
		16.4	**$1,060**			

Total Stormwater Plantings **$7,440**

Note:
Estimated quantities and costs are approximate and subject to change during design and construction.
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table D-6: Backup Calculations for Aquatic Remediation Alternatives

Description	Quantity	Unit	Unit Cost	Total Cost	Notes and Assumptions
Access Road and Crane Pads					
Access road surfacing	1,770	CY	$50	$88,500	25 ft wide, 2 ft deep.
Crane pad surfacing	465	CY	$50	$23,250	5 pads, each 25 ft x 25 ft x 4 ft.
Woven soil stabilization fabric mat'l & placement	8,600	SF	$1	$8,600	
Surfacing removal and disposal	2,235	CY	$0	$0	
Removal and placement as backfill	2,235	CY	$15	$33,525	Reuse on site as part of backfill material in nearshore excavation area.
Total				**$153,875**	
Concrete Pier Demolition					
Pier demolition	650	CY	$400	$260,000	
Piling removal	245	each	$375	$91,875	
Piling transport and disposal	245	each	$100	$24,500	Subtitle D landfill disposal.
Debris curtain	700	LF	$25	$17,500	
Total				**$393,875**	
Bulkhead Demolition					
Bulkhead demolition	290	CY	$350	$101,500	
Debris curtain	435	LF	$25	$10,875	
Total				**$112,375**	
Shoreline Protection Feature - Jetty Extension					
Material and placement	13,250	ton	$55	$728,750	
Jetty extension cover (seaward)	5,316	ton	$24	$127,584	
Jetty cover (seaward)	4,839	ton	$24	$116,136	
Jetty cover (landward)	5,644	ton	$17	$95,948	
Total				**$1,068,418**	
Shoreline Protection Feature - Protective Spit					
Gravelly sand and placement	6,900	ton	$30	$207,000	
Armor stone and placement	1,400	ton	$50	$70,000	
Spit cover	1,100	ton	$17	$18,700	
Total				**$295,700**	
Long-Term Monitoring Periodic Cost NPV					
Long-term monitoring cost per event	$80,000				
Repair frequency	5	yr			
NPV time period	30	yr			
Discount rate	2.7%				
	Year	Cost	Discount Factor	Net Present Value	
	0	--	--	--	
	5	$80,000	0.875	$70,023	
	10	$80,000	0.766	$61,289	
	15	$80,000	0.671	$53,646	
	20	$80,000	0.587	$46,955	
	25	$80,000	0.514	$41,099	
	30	$80,000	0.450	$35,973	
	Total			**$308,984**	
Periodic Cap Maintenance/Repair NPV					
Maintenance/repair cost per event	$100,000				
Repair frequency	5	yr			
NPV time period	30	yr			
Discount rate	2.7%				
	Year	Cost	Discount Factor	Net Present Value	
	0	--	--	--	
	5	$100,000	0.875	$87,528	
	10	$100,000	0.766	$76,612	
	15	$100,000	0.671	$67,057	
	20	$100,000	0.587	$58,694	
	25	$100,000	0.514	$51,373	
	30	$100,000	0.450	$44,966	
	Total			**$386,230**	

Note:
Estimated quantities and costs are approximate and subject to change during design and construction.
Estimated cost assumes an accuracy range of -30 to +50 percent.

Table D-7: Estimated Excavation/Dredging Volumes for Aquatic Remediation Alternatives

Area Name/ Designation	Area of Excavation/ Dredging Limits (SF)	Depth (ft)	Excavation/ Dredging Volume (CY)	Notes and Assumptions
Alternative A-1				
Surface debris	63,329	2	4,691	
Nearshore excavation (dioxin > 25 ppt)	9,203	4	1,363	Depth adjusted for surface debris removal.
Nearshore excavation (10 ppt < dioxin < 25 ppt)	54,126	4	8,019	Depth adjusted for surface debris removal.
Total	63,329		9,382	
Offshore dredging (dioxin > 25 ppt)	9,203	6	2,045	
Offshore dredging (10 ppt < dioxin < 25 ppt)	151,893	6	33,754	
Total	161,096		35,799	
ENR thin capping	1,019,698	0.5	18,883	
Alternative A-2				
Surface debris	63,329	2	4,691	
Nearshore excavation (dioxin > 25 ppt)	9,203	4	1,363	Depth adjusted for surface debris removal.
Nearshore excavation (10 ppt < dioxin < 25 ppt)	54,126	0	0	Depth adjusted for surface debris removal.
Total	63,329		1,363	
Offshore dredging (dioxin > 25 ppt)	9,203	6	2,045	
Offshore dredging (10 ppt < dioxin < 25 ppt)	151,893	2	11,251	
Total	161,096		13,296	
ENR thin capping	1,019,698	0.5	18,883	
Alternative A-3				
Surface debris	63,329	2	4,691	
Nearshore excavation (dioxin > 25 ppt)	9,203	4	1,363	Depth adjusted for surface debris removal.
Nearshore excavation (10 ppt < dioxin < 25 ppt)	54,126	4	8,019	Depth adjusted for surface debris removal.
Total	63,329		9,382	
Offshore dredging (dioxin > 25 ppt)	9,203	6	2,045	
Offshore dredging (10 ppt < dioxin < 25 ppt)	151,893	2	11,251	
Total	161,096		13,296	
ENR thin capping	1,019,698	0.5	18,883	
Alternative A-4				
Surface debris	63,329	2	4,691	
Nearshore excavation (dioxin > 25 ppt)	9,203	4	1,363	Depth adjusted for surface debris removal.
Nearshore excavation (10 ppt < dioxin < 25 ppt)	54,126	4	8,019	Depth adjusted for surface debris removal.
Total	63,329		9,382	
Offshore dredging (dioxin > 25 ppt)	9,203	6	2,045	
Offshore dredging (10 ppt < dioxin < 25 ppt)	151,893	6	33,754	
Offshore dredging (10 ppt < dioxin < 25 ppt)	525,635	2	38,936	Additional shallow dredging area.
Total	686,731		74,735	
ENR thin capping	494,063	0.5	9,149	Eelgrass bed areas only.
Alternative A-5				
Surface debris	63,329	2	4,691	
Nearshore excavation (dioxin > 25 ppt)	9,203	4	1,363	Depth adjusted for surface debris removal.
Nearshore excavation (10 ppt < dioxin < 25 ppt)	54,126	0	0	Depth adjusted for surface debris removal.
Total	63,329		1,363	

Table D-7: Estimated Excavation/Dredging Volumes for Aquatic Remediation Alternatives

Area Name/ Designation	Area of Excavation/ Dredging Limits (SF)	Depth (ft)	Excavation/ Dredging Volume (CY)	Notes and Assumptions
Offshore dredging (dioxin > 25 ppt)	9,203	6	2,045	
Offshore dredging (10 ppt < dioxin < 25 ppt)	151,893	2	11,251	
Offshore dredging (10 ppt < dioxin < 25 ppt)	525,635	2	38,936	Additional shallow dredging area.
Total	686,731		52,232	
ENR thin capping	494,063	0.5	9,149	Eelgrass bed areas only.

Note:
Estimated quantities and costs are approximate and subject to change during design and construction
Estimated cost assumes an accuracy range of -30 to +50 percent.

APPENDIX E
SUPPLEMENTAL FIELD INVESTIGATION
SEDIMENT DIOXIN AND WOOD WASTE

Supplemental Field Investigation
Sediment Dioxin and
Wood Waste
Former Custom Plywood Site
Anacortes, Washington

Prepared for
Department of Ecology

May 17, 2011
17330-27

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SUPPLEMENTAL FIELD INVESTIGATION
SEDIMENT DIOXIN AND WOOD WASTE
FORMER CUSTOM PLYWOOD SITE
ANACORTES, WASHINGTON

1.0 INTRODUCTION AND BACKGROUND INFORMATION

This report documents an intertidal and subtidal sediment investigation adjacent to the former Custom Plywood Mill property (Site) located on Fidalgo Bay in Anacortes, Washington (Figure 1). These investigations are in support of a Washington State Department of Ecology (Ecology) Interim Action cleanup at the Site, which includes the removal of creosote-treated pilings, an overwater pier, construction debris, and impacted soils.

The scope of work was designed to acquire the necessary data to further characterize dioxin concentrations in sediment within the Site, and to determine the areal and vertical extent of wood waste in the intertidal and subtidal area along the shoreline of the Site. Sediment samples were collected and analyzed in general accordance with our Sampling and Analysis Plan (SAP) dated December 10, 2010.

Vibracore samples were collected to depths of up to approximately four to ten feet and visually evaluated to determine the thickness, type and approximate percentage of wood waste. Twenty surface and subsurface sediment samples were collected on December 14 and 15, 2010, and submitted to Analytical Resources, Inc., an Ecology-accredited laboratory, for chemical analysis of dioxins.

1.1 Site Setting and History

The former Custom Plywood Mill property (Site) was a sawmill and plywood manufacturing facility that operated from the early 1900s until it was largely destroyed by fire in 1992. The property is located on Fidalgo Bay in Anacortes and covers 6.6 acres of upland area and 34 acres of tidal area. Fidalgo Bay is one of Ecology's seven Puget Sound Initiative embayments identified for priority cleanup, and supports highly productive habitat and resources including eelgrass, herring, salmon, shellfish, and nursery grounds. Nearshore habitat is currently degraded by contamination and the accumulation of debris, including derelict creosote-treated pilings, a crumbling overwater pier, and large industrial construction debris at the site. These structures also present a navigational and public safety threat.

When the plant was operational, plywood veneers were dried in one of two kiln dryers heated by a hog-fuel boiler. Sawdust created by the plant was used to soak up oil spills inside the plant and then used as hog fuel in the boilers. Veneers were glued together and then pressed by three large hydraulic presses. Toluene was used to clean out the glue application nozzles and tips. There is no historical documentation that wood preservatives such as pentachlorophenol (PCP) were used on site. Phenolic resins and caustics were used in the glue-making process.

The Custom Plywood site has a significant history of chemical handling, use, piping, and distribution, as well as waste materials disposal, which consisted of filling tidelands with wood, ash, bricks, metal, and sediments. Potential contamination sources include releases, spills, or on-site disposal of transformer fluid, wash water and sludge, pollution control sludge, glue wash water sludge, knot filler sludge, boiler ash, scrap steel, barrels and drums, aluminum cans, scrap wood, paper, asbestos pipe coverings, creosote-treated pilings, and transformers with PCB oils. The major potential contaminants are:

- Upland Soil – heavy petroleum hydrocarbons, metals, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), polychlorinated biphenyls (PCBs), and wood waste including sawdust.

- Intertidal and Subtidal Soil and Sediment – wood waste sawdust, dioxins, metals, PAHs, and heavy petroleum hydrocarbons.

Ecology investigated the site numerous times in the early 1990s, and the site was added to the Confirmed and Suspected Contaminated Site List in 1993.

1.2 Summary of Previous Sediment Quality Investigations

Since 1993, previous property owners, the City of Anacortes, Ecology, and the US Environmental Protection Agency (EPA) have conducted a series of environmental characterization and sampling investigations near the property, before the Agreed Order process that started in 2008. These investigations were conducted to define the extent of contamination and evaluate the condition of soil, groundwater, and offshore sediments. Each successive investigation targeted data gaps identified in the previous investigations.

Investigations conducted between 1993 and 1995 were generally limited, and concentrated sampling in upland areas with the highest likelihood of contamination.

Investigations conducted between 1995 and 2003 culminated in the development of an Interim Remedial Action Plan for soil removal within the upland excavation areas (Geomatrix 2007). The Interim Remedial Action Plan (IRAP) was conducted under the Voluntary Cleanup Program (VCP) with excavation and disposal of the soil in the northern tracts first, followed by planned excavation and disposal of the soil in the southern tracts a year later. After the interim action in 2007, Ecology required the subsequent work to be conducted within the Puget Sound Initiative (PSI) program under an Agreed Order to be consistent with the approach at other PSI-led sites in Fidalgo Bay. Consequently, the VCP was not entered and negotiations for an RI/FS and Agreed Order commenced.

Following the Interim Action in July 2007, an additional remedial investigation was carried out by AMEC in July 2008 with supplemental investigations in April and August 2009. Additional sampling and surveying was conducted to further define the extent of contamination and to evaluate the condition of the soil, groundwater, offshore sediment, and benthic habitat (AMEC Geomatrix 2010).

In June 2010, SAIC conducted a supplementary investigation (SAIC 2010) of Fidalgo and Padilla Bays and areas adjacent to the former Custom Plywood Mill property to determine potential sources of dioxin contamination observed in previous investigations (SAIC 2008, AMEC Geomatrix 2008). The purpose of this supplementary sediment investigation was to determine the bay-wide background concentrations of dioxin/furan in Fidalgo and Padilla Bays and to further characterize and delineate the extent of dioxin/furan in sediment and clam tissue in nearshore sediments adjacent to the former Custom Plywood Mill property.

In August 2010, Hart Crowser performed test pit sampling in the intertidal zone to define the extent of contamination in the intertidal zone sediments and water immediately adjacent to the property (Hart Crowser 2010).

1.3 Data Gaps

Extent of Wood Waste

Review of results from previous investigations indicated that the areal and vertical extent of the wood waste in the intertidal and subtidal areas had not been adequately defined for the purposes of evaluating impacts and potential remediation measures. The location, thickness, extent, type and estimated percentage by volume of wood debris required further delineation.

Dioxin Hotspots

Previous surface sampling points shown on Figure 2 were typically hundreds of feet apart and had substantial spatial data gaps. Dioxin concentrations were commonly in the 10 to 20 parts per trillion (ppt) total toxics equivalent concentration (TEC) range. Two hotspot outliers with concentrations of 41.01 ppt and 81.2 ppt total TEC were previously identified. Additional sampling locations were selected to better delineate the extent of the dioxin impacts, occurrence of dioxins at depth within the sediment at previous hotspot outlier locations, and to potentially confirm the dioxin hotspot concentrations.

2.0 SEDIMENT SAMPLING

2.1 Deviations from the 2010 SAP

Minor deviations from the SAP were made to adjust and optimize the number and type of samples collected to obtain the most usable results for the investigation. SAP modifications were also made, as necessary, based on adaptations to the field conditions encountered. Deviations from the Ecology-approved SAP for the Custom Plywood investigation are summarized below and are discussed in more detail in the applicable report sections.

- Some actual surface sediment collection locations were shifted more than 25 feet from proposed surface sediment locations due to rocks and debris on the bottom. These locations included HC-SS-3, HC-SS-5, and HC-SS-10. The largest deviation was approximately 75 feet southeast at site HC-SS-5. Some actual vibracore collection locations were shifted greater than 25 feet from proposed coring locations due to rocks and debris on the bottom. These locations included HC-SC-5, HC-SC-6, and HC-SC-7. The largest deviation was approximately 80 feet southeast at site HC-SC-5.

- Four proposed surface sediment locations coincided with proposed vibracore locations (HC-SS-2/HC-SC-2, HC-SS-4/HC-SC-4, HC-SS-5/HC-SC-5, and HC-SS-7/HC-SC-7). The vibracore samples were collected the day following the surface sediment sample collection. The sample coordinates were used to return to the location, but due to rocks and debris on the bottom, some vibracore locations were shifted up to approximately 30 feet from the surface grab sample locations.

- Surface sediment samples were collected from thirteen locations using the power van Veen grab sampler. An additional surface sediment sample was collected from the upper 0 to 10 centimeters (cm) at the vibracore sample location HC-SC-15 (sample HC-SC-15-0-10cm). Only the upper 0 to 7 cm was collected for sample HC-SS-3 on the fifth attempt.

- Actual sampling coordinates and water depth could not be determined at surface sediment grab sample location HC-SS-2 due to rough water and high winds. The proposed sample location coordinates were used for plotting the sample location on the figure. These coordinates are considered a good estimate, as the sample was collected on the first attempt after the vessel had reached the proposed location.

- There was no Ecology on-site representative, so additional surface sediment samples and vibracore locations were determined based on field observations and consultation with Hart Crowser project managers. A total of 29 vibracore sampling locations were drilled.

- Due to the large number of sediment cores collected solely for the purpose of evaluating the presence of wood waste, only abbreviated core sampling logs were written at the time of collection. Core descriptions were subsequently developed through review of field notes and photographs, but depths and transitions for HC-SC-19 through HC-SC-38 should be considered estimates.

- Gravity Environmental and Hart Crowser field staff performed wet sieving of a portion of three vibracore sediment samples. Wet sieving was done to determine if there was wood waste that was too small to be observed in the bulk sediment sample.

2.2 Sample Location Control

A differential global positioning system (DGPS) was used aboard the sampling vessel for location positioning (sub-meter accuracy) for vibracore and surface sediment grab sampling. The DGPS receiver was placed on the sampling device deployment boom to accurately record the sampling location position. Once the sampler was deployed, the actual position was recorded when the sampler was on the bottom and the deployment cable was in a vertical position. State Plane (Northing and Easting) coordinates for the actual sampling locations are presented in Table A-1 in Appendix A. Gravity Environmental operated the vessel under subcontract to Hart Crowser for the vibracore and surface sediment grab sample activities.

Water depths were measured directly by sonar and converted to mudline elevations using the predictive tide charts. The vessel maintained station using an anchor, engine power, or by tying off on remaining piers.

2.3 Sediment Core Sampling

Twenty-nine sediment cores were collected from intertidal and subtidal locations at the Site in Fidalgo Bay (Figure 2). Five core locations were proposed for collection of subsurface sediment dioxin samples (HC-SC-2, HC-SC-4, HC-SC-5, HC-SC-6, and HC-SC-7). One additional core location was selected for surface and subsurface sediment dioxin samples during the sampling event (HC-SC-15). An additional 23 cores were collected to determine the depth and areal extent of wood debris.

Sediment core samples were collected using a vibracore sampling device. The vibracore device vibrates a core tube or sample barrel into unconsolidated water-saturated sediment. The core tube was constructed of rigid, clear 4-inch-diameter Lexan (polycarbonate) in which the sediment sample is recovered. A Lexan core catcher attached to the end of the barrel was used to hold the undisturbed sediment inside the barrel when withdrawn from the seafloor.

During sampling, a core tube was driven below the surface sediment with the vibracore device until the desired penetration was achieved or to refusal. Sediment cores were collected to a depth of up to 10 feet below the sediment-water interface. Upon retrieval of the core, the acceptability was assessed relative to the criteria established in the SAP.

After vibracore collection, the outer core tube was cleaned and visually examined. Sediment from the cores was extruded on the vessel. Each core was visually examined in general accordance with ASTM D 2488, Standard Practice for the Classification of Soils (Visual-Manual Procedure). Each core was photographed and visual observations and soil descriptions were documented on core logs presented in Appendix A, Figures A-1 through A-30.

Subsurface sediment dioxin samples were collected from the three foot depth from cores HC-SC-2, HC-SC-4, HC-SC-5, HC-SC-6, HC-SC-7, and HC-SC-15. One surface sediment dioxin sample was collected from the upper 0 to 10 cm depth from core HC-SC-15. The samples were individually homogenized, placed in designated containers, and submitted to Analytical Resources, Inc. (ARI) of Tukwila, Washington, for analysis of dioxins/furans.

Evidence of petroleum-like impacts was observed in the upper 3 feet of the three cores HC-SC-31, HC-SC-32, and HC-SC-34. A moderate petroleum-like sheen and slight petroleum-like odor was observed in the upper 2.75 feet of HC-SC-31; oil droplets were observed in the upper 0.5 feet of HC-SC-32; and petroleum-like odor was observed in the upper 2.75 feet if HC-SC-34.

2.4 Surface Sediment Grab Sampling

Thirteen surface sediment grab samples were collected from intertidal and subtidal locations at the Site in Fidalgo Bay (Figure 2). Four proposed sediment grab locations coincided with core locations (HC-SS-2, HC-SS-4, HC-SS-5, and HC-SS-7). The coincident vibracore locations were collected on the day following the sediment grab collection, and it was not possible to collect cores from the exact same location due to debris and rocks on the bottom. There was up to approximately 30 feet variance between the surface sediment grab and the subsurface core samples for the coincident samples.

Surface sediment grab samples were collected using a 0.2 square meters (m^2) pneumatic power surface grab sampler. Samples from each surface grab location were collected from the 0- to 10-cm-depth interval with the exception of sample HC-SS-3, which was collected from the upper 0 to 7-cm-depth interval. The sediment was homogenized and submitted for chemical laboratory testing. Sediment from the 13 surface sediment grab samples was submitted to ARI for chemical analysis of dioxins/furans.

Visual sample descriptions of surface sediment grab samples are presented in Table A-2 in Appendix A. The power grab sampler was decontaminated between sampling locations following the procedure in the SAP. Upon retrieval of the surface sediment grab samples, the acceptability of each grab was assessed relative to the criteria established in the SAP.

3.0 DISTRIBUTION, TYPE, AND ESTIMATED PERCENTAGE OF WOOD WASTE

The sediment cores and surface sediment samples were also used to further delineate the depth, areal extent, type, and estimated percentage of wood waste with a focus on determining the boundaries of the potentially impacted area. After sample collection, sediment cores and surface sediment samples were visually examined to determine the presence, depth, type, and estimated percentage of wood waste. Sediment cores were collected to a depth of up to about 10 feet and surface samples were collected from 0 to 10 cm.

Surface sediment grab samples and sediment core samples from each location offshore of the Site were examined for the presence of wood waste. As noted in the sediment core logs and surface sediment descriptions presented in Appendix A, the samples typically contained large amounts of wood waste, including wood chips, wood chunks and fragments, fine wood particles, sawdust, twigs, sticks, and bark. Identification of wood waste was based primarily on visual interpretation of the surface sediment grab samples and sediment core samples collected in the field and are subjective. At a few select locations, a 200-micron sieve was used in the field to help determine the presence of fine wood waste (i.e., fine wood particles and sawdust) that was otherwise difficult to see.

For purposes of this report, wood waste included wood chips, wood chunks, fragments, fine wood particles, and sawdust, as well as terrestrial wood waste (i.e., twigs, sticks, and bark). The distribution of wood waste offshore of the Site is presented on Figure 3 and the estimated percentage of wood waste for sediment samples are summarized in Table A-3. Figure 3 presents combined near-surface and subsurface distribution of wood waste based on vibracores and surface sediment samples.

Surface sediment grab samples and sediment core samples were evaluated in the field for the presence of wood waste. A summary of the surface sediment grab samples are provided in Table A-2, and sediment core sample bore logs are presented in Appendix A, Figures A-1 through A-30. While the type and thickness of wood waste was widely distributed, wood waste was noted at the majority of the locations (Table A-3). Greater amounts of wood waste (visual and sieve estimates of up to about 50 percent) were generally observed closer to the shoreline of the Site where the historical sawmill and plywood manufacturing operations occurred.

Hart Crowser field representatives also performed wet sieving on a few select sub-samples from three sediment core samples (Table A-3) using a 200-micron sieve to determine whether wood waste, which was too small to be observed in bulk sediment, was present. One to two spoonfuls of sediment suspected to contain fine wood waste were washed through a 200-micron sieve and the presence of fine wood waste was observed. An estimate of the amount of wood waste present in that portion of the core was then determined.

Wood waste was identified in:

- Eleven of the thirteen subtidal surface sediment sample locations (approximately 85 percent);
- Twenty-eight of the twenty-nine subtidal sediment core samples (approximately 97 percent); and
- All of the three wet sieve sediment core samples (100 percent of sieved samples contained fine wood particles and sawdust).

Wood waste was observed with the highest accumulations (5 to 50 percent cover) near the former sawmill and plywood operations near the shoreline by the L-shaped pier (Figure 3). The wood waste noted in the areas near the former sawmill and plywood operations included wood chips, wood chunks, fragments, fine wood particles, and sawdust, as well as terrestrial wood waste such as twigs, sticks, and bark. In contrast, the wood waste noted further from the shoreline generally contained fewer wood chips, wood chunks, fragments, fine wood particles, and sawdust, and more occurrences of terrestrial wood waste such as twigs, sticks, and bark. The surface sediment location, HC-SS-14, had only wood bark (Table A-3), which may denote the outer extent of wood waste derived from historical sawmill and plywood operations at the Site.

4.0 SEDIMENT CHEMICAL ANALYSIS RESULTS

Sediment sample results for dioxins/furans are summarized in Tables 1 and 2. Subsurface sediment dioxins/furans results are provided in Table 1, while surface sediment dioxins/furans results are provided in Table 2. Samples were submitted to ARI for dioxins/furans analysis by EPA Method 1613B. No field duplicates or equipment rinse blanks were collected for analysis.

4.1 Data Quality Review Summary

Overall, the data quality objectives, as set forth in the SAP, were achieved, and the data for this project are acceptable for use, as qualified. Results for several analytes were qualified as estimated concentrations based on exceedances of quality control criteria. A detailed chemical data quality review and chemical laboratory reports are presented in Appendix B.

4.2 Dioxins/Furans

Analytical results for dioxins/furans expressed as 2,3,7,8-TCDD toxic equivalent concentrations (TECs) are presented in Tables 1 and 2 and on Figure 2. TECs were calculated using the World Health Organization 2005 toxic equivalency factors (TEF) for mammals. Total dioxin TECs are reported using two conventions: adding only detected congeners, and using 1/2 the detection limit for non-detected congeners. The latter made a significant difference in reported totals since concentrations for many congeners were below detection limits (Tables 1 and 2). For the presentation of data on Figure 2, the values were calculated using 1/2 the detection limit for non-detected results.

Dioxin/furan congeners were detected in all samples. For the surface (0 to 10 cm) samples, the total TEC concentrations ranged from 5.164 to 137.79 pg/g (picograms/gram, equivalent to parts per trillion (Table 2)). The highest concentration was in sample HC-SS-3, located close to shore, and near the previously identified dioxin hotspot (Figure 2). For the subsurface samples (3 feet depth), the total TEC concentrations ranged from 1.01 to 160.29 pg/g (Table 1). The highest concentration was in sample HC-SC-2-3′ (Figure 2).

Dioxin/furan concentrations do not have numerical criteria under SMS for marine sediments. However, for comparative purposes, the detected TEC concentrations exceed the Puget Sound background concentrations, as reported in EPA's 2008 Puget Sound Background Study (EPA 2008). TEC concentrations in the Puget Sound study ranged from 0.24 to 11.63 pg/g with a lognormal mean of 1.35 and a median of 1.0 pg/g. The detected concentrations from the Site generally exceed this range.

5.0 SUMMARY

The highest accumulations of wood waste were observed near the shoreline in the vicinity of the former mill. Wood waste noted further from the shoreline generally contained less wood chips, wood chunks, fragments, fine wood particles, and sawdust, and more occurrences of terrestrial wood waste such as twigs, sticks, and bark. Most core samples collected from within the inner harbor line contained wood waste over their entire depth (approximately 3 to 9 feet). Surface sediment samples collected from the north and northeast area of the site between the inner and outer harbor lines only contained wood bark and twigs and may indicate that the outer extent of wood waste in this area may be just outside the inner harbor line. This result may be also indicative of use in that area (i.e., log handling as opposed to processing). Similarly, surface sediment samples collected east and southeast of the site between –3 and –4 MLLW elevations only contained wood bark and twigs suggesting the wood waste boundary in this area may be between these two elevations.

The highest dioxin concentrations were detected in the northern half of the site near the former mill and appear to be associated with wood waste, particularly sawdust. The highest concentrations appear to be within the inner harbor line though there are a number of data gaps in this area due to low sampling density.

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Table 1 - Analytical Results for Subsurface Dioxin Samples

Sample ID	HC-SC-2-3'	HC-SC-4-3'	HC-SC-5-3'	HC-SC-6-3'	HC-SC-7-3'	HC-SC-15-3'
Sampling Date	12/15/10	12/15/10	12/15/10	12/15/10	12/15/10	12/15/10
Sample Depth	3 ft.	3 ft.	3 ft.	3 ft.	3 ft.	3 ft.
Dioxins in pg/g						
2,3,7,8-TCDD	3.87	9.78	0.651 U	0.0892 U	0.35 U	2.49
1,2,3,7,8-PeCDD	25	37.6	2.06 T	0.246 T	2.85 T	16.6
1,2,3,4,7,8-HxCDD	27.2	24.1	1.56 T	0.242 T	2.87 T	23.3
1,2,3,6,7,8-HxCDD	221	86.4	8.01	1.42 U	17.2	146
1,2,3,7,8,9-HxCDD	67	54.5	3.29 T	0.537 U	7.02	52.5
1,2,3,4,6,7,8-HpCDD	5150	1570	149	33.9	389	3980
OCDD	34400	10100	939	267	2540	28700
2,3,7,8-TCDF	8.59	22.5 J	2.38	0.103 JT	0.987	4.56
1,2,3,7,8-PeCDF	8.16	16.5	1.12 JT	0.0733 U	0.821 T	4.45 T
2,3,4,7,8-PeCDF	19.9	20.7	1.4 U	0.135 U	1.33 U	9.12
1,2,3,4,7,8-HxCDF	57.7 J	24.6 J	2.19 T	0.353 U	4.46 T	32.1
1,2,3,6,7,8-HxCDF	25.3	19.2	1.41 T	0.234 T	2.79 T	17
1,2,3,7,8,9-HxCDF	11.5 J	5.95 J	0.55 T	0.0348 U	0.95 T	6.25
2,3,4,6,7,8-HxCDF	48.7 J	24.5 J	2.53 T	0.365 T	4.9	12.8
1,2,3,4,6,7,8-HpCDF	1460	361	47	11.7 U	130	1020
1,2,3,4,7,8,9-HpCDF	66.4	18.6	2.62 U	0.488 U	6.74	54.3
OCDF	4750	1120	174	42.3 U	431	3860
Total TCDD	147 J	671 J	29.1 J	1.54 J	21.3 J	77.3 J
Total PeCDD	260 J	665	31.7	2.61 J	37.8	167
Total HxCDD	1420 J	1050	71.2	10.3 J	162	998 J
Total HpCDD	10300	3010	303	64	786	7880
Total TCDF	146 J	409 J	38.1 J	1.84 J	16.5 J	73.5 J
Total PeCDF	341 J	290 J	23.4 J	4.96 UJ	32.3 J	195 J
Total HxCDF	1610 J	464 J	61.8 J	10.3 J	130 J	1030 J
Total HpCDF	5130	1130 J	160	35.8 UJ	391 J	3610
TEC-1/2 MRL	160.29	103.12	7.1281	1.01	13.516	111.72
TEC-Detects only	160.29	103.12	6.5273	0.7595	13.141	111.72

U = Not detected at the reporting limit indicated.
J = Estimated value.
T = Value is between the MDL and MRL.

Table 2 - Analytical Results for Surface Dioxin Samples

Sample ID	HC-SS-1	HC-SS-2	HC-SS-3	HC-SS-4	HC-SS-5	HC-SS-7	HC-SS-8	HC-SS-9
Sampling Date	12/14/10	12/14/10	12/14/10	12/14/10	12/14/10	12/14/10	12/14/10	12/14/10
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 7 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Dioxins in pg/g								
2,3,7,8-TCDD	1.13 U	0.736 U	5.04	1.94	0.251 U	0.524 U	0.519 U	0.389 U
1,2,3,7,8-PeCDD	6.47 T	3.88 T	27.2	10.6	1.26 T	3.54 T	2.95 T	2.04 T
1,2,3,4,7,8-HxCDD	6.5 T	3.82 T	26.8	12.5	1.16 T	2.81 T	2.47 T	1.77 T
1,2,3,6,7,8-HxCDD	34	25.5	165	48.4	7.02	18.7	13.7	8.4
1,2,3,7,8,9-HxCDD	15.9	9.38	56.3	17.5	2.6 T	7.06	6.23	4 T
1,2,3,4,6,7,8-HpCDD	943	591	4280	931	130	373	266	137
OCDD	7400	4290	39800	6430	901	2630	1730	979
2,3,7,8-TCDF	4.15	2.43	17.9	11.6	0.595 T	1.76	2.08	1.63
1,2,3,7,8-PeCDF	2.9 T	1.41 JT	12.5 J	12.3	0.464 JT	1.02 JT	0.996 T	0.682 T
2,3,4,7,8-PeCDF	4.03 T	2.27 U	21.3	19.9	0.756 U	1.82 U	1.45 U	1.01 U
1,2,3,4,7,8-HxCDF	9.56 JT	6.03	38 J	31.3	1.79 T	4.35 JT	2.98 JT	1.83 JT
1,2,3,6,7,8-HxCDF	5.65 T	3.23 T	18.4	23.6	0.919 T	2.34 T	1.95 T	1.16 T
1,2,3,7,8,9-HxCDF	2.59 T	1.59 T	10.4	10.7	0.324 U	1.01 T	0.611 U	0.456 T
2,3,4,6,7,8-HxCDF	9.37 T	6.68	36.9 J	33.2 J	1.9 T	4.75 T	3.6 JT	2.24 JT
1,2,3,4,6,7,8-HpCDF	214	148	621	297	40.3	101	97.6	44.9
1,2,3,4,7,8,9-HpCDF	11.2	7.61	37	23.5	2.13 T	6.43	4.02 T	2.4 T
OCDF	771	567	1650	676	141	416	314	143
Total TCDD	83.2 J	36.1 J	540 J	93.6 J	9.45 J	37.6 J	51.5 J	30.5 J
Total PeCDD	100	51.7	811 J	264 J	14.8 J	48.4	46.2 J	31.6
Total HxCDD	326 J	198 J	1990 J	501	51.3 J	175	122	83.9
Total HpCDD	2170	1300	11600	2220	264	754	565	349
Total TCDF	50.3 J	30 J	305 J	174 J	10 J	27.8 J	29.3 J	21.9 J
Total PeCDF	68.8 J	45 J	372 J	242 J	14.1 J	38.6 J	31.6 J	20.4 J
Total HxCDF	231 J	168 J	1150 J	542 J	47.5 J	121 J	93 J	52.4 J
Total HpCDF	747 J	546	2630 J	891 J	135 J	366 J	286	144
TEC-1/2 MRL	31.236	19.42	137.79	52.406	5.1643	14.102	11.078	6.7347
TEC-Detects only	30.671	18.712	137.79	52.406	4.9092	13.567	10.57	6.3887

Table 2 - Analytical Results for Surface Dioxin Samples

Sample ID	HC-SS-10	HC-SS-11	HC-SS-12	HC-SS-13	HC-SS-14	HC-SC-15-0-10cm
Sampling Date	12/14/10	12/14/10	12/14/10	12/14/10	12/14/10	12/15/10
Sample Depth	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm	0 - 10 cm
Dioxins in pg/g						
2,3,7,8-TCDD	0.461 U	0.644 U	0.594 U	0.356 U	0.365 U	0.972 T
1,2,3,7,8-PeCDD	2.5 T	3.83 T	3.73 T	2.34 T	2.01 T	5.21
1,2,3,4,7,8-HxCDD	2.51 T	3.57 T	3.69 T	2.38 T	1.61 T	5.61
1,2,3,6,7,8-HxCDD	12.1	19.6	20.7	10.4	6.06	33.8
1,2,3,7,8,9-HxCDD	5.97	8.25	8.58	4.93	3.45 T	12.7
1,2,3,4,6,7,8-HpCDD	320	398	444	222	103	763
OCDD	2590	2710	3040	1510	660	5150
2,3,7,8-TCDF	1.88	2.43	2.22	1.86	1.91	2.13
1,2,3,7,8-PeCDF	0.846 T	1.21 T	1.22 T	0.768 JT	0.731 T	1.71 T
2,3,4,7,8-PeCDF	1.2 U	1.86 U	1.93 U	1.12 U	0.977 U	3.57 U
1,2,3,4,7,8-HxCDF	2.48 JT	4.54 JT	5.04 J	2.43 JT	1.5 JT	9.35 J
1,2,3,6,7,8-HxCDF	1.52 T	2.86 T	2.8 T	1.54 T	1.09 T	4.61 T
1,2,3,7,8,9-HxCDF	0.571 T	0.951 T	1.07 T	0.54 T	0.421 JT	1.97 T
2,3,4,6,7,8-HxCDF	2.72 JT	5.48 J	5.58 J	2.77 T	1.67 JT	9.71
1,2,3,4,6,7,8-HpCDF	61.9	121	129	58.8	28.5	233
1,2,3,4,7,8,9-HpCDF	3.42 J	7.11	7.36	3.19 T	1.57 U	11.2
OCDF	218	411	489	197	81.8	900
Total TCDD	63.9 J	49.4 J	65 J	63.2 J	61.9 J	40.3 J
Total PeCDD	67.2	67.4	65.2	43.3	43.4	57.8 J
Total HxCDD	176 J	171	172 J	101	76.9 J	254 J
Total HpCDD	735	800	929	470	244	1620
Total TCDF	25.7 J	32 J	28.7 J	24.3 J	22.1 J	35.6 J
Total PeCDF	24.2 J	39.3 J	37.2 J	22.9 J	18 J	66.2 J
Total HxCDF	66.7 J	126 J	140 J	61.2 J	32.3 J	269 J
Total HpCDF	213	404 J	464 J	187 J	85	833
TEC-1/2 MRL	10.607	15.433	16.183	8.746	5.6775	26.644
TEC-Detects only	10.196	14.832	15.597	8.4	5.3406	26.108

U = Not detected at the reporting limit indicated.
J = Estimated value.
T = Value is between the MDL and MRL.

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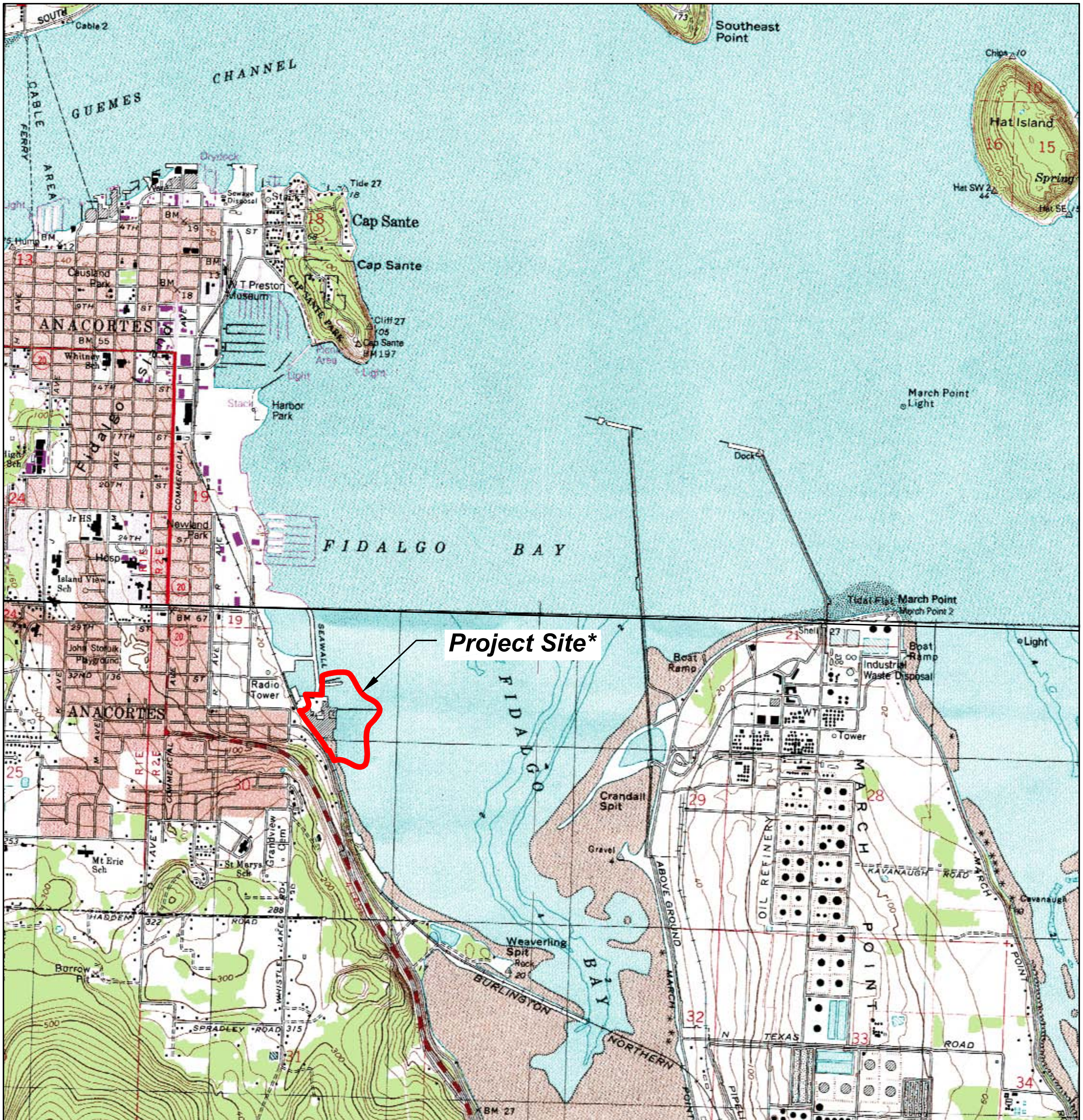

Source: Base map prepared from USGS 7.5-Minute Series Topographic Map, Anacortes North and Anacortes South Quadrangles.

0 0.5 1

Scale in Miles

N

* Represents upland and aquatic portions of the Site included with current Feasibility Study.

Custom Plywood Site

Anacortes, Washington

Vicinity Map

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Figure

1

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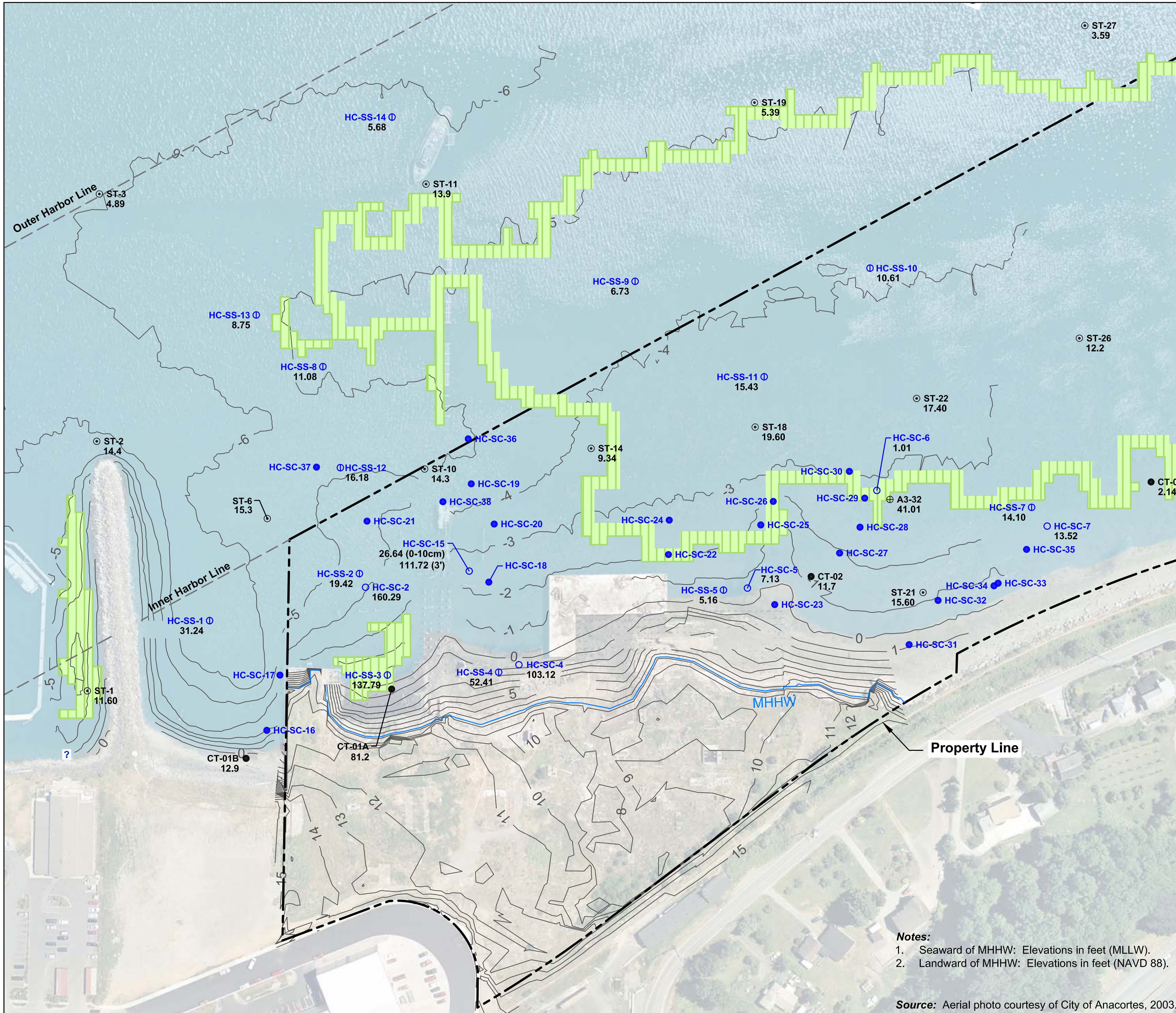

Sediment Dioxin Sample Location and Number

Hart Crowser 2010 Dioxin Sediment Sampling

HC-SS-2 Surface Sediment Dioxin Sample

HC-SC-2 Subsurface Sediment Dioxin Sample

HC-SC-37 Vibracore Sample

Previous Dioxin Sediment Sampling

CT-01A SAIC, 2010

A3-23 SAIC, 2008

ST-1 Geomatrix, 2008

8.99 Discrete dioxin analysis with result in parts per trillion (ppt) TEC (1/2 DL TEC)

Approximate Extent of Eelgrass Beds

N

0 150 300

Scale in Feet

Notes:
1. Seaward of MHHW: Elevations in feet (MLLW).
2. Landward of MHHW: Elevations in feet (NAVD 88).

Source: Aerial photo courtesy of City of Anacortes, 2003.

Former Custom Plywood Mill
Anacortes, Washington

Sediment Dioxin Sample TEC Results and Locations

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Figure **2**

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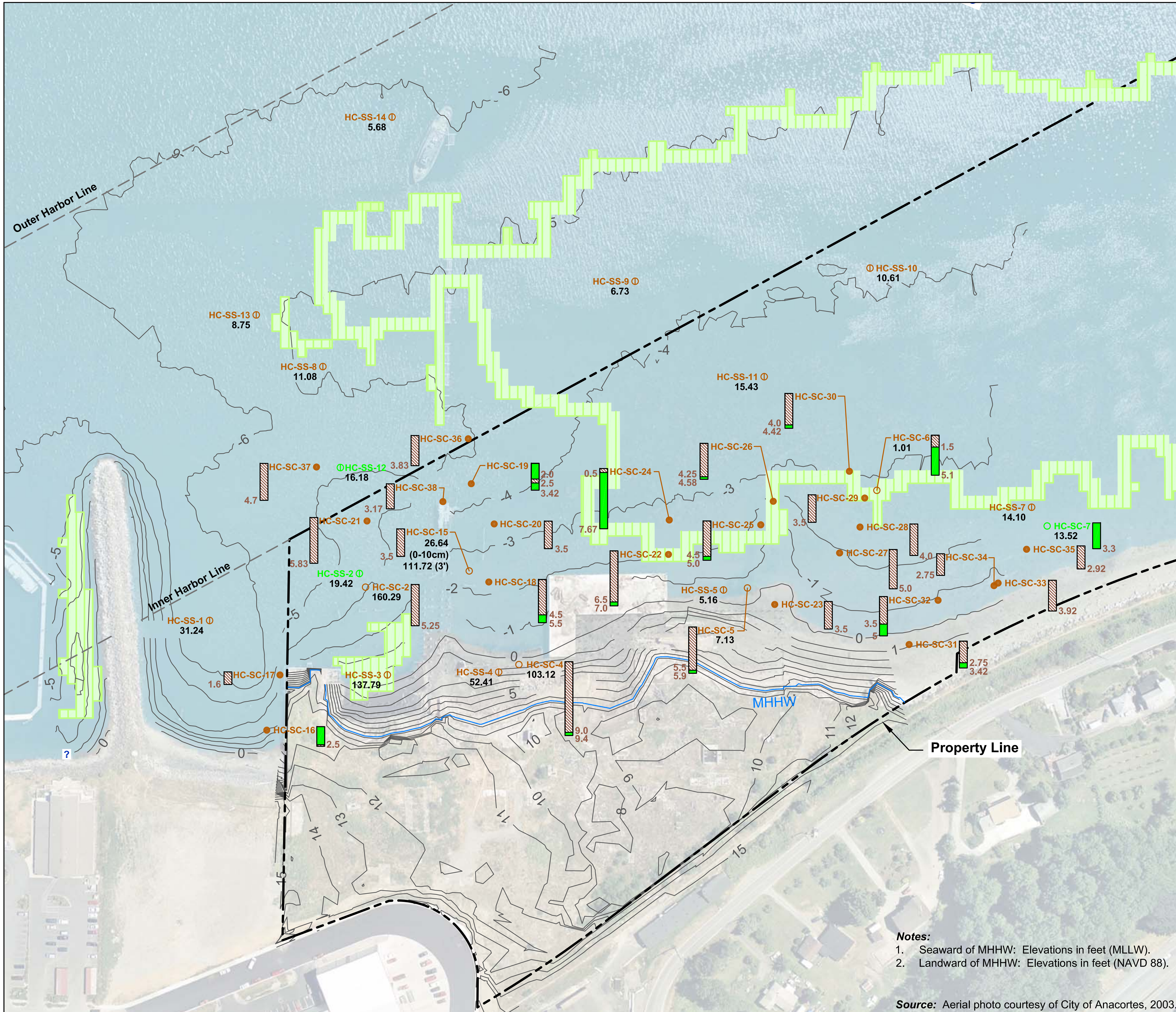

Sediment Dioxin Sample Location and Number

Hart Crowser 2010 Dioxin Sediment Sampling

HC-SS-2 ⦶ Surface Sediment Dioxin Sample

HC-SC-2 ○ Subsurface Sediment Dioxin Sample

HC-SC-37 ● Vibracore Sample

HC-SC-35 ● Wood Waste Present

HC-SC-7 ○ No Visual Evidence of Wood Waste

10.61 Discrete dioxin analysis with result in parts per trillion (ppt) TEC (1/2 DL TEC)

Vibracore Location

5.3 Length Equivalent to Recovery (Uncorrected for Compaction)

Wood Waste

No Visual Evidence of Wood Waste

Approximate Extent of Eelgrass Beds

N

0 150 300

Scale in Feet

Notes:
1. Seaward of MHHW: Elevations in feet (MLLW).
2. Landward of MHHW: Elevations in feet (NAVD 88).

Source: Aerial photo courtesy of City of Anacortes, 2003.

Former Custom Plywood Mill
Anacortes, Washington

Surface Sediment and Vibracore Location Plan Showing Wood Waste Distribution

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Figure **3**

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APPENDIX A
FIELD DOCUMENTATION
VIBRACORE LOGS

Table A-1 - Sample Location Coordinates

Sample Name	Actual Coordinates			
	Northing	Easting	Latitude	Longitide
Van Veen Power Grabs - Surface Sediment (SS)				
HC-SS-1	550546.148	1212030.748	48 29.747	122 36.015
HC-SS-2 *	550317.1579	1212102.616	48 29.710	122 35.996
HC-SS-3	550274.3734	1211947.622	48 29.702	122 36.034
HC-SS-4	550104.225	1211951.961	48 29.674	122 36.032
HC-SS-5	549760.5157	1212077.466	48 29.618	122 35.999
HC-SS-7	549289.4313	1212203.932	48 29.541	122 35.965
HC-SS-8	550373.0273	1212418.952	48 29.720	122 35.918
HC-SS-9	549895.6502	1212549.402	48 29.642	122 35.883
HC-SS-10	549536.4807	1212569.542	48 29.583	122 35.876
HC-SS-11	549698.2966	1212403.472	48 29.609	122 35.918
HC-SS-12	550346.2822	1212264.571	48 29.715	122 35.956
HC-SS-13	550474.8503	1212497.929	48 29.737	122 35.899
HC-SS-14	550267.2119	1212800.46	48 29.704	122 35.823
Vibracores - Sediment Core (SC)				
HC-SC-2	550307.7836	1212081.785	48 29.708	122 36.001
HC-SC-4	550073.3102	1211963.378	48 29.669	122 36.029
HC-SC-5	549723.9547	1212080.507	48 29.612	122 35.998
HC-SC-6	549526.0313	1212229.737	48 29.580	122 35.960
HC-SC-7	549265.6406	1212175.251	48 29.537	122 35.972
HC-SC-15	550149.209	1212106.521	48 29.682	122 35.994
HC-SC-16	550458.771	1211863.09	48 29.732	122 36.056
HC-SC-17	550438.5861	1211947.513	48 29.729	122 36.035
HC-SC-18	550119.3102	1212089.584	48 29.677	122 35.998
HC-SC-19	550146.1484	1212239.847	48 29.682	122 35.961
HC-SC-20	550111.0675	1212178.407	48 29.676	122 35.976
HC-SC-21	550305.4629	1212182.869	48 29.708	122 35.976
HC-SC-22	549844.6578	1212131.787	48 29.632	122 35.986
HC-SC-23	549682.2039	1212055.294	48 29.605	122 36.004
HC-SC-24	549843.4502	1212184.391	48 29.632	122 35.973
HC-SC-25	549703.4926	1212177.055	48 29.609	122 35.974
HC-SC-26	549684.422	1212212.999	48 29.606	122 35.965
HC-SC-27	549582.965	1212134.025	48 29.589	122 35.984
HC-SC-28	549551.7695	1212173.572	48 29.584	122 35.974
HC-SC-29	549544.5454	1212218.035	48 29.583	122 35.963
HC-SC-30	549568.058	1212258.837	48 29.587	122 35.953
HC-SC-31	549476.7053	1211994.062	48 29.571	122 36.018
HC-SC-32	549432.4578	1212061.687	48 29.564	122 36.001
HC-SC-33	549340.6269	1212087.956	48 29.549	122 35.994
HC-SC-34	549346.9217	1212083.977	48 29.550	122 35.995
HC-SC-35	549297.1118	1212139.59	48 29.542	122 35.981
HC-SC-36	550150.7742	1212308.591	48 29.683	122 35.944
HC-SC-37	550382.7541	1212265.408	48 29.721	122 35.956
HC-SC-38	550189.4715	1212212.464	48 29.689	122 35.968

Note: Northing and Easting coordinates in NAD83 State Plane North, in U.S. feet.
* Actual sampling coordinates were not determined due to rough water and high winds.
Proposed sample coordinates are provided.

Table A-2 - Surface Sediment Grab Sample Descriptions

Sample Number	Collection Date	Visual Sediment Description	Comments
HC-SS-1	12/14/2010	Saturated, very loose, olive-brown, SILT (OL) with wood chips.	Power grab. Eelgrass. Wood chips.
HC-SS-2	12/14/2010	Saturated, very loose, olive brown to black, SILT (ML) with minor shell fragments.	Power grab. Rough water prevented mudline elevation measurement.
HC-SS-3	12/14/2010	Saturated, very loose, black, silty SAND (SM) with wood chips.	Power grab. Eelgrass detritus. Wood chips. Slight odor.
HC-SS-4	12/14/2010	Saturated, very loose, black, sandy SILT (ML), with shell debris, rocks, and wood chunks.	Power grab. Eelgrass detritus, crab shell, amphipods, small shrimp. Wood chunks and metal wire.
HC-SS-5	12/14/2010	Saturated, very loose, brown to black, sandy SILT (ML), with shell fragments and scattered wood.	Power grab. Only upper 4 cm collected after 21 attempts. Shrimp, barnacles, polychaetes. Wood chunks and twigs.
HC-SS-7	12/14/2010	Saturated, very soft, dark brown to black, fine sandy SILT (ML) with shells, shell fragments, gravel, and wood chips.	Power grab. Eelgrass. Wood chips and sulfur odor.
HC-SS-8	12/14/2010	Saturated, very soft, olive brown to black, sandy SILT (ML) with shell fragments and wood twigs.	Power grab. Eelgrass, kelp. Wood twigs and bark.
HC-SS-9	12/14/2010	Saturated, loose, olive brown, SILT (ML) with wood and minor shell fragments.	Power grab. Eelgrass, red algae. Wood bark, fragments, twigs.
HC-SS-10	12/14/2010	Saturated, very soft, dark brown, SILT (ML) with wood chunks.	Power grab. Eelgrass. Wood chunks and slight sulfur odor.
HC-SS-11	12/14/2010	Saturated, very soft, brown-black, SILT (ML) with shell fragments and wood.	Power grab. Eelgrass with rhizomes, red algae. Wood bark.
HC-SS-12	12/14/2010	Saturated, very soft, olive brown to black, sandy SILT (ML) with shell fragments.	Power grab.
HC-SS-13	12/14/2010	Saturated, soft, olive brown, sandy SILT (ML) with shell fragments and wood chips.	Power grab. Juvenile Dungeness crab, eelgrass. Wood chips.
HC-SS-14	12/14/2010	Saturated, soft, olive brown, sandy SILT (ML) with minor shells, shell fragments, and wood bark.	Power grab. Wood bark.

Table A-3 - Presence and Type of Wood Waste in Sediment Samples

Sample Number	Exploration Type	Estimated Depth of Wood Waste in Feet *	200 Micron Sieve Sample	Absence of Wood Waste	Type of Wood Waste: Wood Waste (general)	Likely Industrial: Wood Chips	Likely Industrial: Wood Chunks & Fragments	Likely Industrial: Fine Wood Particles & Sawdust	Likely Terrestrial: Twigs & Sticks	Likely Terrestrial: Bark	Notes
Power Grabs - Surface Sediment (SS)											
HC-SS-1	Van Veen	0- to 10-cm				X					
HC-SS-2	Van Veen	NA		X							
HC-SS-3	Van Veen	0 to 7-cm				X					
HC-SS-4	Van Veen	0- to 10-cm					X				
HC-SS-5	Van Veen	0- to 10-cm			X		X		X		
HC-SS-7	Van Veen	0- to 10-cm				X					
HC-SS-8	Van Veen	0- to 10-cm							X	X	
HC-SS-9	Van Veen	0- to 10-cm			X		X		X	X	
HC-SS-10	Van Veen	0- to 10-cm					X				
HC-SS-11	Van Veen	0- to 10-cm			X		X			X	
HC-SS-12	Van Veen	NA		X							
HC-SS-13	Van Veen	0- to 10-cm				X	X				
HC-SS-14	Van Veen	0- to 10-cm								X	
Vibracores - Sediment Core (SC)											
HC-SC-2	Vibracore	0 to 5.25			X	X		X			Approximately 30-50% wood waste.
HC-SC-4	Vibracore	0 to 9					X		X	X	Approximately 50% wood waste.
HC-SC-5	Vibracore	0 to 5.5			X					X	
HC-SC-6	Vibracore	0 to 1.5			X				X	X	
HC-SC-7	Vibracore	NA		X							
HC-SC-15	Vibracore	0 to 3.5			X	X	X	X			Approximately 40 to 80% wood waste.
HC-SC-16	Vibracore	2.5			X						Piece of wood at bottom.
HC-SC-17	Vibracore	0 to 1.5						X		X	
HC-SC-18	Vibracore	0 to 4.5			X		X	X		X	
HC-SC-19	Vibracore	2 to 2.5			X						
HC-SC-20	Vibracore	0 to 3.5				X				X	
HC-SC-21	Vibracore	0 to 5.83			X	X					
HC-SC-22	Vibracore	0 to 6.5			X						Approximately 10-50% wood waste.
HC-SC-23	Vibracore	0 to 3.5			X						
HC-SC-24	Vibracore	0 to 0.5								X	
HC-SC-25	Vibracore	0 to 4.5			X		X	X			Approximately 50% wood waste.
HC-SC-26	Vibracore	0 to 4.25			X	X		X			
HC-SC-27	Vibracore	0 to 5			X		X	X			
HC-SC-28	Vibracore	0 to 4			X			X			
HC-SC-29	Vibracore	0 to 3.5			X	X	X			X	Approximately 20% wood waste.
HC-SC-30	Vibracore	0 to 4			X	X	X			X	Approximately 10-20% wood waste.
HC-SC-31	Vibracore	0 to 2.75			X						Approximately 5-10% wood waste.
HC-SC-32	Vibracore	0 to 3.5			X						Approximately 20-40% wood waste.
HC-SC-33	Vibracore	0 to 3.92			X						Approximately >50% wood waste.
HC-SC-34	Vibracore	0 to 2.75			X		X	X			
HC-SC-35	Vibracore	0 to 2.92			X			X			Approximately 25% wood waste.
HC-SC-36	Vibracore	0 to 3.83	X		X			X			
HC-SC-37	Vibracore	0 to 4.7	X		X		X	X			
HC-SC-38	Vibracore	0 to 3.17	X				X	X			

Notes:
* Estimated depth of wood waste in feet is uncorrected for compaction, refer to Appendix A for individual vibracore logs.
NA - Not Available.

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Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and probes is estimated based on visual observation and is presented parenthetically on the logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 to 4	Very soft	0 to 2	<0.125
Loose	4 to 10	Soft	2 to 4	0.125 to 0.25
Medium dense	10 to 30	Medium stiff	4 to 8	0.25 to 0.5
Dense	30 to 50	Stiff	8 to 15	0.5 to 1.0
Very dense	>50	Very stiff	15 to 30	1.0 to 2.0
		Hard	>30	>2.0

Sampling Test Symbols

- 1.5" I.D. Split Spoon
- Grab (Jar)
- 3.0" I.D. Split Spoon
- Shelby Tube (Pushed)
- Bag
- Cuttings
- Core Run

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

KEY SHEET 1733027-VC.GPJ HC_CORP.GDT 3/7/11

Moisture

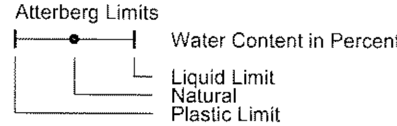
Dry	Little perceptible moisture
Damp	Some perceptible moisture, likely below optimum
Moist	Likely near optimum moisture content
Wet	Much perceptible moisture, likely above optimum

Minor Constituents

Minor Constituents	Estimated Percentage
Trace	<5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Laboratory Test Symbols

GS	Grain Size Classification
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits



PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	In Situ Density in PCF
OT	Tests by Others

Groundwater Indicators

- Groundwater Level on Date or (ATD) At Time of Drilling
- Groundwater Seepage (Test Pits)

Sample Key

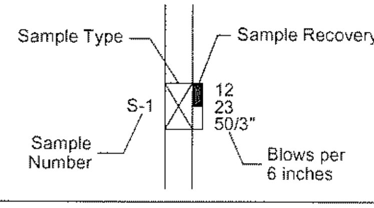


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Figure A-1

Vibracore Log HC-SC-2

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -2.8 Feet
Water Depth in Feet: 11 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550307.7836
Easting: 1212081.785
Logged By: A. Conrad Reviewed By: C. Rust

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS
PT	(Very soft), wet, brown-black, silty PEAT with large wood chips (~50% wood).	0	HC-SC-2-3'	CA
ML	(Medium stiff), moist, brown-black SILT with organic material (~30-40% wood).			
PT	(Stiff), moist, brown, silty PEAT with strong odor, wood chips, and fine wood waste.	5		
	Bottom of Sediment in Core Tube.			
	Bottom of Core Tube at 6.9 Feet. Drive length: 6.9 feet, Recovery Length: 5.25 feet. Date/Time: 12/15/10 10:37	10		

Sediment Recovery in Core Tube

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/14/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.

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Figure A-2

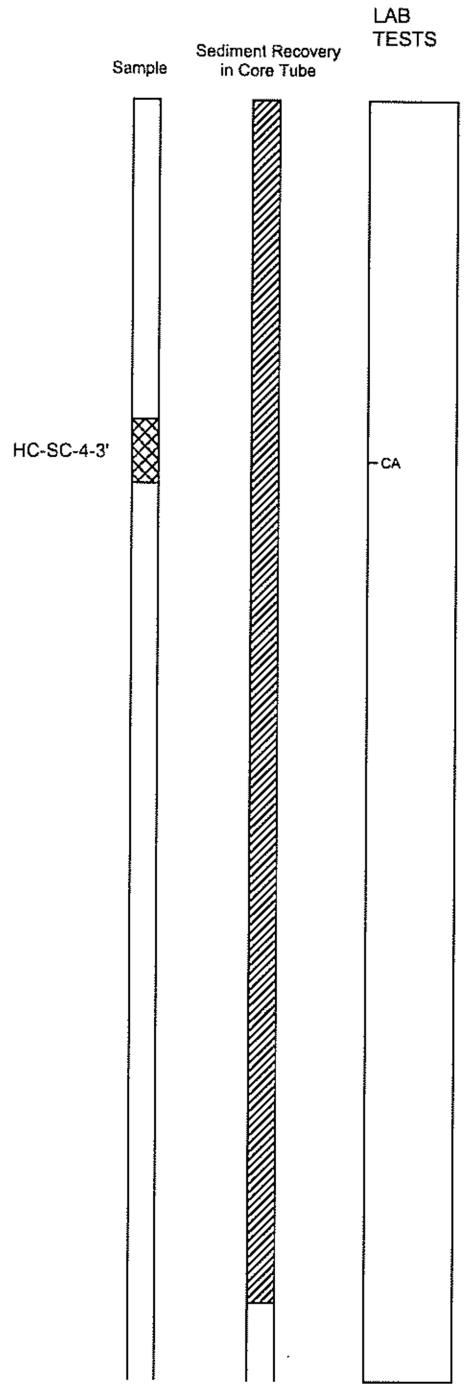
Vibracore Log HC-SC-4

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): 0.3 Feet
Water Depth in Feet: 8 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550073.3102
Easting: 1211963.378
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Soil Descriptions	Depth in Feet
PT	(Soft), wet, dark brown to black, silty PEAT (~50% wood debris including bark, sticks, chips).	0
	Grades to wood chips with silt layers.	
	Minor shell hash.	
		5
	Shell hash layer.	
	Decomposing wood.	
	Minor shell hash.	
CH	(Stiff), moist, blue-gray, silty CLAY.	
	Bottom of Sediment in Core Tube.	
	Bottom of Core Tube at 10.0 Feet.	10

Drive length: 10 feet, Recovery Length: 9.4 feet. Date/Time: 12/15/10 11:03



VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/14/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.

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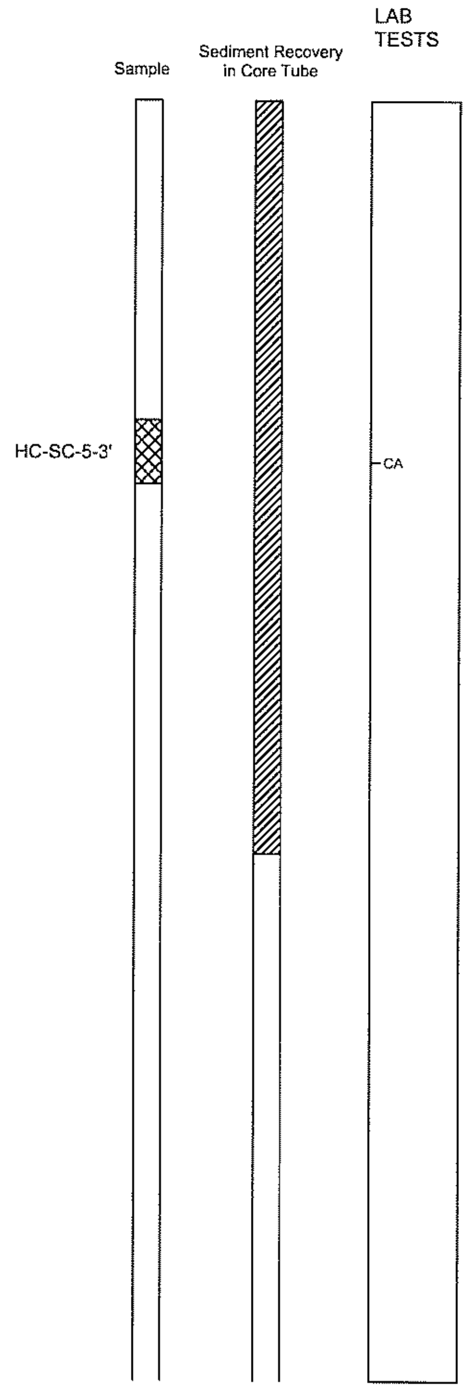
Figure A-3

Vibracore Log HC-SC-5

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -0.7 Feet
Water Depth in Feet: 8.4 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549723.9547
Easting: 1212080.507
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet
PT		(Loose), wet, brown-black PEAT (wood waste).	0
		Bark, grading to shell hash with sand.	
			5
GP		(Very loose), wet, gray and black GRAVEL with shells.	
		Bottom of Sediment in Core Tube.	
		Bottom of Core Tube at 7.0 Feet.	
		Drive length: 7 feet, Recovery Length: 5.9 feet. Date/Time: 12/15/10 09:34	
			10



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.

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Figure A-4

Vibracore Log HC-SC-6

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -3.6 Feet
Water Depth in Feet: 11.5 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549526.0313
Easting: 1212229.737
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Soil Descriptions	Depth in Feet	Sample	LAB TESTS
ML	(Loose), wet, gray-brown SILT with organic material (wood waste - bark, twigs).	0		
ML	(Medium stiff), wet, gray-brown, sandy SILT with numerous clam shells (10 - 20% shells).		HC-SC-6-3'	CA
	Bottom of Sediment in Core Tube.	5		
	Bottom of Core Tube at 5.8 Feet. Drive length: 5.83 feet, Recovery Length: 5.1 feet. Date/Time: 12/15/10 09:51			
		10		

Sediment Recovery in Core Tube

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/14/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.

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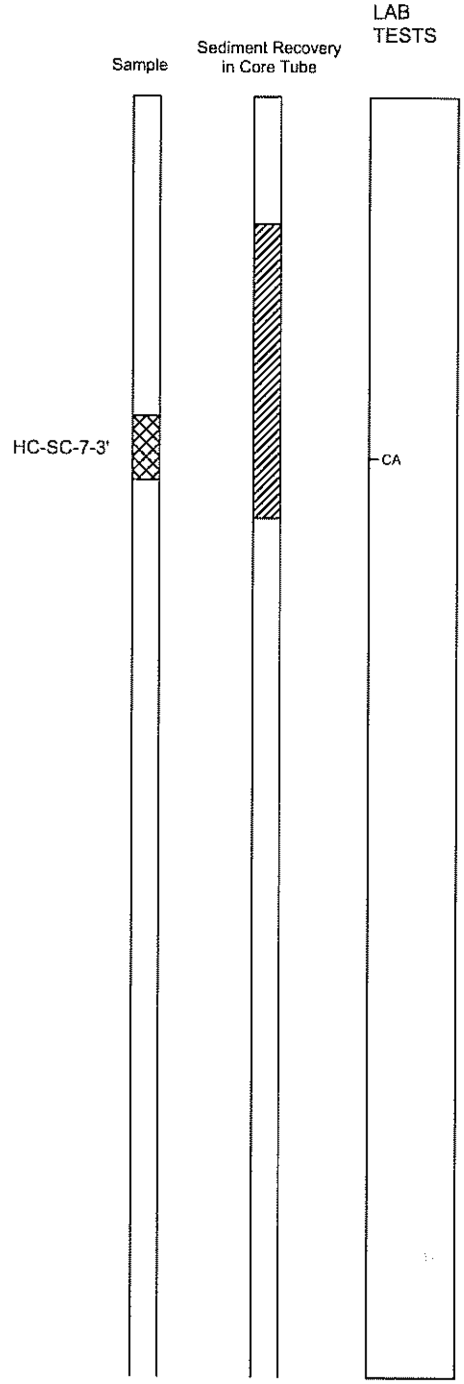
Figure A-5

Vibracore Log HC-SC-7

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -1.6 Feet
Water Depth in Feet: 9.7 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549265.6406
Easting: 1212175.251
Logged By: A. Conrad Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet
		No recovery.	0
ML		(Loose), wet, brown-black, sandy SILT with shells.	
		Bottom of Sediment in Core Tube.	
		Bottom of Core Tube at 4.0 Feet. Drive length: 4.0 feet, Recovery Length: 3.3 feet. Date/Time: 12/15/10 10:10	
			5
			10



VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/14/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.

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Figure A-6

Vibracore Log HC-SC-15

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -2.3 Feet
Water Depth in Feet: 6.9 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550149.209
Easting: 1212106.521
Logged By: A. Conrad Reviewed By: C. Rust

USCS Class	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
ML	(Loose), wet, black SILT with organic material (~40% large wood chunks) and scattered shells.	0	HC-SC-15-0-10cm		CA
	Grading to 20 - 30% wood with shell layers.				
PT	(Very loose), wet, brown-black, silty PEAT (~70 - 80% sawdust and wood chips).		HC-SC-15-3'		CA
	Bottom of Sediment in Core Tube.				
	Bottom of Core Tube at 4.3 Feet.				
	Drive length: 4.33 feet, Recovery Length: 3.5 feet. Date/Time: 12/15/10 15:15	5			
		10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/14/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.

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Figure A-7

Vibracore Log HC-SC-16

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -0.1 Feet
Water Depth in Feet: 6 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550458.771
Easting: 1211863.09
Logged By: A. Conrad Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
GM		(Very loose), wet, black, silty GRAVEL.	0			
ML		(Loose), wet, black SILT.				
		Small piece of wood at bottom.				
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 4.0 Feet.				
		Drive length: 4.0 feet, Recovery Length: 2.5 feet. Date/Time: 12/15/10 14:20				
			5			
			10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears <1 foot wood waste.

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Figure A-8

Vibracore Log HC-SC-17

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -3.9 Feet
Water Depth in Feet: 9.4 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550438.5861
Easting: 1211947.513
Logged By: A. Conrad Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
GM		(Very loose), wet, black GRAVEL with organic material. Contains sawdust, bark, and gravel.	0			
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 4.0 Feet. Drive length: 4.0 feet, Recovery Length: 1.6 feet. Date/Time: 12/15/10 14:40	5			
			10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Poor recovery. Drove through gravel and bark. Undetermined amount of wood waste.

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Figure A-9

Vibracore Log HC-SC-18

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -6.6 Feet
Water Depth in Feet: 11.8 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550119.3102
Easting: 1212089.584
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Soil Descriptions
ML	(Loose), wet, black SILT with scattered wood.
ML	(Loose), wet, brown-black SILT with organic material (wood chunks and bark).
PT	(Loose), wet, brown-black, silty PEAT. (Decomposing sawdust)
CH	(Very stiff), moist, blue-gray, silty CLAY.
	Bottom of Sediment in Core Tube.
	Bottom of Core Tube at 5.8 Feet.

Drive length: 5.83 feet, Recovery Length: 5.5 feet. Date/Time: 12/15/10 14:55

Depth in Feet: 0, 5, 10

Sample | Sediment Recovery in Core Tube | LAB TESTS

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot wood waste.

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Figure A-10

Vibracore Log HC-SC-19

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -4.9 Feet
Water Depth in Feet: 9 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550146.1484
Easting: 1212239.847
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
ML		(Loose), wet, black SILT with organic material and scattered shells.	0			
PT		(Loose), wet, brown PEAT (3-6" layer wood waste).				
ML		(Loose), wet, black SILT with organic material and scattered shells.				
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 4.0 Feet. Drive length: 4.0 feet, Recovery Length: 3.42 feet. Date/Time: 12/15/10 15:40	5			
			10			

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears ~1 foot wood waste.

Vibracore Log HC-SC-20

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -4 Feet
Water Depth in Feet: 7.8 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550111.0675
Easting: 1212178.407
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
ML	(Loose), wet, black SILT with organic material (wood chips) and scattered shells.	0			
PT	(Loose), wet, brown, silty PEAT with 3-6" wood chip and bark layer.				
ML	(Loose), wet, black SILT with organic material (wood chips) and scattered shells.				
	Bottom of Sediment in Core Tube.				
	Bottom of Core Tube at 4.0 Feet.				
	Drive length: 4.0 feet, Recovery Length: 3.5 feet. Date/Time: 12/15/10 15:52				
		5			
		10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears <1 foot wood layer, scattered wood waste throughout.

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Figure A-12

Vibracore Log HC-SC-21

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -4.8 Feet
Water Depth in Feet: 8.3 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550305.4629
Easting: 1212182.869
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
ML		(Loose), wet, black SILT with scattered wood.	0			
		3" layer of wood chips.				
			5			
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 6.0 Feet.				
		Drive length: 6.0 feet, Recovery Length: 5.83 feet. Date/Time: 12/15/10				
			10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears <1 foot wood layer, scattered wood waste throughout.

HARTCROWSER

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Figure A-13

Vibracore Log HC-SC-22

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -2 Feet
Water Depth in Feet: 5 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549844.6578
Easting: 1212131.787
Logged By: A. Conrad Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
OL		(Loose), wet, brown-black SILT with organic material (40 - 50% wood).	0			
		Grading to (loose), wet, brown-black SILT with organic material (10 - 20% wood) and scattered shells.				
ML		(Loose), wet, black SILT with shells and wood.	5			
CH		(Stiff), moist, blue-gray, silty CLAY.				
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 7.6 Feet.				
		Drive length: 7.6 feet, Recovery Length: 7.0 feet. Date/Time: 12/15/10 16:30	10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot wood waste.

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Figure A-14

Vibracore Log HC-SC-23

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -0.7 Feet
Water Depth in Feet: 2 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549682.2039
Easting: 1212055.294
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet
PT		(Loose), wet, black, silty PEAT (wood waste).	0
ML		(Loose), wet, black SILT with organic material and wood waste.	
		Bottom of Sediment in Core Tube.	
		Bottom of Core Tube at 4.0 Feet.	
		Drive length: 4.0 feet, Recovery Length: 3.5 feet. Date/Time: 12/15/10 16:45	5
			10

Sample | Sediment Recovery in Core Tube | LAB TESTS

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot wood waste.

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Figure A-15

Vibracore Log HC-SC-24

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -3.6 Feet
Water Depth in Feet: 10.5 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549843.4502
Easting: 1212184.391
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet
PT		(Loose), wet, brown-black, silty PEAT (bark).	0
ML		(Very soft to soft), wet, black SILT with numerous shell debris.	5
GM		(Loose), wet, gray-black, silty GRAVEL.	
		Bottom of Sediment in Core Tube.	
		Bottom of Core Tube at 8.0 Feet.	
		Drive length: 8.0 feet, Recovery Length: 7.67 feet. Date/Time: 12/16/10 08:20	10

Sample | Sediment Recovery in Core Tube | LAB TESTS

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears <1 foot wood waste.

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Figure A-16

Vibracore Log HC-SC-25

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -2.2 Feet
Water Depth in Feet: 9.2 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549703.4926
Easting: 1212177.055
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Soil Descriptions	Depth in Feet
ML	(Very loose), wet SILT with organic material (very fine wood waste ~50%).	0
ML	(Loose), wet SILT with organic material (wood waste - chunks, fines) and layers of shell hash.	
GM	(Very loose), wet, gray-black GRAVEL with shells.	
	Bottom of Sediment in Core Tube.	5
	Bottom of Core Tube at 6.0 Feet. Drive length: 6.0 feet, Recovery Length: 5.0 feet. Date/Time: 12/16/10 08:37	
		10

Sample | Sediment Recovery in Core Tube | LAB TESTS

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot wood waste.

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Figure A-17

Vibracore Log HC-SC-26

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -2.4 Feet
Water Depth in Feet: 9.5 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549684.422
Easting: 1212212.999
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
		Poor recovery - turbid water with fine wood particles.	0			
ML		(Very loose), wet, black SILT with organic material (wood waste - occasional wood chips, fines) and layers of shell hash.				
GM		(Very loose), wet, black, silty GRAVEL.				
		Bottom of Sediment in Core Tube.	5			
		Bottom of Core Tube at 6.0 Feet. Drive length: 6.0 feet, Recovery Length: 4.58 feet. Date/Time: 12/16/10 08:51	10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears <1 foot wood waste.

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Figure A-18

Vibracore Log HC-SC-27

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -2.3 Feet
Water Depth in Feet: 9.5 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549582.965
Easting: 1212134.025
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
PT		Poor recovery. Saturated black, silty PEAT (wood waste - wood particles and chunks).	0			
		Bottom of Core Tube at 5.0 Feet. Drive length: 5.0 feet, Recovery Length: Unable to calculate. Date/Time: 12/16/10 09:04	5			
			10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot wood waste.

HARTCROWSER

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Figure A-19

Vibracore Log HC-SC-28

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -3.2 Feet
Water Depth in Feet: 10.5 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549551.7695
Easting: 1212173.572
Logged By: A. Conrad Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
PT		Saturated, black, silty PEAT (wood waste - fine wood particles).	0			
		Shell hash.				
		Bottom of Core Tube at 4.0 Feet.				
		Drive length: 4.0 feet, Recovery Length: Unable to calculate. Date/Time: 12/16/10 09:13	5			
			10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot wood waste.

HARTCROWSER

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Figure A-20

Vibracore Log HC-SC-29

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -3.7 Feet
Water Depth in Feet: 11.1 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549544.5454
Easting: 1212218.035
Logged By: A. Conrad Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
ML		(Very loose), wet, brown-black SILT with organic material (wood chips, bark, wood fragments). Eelgrass present.	0			
ML		(Soft), wet, brown-black SILT with numerous wood waste (~20% obvious wood).				
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 5.0 Feet. Drive length: 5.0 feet, Recovery Length: 3.5 feet. Date/Time: 12/16/10 09:21	5			
			10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot wood waste.

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Figure A-21

Vibracore Log HC-SC-30

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -3.8 Feet
Water Depth in Feet: 11.4 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549568.058
Easting: 1212258.837
Logged By: A. Conrad Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
ML		(Soft), wet, brown-black SILT with wood debris (10 - 20% wood - bark, chips, chunks.) Eelgrass present.	0			
		Grades to (soft), wet, brown-black SILT with occasional wood and shells.				
CH		(Stiff), wet, blue-gray, silty CLAY.				
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 5.0 Feet.	5			
		Drive length: 5.0 feet, Recovery Length: 4.42 feet. Date/Time: 12/16/10 09:41				
			10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears <1 foot wood waste.

HARTCROWSER

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Figure A-22

Vibracore Log HC-SC-31

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -2.2 Feet
Water Depth in Feet: 5.6 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549476.7053
Easting: 1211994.062
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet
PT		(Very loose), wet, brown-black, silty PEAT (wood waste). Polychaetes at surface. Moderate petroleum-like sheen, and slight petroleum-like odor.	0
SM		(Loose), wet, brown-black, silty SAND with organic material and shells (5 - 10% wood, 5 - 10% shell). Moderate petroleum-like sheen and slight petroleum-like odor.	
GM		(Very loose), wet, brown-black, silty GRAVEL with shells.	
		Bottom of Sediment in Core Tube.	
		Bottom of Core Tube at 4.0 Feet. Drive length: 4.0 feet, Recovery Length: 3.42 feet. Date/Time: 12/16/10 10:00	5
			10

Sample | Sediment Recovery in Core Tube | LAB TESTS

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot wood waste.

HARTCROWSER

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Figure A-23

Vibracore Log HC-SC-32

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -0.2 Feet
Water Depth in Feet: 8.1 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549432.4578
Easting: 1212061.687
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Soil Descriptions	Depth in Feet
ML	(Very soft), wet, brown-black, SILT with organic material and scattered shell fragments (wood ~40%). Eelgrass with rhizomes and polychaetes present. Oil droplets present.	0
ML	(Soft), wet, black SILT with scattered wood waste and abundant shells (~20%).	
GM	(Loose), wet, black, silty GRAVEL with abundant shells.	
CH	(Stiff), moist, blue-gray, silty CLAY.	
	Bottom of Sediment in Core Tube.	5
	Bottom of Core Tube at 6.0 Feet.	
	Drive length: 6.0 feet, Recovery Length: 5.0 feet. Date/Time: 12/16/10 10:15	
		10

Sample | Sediment Recovery in Core Tube | LAB TESTS

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 3/9/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot wood waste.

HARTCROWSER

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Figure A-24

Vibracore Log HC-SC-33

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -1.8 Feet
Water Depth in Feet: 9.8 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549340.6269
Easting: 1212087.956
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
ML		(Soft), wet, brown-black SILT with organic material and scattered shell fragments (wood waste >50%).	0			
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 4.0 Feet.				
		Drive length: 4.0 feet, Recovery Length: 3.92 feet. Date/Time: 12/16/10 10:37	5			
			10			

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot wood waste.

Vibracore Log HC-SC-34

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -0.9 Feet
Water Depth in Feet: 9 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549346.9217
Easting: 1212083.977
Logged By: A. Conrad Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
OL		(Very soft), wet, brown-black SILT with organic material and trace gravel and shells. Wood present as large chunks on surface and finer matrix pieces. Petroleum-like odor present.	0			
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 4.0 Feet. Drive length: 4.0 feet, Recovery Length: 2.75 feet. Date/Time: 12/16/10 10:50	5			
			10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot wood waste.

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Figure A-26

Vibracore Log HC-SC-35

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -1.2 Feet
Water Depth in Feet: 9.4 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 549297.1118
Easting: 1212139.59
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
ML		(Soft), wet, black-brown SILT with fine-grained wood waste (~25%).	0			
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 4.0 Feet. Drive length: 4.0 feet, Recovery Length: 2.92 feet. Date/Time: 12/16/10 11:10	5			
			10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears <1 foot wood waste.

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Figure A-27

Vibracore Log HC-SC-36

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -4.8 Feet
Water Depth in Feet: 13 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550150.7742
Easting: 1212308.591
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
OL		(Very soft), wet, black-brown SILT with organic material and fine-grained wood waste.	0			
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 4.0 Feet. Drive length: 4.0 feet, Recovery Length: 3.83 feet. Date/Time: 12/16/10 11:47				
			5			
			10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot fine-grained wood waste.

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Figure A-28

Vibracore Log HC-SC-37

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -4.6 Feet
Water Depth in Feet: 12.8 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550382.7541
Easting: 1212265.408
Logged By: A. Conrad   Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
ML		(Very soft), wet, brown-black SILT with organic material. Wood waste chunks near top. Fine wood fiber below 1 foot.	0			
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 4.7 Feet. Drive length: 4.67 feet, Recovery Length: 3.17 feet. Date/Time: 12/16/10 12:00	5			
			10			

VIBROCORE LOG 1733027-VC.GPJ HC_CORP.GDT 2/11/11

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears >1 foot fine-grained wood waste.

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Figure A-29

Vibracore Log HC-SC-38

Location: See Figure 2.
Mudline Elevation in Feet (MLLW): -4.8 Feet
Water Depth in Feet: 12.8 Feet

Type of Sample: Vibracore
Core Diameter: 4 inches
Northing: 550189.4715
Easting: 1212212.464
Logged By: A. Conrad Reviewed By: C. Rust

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet	Sample	Sediment Recovery in Core Tube	LAB TESTS
ML		(Very soft), wet, brown-black SILT with organic material. Fine-grained wood throughout.	0			
		Wood chunks and fine-grained wood.				
		Bottom of Sediment in Core Tube.				
		Bottom of Core Tube at 4.0 Feet. Drive length: 4.0 feet, Recovery Length: 3.17 feet. Date/Time: 12/16/10 12:28	5			
			10			

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Appears <1 foot wood waste.

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Figure A-30

APPENDIX B
CHEMICAL DATA QUALITY REVIEW
LABORATORY REPORTS

APPENDIX B
CHEMICAL DATA QUALITY REVIEW AND LABORATORY REPORTS

Chemical Data Quality Review for Sediment Samples

Thirteen surface sediment samples and seven sediment core samples were collected from the former Custom Plywood Mill Site on December 14 and 15, 2010. The samples were submitted to Analytical Resources, Inc. (ARI), in Tukwila, Washington for analysis of dioxins/furans and total solids. The samples were reported in ARI Job Nos. SB65 and SB69.

Quality assurance/quality control (QA/QC) reviews of laboratory procedures are performed on an ongoing basis by the laboratory. Hart Crowser performed the data review, using laboratory quality control results summary sheets and raw data, as required, to ensure they met data quality objectives for the project. Data review generally followed the format outlined in the National Functional Guidelines for Chlorinated Dibenzo-p-Dioxin (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review (EPA 2005). The following criteria were evaluated in the standard data quality review process:

- Holding times;
- Method blanks;
- Labeled compound recoveries;
- Ongoing Precision and Recovery sample (OPR) recoveries;
- Calibration criteria; and
- Reporting limits (RL).

The data were determined to be acceptable for use, as qualified. Full laboratory results are presented at the end of this appendix. Results of the data reviews, organized by analysis class, follow.

Conventional Sediment Parameters

Analytical Methods

Total solids were determined by modified EPA Method 160.3.

Sample Holding Times

The samples met holding time limits for total solids.

Laboratory Detection Limits

Reported detection limits were acceptable.

Dioxins/Furans

Analytical Methods

Sediment samples for dioxins/furans analysis were prepared and analyzed by EPA Method 1613.

Sample Holding Times

The samples were prepared and analyzed within holding time limits.

Laboratory Detection Limits

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors. Detections that fell between the reporting limit (RL) and the Estimated Detection Limit (EDL) were qualified by the laboratory as "J." The laboratory "J" qualifier was changed to "T" to be consistent with Ecology's EIM database.

Blank Contamination

The method blanks had detections for multiple analytes between the EDL and the RL. The laboratory qualified detections in the associated samples with B. The detections in the associated samples were evaluated and results modified as follows:

- MB-122110: The method blank had detections for 2,3,4,7,8-PeCDF, 1,2,3,4,6,7,8-HpCDD, OCDD, Total HpCDD and Total PeCDF between the EDL and RL.

  - Results for those analytes in associated samples that fell between the EDL and the RL were raised to the RL and qualified as non-detect (U):

    - HC-SS-2: 2,3,4,7,8-PeCDF
    - HC-SS-5: 2,3,4,7,8-PeCDF
    - HC-SS-7: 2,3,4,7,8-PeCDF
    - HC-SS-8: 2,3,4,7,8-PeCDF
    - HC-SS-9: 2,3,4,7,8-PeCDF
    - HC-SS-10: 2,3,4,7,8-PeCDF

- HC-SS-11: 2,3,4,7,8-PeCDF
- HC-SS-12: 2,3,4,7,8-PeCDF
- HC-SS-13: 2,3,4,7,8-PeCDF

- Results for those analytes in associated samples with detections above the RL at the instrument and greater than five times the amount in the method blank at the instrument had the B qualifier removed:

  - HC-SS-2: Total PeCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, OCDD
  - HC-SS-3: Total PeCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, OCDD
  - HC-SS-4: Total PeCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, OCDD
  - HC-SS-5: Total PeCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, OCDD
  - HC-SS-7: Total PeCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, OCDD
  - HC-SS-8: Total PeCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, OCDD
  - HC-SS-9: Total PeCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, OCDD
  - HC-SS-10: Total PeCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, OCDD
  - HC-SS-11: Total PeCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, OCDD
  - HC-SS-12: Total PeCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, OCDD
  - HC-SS-13: Total PeCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, OCDD

- MB-011211: The method blank had detections for 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDF, Total HpCDD, OCDF, and OCDD between the EDL and the RL.

  - Results for those analytes in associated samples with detections above the RL at the instrument and greater than five times the amount in the method blank at the instrument had the B qualifier removed:

    - HC-SS-1: 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDF, Total HpCDD, OCDF, and OCDD.

- MB-122210: The method blank had detections for 2,3,4,7,8-PeCDF, 1,2,3,6,7,8-HxCDD, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, OCDD, Total PeCDF, Total HxCDF, and Total HxCDD between the EDL and the RL. The method blank had detections for Total HpCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, and OCDF above the RL.

  - Results in the associated samples for 2,3,4,7,8-PeCDF, 1,2,3,6,7,8-HxCDD, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, OCDD, Total

PeCDF, Total HxCDF, and/or Total HxCDD that fell between the EDL and the RL were raised to the RL and qualified as non-detect (U):

- HC-SS-14: 2,3,4,7,8-PeCDF and 1,2,3,4,7,8,9-HpCDF
- HC-SC-5-3′: 2,3,4,7,8-PeCDF and 1,2,3,4,7,8,9-HpCDF
- HC-SC-6-3′: 2,3,4,7,8-PeCDF, Total PeCDF, 1,2,3,6,7,8-HxCDD, and 1,2,3,4,7,8,9-HpCDF
- HC-SC-7-3′: 2,3,4,7,8-PeCDF
- HC-SC-15-0-10cm: 2,3,4,7,8-PeCDF

- Results in the associated samples for 2,3,4,7,8-PeCDF, 1,2,3,6,7,8-HxCDD, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, OCDD, Total PeCDF, Total HxCDF, and/or Total HxCDD that were above the RL at the instrument and greater than five times the amount in the method blank at the instrument had the B qualifier removed:

  - HC-SS-14: 1,2,3,6,7,8-HxCDD, 1,2,3,4,6,7,8-HpCDF, OCDD, Total PeCDF, Total HxCDF, Total HxCDD
  - HC-SC-2-3′: 2,3,4,7,8-PeCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, 1,2,3,6,7,8-HxCDD, OCDD, Total PeCDF, Total HxCDF, Total HxCDD
  - HC-SC-4-3′: 2,3,4,7,8-PeCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, 1,2,3,6,7,8-HxCDD, OCDD, Total PeCDF, Total HxCDF, Total HxCDD
  - HC-SC-5-3′: 1,2,3,4,6,7,8-HpCDF, 1,2,3,6,7,8-HxCDD, OCDD, Total PeCDF, Total HxCDF, Total HxCDD
  - HC-SC-6-3′: OCDD, Total HxCDF Total HxCDD
  - HC-SC-7-3′: 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, 1,2,3,6,7,8-HxCDD, OCDD, Total PeCDF, Total HxCDF, Total HxCDD
  - HC-SC-15-0-10cm: 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, 1,2,3,6,7,8-HxCDD, OCDD, Total PeCDF, Total HxCDF, Total HxCDD]
  - HC-SC-15-3′: 2,3,4,7,8-PeCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, 1,2,3,6,7,8-HxCDD, OCDD, Total PeCDF, Total HxCDF, Total HxCDD

- Results in the associated samples for 2,3,4,7,8-PeCDF, 1,2,3,6,7,8-HxCDD, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, OCDD, Total PeCDF, Total HxCDF, and/or Total HxCDD with detections above the RL at the instrument and less than five times the amount in the method blank at the instrument were qualified as non-detect (U):

  - HC-SC-6-3′: 1,2,3,4,6,7,8-HpCDF

- Results in the associated samples for Total HpCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, and/or OCDF with detections at the instrument less than five times the amount in the method blank at instrument were qualified as non-detect (U):

  - HC-SC-6-3′: OCDF, Total HpCDF

- Results in the associated samples for Total HpCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD, and/or OCDF with detections at instrument greater than five times the amount in the method blank at the instrument had the B qualifier removed:

  - HC-SS-14: Total HpCDF, OCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDD
  - HC-SC-2-3′: OCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDF, Total HpCDD
  - HC-SC-4-3′: OCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDF, Total HpCDD
  - HC-SC-5-3′: OCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDF, Total HpCDD
  - HC-SC-6-3′: 1,2,3,4,6,7,8-HpCDD, Total HpCDD
  - HC-SC-7-3′: OCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDF, Total HpCDD
  - HC-SC-15-0-10cm: OCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDF, Total HpCDD
  - HC-SC-15-3′: OCDF, 1,2,3,4,6,7,8-HpCDD, Total HpCDF, Total HpCDD

Labeled Compound Recoveries

The labeled compound recoveries were within control limits with the following exception:

- HC-SS-1: The recoveries for seven labeled compounds fell below the control limits. The sample was re-extracted and reanalyzed within method holding time and results reported from the reextraction.

Ongoing Precision and Recovery

OPR recoveries were within QC limits.

Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)

The initial calibration curves and CCVs were within acceptance criteria.

Sample Qualifiers

Multiple compounds in all of the samples were qualified by the laboratory with Y due to failure to meet identification criteria. The Y qualifiers were reported as non-detect (U) for individual analytes. The Y qualifiers on Total values were reported as estimated (J).

Multiple compounds in all of the samples were qualified by the laboratory with X due to interference from polychlorinated diphenyl ethers. The X qualifiers were removed and the results were qualified as estimated (J).

J:\Jobs\1733027\Dioxin and Wood Waste\Final\Supplemental Field Investigation.doc

LABORATORY REPORTS
ANALYTICAL RESOURCES, INC.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

January 21, 2011

Mr. Roger McGinnis
Hart Crowser, Inc.
1700 Westlake Avenue North Suite 200
Seattle, WA 98109-3056

RE: Project: Custom Plywood, 17330-27
ARI Job No.: SB65

Dear Mr. McGinnis:

Please find enclosed the original Chain-of-Custody (COC) record, sample receipt documentation, and the final data package for the samples from the project referenced above.

Sample receipt and details of these analyses are discussed in the Case Narrative.

An electronic copy of this data package and the supporting data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Respectfully,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
206-695-6211
kellyb@arilabs.com
www.arilabs.com

cc: files SB65

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Table of Contents: ARI Job SB65

Client: Hart Crowser, Inc.

Project: 17330-27 Custom Plywood

Signature ____________________

Date January-18-2011

Chain of Custody Documentation

ARI Job ID: SB65

Sample Custody Record

Samples Shipped to: ARI

HART CROWSER
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17330-~~29~~27 LAB NUMBER

PROJECT NAME CUSTOM PLYWOOD

HART CROWSER CONTACT R. McGINNIS

A. CONRAD

SAMPLED BY: A, AK

REQUESTED ANALYSIS

OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	DIOXIN/FURAN	TOTAL SOLIDS	NO. OF CONTAINERS
	HC-SS-1		12/14/10	1222	SED	X	X	1
	HC-SS-2		↓	1247	↓	↓	↓	1
	HC-SS-3			0900				1
	HC-SS-4			0944				1
	HC-SS-5			1048				1
	HC-SS-7			1106				1
	HC-SS-8			1450				1
	HC-SS-9			1432				1
	HC-SS-10			1124				1
	HC-SS-11			1615				1
	HC-SS-12			1640				1
	HC-SS-13		↓	1602	↓	↓	↓	1

TOTAL NUMBER OF CONTAINERS: 12

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE: [signature]	12/17/10	SIGNATURE: R. McGinnis	12/17/10
PRINT NAME: Anne M Conrad	TIME: 1000	PRINT NAME: R. McGinnis	TIME: 10:00
COMPANY: Hart Crowser		COMPANY: Hart Crowser	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE: R. McGinnis	12/17/10	SIGNATURE: [signature]	12/17/10
PRINT NAME: R. McGinnis	TIME: 5:18	PRINT NAME: Jennifer Millsap	TIME: 1718
COMPANY: Hart Crowser		COMPANY: ARI	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:
FULL DATA PACKAGE

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION: ☐YES ☐NO
TEMPERATURE ______
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.:

STORAGE LOCATION:

See Lab Work Order No. ______
for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER ______

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Hart Crowser
COC No(s): ______ NA
Assigned ARI Job No: SP605
Project Name: Custom Plywood
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) 4.8 4.5 ___ ___
If cooler temperature is out of compliance fill out form 00070F
Temp Gun ID#: 90877619
Cooler Accepted by: JM Date: 12/17/10 Time: 1718

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: ______

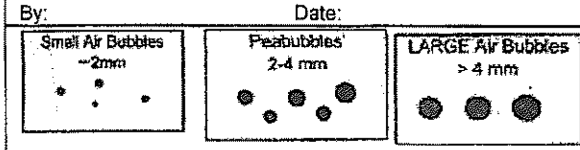
Samples Logged by: JM Date: 12/17/10 Time: 1730

***** 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"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: SB65

ANALYTICAL
RESOURCES
INCORPORATED

Sample Receipt:

Analytical Resources, Inc. (ARI) accepted twelve sediment samples in good condition on December 17, 2010 under ARI Sample Delivery Group (SDG) SB65. The samples were received with cooler temperatures between 4.5 and 4.8°C. For further details regarding sample receipt please refer to the enclosed Cooler Receipt Form.

The samples were analyzed for Dioxin/Furans and Total Solids, as requested on the Chain-of-Custody.

Dioxin/Furans by Method 1613B:

The samples were extracted on 12/21/10 and 1/12/11. The extracts were analyzed between 12/23/10 and 1/14/11 - within the method recommended holding times.

Analysis was performed using the application specific RTX-Dioxin 2 column, which has a unique elution order and selectivity for the target compounds, as well as a unique isomer separation for the 2378-TCDF. A resolution test mixture was designed specifically for this column, consisting of 2348-TCDF, 2378-TCDF and 3467-TCDF to evaluate the method required minimum valley between isomer of 25%. Use of the RTX-Dioxin2 column eliminates the need for second column confirmation.

Initial calibration(s): All analytes of interest were within method acceptance criteria.

Continuing calibration(s): All analytes of interest were within method acceptance criteria.

Surrogates: Several percent recoveries fell outside the control limits for sample **HC-SS-1**. The sample was re-extracted and all percent recoveries were within control limits. No further corrective action was taken.

Method Blank(s): The method blank **MB-122110** contained reportable responses of 2,3,4,7,8-PeCDF, 1,2,3,4,6,7,8-HpCDF, and OCDD below the reporting limits. Associated sample results have been flagged with a "B" qualifier. No further corrective action was taken.

The method blank **MB-011211** contained reportable responses of 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,6,7,8-HpCDD, OCDF, and OCDD below the reporting limits. The associated sample results have been flagged with a "B" qualifier. No further corrective action was taken.

Samples: The TEQ was calculated with WHO2005 with ND=0 for non-detected results (flagged a "U" or "Y" qualifier). Select results have been "Y"-flagged indicating a raised reporting limit due to interference, equivalent to an EMPC.

OPR(s): The OPR (Ongoing Precision and Accuracy or LCS) sample percent recoveries were within control limits.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 7/10/2009

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.

Y 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

Dioxin Analysis
Report and Summary QC Forms

ARI Job ID: SB65

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: HC-SS-1

Lab Sample ID: SB65A
LIMS ID: 10-31557
Matrix: Sediment
Data Release Authorized:
Reported: 01/24/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 18:54
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.5 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	0.79	0.65-0.89		0.951	3.25		
Total TCDF				0.951	37.5	XY	
2,3,7,8-TCDD	0.45	0.65-0.89		0.951	0.833	JY	
Total TCDD				0.951	50.5	Y	
1,2,3,7,8-PeCDF	1.60	1.32-1.78		4.76	2.08	J	
2,3,4,7,8-PeCDF	1.68	1.32-1.78		4.76	3.03	BJ	
Total PeCDF				4.76	56.9	BXY	
1,2,3,7,8-PeCDD	1.63	1.32-1.78		4.76	5.14		
Total PeCDD				4.76	76.3		
1,2,3,4,7,8-HxCDF	1.19	1.05-1.43		4.76	7.73		
1,2,3,6,7,8-HxCDF	1.28	1.05-1.43		4.76	4.19	J	
2,3,4,6,7,8-HxCDF	1.29	1.05-1.43		4.76	7.59		
1,2,3,7,8,9-HxCDF	1.19	1.05-1.43		4.76	2.47	J	
Total HxCDF				4.76	203	Y	
1,2,3,4,7,8-HxCDD	1.21	1.05-1.43		4.76	5.05		
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43		4.76	29.2		
1,2,3,7,8,9-HxCDD	1.23	1.05-1.43		4.76	12.4		
Total HxCDD				4.76	302		
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20		4.76	188		
1,2,3,4,7,8,9-HpCDF	1.01	0.88-1.20		4.76	10.3		
Total HpCDF				4.76	719		
1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20		4.76	1,000	B	
Total HpCDD				4.76	2,480	B	
OCDF	0.87	0.76-1.02		9.51	832		
OCDD	0.89	0.76-1.02		47.6	8,810	B	#

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 29.0

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 29.0

#-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: HC-SS-1

Lab Sample ID: SB65A
LIMS ID: 10-31557
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 18:54
Instrument/Analyst: AS1/PK

Sample Amount: 10.5 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-2,3,7,8-TCDF	0.77	0.65-0.89	31.2	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	28.1	25-164
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	24.2	24-185
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	24.7	21-178
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	26.1	25-181
13C-1,2,3,4,7,8-HxCDF	0.53	0.43-0.59	22.8	26-152
13C-1,2,3,6,7,8-HxCDF	0.51	0.43-0.59	21.2	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	22.8	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	31.8	29-147
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	23.9	32-141
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	22.2	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	21.2	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	23.0	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	23.4	23-140
13C-OCDD	0.89	0.76-1.02	23.4	17-157
37Cl4-2,3,7,8-TCDD			98.8	35-197

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

Sample ID: HC-SS-1
DILUTION

Lab Sample ID: SB65A
LIMS ID: 10-31557
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 01/04/11 12:57
Instrument/Analyst: AS1/PK

Sample Amount: 10.5 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 5.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-OCDD	0.92	0.76-1.02	16.0	17-157
37Cl4-2,3,7,8-TCDD			74.3	35-197

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

Sample ID: HC-SS-2

Lab Sample ID: SB65B
LIMS ID: 10-31558
Matrix: Sediment
Data Release Authorized:
Reported: 01/24/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 19:49
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.4 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	0.78	0.65-0.89		0.961	2.43		
Total TCDF				0.961	30.0	XY	
2,3,7,8-TCDD	0.57	0.65-0.89		0.961	0.736	JY	
Total TCDD				0.961	36.1	Y	
1,2,3,7,8-PeCDF	1.42	1.32-1.78		4.80	1.41	JX	
2,3,4,7,8-PeCDF	1.52	1.32-1.78		4.80	2.27	BJ	
Total PeCDF				4.80	45.0	BXY	
1,2,3,7,8-PeCDD	1.54	1.32-1.78		4.80	3.88	J	
Total PeCDD				4.80	51.7		
1,2,3,4,7,8-HxCDF	1.24	1.05-1.43		4.80	6.03		
1,2,3,6,7,8-HxCDF	1.25	1.05-1.43		4.80	3.23	J	
2,3,4,6,7,8-HxCDF	1.19	1.05-1.43		4.80	6.68		
1,2,3,7,8,9-HxCDF	1.18	1.05-1.43		4.80	1.59	J	
Total HxCDF				4.80	168	Y	
1,2,3,4,7,8-HxCDD	1.19	1.05-1.43		4.80	3.82	J	
1,2,3,6,7,8-HxCDD	1.23	1.05-1.43		4.80	25.5		
1,2,3,7,8,9-HxCDD	1.27	1.05-1.43		4.80	9.38		
Total HxCDD				4.80	198	Y	
1,2,3,4,6,7,8-HpCDF	1.03	0.88-1.20		4.80	148		
1,2,3,4,7,8,9-HpCDF	1.03	0.88-1.20		4.80	7.61		
Total HpCDF				4.80	546		
1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20		4.80	591	B	
Total HpCDD				4.80	1,300	B	
OCDF	0.88	0.76-1.02		9.61	567		
OCDD	0.89	0.76-1.02		48.0	4,290	B	#

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 20.1

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 20.1

#-Result from diluted secondary analysis.

Reported in pg/g

 BC 1/24/11

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: HC-SS-2

Lab Sample ID: SB65B
LIMS ID: 10-31558
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 19:49
Instrument/Analyst: AS1/PK

Sample Amount: 10.4 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-2,3,7,8-TCDF	0.78	0.65-0.89	61.7	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	62.5	25-164
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	61.0	24-185
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	62.6	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	68.2	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	52.7	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	49.4	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	54.1	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	71.5	29-147
13C-1,2,3,4,7,8-HxCDD	1.25	1.05-1.43	57.7	32-141
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	52.4	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	50.1	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	56.0	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	57.9	23-140
13C-OCDD	0.89	0.76-1.02	58.9	17-157
37Cl4-2,3,7,8-TCDD			95.3	35-197

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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ANALYTICAL RESOURCES INCORPORATED

Sample ID: HC-SS-2
DILUTION

Lab Sample ID: SB65B
LIMS ID: 10-31558
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 01/04/11 13:48
Instrument/Analyst: AS1/PK

Sample Amount: 10.4 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 5.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-OCDD	0.87	0.76-1.02	35.6	17-157
37Cl4-2,3,7,8-TCDD			61.9	35-197

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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ANALYTICAL RESOURCES INCORPORATED

Sample ID: HC-SS-3

Lab Sample ID: SB65C
LIMS ID: 10-31559
Matrix: Sediment
Data Release Authorized:
Reported: 02/21/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 20:40
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	0.73	0.65-0.89		0.978	17.9		
Total TCDF				0.978	305	XY	
2,3,7,8-TCDD	0.76	0.65-0.89		0.978	5.04		
Total TCDD				0.978	540	Y	
1,2,3,7,8-PeCDF	1.56	1.32-1.78		4.89	12.5	X	
2,3,4,7,8-PeCDF	1.52	1.32-1.78		4.89	21.3	B	
Total PeCDF				4.89	372	BXY	
1,2,3,7,8-PeCDD	1.55	1.32-1.78		4.89	27.2		
Total PeCDD				4.89	811	Y	
1,2,3,4,7,8-HxCDF	1.22	1.05-1.43		4.89	38.0	X	
1,2,3,6,7,8-HxCDF	1.22	1.05-1.43		4.89	18.4		
2,3,4,6,7,8-HxCDF	1.21	1.05-1.43		4.89	36.9	X	
1,2,3,7,8,9-HxCDF	1.21	1.05-1.43		4.89	10.4		
Total HxCDF				4.89	1,150	XY	
1,2,3,4,7,8-HxCDD	1.26	1.05-1.43		4.89	26.8		
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43		4.89	165		
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43		4.89	56.3		
Total HxCDD				4.89	1,990	Y	
1,2,3,4,6,7,8-HpCDF	1.03	0.88-1.20		4.89	621		
1,2,3,4,7,8,9-HpCDF	1.03	0.88-1.20		4.89	37.0		
Total HpCDF				4.89	2,630	X	
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		48.9	4,280	B	#
Total HpCDD				4.89	11,600	B	
OCDF	0.88	0.76-1.02		9.78	1,650		
OCDD	0.89	0.76-1.02		97.8	39,800	B	#

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 133

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 133

#-Result from diluted secondary analysis.

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: HC-SS-3

Lab Sample ID: SB65C
LIMS ID: 10-31559
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 20:40
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	74.7	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	95.6	25-164
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	84.9	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	88.6	21-178
13C-1,2,3,7,8-PeCDD	1.56	1.32-1.78	95.8	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	70.3	26-152
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	61.9	26-123
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	73.6	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	81.4	29-147
13C-1,2,3,4,7,8-HxCDD	1.25	1.05-1.43	79.7	32-141
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	69.2	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	70.2	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	76.6	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	83.9	23-140
13C-OCDD	0.90	0.76-1.02	90.7	17-157
37Cl4-2,3,7,8-TCDD			107	35-197

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: HC-SS-3
DILUTION

Lab Sample ID: SB65C
LIMS ID: 10-31559
Matrix: Sediment
Data Release Authorized: VJS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 01/04/11 14:41
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
13C-1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20	46.0	23-140
13C-OCDD	0.91	0.76-1.02	52.1	17-157
37Cl4-2,3,7,8-TCDD			52.8	35-197

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: HC-SS-4

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: SB65D
LIMS ID: 10-31560
Matrix: Sediment
Data Release Authorized:
Reported: 01/24/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 12:47
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.4 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	0.76	0.65-0.89		0.958	11.6		
Total TCDF				0.958	174	Y	
2,3,7,8-TCDD	0.69	0.65-0.89		0.958	1.94		
Total TCDD				0.958	93.6	Y	
1,2,3,7,8-PeCDF	1.52	1.32-1.78		4.79	12.3		
2,3,4,7,8-PeCDF	1.53	1.32-1.78		4.79	19.9	B	
Total PeCDF				4.79	242	BXY	
1,2,3,7,8-PeCDD	1.56	1.32-1.78		4.79	10.6		
Total PeCDD				4.79	264	Y	
1,2,3,4,7,8-HxCDF	1.33	1.05-1.43		4.79	31.3		
1,2,3,6,7,8-HxCDF	1.19	1.05-1.43		4.79	23.6		
2,3,4,6,7,8-HxCDF	1.22	1.05-1.43		4.79	33.2	X	
1,2,3,7,8,9-HxCDF	1.26	1.05-1.43		4.79	10.7		
Total HxCDF				4.79	542	XY	
1,2,3,4,7,8-HxCDD	1.26	1.05-1.43		4.79	12.5		
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43		4.79	48.4		
1,2,3,7,8,9-HxCDD	1.26	1.05-1.43		4.79	17.5		
Total HxCDD				4.79	501		
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20		4.79	297		
1,2,3,4,7,8,9-HpCDF	1.01	0.88-1.20		4.79	23.5		
Total HpCDF				4.79	891	X	
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.79	931	B	
Total HpCDD				4.79	2,220	B	
OCDF	0.88	0.76-1.02		9.58	676		
OCDD	0.89	0.76-1.02		47.9	6,430	B	#

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=0, Including EMPC): 52.4

Total 2,3,7,8-TCDD Equivalence (WHO2005, ND=1/2 EDL, Including EMPC): 52.4

#-Result from diluted secondary analysis.

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: HC-SS-4

Lab Sample ID: SB65D
LIMS ID: 10-31560
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 12:47
Instrument/Analyst: AS1/PK

Sample Amount: 10.4 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-2,3,7,8-TCDF	0.78	0.65-0.89	45.9	24-169
13C-2,3,7,8-TCDD	0.79	0.65-0.89	68.2	25-164
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	77.9	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	79.8	21-178
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	88.6	25-181
13C-1,2,3,4,7,8-HxCDF	0.53	0.43-0.59	73.2	26-152
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	69.7	26-123
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	76.9	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	43.8	29-147
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	78.7	32-141
13C-1,2,3,6,7,8-HxCDD	1.21	1.05-1.43	77.8	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	66.2	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	71.6	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	82.8	23-140
13C-OCDD	0.89	0.76-1.02	64.1	17-157
37Cl4-2,3,7,8-TCDD			71.6	35-197

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: HC-SS-4
DILUTION

Lab Sample ID: SB65D
LIMS ID: 10-31560
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/29/10 17:57
Instrument/Analyst: AS1/PK

Sample Amount: 10.4 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 5.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-OCDD	0.90	0.76-1.02	71.3	17-157
37Cl4-2,3,7,8-TCDD			58.4	35-197

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: HC-SS-5

Lab Sample ID: SB65E
LIMS ID: 10-31561
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 21:32
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	0.70	0.65-0.89		0.982	0.595	J
Total TCDF				0.982	10.0	Y
2,3,7,8-TCDD	0.48	0.65-0.89		0.982	0.251	JY
Total TCDD				0.982	9.45	Y
1,2,3,7,8-PeCDF	1.46	1.32-1.78		4.91	0.464	JX
2,3,4,7,8-PeCDF	1.61	1.32-1.78		4.91	0.756	BJ
Total PeCDF				4.91	14.1	BXY
1,2,3,7,8-PeCDD	1.45	1.32-1.78		4.91	1.26	J
Total PeCDD				4.91	14.8	Y
1,2,3,4,7,8-HxCDF	1.29	1.05-1.43		4.91	1.79	J
1,2,3,6,7,8-HxCDF	1.22	1.05-1.43		4.91	0.919	J
2,3,4,6,7,8-HxCDF	1.20	1.05-1.43		4.91	1.90	J
1,2,3,7,8,9-HxCDF	1.05	1.05-1.43		4.91	0.324	JY
Total HxCDF				4.91	47.5	Y
1,2,3,4,7,8-HxCDD	1.18	1.05-1.43		4.91	1.16	J
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43		4.91	7.02	
1,2,3,7,8,9-HxCDD	1.33	1.05-1.43		4.91	2.60	J
Total HxCDD				4.91	51.3	Y
1,2,3,4,6,7,8-HpCDF	1.04	0.88-1.20		4.91	40.3	
1,2,3,4,7,8,9-HpCDF	1.01	0.88-1.20		4.91	2.13	J
Total HpCDF				4.91	135	Y
1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20		4.91	130	B
Total HpCDD				4.91	264	B
OCDF	0.89	0.76-1.02		9.82	141	
OCDD	0.89	0.76-1.02		9.82	901	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 5.42

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 5.42

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: HC-SS-5

Lab Sample ID: SB65E
LIMS ID: 10-31561
Matrix: Sediment
Data Release Authorized: VJS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 21:32
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	79.1	24-169
13C-2,3,7,8-TCDD	0.79	0.65-0.89	93.7	25-164
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	96.3	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	106	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	115	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	78.7	26-152
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	74.8	26-123
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	84.9	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	94.0	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	90.6	32-141
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	81.9	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	76.7	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	88.8	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	88.3	23-140
13C-OCDD	0.89	0.76-1.02	89.6	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: HC-SS-7

Lab Sample ID: SB65F
LIMS ID: 10-31562
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 13:37
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.3 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	0.78	0.65-0.89		0.970	1.76	
Total TCDF				0.970	27.8	XY
2,3,7,8-TCDD	0.55	0.65-0.89		0.970	0.524	JY
Total TCDD				0.970	37.6	Y
1,2,3,7,8-PeCDF	1.54	1.32-1.78		4.85	1.02	JX
2,3,4,7,8-PeCDF	1.54	1.32-1.78		4.85	1.82	BJ
Total PeCDF				4.85	38.6	BXY
1,2,3,7,8-PeCDD	1.59	1.32-1.78		4.85	3.54	J
Total PeCDD				4.85	48.4	
1,2,3,4,7,8-HxCDF	1.20	1.05-1.43		4.85	4.35	JX
1,2,3,6,7,8-HxCDF	1.27	1.05-1.43		4.85	2.34	J
2,3,4,6,7,8-HxCDF	1.19	1.05-1.43		4.85	4.75	J
1,2,3,7,8,9-HxCDF	1.25	1.05-1.43		4.85	1.01	J
Total HxCDF				4.85	121	XY
1,2,3,4,7,8-HxCDD	1.18	1.05-1.43		4.85	2.81	J
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43		4.85	18.7	
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43		4.85	7.06	
Total HxCDD				4.85	175	
1,2,3,4,6,7,8-HpCDF	1.03	0.88-1.20		4.85	101	
1,2,3,4,7,8,9-HpCDF	1.03	0.88-1.20		4.85	6.43	
Total HpCDF				4.85	366	XY
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.85	373	B
Total HpCDD				4.85	754	B
OCDF	0.88	0.76-1.02		9.70	416	
OCDD	0.89	0.76-1.02		9.70	2,630	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 14.6

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 14.6

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: HC-SS-7

Lab Sample ID: SB65F
LIMS ID: 10-31562
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 13:37
Instrument/Analyst: AS1/PK

Sample Amount: 10.3 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-2,3,7,8-TCDF	0.78	0.65-0.89	90.9	24-169
13C-2,3,7,8-TCDD	0.79	0.65-0.89	99.9	25-164
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	93.5	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	97.7	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	109	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	73.0	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	68.3	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	79.5	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	89.5	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	84.4	32-141
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	73.7	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.46	0.37-0.51	72.7	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	85.6	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	86.6	23-140
13C-OCDD	0.89	0.76-1.02	91.7	17-157
37Cl4-2,3,7,8-TCDD			110	35-197

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: HC-SS-8

Lab Sample ID: SB65G
LIMS ID: 10-31563
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 14:34
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.6 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		0.940	2.08	
Total TCDF				0.940	29.3	XY
2,3,7,8-TCDD	0.58	0.65-0.89		0.940	0.519	JY
Total TCDD				0.940	51.5	Y
1,2,3,7,8-PeCDF	1.53	1.32-1.78		4.70	0.996	J
2,3,4,7,8-PeCDF	1.33	1.32-1.78		4.70	1.45	BJ
Total PeCDF				4.70	31.6	BXY
1,2,3,7,8-PeCDD	1.51	1.32-1.78		4.70	2.95	J
Total PeCDD				4.70	46.2	Y
1,2,3,4,7,8-HxCDF	1.22	1.05-1.43		4.70	2.98	JX
1,2,3,6,7,8-HxCDF	1.24	1.05-1.43		4.70	1.95	J
2,3,4,6,7,8-HxCDF	1.22	1.05-1.43		4.70	3.60	JX
1,2,3,7,8,9-HxCDF	1.05	1.05-1.43		4.70	0.611	JY
Total HxCDF				4.70	93.0	XY
1,2,3,4,7,8-HxCDD	1.25	1.05-1.43		4.70	2.47	J
1,2,3,6,7,8-HxCDD	1.25	1.05-1.43		4.70	13.7	
1,2,3,7,8,9-HxCDD	1.26	1.05-1.43		4.70	6.23	
Total HxCDD				4.70	122	
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20		4.70	97.6	
1,2,3,4,7,8,9-HpCDF	1.02	0.88-1.20		4.70	4.02	J
Total HpCDF				4.70	286	
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.70	266	B
Total HpCDD				4.70	565	B
OCDF	0.87	0.76-1.02		9.40	314	
OCDD	0.89	0.76-1.02		9.40	1,730	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 11.6

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 11.6

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: HC-SS-8

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: SB65G
LIMS ID: 10-31563
Matrix: Sediment
Data Release Authorized: VJS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 14:34
Instrument/Analyst: AS1/PK

Sample Amount: 10.6 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-2,3,7,8-TCDF	0.78	0.65-0.89	97.3	24-169
13C-2,3,7,8-TCDD	0.79	0.65-0.89	95.5	25-164
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	86.6	24-185
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	88.4	21-178
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	98.1	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	74.4	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	67.3	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	72.5	28-136
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	84.6	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	80.2	32-141
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	71.6	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	70.8	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.46	0.37-0.51	82.7	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	83.0	23-140
13C-OCDD	0.89	0.76-1.02	85.7	17-157
37Cl4-2,3,7,8-TCDD			102	35-197

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: HC-SS-9

Lab Sample ID: SB65H
LIMS ID: 10-31564
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 15:25
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 11.4 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	0.80	0.65-0.89		0.880	1.63	
Total TCDF				0.880	21.9	XY
2,3,7,8-TCDD	0.56	0.65-0.89		0.880	0.389	JY
Total TCDD				0.880	30.5	Y
1,2,3,7,8-PeCDF	1.63	1.32-1.78		4.40	0.682	J
2,3,4,7,8-PeCDF	1.56	1.32-1.78		4.40	1.01	BJ
Total PeCDF				4.40	20.4	BXY
1,2,3,7,8-PeCDD	1.52	1.32-1.78		4.40	2.04	J
Total PeCDD				4.40	31.6	
1,2,3,4,7,8-HxCDF	1.26	1.05-1.43		4.40	1.83	JX
1,2,3,6,7,8-HxCDF	1.34	1.05-1.43		4.40	1.16	J
2,3,4,6,7,8-HxCDF	1.27	1.05-1.43		4.40	2.24	JX
1,2,3,7,8,9-HxCDF	1.26	1.05-1.43		4.40	0.456	J
Total HxCDF				4.40	52.4	XY
1,2,3,4,7,8-HxCDD	1.31	1.05-1.43		4.40	1.77	J
1,2,3,6,7,8-HxCDD	1.22	1.05-1.43		4.40	8.40	
1,2,3,7,8,9-HxCDD	1.27	1.05-1.43		4.40	4.00	J
Total HxCDD				4.40	83.9	
1,2,3,4,6,7,8-HpCDF	1.03	0.88-1.20		4.40	44.9	
1,2,3,4,7,8,9-HpCDF	1.01	0.88-1.20		4.40	2.40	J
Total HpCDF				4.40	144	
1,2,3,4,6,7,8-HpCDD	1.09	0.88-1.20		4.40	137	B
Total HpCDD				4.40	349	B
OCDF	0.88	0.76-1.02		8.80	143	
OCDD	0.89	0.76-1.02		8.80	979	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 7.08

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 7.08

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: HC-SS-9

Lab Sample ID: SB65H
LIMS ID: 10-31564
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 15:25
Instrument/Analyst: AS1/PK

Sample Amount: 11.4 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
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	97.1	25-164
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	87.4	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	92.7	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	100	25-181
13C-1,2,3,4,7,8-HxCDF	0.53	0.43-0.59	74.1	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	68.6	26-123
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	78.2	28-136
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	93.5	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	83.6	32-141
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	75.6	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.46	0.37-0.51	72.1	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	83.3	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	85.8	23-140
13C-OCDD	0.89	0.76-1.02	84.8	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
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Sample ID: HC-SS-10

Lab Sample ID: SB65I
LIMS ID: 10-31565
Matrix: Sediment
Data Release Authorized: VR
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 17:16
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	0.77	0.65-0.89		0.981	1.88	
Total TCDF				0.981	25.7	XY
2,3,7,8-TCDD	0.58	0.65-0.89		0.981	0.461	JY
Total TCDD				0.981	63.9	Y
1,2,3,7,8-PeCDF	1.48	1.32-1.78		4.91	0.846	J
2,3,4,7,8-PeCDF	1.50	1.32-1.78		4.91	1.20	BJ
Total PeCDF				4.91	24.2	BXY
1,2,3,7,8-PeCDD	1.50	1.32-1.78		4.91	2.50	J
Total PeCDD				4.91	67.2	
1,2,3,4,7,8-HxCDF	1.25	1.05-1.43		4.91	2.48	JX
1,2,3,6,7,8-HxCDF	1.36	1.05-1.43		4.91	1.52	J
2,3,4,6,7,8-HxCDF	1.17	1.05-1.43		4.91	2.72	JX
1,2,3,7,8,9-HxCDF	1.16	1.05-1.43		4.91	0.571	J
Total HxCDF				4.91	66.7	XY
1,2,3,4,7,8-HxCDD	1.32	1.05-1.43		4.91	2.51	J
1,2,3,6,7,8-HxCDD	1.22	1.05-1.43		4.91	12.1	
1,2,3,7,8,9-HxCDD	1.21	1.05-1.43		4.91	5.97	
Total HxCDD				4.91	176	Y
1,2,3,4,6,7,8-HpCDF	1.03	0.88-1.20		4.91	61.9	
1,2,3,4,7,8,9-HpCDF	1.06	0.88-1.20		4.91	3.42	J
Total HpCDF				4.91	213	
1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20		4.91	320	B
Total HpCDD				4.91	735	B
OCDF	0.87	0.76-1.02		9.81	218	
OCDD	0.89	0.76-1.02		9.81	2,590	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 11.0

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 11.0

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: HC-SS-10

Lab Sample ID: SB65I
LIMS ID: 10-31565
Matrix: Sediment
Data Release Authorized: VJB
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 17:16
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
13C-2,3,7,8-TCDF	0.79	0.65-0.89	87.4	24-169
13C-2,3,7,8-TCDD	0.77	0.65-0.89	90.8	25-164
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	84.3	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	89.1	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	98.0	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	74.6	26-152
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	69.3	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	77.5	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	90.0	29-147
13C-1,2,3,4,7,8-HxCDD	1.25	1.05-1.43	81.7	32-141
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	75.5	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	71.0	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.46	0.37-0.51	78.5	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	83.3	23-140
13C-OCDD	0.89	0.76-1.02	79.7	17-157
37Cl4-2,3,7,8-TCDD			102	35-197

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: HC-SS-11

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: SB65J
LIMS ID: 10-31566
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 18:11
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	0.76	0.65-0.89		0.984	2.43	
Total TCDF				0.984	32.0	XY
2,3,7,8-TCDD	0.59	0.65-0.89		0.984	0.644	JY
Total TCDD				0.984	49.4	Y
1,2,3,7,8-PeCDF	1.52	1.32-1.78		4.92	1.21	J
2,3,4,7,8-PeCDF	1.51	1.32-1.78		4.92	1.86	BJ
Total PeCDF				4.92	39.3	BXY
1,2,3,7,8-PeCDD	1.58	1.32-1.78		4.92	3.83	J
Total PeCDD				4.92	67.4	
1,2,3,4,7,8-HxCDF	1.27	1.05-1.43		4.92	4.54	JX
1,2,3,6,7,8-HxCDF	1.25	1.05-1.43		4.92	2.86	J
2,3,4,6,7,8-HxCDF	1.25	1.05-1.43		4.92	5.48	X
1,2,3,7,8,9-HxCDF	1.24	1.05-1.43		4.92	0.951	J
Total HxCDF				4.92	126	XY
1,2,3,4,7,8-HxCDD	1.19	1.05-1.43		4.92	3.57	J
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43		4.92	19.6	
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43		4.92	8.25	
Total HxCDD				4.92	171	
1,2,3,4,6,7,8-HpCDF	1.03	0.88-1.20		4.92	121	
1,2,3,4,7,8,9-HpCDF	1.03	0.88-1.20		4.92	7.11	
Total HpCDF				4.92	404	X
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.92	398	B
Total HpCDD				4.92	800	B
OCDF	0.88	0.76-1.02		9.84	411	
OCDD	0.89	0.76-1.02		9.84	2,710	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 16.0

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 16.0

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: HC-SS-11

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: SB65J
LIMS ID: 10-31566
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 18:11
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	78.3	24-169
13C-2,3,7,8-TCDD	0.79	0.65-0.89	87.1	25-164
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	88.7	24-185
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	89.1	21-178
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	99.2	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	76.5	26-152
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	70.4	26-123
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	81.6	28-136
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	85.5	29-147
13C-1,2,3,4,7,8-HxCDD	1.25	1.05-1.43	92.7	32-141
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	76.6	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	74.1	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	82.1	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	91.3	23-140
13C-OCDD	0.89	0.76-1.02	90.3	17-157
37Cl4-2,3,7,8-TCDD			90.4	35-197

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

ANALYTICAL RESOURCES INCORPORATED

Sample ID: HC-SS-12

Lab Sample ID: SB65K
LIMS ID: 10-31567
Matrix: Sediment
Data Release Authorized: VJS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 19:02
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	0.81	0.65-0.89		0.996	2.22	
Total TCDF				0.996	28.7	XY
2,3,7,8-TCDD	0.55	0.65-0.89		0.996	0.594	JY
Total TCDD				0.996	65.0	Y
1,2,3,7,8-PeCDF	1.47	1.32-1.78		4.98	1.22	JX
2,3,4,7,8-PeCDF	1.52	1.32-1.78		4.98	1.93	BJ
Total PeCDF				4.98	37.2	BXY
1,2,3,7,8-PeCDD	1.55	1.32-1.78		4.98	3.73	J
Total PeCDD				4.98	65.2	
1,2,3,4,7,8-HxCDF	1.22	1.05-1.43		4.98	5.04	X
1,2,3,6,7,8-HxCDF	1.20	1.05-1.43		4.98	2.80	J
2,3,4,6,7,8-HxCDF	1.25	1.05-1.43		4.98	5.58	X
1,2,3,7,8,9-HxCDF	1.14	1.05-1.43		4.98	1.07	J
Total HxCDF				4.98	140	XY
1,2,3,4,7,8-HxCDD	1.26	1.05-1.43		4.98	3.69	J
1,2,3,6,7,8-HxCDD	1.27	1.05-1.43		4.98	20.7	
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43		4.98	8.58	
Total HxCDD				4.98	172	Y
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20		4.98	129	
1,2,3,4,7,8,9-HpCDF	1.04	0.88-1.20		4.98	7.36	
Total HpCDF				4.98	464	XY
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.98	444	B
Total HpCDD				4.98	929	B
OCDF	0.87	0.76-1.02		9.96	489	
OCDD	0.89	0.76-1.02		9.96	3,040	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 16.8

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 16.8

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

Sample ID: HC-SS-12

Lab Sample ID: SB65K
LIMS ID: 10-31567
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 19:02
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	94.4	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	93.0	25-164
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	82.8	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	85.6	21-178
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	93.8	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	71.7	26-152
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	65.8	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	79.9	28-136
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	78.1	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	88.2	32-141
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	72.5	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	68.5	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	78.9	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	84.0	23-140
13C-OCDD	0.89	0.76-1.02	82.2	17-157
37Cl4-2,3,7,8-TCDD			99.4	35-197

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: HC-SS-13

Lab Sample ID: SB65L
LIMS ID: 10-31568
Matrix: Sediment
Data Release Authorized: VTB
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 19:53
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 10.3 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		0.972	1.86	
Total TCDF				0.972	24.3	XY
2,3,7,8-TCDD	0.41	0.65-0.89		0.972	0.356	JY
Total TCDD				0.972	63.2	Y
1,2,3,7,8-PeCDF	1.46	1.32-1.78		4.86	0.768	JX
2,3,4,7,8-PeCDF	1.57	1.32-1.78		4.86	1.12	BJ
Total PeCDF				4.86	22.9	BXY
1,2,3,7,8-PeCDD	1.51	1.32-1.78		4.86	2.34	J
Total PeCDD				4.86	43.3	
1,2,3,4,7,8-HxCDF	1.22	1.05-1.43		4.86	2.43	JX
1,2,3,6,7,8-HxCDF	1.32	1.05-1.43		4.86	1.54	J
2,3,4,6,7,8-HxCDF	1.25	1.05-1.43		4.86	2.77	J
1,2,3,7,8,9-HxCDF	1.21	1.05-1.43		4.86	0.540	J
Total HxCDF				4.86	61.2	XY
1,2,3,4,7,8-HxCDD	1.30	1.05-1.43		4.86	2.38	J
1,2,3,6,7,8-HxCDD	1.23	1.05-1.43		4.86	10.4	
1,2,3,7,8,9-HxCDD	1.23	1.05-1.43		4.86	4.93	
Total HxCDD				4.86	101	
1,2,3,4,6,7,8-HpCDF	1.03	0.88-1.20		4.86	58.8	
1,2,3,4,7,8,9-HpCDF	1.00	0.88-1.20		4.86	3.19	J
Total HpCDF				4.86	187	XY
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.86	222	B
Total HpCDD				4.86	470	B
OCDF	0.87	0.76-1.02		9.72	197	
OCDD	0.89	0.76-1.02		9.72	1,510	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 9.09

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 9.09

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: HC-SS-13

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: SB65L
LIMS ID: 10-31568
Matrix: Sediment
Data Release Authorized:
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/21/10
Date Analyzed: 12/27/10 19:53
Instrument/Analyst: AS1/PK

Sample Amount: 10.3 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-2,3,7,8-TCDF	0.78	0.65-0.89	77.6	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	80.0	25-164
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	80.3	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	83.6	21-178
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	91.2	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	68.0	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	61.6	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	76.6	28-136
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	82.2	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	79.1	32-141
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	68.3	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	64.6	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	75.3	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	77.3	23-140
13C-OCDD	0.89	0.76-1.02	76.7	17-157
37Cl4-2,3,7,8-TCDD			82.4	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-122110

Lab Sample ID: OPR-122110
LIMS ID: 10-31557
Matrix: Sediment
Data Release Authorized: VJS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 15:20
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	0.77	0.65-0.89	1.00	21.3	
Total TCDF			1.00	22.2	Y
2,3,7,8-TCDD	0.76	0.65-0.89	1.00	20.2	
Total TCDD			1.00	20.9	Y
1,2,3,7,8-PeCDF	1.54	1.32-1.78	5.00	102	
2,3,4,7,8-PeCDF	1.52	1.32-1.78	5.00	99.2	B
Total PeCDF			5.00	207	BY
1,2,3,7,8-PeCDD	1.54	1.32-1.78	5.00	101	
Total PeCDD			5.00	101	Y
1,2,3,4,7,8-HxCDF	1.23	1.05-1.43	5.00	102	
1,2,3,6,7,8-HxCDF	1.23	1.05-1.43	5.00	105	
2,3,4,6,7,8-HxCDF	1.25	1.05-1.43	5.00	103	
1,2,3,7,8,9-HxCDF	1.23	1.05-1.43	5.00	102	
Total HxCDF			5.00	413	Y
1,2,3,4,7,8-HxCDD	1.24	1.05-1.43	5.00	103	
1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	5.00	101	
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43	5.00	106	
Total HxCDD			5.00	311	Y
1,2,3,4,6,7,8-HpCDF	1.03	0.88-1.20	5.00	114	
1,2,3,4,7,8,9-HpCDF	1.01	0.88-1.20	5.00	102	
Total HpCDF			5.00	219	Y
1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20	5.00	105	B
Total HpCDD			5.00	107	B
OCDF	0.91	0.76-1.02	10.0	195	
OCDD	0.90	0.76-1.02	10.0	211	B

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-122110

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: OPR-122110
LIMS ID: 10-31557
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 15:20
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
13C-2,3,7,8-TCDF	0.79	0.65-0.89	95.4	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	86.0	25-164
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	85.9	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	73.8	21-178
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	83.4	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	0.53	0.43-0.59	77.1	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	76.7	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	77.0	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	84.5	32-141
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	80.6	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.44	0.37-0.51	70.0	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	74.0	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	78.0	23-140
13C-OCDD	0.89	0.76-1.02	73.5	17-157
37Cl4-2,3,7,8-TCDD			90.8	35-197

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-122110

Lab Sample ID: OPR-122110
LIMS ID: 10-31557
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 15:20
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	21.3	20.0	106	30-160
2,3,7,8-TCDD	20.2	20.0	101	30-160
1,2,3,7,8-PeCDF	102	100	102	30-160
2,3,4,7,8-PeCDF	99.2	100	99.2	30-160
1,2,3,7,8-PeCDD	101	100	101	30-160
1,2,3,4,7,8-HxCDF	102	100	102	30-160
1,2,3,6,7,8-HxCDF	105	100	105	30-160
2,3,4,6,7,8-HxCDF	103	100	103	30-160
1,2,3,7,8,9-HxCDF	102	100	102	30-160
1,2,3,4,7,8-HxCDD	103	100	103	30-160
1,2,3,6,7,8-HxCDD	101	100	101	30-160
1,2,3,7,8,9-HxCDD	106	100	106	30-160
1,2,3,4,6,7,8-HpCDF	114	100	114	30-160
1,2,3,4,7,8,9-HpCDF	102	100	102	30-160
1,2,3,4,6,7,8-HpCDD	105	100	105	30-160
OCDF	195	200	97.5	30-160
OCDD	211	200	106	30-160

Reported in pg/g

4DF - FORM IV-HR CDD
CDD/CDF METHOD BLANK SUMMARY
HIGH RESOLUTION

Sample No.

SB65MB

Lab Name: ANALYTICAL RESOURCES, INC. Contract: HART CROWSER

Lab Code: SB65 Case No.: CUSTOM PLYWOOD TO No.: SDG No.:

Matrix:(Soil/Water/Ash/Tissue/Oil) SOIL

Lab Sample ID: SB69MB

Sample wt/vol: 10 (g/ml) g

Lab File ID: 10122804

Water Sample Prep: (SEPF/SPE)

Date Received: 17-DEC-10

GC Column: RTX-DIOXIN2 ID: 0.25 (mm)

Date Extracted: 21-DEC-10

Instrument ID: AUTOSPEC1

Date Analyzed: 23-DEC-10

Client Sample No.	Lab Sample ID	Lab File ID	Date Analyzed
SB65OPR	SB65OPR	10122305	12/23/10
HC-SS-1	SB65A	10122309	12/23/10
HC-SS-2	SB65B	10122310	12/23/10
HC-SS-3	SB65C	10122311	12/23/10
HC-SS-4	SB65D	10122704	12/27/10
HC-SS-5	SB65E	10122312	12/23/10
HC-SS-6	SB65F	10122705	12/27/10
HC-SS-7	SB65G	10122706	12/27/10
HC-SS-8	SB65H	10122707	12/27/10
HC-SS-9	SB65I	10122709	12/27/10
HC-SS-10	SB65J	10122710	12/27/10
HC-SS-11	SB65K	10122711	12/27/10
HC-SS-12	SB65L	10122712	12/27/10
HC-SS-1	SB65A 5X	11010404	01/04/11
HC-SS-2	SB65B 5X	11010405	01/04/11
HC-SS-3	SB65C 10X	11010406	01/04/11
HC-SS-4	SB65D 5X	10122909	12/29/10

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-122110

Lab Sample ID: MB-122110
LIMS ID: 10-31557
Matrix: Sediment
Data Release Authorized: [signature]
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 14:30
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	0.0151	1.00	< 0.0151	U
Total TCDF			0.0151	1.00	< 0.0151	U
2,3,7,8-TCDD		0.65-0.89	0.0298	1.00	< 0.0298	U
Total TCDD			0.0298	1.00	< 0.0298	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0116	5.00	< 0.0116	U
2,3,4,7,8-PeCDF	1.66	1.32-1.78		5.00	0.0460	J
Total PeCDF			0.0116	5.00	0.0460	
1,2,3,7,8-PeCDD		1.32-1.78	0.0212	5.00	< 0.0212	U
Total PeCDD			0.0212	5.00	< 0.0212	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0198	5.00	< 0.0198	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0186	5.00	< 0.0186	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0208	5.00	< 0.0208	U
1,2,3,7,8,9-HxCDF		1.05-1.43	0.0246	5.00	< 0.0246	U
Total HxCDF			0.0246	5.00	< 0.0246	U
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0254	5.00	< 0.0254	U
1,2,3,6,7,8-HxCDD		1.05-1.43	0.0254	5.00	< 0.0254	U
1,2,3,7,8,9-HxCDD		1.05-1.43	0.0289	5.00	< 0.0289	U
Total HxCDD			0.0289	5.00	< 0.0289	U
1,2,3,4,6,7,8-HpCDF		0.88-1.20	0.0270	5.00	< 0.0270	U
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.0424	5.00	< 0.0424	U
Total HpCDF			0.0424	5.00	< 0.0424	U
1,2,3,4,6,7,8-HpCDD	0.96	0.88-1.20		5.00	0.152	J
Total HpCDD				5.00	0.160	
OCDF		0.76-1.02	0.0639	10.0	< 0.0639	U
OCDD	0.91	0.76-1.02		10.0	0.598	J

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

Sample ID: MB-122110

Lab Sample ID: MB-122110
LIMS ID: 10-31557
Matrix: Sediment
Data Release Authorized: VJS
Reported: 01/08/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 12/21/10
Date Analyzed: 12/23/10 14:30
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
13C-2,3,7,8-TCDF	0.79	0.65-0.89	73.2	24-169
13C-2,3,7,8-TCDD	0.79	0.65-0.89	80.8	25-164
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	107	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	78.8	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	91.8	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	74.8	26-152
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	73.8	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	75.0	28-136
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	78.6	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	83.3	32-141
13C-1,2,3,6,7,8-HxCDD	1.25	1.05-1.43	77.4	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	68.8	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	78.7	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	82.1	23-140
13C-OCDD	0.89	0.76-1.02	84.8	17-157
37Cl4-2,3,7,8-TCDD			83.7	35-197

Reported in Percent Recovery

5DFA - FORM V-HR CDD-1
CDD/CDF WINDOW DEFINING MIX (WDM) SUMMARY
HIGH RESOLUTION

Sample No.
CS3

Lab Name: ANALYTICAL RESOURCES, INC. Contract: HART CROWSER

Lab Code: SB65 Case No.: CUSTOM PLYWOOD TO No.: SDG No.:

GC Column: RTX-Dioxin2 ID: 0.25 (mm) Lab File ID: 10122303

Instrument ID: AUTOSPEC1 Date Analyzed: 23-DEC-10

Time Analyzed: 1334

CDD/CDF	RT First Eluting	RT Last Eluting
TCDD	24.18	27.63
TCDF	22.91	27.90
PeCDD	29.41	32.53
PeCDF	27.74	32.92
HxCDD	34.61	37.32
HxCDF	33.82	37.75
HpCDD	40.36	41.66
HpCDF	39.82	42.57

5DFB - FORM V-HR CDD-2
CDD/CDF CHROMATOGRAPHIC RESOLUTION SUMMARY
HIGH RESOLUTION

Sample No.

CS3

Lab Name:	ANALYTICAL RESOURCES, INC.		Contract :	HART CROWSER	
Lab Code:	SB65	Case No.: CUSTOM PLYWOOD	TO No.:		SDG No.:
GC Column:	RTX-DIOXIN2	ID: 0.25 (mm)	Lab File ID:	10122303	
Instrument ID:	Autospec1		Date Analyzed:	23-DEC-10	
			Time Analyzed:	1334	

Percent Valley determination for DB-5 (or equivalent) column -
For the column performance solution beginning 12-hour period:

1238-TCDD/2378-TCDD: 0

Quality Control (QC) Limits:

Percent Valley between the TCDD isomers must be less than or equal to 25%

Percent Valley determination for DB-225 (or equivalent) column -
For the column performance solution beginning 12-hour period:

2347-TCDF/2378-TCDF: 16.0

QC Limits:

Percent Valley between the TCDD/TCDF isomers must be less than or equal to 25%

5DFB - FORM V-HR CDD-3
CDD/CDF ANALTYICAL SEQUENCE SUMMARY
HIGH RESOLUTION

Lab Name: ANALYTICAL RESOURCES, INC. Contract: HART CROWSER

Lab Code: SB65 Case No.: CUSTOM PLYWOOD TO No.: SDG No.:

GC Column: RTX-DIOXIN2 ID: 0.25 (mm) Instrument ID: AUTOSPEC1

Init. Calib. Date(s): 07-DEC-10

Init: Calib. Times: 1415 1745

The Analytical Sequence of standards, samples, blanks, and Laboratory Control Samples (LCS) is as follows:

Client Sample No.	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
1756-1	TCDFS	10122302	12/23/10	1243
I5743	CS3	10122303	12/23/10	1334
SB65MB	SB10MB	10122304	12/23/10	1430
SB65OPR	SB10OPR	10122305	12/23/10	1520
I5743	CS3	10122308	12/23/10	1754
HC-SS-1	SB65A	10122309	12/23/10	1854
HC-SS-2	SB65B	10122310	12/23/10	1949
HC-SS-3	SB65C	10122311	12/23/10	2040
HC-SS-5	SB65E	10122312	12/23/10	2132
I5743	CS3	10122313	12/23/10	2223
1756-1	TCDFS	10122702	12/27/10	1047
I5743	CS3	10122703	12/27/10	1138
HC-SS-4	SB65D	10122704	12/27/10	1247
HC-SS-6	SB65F	10122705	12/27/10	1337
HC-SS-7	SB65G	10122706	12/27/10	1434
HC-SS-8	SB65H	10122707	12/27/10	1525
I5743	CS3	10122708	12/27/10	1616
HC-SS-9	SB65I	10122709	12/27/10	1716
HC-SS-10	SB65J	10122710	12/27/10	1811
HC-SS-11	SB65K	10122711	12/27/10	1902
HC-SS-12	SB65L	10122712	12/27/10	1953
I5743	CS3	10122713	12/27/10	2045
1756-1	TCDFS	10122902	12/29/10	1048
I5743	CS3	10122903	12/29/10	1240
HC-SS-4	SB65DDL	10122909	12/29/10	1757
I5743	CS3	10122910	12/29/10	1849

1756-1	TCDFS	11010402	01/04/11	1101
I5743	CS3	11010403	01/04/11	1157
HC-SS-1	SB65A 5X	11010404	01/04/11	1257
HC-SS-2	SB65B 5X	11010405	01/04/11	1348
HC-SS-3	SB65C 10X	11010406	01/04/11	1441
I5743	CS3	11010407	01/04/11	1532

USEPA
6DFA - Form VI-HR CDD-1
CDD/CDF INITIAL CALIBRATION RESPONSE FACTOR SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1		
Init.Calib.Date CS1:	07-Dec-10	Init.Calib.Time CS1:	14:15:21
Init.Calib.Date CS2:	07-Dec-10	Init.Calib.Time CS2:	15:12:32
Init.Calib.Date CS3:	07-Dec-10	Init.Calib.Time CS3:	16:03:04
Init.Calib.Date CS4:	07-Dec-10	Init.Calib.Time CS4:	16:54:22
Init.Calib.Date CS5:	07-Dec-10	Init.Calib.Time CS5:	17:45:58

Target Analytes	RRF					Mean RRF	% RSD	QC Limits
	CS1	CS2	CS3	CS4	CS5			
2378-TCDD	1.01	1.07	1.07	1.06	1.07	1.05	2.4	20.0
2378-TCDF	0.89	0.89	0.93	0.90	0.92	0.91	1.9	20.0
12378-PeCDF	0.89	0.93	0.93	0.93	0.95	0.93	2.3	20.0
12378-PeCDD	0.98	1.00	0.99	1.01	1.00	1.00	1.3	20.0
23478-PeCDF	0.98	0.99	0.98	0.98	0.98	0.98	0.8	20.0
123478-HxCDF	1.08	1.12	1.14	1.13	1.14	1.12	2.2	20.0
123678-HxCDF	0.99	1.10	1.06	1.07	1.11	1.07	4.4	20.0
123478-HxCDD	0.99	0.99	0.99	1.00	0.99	0.99	0.7	20.0
123678-HxCDD	0.92	0.94	0.93	0.97	0.94	0.94	2.0	20.0
123789-HxCDD[2]	0.82	0.86	0.89	0.89	0.89	0.87	3.6	20.0
234678-HxCDF	1.08	1.10	1.12	1.10	1.10	1.10	1.3	20.0
123789-HxCDF	1.02	0.99	1.05	1.06	1.05	1.04	2.5	20.0
1234678-HpCDF	1.24	1.31	1.31	1.28	1.30	1.29	2.3	20.0
1234678-HpCDD	0.96	1.00	1.02	1.04	1.03	1.01	3.1	20.0
1234789-HpCDF	1.29	1.27	1.29	1.32	1.33	1.30	2.0	20.0
OCDD	1.00	1.00	1.01	1.04	1.05	1.02	2.2	20.0
OCDF[1]	1.11	1.11	1.13	1.23	1.25	1.17	6.2	20.0

(1) The RRF is calculated based on the labeled analog of OCDD.
(2) The relative response factor (RRF) is calculated based on the labeled analogs of the other two HxCDDs.

Labeled Compounds	RRF					Mean RRF	% RSD	QC Limits
	CS1	CS2	CS3	CS4	CS5			
13C-2378-TCDD	0.85	0.82	0.85	0.84	0.89	0.85	3.4	20.0
13C-12378-PeCDD	0.65	0.64	0.64	0.64	0.70	0.65	4.0	20.0
13C-123478-HxCDD	1.03	1.06	1.00	1.06	1.03	1.04	2.3	20.0
13C-123678-HxCDD	1.15	1.16	1.15	1.16	1.12	1.15	1.6	20.0
13C-1234678-HpCDD	0.83	0.87	0.79	0.87	0.77	0.83	5.4	20.0
13C-OCDD	0.67	0.72	0.64	0.73	0.67	0.68	5.6	20.0
13C-2378-TCDF	1.45	1.40	1.43	1.40	1.45	1.42	1.8	20.0
13C-12378-PeCDF	1.13	1.11	1.16	1.16	1.25	1.16	4.4	20.0
13C-23478-PeCDF	1.07	1.03	1.05	1.06	1.18	1.08	5.5	20.0
13C-123478-HxCDF	1.35	1.42	1.34	1.39	1.33	1.37	2.9	20.0
13C-123678-HxCDF	1.54	1.59	1.54	1.59	1.45	1.54	3.6	20.0
13C-234678-HxCDF	1.38	1.41	1.33	1.41	1.33	1.37	2.8	20.0
13C-123789-HxCDF	1.09	1.13	1.08	1.14	1.07	1.10	2.6	20.0
13C-1234678-HpCDF	1.11	1.19	1.09	1.20	1.07	1.13	4.9	20.0
13C-1234789-HpCDF	0.75	0.79	0.74	0.80	0.73	0.76	4.1	20.0

USEPA
6DFB - Form VI-HR CDD-2
CDD/CDF INITIAL CALIBRATION ION ABUNDANCE RATIO SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1		
Init.Calib.Date CS1:	07-Dec-10	Init.Calib.Time CS1:	14:15:21
Init.Calib.Date CS2:	07-Dec-10	Init.Calib.Time CS2:	15:12:32
Init.Calib.Date CS3:	07-Dec-10	Init.Calib.Time CS3:	16:03:04
Init.Calib.Date CS4:	07-Dec-10	Init.Calib.Time CS4:	16:54:22
Init.Calib.Date CS5:	07-Dec-10	Init.Calib.Time CS5:	17:45:58

Target Analytes	Selected Ions	Ion Abundance Ratio					Ratio Flag	Ratio QC Limits#
		CS1	CS2	CS3	CS4	CS5		
2378-TCDD	320/322	0.79	0.77	0.77	0.79	0.78		0.65 - 0.89
2378-TCDF	304/306	0.82	0.79	0.78	0.77	0.76		0.65 - 0.89
12378-PeCDF	340/342	1.57	1.58	1.53	1.54	1.56		1.32 - 1.78
12378-PeCDD	356/358	1.57	1.58	1.56	1.50	1.55		1.32 - 1.78
23478-PeCDF	340/342	1.52	1.53	1.54	1.53	1.53		1.32 - 1.78
123478-HxCDF	374/376	1.28	1.25	1.21	1.22	1.22		1.05 - 1.43
123678-HxCDF	374/376	1.35	1.20	1.22	1.22	1.22		1.05 - 1.43
123478-HxCDD	390/392	1.22	1.19	1.28	1.25	1.25		1.05 - 1.43
123678-HxCDD	390/392	1.18	1.28	1.20	1.24	1.24		1.05 - 1.43
123789-HxCDD	390/392	1.36	1.22	1.28	1.24	1.25		1.05 - 1.43
234678-HxCDF	374/376	1.20	1.25	1.24	1.22	1.22		1.05 - 1.43
123789-HxCDF	374/376	1.21	1.23	1.23	1.23	1.24		1.05 - 1.43
1234678-HpCDF	408/410	1.06	1.02	1.01	1.01	1.03		0.89 - 1.21
1234678-HpCDD	424/426	1.07	1.07	1.06	1.06	1.05		0.89 - 1.21
1234789-HpCDF	408/410	0.95	1.03	1.04	1.03	1.02		0.89 - 1.21
OCDD	458/460	0.88	0.91	0.89	0.89	0.90		0.76 - 1.02
OCDF	442/444	0.89	0.88	0.88	0.89	0.89		0.76 - 1.02

Labeled Compounds	Selected Ions	Ion Abundance Ratio					Ratio Flag	Ratio QC Limits
		CS1	CS2	CS3	CS4	CS5		
13C-2378-TCDD	332/334	0.79	0.78	0.79	0.79	0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	1.59	1.58	1.58	1.58	1.58		1.32 - 1.78
13C-123478-HxCDD	402/404	1.27	1.27	1.26	1.27	1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	1.24	1.22	1.27	1.22	1.28		1.05 - 1.43
13C-1234678-HpCDD	436/438	1.04	1.04	1.06	1.04	1.07		0.89 - 1.21
13C-OCDD	470/472	0.89	0.90	0.90	0.87	0.88		0.76 - 1.02
13C-2378-TCDF	316/318	0.79	0.78	0.76	0.78	0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.58	1.60	1.53	1.57	1.56		1.32 - 1.78
13C-23478-PeCDF	352/354	1.57	1.57	1.57	1.56	1.56		1.32 - 1.78
13C-123478-HxCDF	384/386	0.52	0.52	0.52	0.52	0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	0.53	0.55	0.53	0.51	0.53		0.43 - 0.59
13C-234678-HxCDF	384/386	0.52	0.52	0.53	0.52	0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	0.54	0.51	0.54	0.53	0.52		0.43 - 0.59
13C-1234678-HpCDF	418/420	0.45	0.45	0.46	0.44	0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.45	0.46	0.45	0.45	0.45		0.37 - 0.51

Internal Standards	Selected Ions	Ion Abundance Ratio					Ratio Flag	Ion Ratio QC Limits
		CS1	CS2	CS3	CS4	CS5		
13C-1234-TCDD	332/334	0.79	0.80	0.80	0.80	0.79		0.65 - 0.89
13C-123789-HxCDD	402/404	1.22	1.23	1.22	1.24	1.25		1.05 - 1.43

(#) Quality Control (QC) limits represent ±15% window around the theoretical ion abundance ratio. The laboratory must flag any analyte in any calibration solution which does not meet the ion abundance ratio QC limit by placing an asterisk in the flag column.

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	GOOSE LAKE
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122303
Date Analysed	23-Dec-10	Time Analysed	13:34:05
Init.Calib.Date:	12/07/10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.03	1.05	-2.7		0.79		0.65 - 0.89
2378-TCDF	304/306	0.92	0.91	1.8		0.79		0.65 - 0.89
12378-PeCDF	340/342	0.95	0.93	2.5		1.53		1.32 - 1.78
12378-PeCDD	356/358	0.99	1.00	-0.9		1.53		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-3.6		1.54		1.32 - 1.78
123478-HxCDF	374/376	1.10	1.12	-1.8		1.23		1.05 - 1.43
123678-HxCDF	374/376	1.06	1.07	-0.4		1.20		1.05 - 1.43
123478-HxCDD	390/392	0.99	0.99	0.4		1.25		1.05 - 1.43
123678-HxCDD	390/392	0.92	0.94	-1.8		1.25		1.05 - 1.43
123789-HxCDD	390/392	0.78	0.87	-10.8		1.23		1.05 - 1.43
234678-HxCDF	374/376	1.09	1.10	-0.5		1.23		1.05 - 1.43
123789-HxCDF	374/376	1.03	1.04	-0.2		1.23		1.05 - 1.43
1234678-HpCDF	408/410	1.29	1.29	0.4		1.01		0.89 - 1.21
1234678-HpCDD	424/426	1.02	1.01	0.4		1.03		0.89 - 1.21
1234789-HpCDF	408/410	1.30	1.30	0.4		1.01		0.89 - 1.21
OCDD	458/460	1.02	1.02	-0.3		0.90		0.76 - 1.02
OCDF	442/444	1.36	1.17	16.8		0.89		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	0.92	0.85	8.8		0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	0.65	0.65	-0.1		1.56		1.32 - 1.78
13C-123478-HxCDD	402/404	1.20	1.04	15.8		1.27		1.05 - 1.43
13C-123678-HxCDD	402/404	1.28	1.15	11.2		1.24		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.85	0.83	2.9		1.04		0.89 - 1.21
13C-OCDD	470/472	0.58	0.68	-15.7		0.89		0.76 - 1.02
13C-2378-TCDF	316/318	1.44	1.42	0.9		0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.05	1.16	-9.9		1.58		1.32 - 1.78
13C-23478-PeCDF	352/354	1.03	1.08	-4.5		1.56		1.32 - 1.78
13C-123478-HxCDF	384/386	1.55	1.37	13.5		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.73	1.54	12.2		0.53		0.43 - 0.59
13C-234678-HxCDF	384/386	1.41	1.37	3.0		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.06	1.10	-3.7		0.53		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.18	1.13	4.0		0.44		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.79	0.76	4.0		0.46		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.23		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	GOOSE LAKE
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122303
Date Analysed	23-Dec-10	Time Analysed	13:34:05
Init.Calib.Date:	12/07/10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.03
2378-TCDF	1.00	26.41
12378-PeCDF	1.00	30.54
12378-PeCDD	1.00	32.13
23478-PeCDF	1.00	31.88
123478-HxCDF	1.00	35.54
123678-HxCDF	1.00	35.69
123478-HxCDD	1.00	36.76
123678-HxCDD	1.00	36.89
123789-HxCDD	1.01	37.32
234678-HxCDF	1.00	36.63
123789-HxCDF	1.00	37.75
1234678-HpCDF	1.00	39.82
1234678-HpCDD	1.00	41.66
1234789-HpCDF	1.00	42.57
OCDD	1.00	47.67
OCDF	1.01	47.96

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.02
13C-12378-PeCDD	1.23	32.11
13C-123478-HxCDD	0.99	36.74
13C-123678-HxCDD	0.99	36.87
13C-1234678-HpCDD	1.12	41.64
13C-OCDD	1.28	47.64
13C-2378-TCDF	1.01	26.39
13C-12378-PeCDF	1.16	30.52
13C-23478-PeCDF	1.22	31.87
13C-123478-HxCDF	0.95	35.52
13C-123678-HxCDF	0.96	35.67
13C-234678-HxCDF	0.98	36.61
13C-123789-HxCDF	1.01	37.73
13C-1234678-HpCDF	1.07	39.79
13C-1234789-HpCDF	1.14	42.56

Clean up Standard	RRT#	RT

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.20
13C-123789-HxCDD	0.00	37.29

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122308
Date Analysed	23-Dec-10	Time Analysed	17:54:56
Init.Calib.Date:	12/07/10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.02	1.05	-3.4		0.76		0.65 - 0.89
2378-TCDF	304/306	0.90	0.91	-0.2		0.75		0.65 - 0.89
12378-PeCDF	340/342	0.92	0.93	-0.8		1.55		1.32 - 1.78
12378-PeCDD	356/358	0.98	1.00	-1.3		1.54		1.32 - 1.78
23478-PeCDF	340/342	0.96	0.98	-2.7		1.54		1.32 - 1.78
123478-HxCDF	374/376	1.13	1.12	0.2		1.24		1.05 - 1.43
123678-HxCDF	374/376	1.09	1.07	2.2		1.25		1.05 - 1.43
123478-HxCDD	390/392	0.99	0.99	-0.4		1.26		1.05 - 1.43
123678-HxCDD	390/392	0.93	0.94	-1.4		1.27		1.05 - 1.43
123789-HxCDD	390/392	0.78	0.87	-9.8		1.22		1.05 - 1.43
234678-HxCDF	374/376	1.09	1.10	-1.2		1.22		1.05 - 1.43
123789-HxCDF	374/376	1.04	1.04	0.3		1.25		1.05 - 1.43
1234678-HpCDF	408/410	1.28	1.29	-0.9		0.99		0.89 - 1.21
1234678-HpCDD	424/426	1.01	1.01	0.1		1.07		0.89 - 1.21
1234789-HpCDF	408/410	1.29	1.30	-0.8		1.01		0.89 - 1.21
OCDD	458/460	1.01	1.02	-1.0		0.88		0.76 - 1.02
OCDF	442/444	1.32	1.17	13.5		0.90		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	0.93	0.85	9.1		0.79		0.65 - 0.89
13C-12378-PeCDD	368/370	0.67	0.65	1.9		1.57		1.32 - 1.78
13C-123478-HxCDD	402/404	1.17	1.04	13.1		1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	1.25	1.15	8.7		1.24		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.80	0.83	-2.6		1.01		0.89 - 1.21
13C-OCDD	470/472	0.57	0.68	-17.3		0.90		0.76 - 1.02
13C-2378-TCDF	316/318	1.50	1.42	5.0		0.79		0.65 - 0.89
13C-12378-PeCDF	352/354	1.10	1.16	-5.3		1.57		1.32 - 1.78
13C-23478-PeCDF	352/354	1.05	1.08	-2.6		1.59		1.32 - 1.78
13C-123478-HxCDF	384/386	1.49	1.37	8.7		0.51		0.43 - 0.59
13C-123678-HxCDF	384/386	1.62	1.54	5.4		0.51		0.43 - 0.59
13C-234678-HxCDF	384/386	1.41	1.37	2.5		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.04	1.10	-5.9		0.53		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.15	1.13	1.9		0.44		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.78	0.76	2.4		0.45		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.23		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122308
Date Analysed	23-Dec-10	Time Analysed	17:54:56
Init.Calib.Date:	12/07/10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.05
2378-TCDF	1.00	26.41
12378-PeCDF	1.00	30.54
12378-PeCDD	1.00	32.13
23478-PeCDF	1.00	31.88
123478-HxCDF	1.00	35.54
123678-HxCDF	1.00	35.69
123478-HxCDD	1.00	36.76
123678-HxCDD	1.00	36.89
123789-HxCDD	1.01	37.32
234678-HxCDF	1.00	36.64
123789-HxCDF	1.00	37.75
1234678-HpCDF	1.00	39.81
1234678-HpCDD	1.00	41.65
1234789-HpCDF	1.00	42.57
OCDD	1.00	47.66
OCDF	1.01	47.96

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.02
13C-12378-PeCDD	1.23	32.11
13C-123478-HxCDD	0.99	36.75
13C-123678-HxCDD	0.99	36.87
13C-1234678-HpCDD	1.12	41.63
13C-OCDD	1.28	47.64
13C-2378-TCDF	1.01	26.39
13C-12378-PeCDF	1.16	30.52
13C-23478-PeCDF	1.22	31.87
13C-123478-HxCDF	0.95	35.53
13C-123678-HxCDF	0.96	35.67
13C-234678-HxCDF	0.98	36.61
13C-123789-HxCDF	1.01	37.73
13C-1234678-HpCDF	1.07	39.80
13C-1234789-HpCDF	1.14	42.54

Clean up Standard	RRT#	RT

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.21
13C-123789-HxCDD	0.00	37.29

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122313
Date Analysed	23-Dec-10	Time Analysed	22:23:35
Init.Calib.Date:	12/07/10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.01	1.05	-4.4		0.79		0.65 - 0.89
2378-TCDF	304/306	0.92	0.91	1.1		0.77		0.65 - 0.89
12378-PeCDF	340/342	0.94	0.93	1.1		1.54		1.32 - 1.78
12378-PeCDD	356/358	0.98	1.00	-1.3		1.56		1.32 - 1.78
23478-PeCDF	340/342	0.96	0.98	-2.3		1.53		1.32 - 1.78
123478-HxCDF	374/376	1.12	1.12	-0.2		1.22		1.05 - 1.43
123678-HxCDF	374/376	1.09	1.07	2.3		1.22		1.05 - 1.43
123478-HxCDD	390/392	0.97	0.99	-1.9		1.25		1.05 - 1.43
123678-HxCDD	390/392	0.94	0.94	-0.5		1.23		1.05 - 1.43
123789-HxCDD	390/392	0.83	0.87	-4.1		1.26		1.05 - 1.43
234678-HxCDF	374/376	1.08	1.10	-1.8		1.21		1.05 - 1.43
123789-HxCDF	374/376	1.04	1.04	0.5		1.22		1.05 - 1.43
1234678-HpCDF	408/410	1.28	1.29	-0.3		1.02		0.89 - 1.21
1234678-HpCDD	424/426	1.03	1.01	1.6		1.06		0.89 - 1.21
1234789-HpCDF	408/410	1.30	1.30	-0.1		1.03		0.89 - 1.21
OCDD	458/460	1.01	1.02	-0.7		0.90		0.76 - 1.02
OCDF	442/444	1.34	1.17	14.7		0.89		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	0.96	0.85	13.6		0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	0.75	0.65	14.8		1.57		1.32 - 1.78
13C-123478-HxCDD	402/404	1.13	1.04	9.0		1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	1.13	1.15	-2.0		1.26		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.86	0.83	4.1		1.05		0.89 - 1.21
13C-OCDD	470/472	0.62	0.68	-8.9		0.90		0.76 - 1.02
13C-2378-TCDF	316/318	1.47	1.42	3.5		0.79		0.65 - 0.89
13C-12378-PeCDF	352/354	1.17	1.16	0.7		1.57		1.32 - 1.78
13C-23478-PeCDF	352/354	1.16	1.08	7.5		1.58		1.32 - 1.78
13C-123478-HxCDF	384/386	1.39	1.37	1.8		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.43	1.54	-7.3		0.52		0.43 - 0.59
13C-234678-HxCDF	384/386	1.32	1.37	-3.5		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.07	1.10	-2.3		0.52		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.11	1.13	-2.4		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.86	0.76	12.4		0.45		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.24		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122313
Date Analysed	23-Dec-10	Time Analysed	22:23:35
Init.Calib.Date:	12/07/10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.06
2378-TCDF	1.00	26.42
12378-PeCDF	1.00	30.55
12378-PeCDD	1.00	32.14
23478-PeCDF	1.00	31.90
123478-HxCDF	1.00	35.55
123678-HxCDF	1.00	35.70
123478-HxCDD	1.00	36.78
123678-HxCDD	1.00	36.90
123789-HxCDD	1.01	37.33
234678-HxCDF	1.00	36.65
123789-HxCDF	1.00	37.77
1234678-HpCDF	1.00	39.84
1234678-HpCDD	1.00	41.67
1234789-HpCDF	1.00	42.59
OCDD	1.00	47.68
OCDF	1.01	47.97

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.03
13C-12378-PeCDD	1.23	32.13
13C-123478-HxCDD	0.99	36.76
13C-123678-HxCDD	0.99	36.89
13C-1234678-HpCDD	1.12	41.65
13C-OCDD	1.28	47.67
13C-2378-TCDF	1.01	26.41
13C-12378-PeCDF	1.16	30.54
13C-23478-PeCDF	1.22	31.88
13C-123478-HxCDF	0.95	35.54
13C-123678-HxCDF	0.96	35.69
13C-234678-HxCDF	0.98	36.63
13C-123789-HxCDF	1.01	37.75
13C-1234678-HpCDF	1.07	39.82
13C-1234789-HpCDF	1.14	42.57

Clean up Standard	RRT#	RT

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.23
13C-123789-HxCDD	0.00	37.32

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122703
Date Analysed	27-Dec-10	Time Analysed	11:38:45
Init.Calib.Date:	12/07/10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.03	1.05	-1.9		0.77		0.65 - 0.89
2378-TCDF	304/306	0.90	0.91	-0.7		0.76		0.65 - 0.89
12378-PeCDF	340/342	0.94	0.93	2.1		1.53		1.32 - 1.78
12378-PeCDD	356/358	0.97	1.00	-3.1		1.56		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-3.5		1.52		1.32 - 1.78
123478-HxCDF	374/376	1.11	1.12	-0.8		1.24		1.05 - 1.43
123678-HxCDF	374/376	1.09	1.07	1.8		1.22		1.05 - 1.43
123478-HxCDD	390/392	0.97	0.99	-2.1		1.25		1.05 - 1.43
123678-HxCDD	390/392	0.94	0.94	-0.1		1.24		1.05 - 1.43
123789-HxCDD	390/392	0.75	0.87	-13.9		1.24		1.05 - 1.43
234678-HxCDF	374/376	1.09	1.10	-0.9		1.22		1.05 - 1.43
123789-HxCDF	374/376	1.04	1.04	0.1		1.20		1.05 - 1.43
1234678-HpCDF	408/410	1.28	1.29	-0.6		1.02		0.89 - 1.21
1234678-HpCDD	424/426	1.03	1.01	1.9		1.05		0.89 - 1.21
1234789-HpCDF	408/410	1.30	1.30	0.0		1.01		0.89 - 1.21
OCDD	458/460	1.00	1.02	-1.5		0.90		0.76 - 1.02
OCDF	442/444	1.41	1.17	21.1		0.87		0.76 - 1.02

OK for 1613 [initials] 12/27/10

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	0.88	0.85	3.5		0.79		0.65 - 0.89
13C-12378-PeCDD	368/370	0.72	0.65	9.4		1.58		1.32 - 1.78
13C-123478-HxCDD	402/404	1.26	1.04	21.8		1.27		1.05 - 1.43
13C-123678-HxCDD	402/404	1.28	1.15	11.3		1.27		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.85	0.83	3.2		1.05		0.89 - 1.21
13C-OCDD	470/472	0.56	0.68	-18.2		0.89		0.76 - 1.02
13C-2378-TCDF	316/318	1.39	1.42	-2.1		0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.11	1.16	-4.6		1.57		1.32 - 1.78
13C-23478-PeCDF	352/354	1.09	1.08	1.4		1.58		1.32 - 1.78
13C-123478-HxCDF	384/386	1.57	1.37	14.9		0.53		0.43 - 0.59
13C-123678-HxCDF	384/386	1.67	1.54	8.2		0.53		0.43 - 0.59
13C-234678-HxCDF	384/386	1.34	1.37	-2.3		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.05	1.10	-4.7		0.52		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.24	1.13	9.5		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.82	0.76	8.1		0.45		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.01	0.95	6.0		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.26		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122703
Date Analysed	27-Dec-10	Time Analysed	11:38:45
Init.Calib.Date:	12/07/10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.03
2378-TCDF	1.00	26.41
12378-PeCDF	1.00	30.54
12378-PeCDD	1.00	32.12
23478-PeCDF	1.00	31.88
123478-HxCDF	1.00	35.54
123678-HxCDF	1.00	35.68
123478-HxCDD	1.00	36.76
123678-HxCDD	1.00	36.88
123789-HxCDD	1.01	37.30
234678-HxCDF	1.00	36.62
123789-HxCDF	1.00	37.75
1234678-HpCDF	1.00	39.81
1234678-HpCDD	1.00	41.65
1234789-HpCDF	1.00	42.57
OCDD	1.00	47.66
OCDF	1.01	47.94

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.02
13C-12378-PeCDD	1.23	32.11
13C-123478-HxCDD	0.99	36.73
13C-123678-HxCDD	0.99	36.87
13C-1234678-HpCDD	1.12	41.63
13C-OCDD	1.28	47.64
13C-2378-TCDF	1.01	26.39
13C-12378-PeCDF	1.16	30.52
13C-23478-PeCDF	1.22	31.86
13C-123478-HxCDF	0.95	35.52
13C-123678-HxCDF	0.96	35.67
13C-234678-HxCDF	0.98	36.61
13C-123789-HxCDF	1.01	37.73
13C-1234678-HpCDF	1.07	39.80
13C-1234789-HpCDF	1.14	42.54

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.03

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.20

Internal Standards	RRT#	RT
13C-123789-HxCDD	0.00	37.29

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122708
Date Analysed	27-Dec-10	Time Analysed	16:16:39
Init.Calib.Date:		Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.05	1.05	-0.5		0.81		0.65 - 0.89
2378-TCDF	304/306	0.90	0.91	-0.6		0.76		0.65 - 0.89
12378-PeCDF	340/342	0.94	0.93	2.0		1.53		1.32 - 1.78
12378-PeCDD	356/358	0.98	1.00	-2.0		1.55		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-3.1		1.53		1.32 - 1.78
123478-HxCDF	374/376	1.12	1.12	-0.6		1.24		1.05 - 1.43
123678-HxCDF	374/376	1.09	1.07	2.4		1.25		1.05 - 1.43
123478-HxCDD	390/392	0.98	0.99	-1.2		1.24		1.05 - 1.43
123678-HxCDD	390/392	0.91	0.94	-3.5		1.24		1.05 - 1.43
123789-HxCDD	390/392	0.77	0.87	-11.2		1.23		1.05 - 1.43
234678-HxCDF	374/376	1.09	1.10	-0.9		1.23		1.05 - 1.43
123789-HxCDF	374/376	1.05	1.04	1.0		1.23		1.05 - 1.43
1234678-HpCDF	408/410	1.26	1.29	-2.0		1.01		0.89 - 1.21
1234678-HpCDD	424/426	1.02	1.01	1.0		1.03		0.89 - 1.21
1234789-HpCDF	408/410	1.27	1.30	-2.0		1.01		0.89 - 1.21
OCDD	458/460	1.01	1.02	-0.8		0.90		0.76 - 1.02
OCDF	442/444	1.36	1.17	16.3		0.90		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	0.94	0.85	10.9		0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	0.76	0.65	16.9		1.58		1.32 - 1.78
13C-123478-HxCDD	402/404	1.20	1.04	15.9		1.24		1.05 - 1.43
13C-123678-HxCDD	402/404	1.21	1.15	4.9		1.24		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.85	0.83	2.7		1.05		0.89 - 1.21
13C-OCDD	470/472	0.55	0.68	-19.8		0.88		0.76 - 1.02
13C-2378-TCDF	316/318	1.44	1.42	0.7		0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.17	1.16	1.0		1.58		1.32 - 1.78
13C-23478-PeCDF	352/354	1.18	1.08	9.0		1.56		1.32 - 1.78
13C-123478-HxCDF	384/386	1.43	1.37	4.5		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.47	1.54	-4.6		0.52		0.43 - 0.59
13C-234678-HxCDF	384/386	1.41	1.37	3.1		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.05	1.10	-4.4		0.52		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.16	1.13	2.6		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.80	0.76	5.0		0.45		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.04	0.95	9.8		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.78		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag[#]	Ion Ratio	Ion Ratio Flag[#]	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.25		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122708
Date Analysed	27-Dec-10	Time Analysed	16:16:39
Init.Calib.Date:		Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.05
2378-TCDF	1.00	26.42
12378-PeCDF	1.00	30.55
12378-PeCDD	1.00	32.14
23478-PeCDF	1.00	31.89
123478-HxCDF	1.00	35.55
123678-HxCDF	1.00	35.70
123478-HxCDD	1.00	36.77
123678-HxCDD	1.00	36.90
123789-HxCDD	1.01	37.33
234678-HxCDF	1.00	36.65
123789-HxCDF	1.00	37.76
1234678-HpCDF	1.00	39.83
1234678-HpCDD	1.00	41.67
1234789-HpCDF	1.00	42.58
OCDD	1.00	47.67
OCDF	1.01	47.97

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.03
13C-12378-PeCDD	1.23	32.12
13C-123478-HxCDD	0.99	36.76
13C-123678-HxCDD	0.99	36.88
13C-1234678-HpCDD	1.12	41.65
13C-OCDD	1.28	47.66
13C-2378-TCDF	1.01	26.41
13C-12378-PeCDF	1.16	30.53
13C-23478-PeCDF	1.22	31.88
13C-123478-HxCDF	0.95	35.54
13C-123678-HxCDF	0.96	35.68
13C-234678-HxCDF	0.98	36.62
13C-123789-HxCDF	1.01	37.74
13C-1234678-HpCDF	1.07	39.81
13C-1234789-HpCDF	1.14	42.57

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.05

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.21

Internal Standards	RRT#	RT
13C-123789-HxCDD	0.00	37.30

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122713
Date Analysed	27-Dec-10	Time Analysed	20:45:02
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.00	1.05	-5.2		0.76		0.65 - 0.89
2378-TCDF	304/306	0.90	0.91	-0.2		0.77		0.65 - 0.89
12378-PeCDF	340/342	0.94	0.93	1.1		1.52		1.32 - 1.78
12378-PeCDD	356/358	0.98	1.00	-1.8		1.55		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-3.3		1.56		1.32 - 1.78
123478-HxCDF	374/376	1.12	1.12	-0.3		1.23		1.05 - 1.43
123678-HxCDF	374/376	1.08	1.07	1.5		1.25		1.05 - 1.43
123478-HxCDD	390/392	0.96	0.99	-3.2		1.24		1.05 - 1.43
123678-HxCDD	390/392	0.95	0.94	1.1		1.23		1.05 - 1.43
123789-HxCDD	390/392	0.81	0.87	-7.3		1.23		1.05 - 1.43
234678-HxCDF	374/376	1.10	1.10	0.3		1.22		1.05 - 1.43
123789-HxCDF	374/376	1.02	1.04	-1.7		1.22		1.05 - 1.43
1234678-HpCDF	408/410	1.28	1.29	-0.7		1.03		0.89 - 1.21
1234678-HpCDD	424/426	1.01	1.01	-0.1		1.05		0.89 - 1.21
1234789-HpCDF	408/410	1.30	1.30	0.2		1.02		0.89 - 1.21
OCDD	458/460	1.00	1.02	-1.8		0.90		0.76 - 1.02
OCDF	442/444	1.34	1.17	15.2		0.90		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	0.97	0.85	14.6		0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	0.81	0.65	23.8		1.57		1.32 - 1.78
13C-123478-HxCDD	402/404	1.23	1.04	18.8		1.27		1.05 - 1.43
13C-123678-HxCDD	402/404	1.13	1.15	-1.8		1.24		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.85	0.83	3.6		1.06		0.89 - 1.21
13C-OCDD	470/472	0.61	0.68	-10.6		0.90		0.76 - 1.02
13C-2378-TCDF	316/318	1.49	1.42	4.5		0.77		0.65 - 0.89
13C-12378-PeCDF	352/354	1.23	1.16	6.1		1.57		1.32 - 1.78
13C-23478-PeCDF	352/354	1.21	1.08	12.3		1.57		1.32 - 1.78
13C-123478-HxCDF	384/386	1.37	1.37	-0.2		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.43	1.54	-7.3		0.52		0.43 - 0.59
13C-234678-HxCDF	384/386	1.45	1.37	5.8		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.09	1.10	-1.3		0.52		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.11	1.13	-2.4		0.46		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.82	0.76	7.5		0.45		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.07	0.95	12.4		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.78		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.25		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122713
Date Analysed	27-Dec-10	Time Analysed	20:45:02
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.06
2378-TCDF	1.00	26.44
12378-PeCDF	1.00	30.56
12378-PeCDD	1.00	32.15
23478-PeCDF	1.00	31.91
123478-HxCDF	1.00	35.57
123678-HxCDF	1.00	35.72
123478-HxCDD	1.00	36.79
123678-HxCDD	1.00	36.91
123789-HxCDD	1.01	37.34
234678-HxCDF	1.00	36.66
123789-HxCDF	1.00	37.78
1234678-HpCDF	1.00	39.85
1234678-HpCDD	1.00	41.68
1234789-HpCDF	1.00	42.60
OCDD	1.00	47.69
OCDF	1.01	48.00

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.05
13C-12378-PeCDD	1.23	32.13
13C-123478-HxCDD	0.99	36.77
13C-123678-HxCDD	0.99	36.90
13C-1234678-HpCDD	1.12	41.66
13C-OCDD	1.28	47.67
13C-2378-TCDF	1.01	26.42
13C-12378-PeCDF	1.16	30.55
13C-23478-PeCDF	1.22	31.89
13C-123478-HxCDF	0.95	35.55
13C-123678-HxCDF	0.96	35.69
13C-234678-HxCDF	0.98	36.65
13C-123789-HxCDF	1.01	37.77
13C-1234678-HpCDF	1.07	39.83
13C-1234789-HpCDF	1.14	42.58

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.06

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.23

Internal Standards	RRT#	RT
13C-123789-HxCDD	0.00	37.33

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122903
Date Analysed	29-Dec-10	Time Analysed	12:40:35
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.03	1.05	-2.7		0.78		0.65 - 0.89
2378-TCDF	304/306	0.90	0.91	-1.1		0.76		0.65 - 0.89
12378-PeCDF	340/342	0.92	0.93	-0.1		1.52		1.32 - 1.78
12378-PeCDD	356/358	0.97	1.00	-2.6		1.57		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-3.4		1.52		1.32 - 1.78
123478-HxCDF	374/376	1.12	1.12	-0.2		1.24		1.05 - 1.43
123678-HxCDF	374/376	1.10	1.07	2.8		1.22		1.05 - 1.43
123478-HxCDD	390/392	0.98	0.99	-1.0		1.25		1.05 - 1.43
123678-HxCDD	390/392	0.95	0.94	0.7		1.24		1.05 - 1.43
123789-HxCDD	390/392	0.95	0.87	9.0		1.24		1.05 - 1.43
234678-HxCDF	374/376	1.09	1.10	-0.6		1.24		1.05 - 1.43
123789-HxCDF	374/376	1.03	1.04	-0.4		1.23		1.05 - 1.43
1234678-HpCDF	408/410	1.28	1.29	-0.4		1.03		0.89 - 1.21
1234678-HpCDD	424/426	1.05	1.01	3.3		1.04		0.89 - 1.21
1234789-HpCDF	408/410	1.32	1.30	1.6		1.02		0.89 - 1.21
OCDD	458/460	1.01	1.02	-0.8		0.90		0.76 - 1.02
OCDF	442/444	1.14	1.17	-1.9		0.89		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	1.01	0.85	18.9		0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	0.84	0.65	29.0		1.57		1.32 - 1.78
13C-123478-HxCDD	402/404	0.98	1.04	-5.7		1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	1.00	1.15	-12.7		1.24		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.86	0.83	3.6		1.04		0.89 - 1.21
13C-OCDD	470/472	0.79	0.68	15.9		0.89		0.76 - 1.02
13C-2378-TCDF	316/318	1.53	1.42	7.1		0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.28	1.16	10.1		1.56		1.32 - 1.78
13C-23478-PeCDF	352/354	1.26	1.08	17.0		1.57		1.32 - 1.78
13C-123478-HxCDF	384/386	1.19	1.37	-13.2		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.25	1.54	-19.0		0.52		0.43 - 0.59
13C-234678-HxCDF	384/386	1.22	1.37	-11.4		0.53		0.43 - 0.59
13C-123789-HxCDF	384/386	1.11	1.10	0.5		0.53		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.03	1.13	-9.3		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.81	0.76	6.9		0.45		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.11	0.95	17.4		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.25		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122903
Date Analysed	29-Dec-10	Time Analysed	12:40:35
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.06
2378-TCDF	1.00	26.42
12378-PeCDF	1.00	30.56
12378-PeCDD	1.00	32.14
23478-PeCDF	1.00	31.90
123478-HxCDF	1.00	35.56
123678-HxCDF	1.00	35.70
123478-HxCDD	1.00	36.78
123678-HxCDD	1.00	36.90
123789-HxCDD	1.01	37.33
234678-HxCDF	1.00	36.65
123789-HxCDF	1.00	37.77
1234678-HpCDF	1.00	39.84
1234678-HpCDD	1.00	41.67
1234789-HpCDF	1.00	42.59
OCDD	1.00	47.69
OCDF	1.01	47.98

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.03
13C-12378-PeCDD	1.23	32.13
13C-123478-HxCDD	0.99	36.76
13C-123678-HxCDD	0.99	36.89
13C-1234678-HpCDD	1.12	41.66
13C-OCDD	1.28	47.67
13C-2378-TCDF	1.01	26.41
13C-12378-PeCDF	1.16	30.54
13C-23478-PeCDF	1.22	31.88
13C-123478-HxCDF	0.95	35.54
13C-123678-HxCDF	0.96	35.69
13C-234678-HxCDF	0.98	36.64
13C-123789-HxCDF	1.01	37.75
13C-1234678-HpCDF	1.07	39.82
13C-1234789-HpCDF	1.14	42.57

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.06

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.23

Internal Standards	RRT#	RT
13C-123789-HxCDD	0.00	37.32

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122910
Date Analysed	29-Dec-10	Time Analysed	18:49:02
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.01	1.05	-4.7		0.77		0.65 - 0.89
2378-TCDF	304/306	0.90	0.91	-0.2		0.80		0.65 - 0.89
12378-PeCDF	340/342	0.94	0.93	1.1		1.54		1.32 - 1.78
12378-PeCDD	356/358	0.99	1.00	-1.3		1.55		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-3.3		1.54		1.32 - 1.78
123478-HxCDF	374/376	1.12	1.12	0.0		1.23		1.05 - 1.43
123678-HxCDF	374/376	1.09	1.07	2.1		1.23		1.05 - 1.43
123478-HxCDD	390/392	1.00	0.99	1.2		1.23		1.05 - 1.43
123678-HxCDD	390/392	0.92	0.94	-2.0		1.23		1.05 - 1.43
123789-HxCDD	390/392	0.99	0.87	13.3		1.25		1.05 - 1.43
234678-HxCDF	374/376	1.08	1.10	-1.3		1.23		1.05 - 1.43
123789-HxCDF	374/376	1.04	1.04	0.7		1.24		1.05 - 1.43
1234678-HpCDF	408/410	1.30	1.29	0.8		1.03		0.89 - 1.21
1234678-HpCDD	424/426	1.03	1.01	1.4		1.04		0.89 - 1.21
1234789-HpCDF	408/410	1.28	1.30	-1.3		1.03		0.89 - 1.21
OCDD	458/460	1.00	1.02	-1.6		0.89		0.76 - 1.02
OCDF	442/444	1.14	1.17	-2.1		0.91		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	1.03	0.85	21.4		0.79		0.65 - 0.89
13C-12378-PeCDD	368/370	0.84	0.65	28.0		1.57		1.32 - 1.78
13C-123478-HxCDD	402/404	0.96	1.04	-7.5		1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	1.01	1.15	-12.4		1.26		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.85	0.83	3.2		1.04		0.89 - 1.21
13C-OCDD	470/472	0.79	0.68	15.7		0.89		0.76 - 1.02
13C-2378-TCDF	316/318	1.53	1.42	7.5		0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.28	1.16	9.9		1.56		1.32 - 1.78
13C-23478-PeCDF	352/354	1.24	1.08	15.4		1.57		1.32 - 1.78
13C-123478-HxCDF	384/386	1.16	1.37	-15.5		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.23	1.54	-20.1		0.53		0.43 - 0.59
13C-234678-HxCDF	384/386	1.24	1.37	-9.6		0.53		0.43 - 0.59
13C-123789-HxCDF	384/386	1.12	1.10	1.4		0.52		0.43 - 0.59
13C-1234678-HpCDF	418/420	0.98	1.13	-13.3		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.82	0.76	7.8		0.44		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.13	0.95	19.0		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.26		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122910
Date Analysed	29-Dec-10	Time Analysed	18:49:02
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.03
2378-TCDF	1.00	26.41
12378-PeCDF	1.00	30.54
12378-PeCDD	1.00	32.13
23478-PeCDF	1.00	31.88
123478-HxCDF	1.00	35.54
123678-HxCDF	1.00	35.69
123478-HxCDD	1.00	36.76
123678-HxCDD	1.00	36.89
123789-HxCDD	1.01	37.32
234678-HxCDF	1.00	36.64
123789-HxCDF	1.00	37.75
1234678-HpCDF	1.00	39.81
1234678-HpCDD	1.00	41.66
1234789-HpCDF	1.00	42.57
OCDD	1.00	47.66
OCDF	1.01	47.96

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.02
13C-12378-PeCDD	1.23	32.11
13C-123478-HxCDD	0.99	36.75
13C-123678-HxCDD	0.99	36.87
13C-1234678-HpCDD	1.12	41.63
13C-OCDD	1.28	47.65
13C-2378-TCDF	1.01	26.39
13C-12378-PeCDF	1.16	30.52
13C-23478-PeCDF	1.22	31.87
13C-123478-HxCDF	0.95	35.53
13C-123678-HxCDF	0.96	35.67
13C-234678-HxCDF	0.98	36.61
13C-123789-HxCDF	1.01	37.73
13C-1234678-HpCDF	1.07	39.80
13C-1234789-HpCDF	1.14	42.56

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.03

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.20

Internal Standards	RRT#	RT
13C-123789-HxCDD	0.00	37.29

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	11010403
Date Analysed	04-Jan-11	Time Analysed	11:57:15
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.03	1.05	-2.7		0.76		0.65 - 0.89
2378-TCDF	304/306	0.91	0.91	0.1		0.79		0.65 - 0.89
12378-PeCDF	340/342	0.93	0.93	0.9		1.53		1.32 - 1.78
12378-PeCDD	356/358	0.99	1.00	-0.4		1.56		1.32 - 1.78
23478-PeCDF	340/342	0.94	0.98	-4.2		1.51		1.32 - 1.78
123478-HxCDF	374/376	1.12	1.12	0.1		1.23		1.05 - 1.43
123678-HxCDF	374/376	1.08	1.07	1.7		1.23		1.05 - 1.43
123478-HxCDD	390/392	0.99	0.99	0.3		1.25		1.05 - 1.43
123678-HxCDD	390/392	0.91	0.94	-3.4		1.24		1.05 - 1.43
123789-HxCDD	390/392	0.97	0.87	11.0		1.24		1.05 - 1.43
234678-HxCDF	374/376	1.08	1.10	-1.4		1.21		1.05 - 1.43
123789-HxCDF	374/376	1.03	1.04	-0.7		1.24		1.05 - 1.43
1234678-HpCDF	408/410	1.29	1.29	-0.1		1.03		0.89 - 1.21
1234678-HpCDD	424/426	1.03	1.01	2.1		1.06		0.89 - 1.21
1234789-HpCDF	408/410	1.29	1.30	-0.7		1.04		0.89 - 1.21
OCDD	458/460	1.01	1.02	-1.2		0.88		0.76 - 1.02
OCDF	442/444	1.14	1.17	-2.3		0.90		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	0.97	0.85	14.5		0.79		0.65 - 0.89
13C-12378-PeCDD	368/370	0.80	0.65	22.3		1.58		1.32 - 1.78
13C-123478-HxCDD	402/404	0.96	1.04	-7.4		1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	0.99	1.15	-13.5		1.24		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.84	0.83	2.3		1.05		0.89 - 1.21
13C-OCDD	470/472	0.75	0.68	9.1		0.89		0.76 - 1.02
13C-2378-TCDF	316/318	1.51	1.42	6.0		0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.22	1.16	5.0		1.55		1.32 - 1.78
13C-23478-PeCDF	352/354	1.20	1.08	11.3		1.57		1.32 - 1.78
13C-123478-HxCDF	384/386	1.14	1.37	-16.3		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.20	1.54	-22.0		0.52		0.43 - 0.59
13C-234678-HxCDF	384/386	1.19	1.37	-13.1		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.07	1.10	-3.2		0.53		0.43 - 0.59
13C-1234678-HpCDF	418/420	0.98	1.13	-13.6		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.79	0.76	4.2		0.45		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.08	0.95	13.5		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag[#]	Ion Ratio	Ion Ratio Flag[#]	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.25		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	11010403
Date Analysed	04-Jan-11	Time Analysed	11:57:15
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.00
2378-TCDF	1.00	26.38
12378-PeCDF	1.00	30.51
12378-PeCDD	1.00	32.10
23478-PeCDF	1.00	31.85
123478-HxCDF	1.00	35.51
123678-HxCDF	1.00	35.66
123478-HxCDD	1.00	36.72
123678-HxCDD	1.00	36.86
123789-HxCDD	1.01	37.27
234678-HxCDF	1.00	36.59
123789-HxCDF	1.00	37.72
1234678-HpCDF	1.00	39.78
1234678-HpCDD	1.00	41.61
1234789-HpCDF	1.00	42.52
OCDD	1.00	47.61
OCDF	1.01	47.91

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	26.99
13C-12378-PeCDD	1.23	32.08
13C-123478-HxCDD	0.99	36.70
13C-123678-HxCDD	0.99	36.83
13C-1234678-HpCDD	1.12	41.59
13C-OCDD	1.28	47.59
13C-2378-TCDF	1.01	26.36
13C-12378-PeCDF	1.17	30.49
13C-23478-PeCDF	1.22	31.82
13C-123478-HxCDF	0.95	35.48
13C-123678-HxCDF	0.96	35.64
13C-234678-HxCDF	0.98	36.58
13C-123789-HxCDF	1.01	37.70
13C-1234678-HpCDF	1.07	39.77
13C-1234789-HpCDF	1.14	42.51

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.00

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.17

Internal Standards	RRT#	RT
13C-123789-HxCDD	0.00	37.26

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	11010407
Date Analysed	04-Jan-11	Time Analysed	15:32:26
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.03	1.05	-2.1		0.77		0.65 - 0.89
2378-TCDF	304/306	0.90	0.91	-0.5		0.78		0.65 - 0.89
12378-PeCDF	340/342	0.94	0.93	1.5		1.51		1.32 - 1.78
12378-PeCDD	356/358	0.97	1.00	-2.4		1.57		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-2.9		1.54		1.32 - 1.78
123478-HxCDF	374/376	1.11	1.12	-1.3		1.25		1.05 - 1.43
123678-HxCDF	374/376	1.09	1.07	2.7		1.21		1.05 - 1.43
123478-HxCDD	390/392	0.98	0.99	-0.8		1.23		1.05 - 1.43
123678-HxCDD	390/392	0.91	0.94	-3.2		1.25		1.05 - 1.43
123789-HxCDD	390/392	0.96	0.87	10.6		1.21		1.05 - 1.43
234678-HxCDF	374/376	1.10	1.10	-0.3		1.23		1.05 - 1.43
123789-HxCDF	374/376	1.04	1.04	0.0		1.23		1.05 - 1.43
1234678-HpCDF	408/410	1.27	1.29	-1.0		1.01		0.89 - 1.21
1234678-HpCDD	424/426	1.02	1.01	0.8		1.05		0.89 - 1.21
1234789-HpCDF	408/410	1.29	1.30	-0.9		1.00		0.89 - 1.21
OCDD	458/460	1.00	1.02	-1.5		0.90		0.76 - 1.02
OCDF	442/444	1.15	1.17	-1.5		0.89		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	1.00	0.85	17.4		0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	0.77	0.65	17.1		1.56		1.32 - 1.78
13C-123478-HxCDD	402/404	0.97	1.04	-5.9		1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	1.00	1.15	-13.0		1.24		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.84	0.83	1.2		1.04		0.89 - 1.21
13C-OCDD	470/472	0.77	0.68	13.2		0.90		0.76 - 1.02
13C-2378-TCDF	316/318	1.51	1.42	6.1		0.79		0.65 - 0.89
13C-12378-PeCDF	352/354	1.20	1.16	3.4		1.57		1.32 - 1.78
13C-23478-PeCDF	352/354	1.16	1.08	8.0		1.57		1.32 - 1.78
13C-123478-HxCDF	384/386	1.18	1.37	-13.7		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.25	1.54	-19.1		0.52		0.43 - 0.59
13C-234678-HxCDF	384/386	1.21	1.37	-11.5		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.10	1.10	0.4		0.52		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.00	1.13	-11.8		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.81	0.76	6.4		0.45		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.12	0.95	18.2		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.25		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	11010407
Date Analysed	04-Jan-11	Time Analysed	15:32:26
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.00
2378-TCDF	1.00	26.38
12378-PeCDF	1.00	30.50
12378-PeCDD	1.00	32.09
23478-PeCDF	1.00	31.85
123478-HxCDF	1.00	35.51
123678-HxCDF	1.00	35.65
123478-HxCDD	1.00	36.72
123678-HxCDD	1.00	36.84
123789-HxCDD	1.01	37.28
234678-HxCDF	1.00	36.59
123789-HxCDF	1.00	37.72
1234678-HpCDF	1.00	39.78
1234678-HpCDD	1.00	41.61
1234789-HpCDF	1.00	42.52
OCDD	1.00	47.61
OCDF	1.01	47.91

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	26.99
13C-12378-PeCDD	1.23	32.08
13C-123478-HxCDD	0.98	36.70
13C-123678-HxCDD	0.99	36.83
13C-1234678-HpCDD	1.12	41.59
13C-OCDD	1.28	47.59
13C-2378-TCDF	1.01	26.36
13C-12378-PeCDF	1.17	30.49
13C-23478-PeCDF	1.22	31.82
13C-123478-HxCDF	0.95	35.48
13C-123678-HxCDF	0.96	35.64
13C-234678-HxCDF	0.98	36.58
13C-123789-HxCDF	1.01	37.70
13C-1234678-HpCDF	1.07	39.77
13C-1234789-HpCDF	1.14	42.51

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.00

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.17

Internal Standards	RRT#	RT
13C-123789-HxCDD	0.00	37.26

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: HC-SS-1

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: SB65A
LIMS ID: 11-895
Matrix: Sediment
Data Release Authorized: VJS
Reported: 01/18/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 01/12/11
Date Analyzed: 01/14/11 15:36
Instrument/Analyst: AS1/PK
Acid Cleanup: Yes
Silica-Carbon Cleanup: No

Sample Amount: 5.01 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		2.00	4.15	
Total TCDF				2.00	50.3	XY
2,3,7,8-TCDD	0.59	0.65-0.89		2.00	1.13	JY
Total TCDD				2.00	83.2	Y
1,2,3,7,8-PeCDF	1.48	1.32-1.78		9.98	2.90	J
2,3,4,7,8-PeCDF	1.58	1.32-1.78		9.98	4.03	J
Total PeCDF				9.98	68.8	XY
1,2,3,7,8-PeCDD	1.56	1.32-1.78		9.98	6.47	J
Total PeCDD				9.98	100	
1,2,3,4,7,8-HxCDF	1.26	1.05-1.43		9.98	9.56	JX
1,2,3,6,7,8-HxCDF	1.19	1.05-1.43		9.98	5.65	J
2,3,4,6,7,8-HxCDF	1.18	1.05-1.43		9.98	9.37	J
1,2,3,7,8,9-HxCDF	1.21	1.05-1.43		9.98	2.59	J
Total HxCDF				9.98	231	XY
1,2,3,4,7,8-HxCDD	1.31	1.05-1.43		9.98	6.50	J
1,2,3,6,7,8-HxCDD	1.23	1.05-1.43		9.98	34.0	
1,2,3,7,8,9-HxCDD	1.26	1.05-1.43		9.98	15.9	
Total HxCDD				9.98	326	Y
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20		9.98	214	B
1,2,3,4,7,8,9-HpCDF	1.00	0.88-1.20		9.98	11.2	
Total HpCDF				9.98	747	BXY
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		9.98	943	B
Total HpCDD				9.98	2,170	B
OCDF	0.87	0.76-1.02		20.0	771	B
OCDD	0.89	0.76-1.02		20.0	7,400	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 31.8

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 31.8

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: HC-SS-1

Lab Sample ID: SB65A
LIMS ID: 11-895
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/18/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 01/12/11
Date Analyzed: 01/14/11 15:36
Instrument/Analyst: AS1/PK

Sample Amount: 5.01 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 1.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-2,3,7,8-TCDF	0.78	0.65-0.89	98.5	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	96.0	25-164
13C-1,2,3,7,8-PeCDF	1.55	1.32-1.78	85.7	24-185
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	92.0	21-178
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	99.8	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	71.7	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	67.3	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	73.3	28-136
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	92.8	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	80.6	32-141
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	75.1	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	73.8	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	85.6	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	86.0	23-140
13C-OCDD	0.89	0.76-1.02	101	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-011211

Lab Sample ID: OPR-011211
LIMS ID: 11-895
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/18/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 01/12/11
Date Analyzed: 01/14/11 14:46
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	0.74	0.65-0.89	1.00	20.4	
Total TCDF			1.00	21.2	Y
2,3,7,8-TCDD	0.76	0.65-0.89	1.00	19.8	
Total TCDD			1.00	20.4	
1,2,3,7,8-PeCDF	1.50	1.32-1.78	5.00	103	
2,3,4,7,8-PeCDF	1.52	1.32-1.78	5.00	96.0	
Total PeCDF			5.00	203	Y
1,2,3,7,8-PeCDD	1.52	1.32-1.78	5.00	96.9	
Total PeCDD			5.00	97.5	Y
1,2,3,4,7,8-HxCDF	1.22	1.05-1.43	5.00	99.3	
1,2,3,6,7,8-HxCDF	1.21	1.05-1.43	5.00	102	
2,3,4,6,7,8-HxCDF	1.22	1.05-1.43	5.00	99.4	
1,2,3,7,8,9-HxCDF	1.25	1.05-1.43	5.00	101	
Total HxCDF			5.00	403	Y
1,2,3,4,7,8-HxCDD	1.23	1.05-1.43	5.00	96.1	
1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	5.00	98.0	
1,2,3,7,8,9-HxCDD	1.25	1.05-1.43	5.00	105	
Total HxCDD			5.00	299	
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20	5.00	111	B
1,2,3,4,7,8,9-HpCDF	1.04	0.88-1.20	5.00	97.8	
Total HpCDF			5.00	210	BY
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	5.00	99.8	B
Total HpCDD			5.00	101	B
OCDF	0.89	0.76-1.02	10.0	180	B
OCDD	0.89	0.76-1.02	10.0	193	B

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: OPR-011211

Lab Sample ID: OPR-011211
LIMS ID: 11-895
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/18/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 01/12/11
Date Analyzed: 01/14/11 14:46
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
13C-2,3,7,8-TCDF	0.77	0.65-0.89	105	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	100	25-164
13C-1,2,3,7,8-PeCDF	1.55	1.32-1.78	101	24-185
13C-2,3,4,7,8-PeCDF	1.55	1.32-1.78	88.8	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	102	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	82.2	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	79.4	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	82.2	28-136
13C-1,2,3,7,8,9-HxCDF	0.54	0.43-0.59	86.6	29-147
13C-1,2,3,4,7,8-HxCDD	1.24	1.05-1.43	92.5	32-141
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	86.7	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	83.2	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.46	0.37-0.51	89.6	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	94.6	23-140
13C-OCDD	0.88	0.76-1.02	96.3	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-011211

Lab Sample ID: OPR-011211
LIMS ID: 11-895
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/18/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 01/12/11
Date Analyzed: 01/14/11 14:46
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	20.4	20.0	102	30-160
2,3,7,8-TCDD	19.8	20.0	99.0	30-160
1,2,3,7,8-PeCDF	103	100	103	30-160
2,3,4,7,8-PeCDF	96.0	100	96.0	30-160
1,2,3,7,8-PeCDD	96.9	100	96.9	30-160
1,2,3,4,7,8-HxCDF	99.3	100	99.3	30-160
1,2,3,6,7,8-HxCDF	102	100	102	30-160
2,3,4,6,7,8-HxCDF	99.4	100	99.4	30-160
1,2,3,7,8,9-HxCDF	101	100	101	30-160
1,2,3,4,7,8-HxCDD	96.1	100	96.1	30-160
1,2,3,6,7,8-HxCDD	98.0	100	98.0	30-160
1,2,3,7,8,9-HxCDD	105	100	105	30-160
1,2,3,4,6,7,8-HpCDF	111	100	111	30-160
1,2,3,4,7,8,9-HpCDF	97.8	100	97.8	30-160
1,2,3,4,6,7,8-HpCDD	99.8	100	99.8	30-160
OCDF	180	200	90.0	30-160
OCDD	193	200	96.5	30-160

Reported in pg/g

4DF - FORM IV-HR CDD
CDD/CDF METHOD BLANK SUMMARY
HIGH RESOLUTION

Sample No.
SB65MBRE

Lab Name: ANALYTICAL RESOURCES, INC. Contract: HART CROWSER

Lab Code: SB65 Case No.: CUSTOM PLYWOOD TO No.: SDG No.:

Matrix:(Soil/Water/Ash/Tissue/Oil) SOIL

Lab Sample ID: SB65MBRE

Sample wt/vol: 10 (g/ml) g

Lab File ID: 11011404

Water Sample Prep: (SEPF/SPE)

Date Received: 17-DEC-10

GC Column: RTX-DIOXIN2 ID: 0.25 (mm)

Date Extracted: 12-JAN-11

Instrument ID: AUTOSPEC1

Date Analyzed: 14-JAN-11

Client Sample No.	Lab Sample ID	Lab File ID	Date Analyzed
SB65OPR	SB65OPR	11011406	01/14/11
HC-SS-1	SB65A	11011407	01/14/11

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-011211

Lab Sample ID: MB-011211
LIMS ID: 11-895
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/18/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 01/12/11
Date Analyzed: 01/14/11 12:40
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	0.0118	1.00	< 0.0118	U
Total TCDF			0.0118	1.00	< 0.0118	U
2,3,7,8-TCDD		0.65-0.89	0.0299	1.00	< 0.0299	U
Total TCDD			0.0299	1.00	< 0.0299	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0189	5.00	< 0.0189	U
2,3,4,7,8-PeCDF		1.32-1.78	0.0205	5.00	< 0.0205	U
Total PeCDF			0.0205	5.00	< 0.0205	U
1,2,3,7,8-PeCDD		1.32-1.78	0.0244	5.00	< 0.0244	U
Total PeCDD			0.0244	5.00	< 0.0244	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0243	5.00	< 0.0243	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0236	5.00	< 0.0236	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0245	5.00	< 0.0245	U
1,2,3,7,8,9-HxCDF		1.05-1.43	0.0307	5.00	< 0.0307	U
Total HxCDF			0.0307	5.00	< 0.0307	U
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0260	5.00	< 0.0260	U
1,2,3,6,7,8-HxCDD		1.05-1.43	0.0270	5.00	< 0.0270	U
1,2,3,7,8,9-HxCDD		1.05-1.43	0.0277	5.00	< 0.0277	U
Total HxCDD			0.0277	5.00	< 0.0277	U
1,2,3,4,6,7,8-HpCDF	1.00	0.88-1.20		5.00	0.332	J
1,2,3,4,7,8,9-HpCDF		0.88-1.20	0.0359	5.00	< 0.0359	U
Total HpCDF			0.0359	5.00	0.664	
1,2,3,4,6,7,8-HpCDD	0.97	0.88-1.20		5.00	0.272	J
Total HpCDD				5.00	0.442	
OCDF	0.80	0.76-1.02		10.0	0.532	J
OCDD	0.81	0.76-1.02		10.0	0.812	J

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: MB-011211

Lab Sample ID: MB-011211
LIMS ID: 11-895
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/18/11

QC Report No: SB65-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 01/12/11
Date Analyzed: 01/14/11 12:40
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
13C-2,3,7,8-TCDF	0.77	0.65-0.89	98.8	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	89.7	25-164
13C-1,2,3,7,8-PeCDF	1.55	1.32-1.78	80.4	24-185
13C-2,3,4,7,8-PeCDF	1.55	1.32-1.78	77.3	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	88.9	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	71.4	26-152
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	70.0	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	71.6	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	75.0	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	79.4	32-141
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	74.6	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	68.2	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	77.1	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	81.5	23-140
13C-OCDD	0.89	0.76-1.02	83.8	17-157
37Cl4-2,3,7,8-TCDD			93.4	35-197

Reported in Percent Recovery

5DFA - FORM V-HR CDD-1
CDD/CDF WINDOW DEFINING MIX (WDM) SUMMARY
HIGH RESOLUTION

Sample No.
CS3

Lab Name: ANALYTICAL RESOURCES, INC. Contract: HART CROWSER

Lab Code: SB65 Case No.: CUSTOM PLYWOOD TO No.: SDG No.:

GC Column: RTX-Dioxin2 ID: 0.25 (mm) Lab File ID: 11011403

Instrument ID: AUTOSPEC1 Date Analyzed: 14-JAN-11

Time Analyzed: 1133

CDD/CDF	RT First Eluting	RT Last Eluting
TCDD	24.55	28.02
TCDF	23.28	28.27
PeCDD	29.81	32.93
PeCDF	28.14	33.31
HxCDD	35.02	37.71
HxCDF	34.23	38.14
HpCDD	40.83	42.15
HpCDF	40.26	43.08

5DFB - FORM V-HR CDD-2
CDD/CDF CHROMATOGRAPHIC RESOLUTION SUMMARY
HIGH RESOLUTION

Sample No.: CS3

Lab Name: ANALYTICAL RESOURCES, INC. Contract: HART CROWSER

Lab Code: SB65 Case No.: CUSTOM PLYWOOD TO No.: SDG No.:

GC Column: RTX-DIOXIN2 ID: 0.25 (mm) Lab File ID: 11011403

Instrument ID: Autospec1 Date Analyzed: 14-JAN-11

Time Analyzed: 1133

Percent Valley determination for DB-5 (or equivalent) column -
For the column performance solution beginning 12-hour period:

1238-TCDD/2378-TCDD: 0

Quality Control (QC) Limits:

Percent Valley between the TCDD isomers must be less than or equal to 25%

Percent Valley determination for DB-225 (or equivalent) column -
For the column performance solution beginning 12-hour period:

2347-TCDF/2378-TCDF: 10.5

QC Limits:

Percent Valley between the TCDD/TCDF isomers must be less than or equal to 25%

5DFB - FORM V-HR CDD-3
CDD/CDF ANALTYICAL SEQUENCE SUMMARY
HIGH RESOLUTION

Lab Name: ANALYTICAL RESOURCES, INC. Contract: HART CROWSER

Lab Code: SB65 Case No.: CUSTOM PLYWOOD TO No.: SDG No.:

GC Column: RTX-DIOXIN2 ID: 0.25 (mm) Instrument ID: AUTOSPEC1

Init. Calib. Date(s): 07-DEC-10

Init: Calib. Times: 1415 1745

The Analytical Sequence of standards, samples, blanks, and Laboratory Control Samples (LCS) is as follows:

Client Sample No.	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
1756-1	TCDFS	11011402	01/14/11	1037
I5743	CS3	11011403	01/14/11	1133
SB65MB2	SB65MBRE	11011404	01/14/11	1240
SB65OPR2	SB65OPRRE	11011406	01/14/11	1446
HC-SS-1	SB65ARE	11011407	01/14/11	1536
I5743	CS3	11011408	01/14/11	1627

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	GOOSE LAKE
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	11011403
Date Analysed	14-Jan-11	Time Analysed	11:33:30
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.02	1.05	-2.8		0.76		0.65 - 0.89
2378-TCDF	304/306	0.87	0.91	-4.0		0.76		0.65 - 0.89
12378-PeCDF	340/342	0.92	0.93	-0.8		1.49		1.32 - 1.78
12378-PeCDD	356/358	0.96	1.00	-3.7		1.56		1.32 - 1.78
23478-PeCDF	340/342	0.93	0.98	-5.3		1.49		1.32 - 1.78
123478-HxCDF	374/376	1.11	1.12	-0.7		1.21		1.05 - 1.43
123678-HxCDF	374/376	1.07	1.07	0.7		1.23		1.05 - 1.43
123478-HxCDD	390/392	0.94	0.99	-5.1		1.24		1.05 - 1.43
123678-HxCDD	390/392	0.90	0.94	-3.9		1.22		1.05 - 1.43
123789-HxCDD	390/392	0.82	0.87	-5.6		1.24		1.05 - 1.43
234678-HxCDF	374/376	1.08	1.10	-1.4		1.20		1.05 - 1.43
123789-HxCDF	374/376	1.02	1.04	-1.2		1.21		1.05 - 1.43
1234678-HpCDF	408/410	1.26	1.29	-2.4		1.01		0.89 - 1.21
1234678-HpCDD	424/426	1.00	1.01	-1.0		1.04		0.89 - 1.21
1234789-HpCDF	408/410	1.26	1.30	-2.6		1.03		0.89 - 1.21
OCDD	458/460	0.98	1.02	-4.3		0.89		0.76 - 1.02
OCDF	442/444	1.24	1.17	6.5		0.89		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	0.92	0.85	8.6		0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	0.73	0.65	11.9		1.57		1.32 - 1.78
13C-123478-HxCDD	402/404	1.10	1.04	6.2		1.23		1.05 - 1.43
13C-123678-HxCDD	402/404	1.14	1.15	-0.9		1.25		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.85	0.83	3.4		1.04		0.89 - 1.21
13C-OCDD	470/472	0.68	0.68	-1.2		0.89		0.76 - 1.02
13C-2378-TCDF	316/318	1.42	1.42	-0.4		0.77		0.65 - 0.89
13C-12378-PeCDF	352/354	1.14	1.16	-1.9		1.56		1.32 - 1.78
13C-23478-PeCDF	352/354	1.10	1.08	1.7		1.56		1.32 - 1.78
13C-123478-HxCDF	384/386	1.31	1.37	-4.4		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.39	1.54	-9.6		0.53		0.43 - 0.59
13C-234678-HxCDF	384/386	1.25	1.37	-8.8		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.05	1.10	-4.9		0.53		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.11	1.13	-2.5		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.79	0.76	4.2		0.45		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.24		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	GOOSE LAKE
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	11011403
Date Analysed	14-Jan-11	Time Analysed	11:33:30
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.42
2378-TCDF	1.00	26.79
12378-PeCDF	1.00	30.93
12378-PeCDD	1.00	32.53
23478-PeCDF	1.00	32.27
123478-HxCDF	1.00	35.95
123678-HxCDF	1.00	36.11
123478-HxCDD	1.00	37.18
123678-HxCDD	1.00	37.30
123789-HxCDD	1.01	37.71
234678-HxCDF	1.00	37.04
123789-HxCDF	1.00	38.14
1234678-HpCDF	1.00	40.26
1234678-HpCDD	1.00	42.15
1234789-HpCDF	1.00	43.08
OCDD	1.00	48.35
OCDF	1.01	48.63

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.41
13C-12378-PeCDD	1.22	32.51
13C-123478-HxCDD	0.99	37.16
13C-123678-HxCDD	0.99	37.29
13C-1234678-HpCDD	1.12	42.13
13C-OCDD	1.28	48.32
13C-2378-TCDF	1.01	26.76
13C-12378-PeCDF	1.16	30.92
13C-23478-PeCDF	1.21	32.26
13C-123478-HxCDF	0.95	35.94
13C-123678-HxCDF	0.96	36.09
13C-234678-HxCDF	0.98	37.03
13C-123789-HxCDF	1.01	38.11
13C-1234678-HpCDF	1.07	40.25
13C-1234789-HpCDF	1.14	43.06

Clean up Standard	RRT#	RT

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.60
13C-123789-HxCDD	0.00	37.70

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	GOOSE LAKE
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	11011408
Date Analysed	14-Jan-11	Time Analysed	16:27:46
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.03	1.05	-2.6		0.75		0.65 - 0.89
2378-TCDF	304/306	0.88	0.91	-2.8		0.75		0.65 - 0.89
12378-PeCDF	340/342	0.92	0.93	-1.1		1.55		1.32 - 1.78
12378-PeCDD	356/358	0.96	1.00	-4.2		1.52		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-3.7		1.50		1.32 - 1.78
123478-HxCDF	374/376	1.10	1.12	-1.9		1.20		1.05 - 1.43
123678-HxCDF	374/376	1.09	1.07	2.3		1.22		1.05 - 1.43
123478-HxCDD	390/392	0.96	0.99	-2.9		1.25		1.05 - 1.43
123678-HxCDD	390/392	0.89	0.94	-5.3		1.26		1.05 - 1.43
123789-HxCDD	390/392	0.83	0.87	-4.2		1.23		1.05 - 1.43
234678-HxCDF	374/376	1.09	1.10	-1.1		1.23		1.05 - 1.43
123789-HxCDF	374/376	1.03	1.04	-0.8		1.20		1.05 - 1.43
1234678-HpCDF	408/410	1.25	1.29	-2.5		1.01		0.89 - 1.21
1234678-HpCDD	424/426	1.01	1.01	0.2		1.06		0.89 - 1.21
1234789-HpCDF	408/410	1.27	1.30	-2.4		1.03		0.89 - 1.21
OCDD	458/460	0.97	1.02	-4.3		0.90		0.76 - 1.02
OCDF	442/444	1.25	1.17	7.3		0.89		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	0.95	0.85	11.6		0.79		0.65 - 0.89
13C-12378-PeCDD	368/370	0.75	0.65	14.6		1.57		1.32 - 1.78
13C-123478-HxCDD	402/404	1.09	1.04	5.2		1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	1.12	1.15	-2.4		1.25		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.83	0.83	1.1		1.04		0.89 - 1.21
13C-OCDD	470/472	0.66	0.68	-3.7		0.90		0.76 - 1.02
13C-2378-TCDF	316/318	1.45	1.42	1.6		0.77		0.65 - 0.89
13C-12378-PeCDF	352/354	1.16	1.16	-0.4		1.56		1.32 - 1.78
13C-23478-PeCDF	352/354	1.12	1.08	3.8		1.53		1.32 - 1.78
13C-123478-HxCDF	384/386	1.31	1.37	-3.9		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.36	1.54	-11.6		0.52		0.43 - 0.59
13C-234678-HxCDF	384/386	1.27	1.37	-7.5		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.02	1.10	-7.0		0.52		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.12	1.13	-0.9		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.79	0.76	3.1		0.44		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.78		0.65 - 0.89
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.23		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB65	Case No.:	GOOSE LAKE
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	11011408
Date Analysed	14-Jan-11	Time Analysed	16:27:46
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.41
2378-TCDF	1.00	26.76
12378-PeCDF	1.00	30.92
12378-PeCDD	1.00	32.51
23478-PeCDF	1.00	32.26
123478-HxCDF	1.00	35.94
123678-HxCDF	1.00	36.09
123478-HxCDD	1.00	37.16
123678-HxCDD	1.00	37.29
123789-HxCDD	1.01	37.70
234678-HxCDF	1.00	37.03
123789-HxCDF	1.00	38.11
1234678-HpCDF	1.00	40.24
1234678-HpCDD	1.00	42.13
1234789-HpCDF	1.00	43.06
OCDD	1.00	48.31
OCDF	1.01	48.60

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.39
13C-12378-PeCDD	1.22	32.50
13C-123478-HxCDD	0.99	37.14
13C-123678-HxCDD	0.99	37.27
13C-1234678-HpCDD	1.12	42.10
13C-OCDD	1.28	48.29
13C-2378-TCDF	1.01	26.75
13C-12378-PeCDF	1.16	30.90
13C-23478-PeCDF	1.21	32.25
13C-123478-HxCDF	0.95	35.92
13C-123678-HxCDF	0.96	36.06
13C-234678-HxCDF	0.98	37.01
13C-123789-HxCDF	1.01	38.10
13C-1234678-HpCDF	1.07	40.23
13C-1234789-HpCDF	1.14	43.04

Clean up Standard	RRT#	RT

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.59
13C-123789-HxCDD	0.00	37.68

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

Total Solids

ARI Job ID: SB65

Extractions Total Solids-extts
Data By: Allison J. Benny
Created: 12/17/10

Worklist: 241
Analyst: RVR
Comments:

Oven ID:________________

Balance ID:____________________

Samples In: Date:________ Time:________ Temp:________ Analyst:________

Samples Out: Date:________ Time:________ Temp:________ Analyst:________

	ARI ID CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% Solids	pH
1.	SB65A 10-31557 HC-SS-1	1.17	11.59	4.47	31.7	NR
2.	SB65B 10-31558 HC-SS-2	1.16	14.50	7.11	44.6	NR
3.	SB65C 10-31559 HC-SS-3	1.16	11.55	3.36	21.2	NR
4.	SB65D 10-31560 HC-SS-4	1.16	11.34	5.25	40.2	NR
5.	SB65E 10-31561 HC-SS-5	1.16	12.47	8.79	67.5	NR
6.	SB65F 10-31562 HC-SS-7	1.17	11.87	6.73	52.0	NR
7.	SB65G 10-31563 HC-SS-8	1.17	12.27	6.29	46.1	NR
8.	SB65H 10-31564 HC-SS-9	1.18	12.28	6.43	47.3	NR
9.	SB65I 10-31565 HC-SS-10	1.17	15.16	8.05	49.2	NR
10.	SB65J 10-31566 HC-SS-11	1.17	12.20	5.99	43.7	NR
11.	SB65K 10-31567 HC-SS-12	1.17	13.62	6.44	42.3	NR
12.	SB65L 10-31568 HC-SS-13	1.17	11.52	6.08	47.4	NR

Extractions Total Solids-extts
Data By: Allison J. Benny
Created: 12/17/10

Worklist: 241
Analyst: AJB
Comments:

Oven ID: 015

Balance ID: 24150347

Samples In: Date: 12/17 Time: 19:45 Temp: 100 Analyst: AB

Samples Out: Date: 12/21/10 Time: 06:45 Temp: 99° Analyst: RR

	ARI ID / CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% Solids	pH
1.	SB65A 10-31557 HC-SS-1	1.17	11.54		4.47	NR
2.	SB65B 10-31558 HC-SS-2	1.16	14.50		7.11	NR
3.	SB65C 10-31559 HC-SS-3	1.16	11.55		3.36	NR
4.	SB65D 10-31560 HC-SS-4	1.16	11.34		5.25	NR
5.	SB65E 10-31561 HC-SS-5	1.16	12.47		8.79	NR
6.	SB65F 10-31562 HC-SS-7	1.17	11.87		4.73	NR
7.	SB65G 10-31563 HC-SS-8	1.17	12.29		6.29	NR
8.	SB65H 10-31564 HC-SS-9	1.18	12.28		6.43	NR
9.	SB65I 10-31565 HC-SS-10	1.17	15.16		8.05	NR
10.	SB65J 10-31566 HC-SS-11	1.17	12.20		5.99	NR
11.	SB65K 10-31567 HC-SS-12	1.17	13.66		6.44	NR
12.	SB65L 10-31568 HC-SS-13	1.17	11.52		6.08	NR

Total Solids Targets-Extractions
Data By: Jim Hawk
Created: 12/20/10

Worklist: 390
Analyst: JBH
Comments:

ARI ID	Target Dry Wt (g)	Total Solids	Min Wet Wt (g)
1. SB65A	10.00	31.7	31.55
2. SB65B	10.00	44.6	22.42
3. SB65C	10.00	21.2	47.17
4. SB65D	10.00	40.2	24.88
5. SB65E	10.00	67.5	14.81
6. SB65F	10.00	52.0	19.23
7. SB65G	10.00	46.1	21.69
8. SB65H	10.00	47.3	21.14
9. SB65I	10.00	49.2	20.33
10. SB65J	10.00	43.7	22.88
11. SB65K	10.00	42.3	23.64
12. SB65L	10.00	47.4	21.10

Table of Contents: ARI Job SB69

Client: Hart Crowser, Inc.

Project: 17330-27 Custom Plywood

Signature

January-12-2011
Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

January 12, 2011

Mr. Roger McGinnis
Hart Crowser, Inc.
1700 Westlake Avenue North Suite 200
Seattle, WA 98109-3056

RE: Project: Custom Plywood, 17330-27
ARI Job No.: SB69

Dear Mr. McGinnis:

Please find enclosed the original Chain-of-Custody (COC) record, sample receipt documentation, and the final data package for the samples from the project referenced above.

Sample receipt and details of these analyses are discussed in the Case Narrative.

An electronic copy of this data package and the supporting data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Respectfully,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
206-695-6211
kellyb@arilabs.com
www.arilabs.com

cc: files SB69

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Documentation

ARI Job ID: SB69

Sample Custody Record

2 of 2

HARTCROWSER
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

Samples Shipped to: ARI

JOB ~~17330-2927~~ 17330-27 LAB NUMBER
PROJECT NAME Custom Plywood
HART CROWSER CONTACT R McGinnis
A. Conrad
SAMPLED BY: A, AK

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	Dioxin/Furan	Total Solids	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	HC-SS-14		12/14/10	1505	SED	X	X	1	
	HC-SC-2-3'		12/15/10	1215				1	
	HC-SC-4-3'			1155				1	
	HC-SC-5-3'			1325				1	
	HC-SC-6-3'			1300				1	
	HC-SC-7-3'			1240				1	
	HC-SC-15-0-10cm			1530				1	
	HC-SC-15-3'			1535				1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	12/17/10	SIGNATURE R. McGinnis	12/17/10
PRINT NAME Anne M Conrad	TIME 1000	PRINT NAME R. McGinnis	TIME 10:00
COMPANY Hart Crowser		COMPANY Hart Crowser	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE R. McGinnis	12/17/10	SIGNATURE	12/17/10
PRINT NAME R. McGinnis	TIME 5:18	PRINT NAME Jennifer Millsap	TIME 1718
COMPANY Hart Crowser		COMPANY ARI	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:
LEVEL IV DATA PACKAGE

COOLER NO.:
STORAGE LOCATION:

See Lab Work Order No. ______ for Other Contract Requirements

8 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE ______
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER ______

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Hart Crowser

Project Name: Custom Plywood

COC No(s): NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other:

Assigned ARI Job No: SB69

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) 4.8 4.5

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90947619

Cooler Accepted by: JM Date: 12/17/10 Time: 1718

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: 12/20/10 Time: 943

***** 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"
			Peabubbles → "pb"
			Large → "lg"
			Headspace → "hs"

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: SB69

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative
Project: Custom Plywood
ARI Job No.: SB69
January 12, 2011

Sample Receipt:

Analytical Resources, Inc. (ARI) accepted eight soil samples in good condition on December 17, 2010 under ARI Sample Delivery Group (SDG) SB69. The samples were received with cooler temperatures between 4.5 and 4.8°C. For further details regarding sample receipt please refer to the enclosed Cooler Receipt Form.

The samples were analyzed for Dioxin/Furans and Total Solids, as requested on the Chain-of-Custody.

Dioxin/Furans by Method 1613B:

The samples were extracted on 12/22/10. The extracts were analyzed on 12/28/10 and 12/29/10 - within the method recommended holding times.

Analysis was performed using the application specific RTX-Dioxin 2 column, which has a unique elution order and selectivity for the target compounds, as well as a unique isomer separation for the 2378-TCDF. A resolution test mixture was designed specifically for this column, consisting of 2348-TCDF, 2378-TCDF and 3467-TCDF to evaluate the method required minimum valley between isomer of 25%. Use of the RTX-Dioxin2 column eliminates the need for second column confirmation.

Initial calibration(s): All analytes of interest were within method acceptance criteria.

Continuing calibration(s): All analytes of interest were within method acceptance criteria.

Surrogates: Both extraction and clean-up surrogate were within control limits.

Method Blank(s): The method blank contained reportable response of 2,3,4,7,8-PeCDF, 1,2,3,6,7,8-HxCDD, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, and OCDD below the reporting limit. Associated sample results have been flagged with a "B" qualifier. No further corrective action was taken.

Samples: The TEQ was calculated with WHO2005 with ND=0 for non-detected results (flagged a "U" or "Y" qualifier). Select results have been "Y"-flagged indicating a raised reporting limit due to interference, equivalent to an EMPC.

OPR(s): The OPR (Ongoing Precision and Accuracy or LCS) sample percent recoveries were within control limits.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 7/10/2009

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.

Y 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

Dioxin Analysis
Report and Summary QC Forms

ARI Job ID: SB69

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: HC-SS-14

Lab Sample ID: SB69A
LIMS ID: 10-31595
Matrix: Sediment
Data Release Authorized: VJS
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 16:27
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	0.71	0.65-0.89		0.993	1.91	
Total TCDF				0.993	22.1	XY
2,3,7,8-TCDD	0.51	0.65-0.89		0.993	0.365	JY
Total TCDD				0.993	61.9	Y
1,2,3,7,8-PeCDF	1.37	1.32-1.78		4.97	0.731	J
2,3,4,7,8-PeCDF	1.62	1.32-1.78		4.97	0.977	BJ
Total PeCDF				4.97	18.0	BXY
1,2,3,7,8-PeCDD	1.54	1.32-1.78		4.97	2.01	J
Total PeCDD				4.97	43.4	
1,2,3,4,7,8-HxCDF	1.25	1.05-1.43		4.97	1.50	JX
1,2,3,6,7,8-HxCDF	1.08	1.05-1.43		4.97	1.09	J
2,3,4,6,7,8-HxCDF	1.17	1.05-1.43		4.97	1.67	JX
1,2,3,7,8,9-HxCDF	1.28	1.05-1.43		4.97	0.421	JX
Total HxCDF				4.97	32.3	XY
1,2,3,4,7,8-HxCDD	1.39	1.05-1.43		4.97	1.61	J
1,2,3,6,7,8-HxCDD	1.20	1.05-1.43		4.97	6.06	B
1,2,3,7,8,9-HxCDD	1.22	1.05-1.43		4.97	3.45	J
Total HxCDD				4.97	76.9	BY
1,2,3,4,6,7,8-HpCDF	1.03	0.88-1.20		4.97	28.5	B
1,2,3,4,7,8,9-HpCDF	1.03	0.88-1.20		4.97	1.57	BJ
Total HpCDF				4.97	85.0	B
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.97	103	B
Total HpCDD				4.97	244	B
OCDF	0.89	0.76-1.02		9.93	81.8	B
OCDD	0.89	0.76-1.02		9.93	660	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 6.01

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 6.01

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: HC-SS-14

Lab Sample ID: SB69A
LIMS ID: 10-31595
Matrix: Sediment
Data Release Authorized: VJS
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/14/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 16:27
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	106	24-169
13C-2,3,7,8-TCDD	0.79	0.65-0.89	93.9	25-164
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	84.3	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	90.3	21-178
13C-1,2,3,7,8-PeCDD	1.59	1.32-1.78	97.1	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	79.8	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	74.0	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	81.8	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	99.8	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	85.7	32-141
13C-1,2,3,6,7,8-HxCDD	1.23	1.05-1.43	80.5	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	75.6	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.46	0.37-0.51	84.7	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.03	0.88-1.20	86.8	23-140
13C-OCDD	0.89	0.76-1.02	78.9	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
Page 1 of 1

Sample ID: HC-SC-2-3'

Lab Sample ID: SB69B
LIMS ID: 10-31596
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 17:18
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	0.78	0.65-0.89		0.990	8.59		
Total TCDF				0.990	146	XY	
2,3,7,8-TCDD	0.73	0.65-0.89		0.990	3.87		
Total TCDD				0.990	147	Y	
1,2,3,7,8-PeCDF	1.54	1.32-1.78		4.95	8.16		
2,3,4,7,8-PeCDF	1.50	1.32-1.78		4.95	19.9	B	
Total PeCDF				4.95	341	BXY	
1,2,3,7,8-PeCDD	1.53	1.32-1.78		4.95	25.0		
Total PeCDD				4.95	260	Y	
1,2,3,4,7,8-HxCDF	1.20	1.05-1.43		4.95	57.7	X	
1,2,3,6,7,8-HxCDF	1.22	1.05-1.43		4.95	25.3		
2,3,4,6,7,8-HxCDF	1.23	1.05-1.43		4.95	48.7	X	
1,2,3,7,8,9-HxCDF	1.22	1.05-1.43		4.95	11.5	X	
Total HxCDF				4.95	1,610	XY	
1,2,3,4,7,8-HxCDD	1.24	1.05-1.43		4.95	27.2		
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43		4.95	221	B	
1,2,3,7,8,9-HxCDD	1.23	1.05-1.43		4.95	67.0		
Total HxCDD				4.95	1,420	BY	
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20		4.95	1,460	B	
1,2,3,4,7,8,9-HpCDF	1.02	0.88-1.20		4.95	66.4	B	
Total HpCDF				4.95	5,130	B	
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.95	5,150	B	#
Total HpCDD				4.95	10,300	B	
OCDF	0.88	0.76-1.02		9.90	4,750	B	#
OCDD	0.89	0.76-1.02		9.90	34,400	B	#

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 156

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 156

#-Result from diluted secondary analysis.

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

Sample ID: HC-SC-2-3'

Lab Sample ID: SB69B
LIMS ID: 10-31596
Matrix: Sediment
Data Release Authorized: VJ
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 17:18
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	91.8	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	107	25-164
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	93.3	24-185
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	98.3	21-178
13C-1,2,3,7,8-PeCDD	1.56	1.32-1.78	110	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	81.0	26-152
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	72.8	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	82.0	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	89.5	29-147
13C-1,2,3,4,7,8-HxCDD	1.28	1.05-1.43	88.7	32-141
13C-1,2,3,6,7,8-HxCDD	1.22	1.05-1.43	82.4	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	72.4	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	80.7	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	86.4	23-140
13C-OCDD	0.90	0.76-1.02	79.4	17-157
37Cl4-2,3,7,8-TCDD			113	35-197

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: HC-SC-2-3'
DILUTION

Lab Sample ID: SB69B
LIMS ID: 10-31596
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/29/10 14:26
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 10.0

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-1,2,3,4,6,7,8-HpCDD	1.02	0.88-1.20	64.1	23-140
13C-OCDD	0.90	0.76-1.02	74.6	17-157
37Cl4-2,3,7,8-TCDD			74.0	35-197

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: HC-SC-4-3'

Lab Sample ID: SB69C
LIMS ID: 10-31597
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 18:09
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		0.990	22.5	X	
Total TCDF				0.990	409	XY	
2,3,7,8-TCDD	0.76	0.65-0.89		0.990	9.78		
Total TCDD				0.990	671	Y	
1,2,3,7,8-PeCDF	1.53	1.32-1.78		4.95	16.5		
2,3,4,7,8-PeCDF	1.53	1.32-1.78		4.95	20.7	B	
Total PeCDF				4.95	290	BX	
1,2,3,7,8-PeCDD	1.53	1.32-1.78		4.95	37.6		
Total PeCDD				4.95	665		
1,2,3,4,7,8-HxCDF	1.25	1.05-1.43		4.95	24.6	X	
1,2,3,6,7,8-HxCDF	1.25	1.05-1.43		4.95	19.2		
2,3,4,6,7,8-HxCDF	1.21	1.05-1.43		4.95	24.5	X	
1,2,3,7,8,9-HxCDF	1.22	1.05-1.43		4.95	5.95	X	
Total HxCDF				4.95	464	X	
1,2,3,4,7,8-HxCDD	1.25	1.05-1.43		4.95	24.1		
1,2,3,6,7,8-HxCDD	1.24	1.05-1.43		4.95	86.4	B	
1,2,3,7,8,9-HxCDD	1.25	1.05-1.43		4.95	54.5		
Total HxCDD				4.95	1,050	B	
1,2,3,4,6,7,8-HpCDF	1.03	0.88-1.20		4.95	361	B	
1,2,3,4,7,8,9-HpCDF	1.05	0.88-1.20		4.95	18.6	B	
Total HpCDF				4.95	1,130	BY	
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.95	1,570	B	
Total HpCDD				4.95	3,010	B	
OCDF	0.88	0.76-1.02		9.90	1,120	B	
OCDD	0.89	0.76-1.02		9.90	10,100	B	#

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 103

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 103

#-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: HC-SC-4-3'

Lab Sample ID: SB69C
LIMS ID: 10-31597
Matrix: Sediment
Data Release Authorized: VJB
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 18:09
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	70.1	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	80.7	25-164
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	67.5	24-185
13C-2,3,4,7,8-PeCDF	1.55	1.32-1.78	68.3	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	76.8	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	64.2	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	59.0	26-123
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	61.6	28-136
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	67.1	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	66.7	32-141
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	62.7	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.46	0.37-0.51	52.6	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.46	0.37-0.51	61.9	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	63.2	23-140
13C-OCDD	0.90	0.76-1.02	55.2	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
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Sample ID: HC-SC-4-3'
DILUTION

Lab Sample ID: SB69C
LIMS ID: 10-31597
Matrix: Sediment
Data Release Authorized: VJB
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/29/10 15:18
Instrument/Analyst: AS1/PK

Sample Amount: 10.1 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 5.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-OCDD	0.90	0.76-1.02	52.2	17-157
37Cl4-2,3,7,8-TCDD			74.8	35-197

Reported in Percent Recovery

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: HC-SC-5-3'

Lab Sample ID: SB69D
LIMS ID: 10-31598
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 20:01
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	0.76	0.65-0.89		0.996	2.38	
Total TCDF				0.996	38.1	Y
2,3,7,8-TCDD	0.61	0.65-0.89		0.996	0.651	JY
Total TCDD				0.996	29.1	Y
1,2,3,7,8-PeCDF	1.51	1.32-1.78		4.98	1.12	JX
2,3,4,7,8-PeCDF	1.56	1.32-1.78		4.98	1.40	BJ
Total PeCDF				4.98	23.4	BX
1,2,3,7,8-PeCDD	1.60	1.32-1.78		4.98	2.06	J
Total PeCDD				4.98	31.7	
1,2,3,4,7,8-HxCDF	1.21	1.05-1.43		4.98	2.19	J
1,2,3,6,7,8-HxCDF	1.27	1.05-1.43		4.98	1.41	J
2,3,4,6,7,8-HxCDF	1.22	1.05-1.43		4.98	2.53	J
1,2,3,7,8,9-HxCDF	1.16	1.05-1.43		4.98	0.550	J
Total HxCDF				4.98	61.8	Y
1,2,3,4,7,8-HxCDD	1.22	1.05-1.43		4.98	1.56	J
1,2,3,6,7,8-HxCDD	1.29	1.05-1.43		4.98	8.01	B
1,2,3,7,8,9-HxCDD	1.30	1.05-1.43		4.98	3.29	J
Total HxCDD				4.98	71.2	B
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20		4.98	47.0	B
1,2,3,4,7,8,9-HpCDF	1.05	0.88-1.20		4.98	2.62	BJ
Total HpCDF				4.98	160	B
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.98	149	B
Total HpCDD				4.98	303	B
OCDF	0.88	0.76-1.02		9.96	174	B
OCDD	0.90	0.76-1.02		9.96	939	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 7.68

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 7.68

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: HC-SC-5-3'

Lab Sample ID: SB69D
LIMS ID: 10-31598
Matrix: Sediment
Data Release Authorized: VJ
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 20:01
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
13C-2,3,7,8-TCDF	0.77	0.65-0.89	78.4	24-169
13C-2,3,7,8-TCDD	0.79	0.65-0.89	94.9	25-164
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	85.9	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	90.1	21-178
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	101	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	76.2	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	70.2	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	74.5	28-136
13C-1,2,3,7,8,9-HxCDF	0.54	0.43-0.59	79.3	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	82.2	32-141
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	76.1	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	58.3	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	66.6	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	67.9	23-140
13C-OCDD	0.89	0.76-1.02	55.3	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
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Sample ID: HC-SC-6-3'

Lab Sample ID: SB69E
LIMS ID: 10-31599
Matrix: Sediment
Data Release Authorized: VJS
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 20:55
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	0.75	0.65-0.89		0.991	0.103	JX
Total TCDF				0.991	1.84	Y
2,3,7,8-TCDD	0.21	0.65-0.89		0.991	0.0892	JY
Total TCDD				0.991	1.54	Y
1,2,3,7,8-PeCDF	2.14	1.32-1.78		4.96	0.0733	BJY
2,3,4,7,8-PeCDF	1.12	1.32-1.78		4.96	0.135	BJY
Total PeCDF				4.96	2.02	BY
1,2,3,7,8-PeCDD	1.35	1.32-1.78		4.96	0.246	J
Total PeCDD				4.96	2.61	Y
1,2,3,4,7,8-HxCDF	1.45	1.05-1.43		4.96	0.353	JY
1,2,3,6,7,8-HxCDF	1.40	1.05-1.43		4.96	0.234	J
2,3,4,6,7,8-HxCDF	1.35	1.05-1.43		4.96	0.365	J
1,2,3,7,8,9-HxCDF		1.05-1.43	0.0348	4.96	< 0.0348	U
Total HxCDF			0.0348	4.96	10.3	Y
1,2,3,4,7,8-HxCDD	1.39	1.05-1.43		4.96	0.242	J
1,2,3,6,7,8-HxCDD	1.40	1.05-1.43		4.96	1.42	BJ
1,2,3,7,8,9-HxCDD	1.47	1.05-1.43		4.96	0.537	Y
Total HxCDD				4.96	10.3	BY
1,2,3,4,6,7,8-HpCDF	1.05	0.88-1.20		4.96	11.7	B
1,2,3,4,7,8,9-HpCDF	1.37	0.88-1.20		4.96	0.488	BJY
Total HpCDF				4.96	35.8	BY
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.96	33.9	B
Total HpCDD				4.96	64.0	B
OCDF	0.90	0.76-1.02		9.91	42.3	B
OCDD	0.89	0.76-1.02		9.91	267	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 1.26

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 1.26

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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ANALYTICAL RESOURCES INCORPORATED

Sample ID: HC-SC-6-3'

Lab Sample ID: SB69E
LIMS ID: 10-31599
Matrix: Sediment
Data Release Authorized: VD
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 20:55
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	74.6	24-169
13C-2,3,7,8-TCDD	0.79	0.65-0.89	85.8	25-164
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	82.9	24-185
13C-2,3,4,7,8-PeCDF	1.58	1.32-1.78	85.0	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	96.0	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	69.0	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	65.1	26-123
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	69.7	28-136
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	73.6	29-147
13C-1,2,3,4,7,8-HxCDD	1.25	1.05-1.43	77.2	32-141
13C-1,2,3,6,7,8-HxCDD	1.24	1.05-1.43	73.0	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	61.4	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.44	0.37-0.51	68.0	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	71.3	23-140
13C-OCDD	0.90	0.76-1.02	60.6	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
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Sample ID: HC-SC-7-3'

Lab Sample ID: SB69F
LIMS ID: 10-31600
Matrix: Sediment
Data Release Authorized: VT
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 21:47
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	0.79	0.65-0.89		0.978	0.987	
Total TCDF				0.978	16.5	Y
2,3,7,8-TCDD	0.44	0.65-0.89		0.978	0.350	JY
Total TCDD				0.978	21.3	Y
1,2,3,7,8-PeCDF	1.37	1.32-1.78		4.89	0.821	J
2,3,4,7,8-PeCDF	1.36	1.32-1.78		4.89	1.33	BJ
Total PeCDF				4.89	32.3	BXY
1,2,3,7,8-PeCDD	1.55	1.32-1.78		4.89	2.85	J
Total PeCDD				4.89	37.8	
1,2,3,4,7,8-HxCDF	1.20	1.05-1.43		4.89	4.46	J
1,2,3,6,7,8-HxCDF	1.27	1.05-1.43		4.89	2.79	J
2,3,4,6,7,8-HxCDF	1.21	1.05-1.43		4.89	4.90	
1,2,3,7,8,9-HxCDF	1.30	1.05-1.43		4.89	0.950	J
Total HxCDF				4.89	130	Y
1,2,3,4,7,8-HxCDD	1.19	1.05-1.43		4.89	2.87	J
1,2,3,6,7,8-HxCDD	1.23	1.05-1.43		4.89	17.2	B
1,2,3,7,8,9-HxCDD	1.26	1.05-1.43		4.89	7.02	
Total HxCDD				4.89	162	B
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20		4.89	130	B
1,2,3,4,7,8,9-HpCDF	1.02	0.88-1.20		4.89	6.74	B
Total HpCDF				4.89	391	BY
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.89	389	B
Total HpCDD				4.89	786	B
OCDF	0.89	0.76-1.02		9.78	431	B
OCDD	0.89	0.76-1.02		9.78	2,540	B

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 13.9

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 13.9

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
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Sample ID: HC-SC-7-3'

Lab Sample ID: SB69F
LIMS ID: 10-31600
Matrix: Sediment
Data Release Authorized: VJS
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 21:47
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	95.8	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	95.2	25-164
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	89.5	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	89.5	21-178
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	102	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	77.9	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	73.0	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	80.2	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	84.9	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	1.26	1.05-1.43	79.7	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	71.5	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	78.5	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.06	0.88-1.20	83.2	23-140
13C-OCDD	0.88	0.76-1.02	72.6	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
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Sample ID: HC-SC-15-0-10cm

Lab Sample ID: SB69G
LIMS ID: 10-31601
Matrix: Sediment
Data Release Authorized: UJB
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 22:38
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	0.80	0.65-0.89		0.996	2.13		
Total TCDF				0.996	35.6	XY	
2,3,7,8-TCDD	0.67	0.65-0.89		0.996	0.972	J	
Total TCDD				0.996	40.3	Y	
1,2,3,7,8-PeCDF	1.46	1.32-1.78		4.98	1.71	J	
2,3,4,7,8-PeCDF	1.50	1.32-1.78		4.98	3.57	BJ	
Total PeCDF				4.98	66.2	BXY	
1,2,3,7,8-PeCDD	1.52	1.32-1.78		4.98	5.21		
Total PeCDD				4.98	57.8	Y	
1,2,3,4,7,8-HxCDF	1.25	1.05-1.43		4.98	9.35	X	
1,2,3,6,7,8-HxCDF	1.26	1.05-1.43		4.98	4.61	J	
2,3,4,6,7,8-HxCDF	1.27	1.05-1.43		4.98	9.71		
1,2,3,7,8,9-HxCDF	1.29	1.05-1.43		4.98	1.97	J	
Total HxCDF				4.98	269	Y	
1,2,3,4,7,8-HxCDD	1.33	1.05-1.43		4.98	5.61		
1,2,3,6,7,8-HxCDD	1.27	1.05-1.43		4.98	33.8	B	
1,2,3,7,8,9-HxCDD	1.26	1.05-1.43		4.98	12.7		
Total HxCDD				4.98	254	BY	
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20		4.98	233	B	
1,2,3,4,7,8,9-HpCDF	1.00	0.88-1.20		4.98	11.2	B	
Total HpCDF				4.98	833	B	
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.98	763	B	
Total HpCDD				4.98	1,620	B	
OCDF	0.88	0.76-1.02		9.96	900	B	
OCDD	0.89	0.76-1.02		9.96	5,150	B	#

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 27.2

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 27.2

#-Result from diluted secondary analysis.

Reported in pg/g

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

ANALYTICAL RESOURCES INCORPORATED

Sample ID: HC-SC-15-0-10cm

Lab Sample ID: SB69G
LIMS ID: 10-31601
Matrix: Sediment
Data Release Authorized: VJB
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 22:38
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	78.7	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	83.2	25-164
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	75.4	24-185
13C-2,3,4,7,8-PeCDF	1.57	1.32-1.78	78.2	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	87.1	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	63.6	26-152
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	57.6	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	63.8	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	70.4	29-147
13C-1,2,3,4,7,8-HxCDD	1.29	1.05-1.43	71.4	32-141
13C-1,2,3,6,7,8-HxCDD	1.22	1.05-1.43	62.1	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	57.8	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	66.4	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	68.9	23-140
13C-OCDD	0.89	0.76-1.02	61.3	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

Sample ID: HC-SC-15-0-10cm
DILUTION

Lab Sample ID: SB69G
LIMS ID: 10-31601
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/29/10 16:15
Instrument/Analyst: AS1/PK

Sample Amount: 10.0 g-dry-wt
Final Extract Volume: 20 uL
Dilution Factor: 5.00

Analyte	Ion Ratio	Ratio Limits	Result	Limits
13C-OCDD	0.88	0.76-1.02	74.7	17-157
37Cl4-2,3,7,8-TCDD			115	35-197

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: HC-SC-15-3'

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: SB69H
LIMS ID: 10-31602
Matrix: Sediment
Data Release Authorized: VJB
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 23:29
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	0.75	0.65-0.89		0.979	4.56		
Total TCDF				0.979	73.5	Y	
2,3,7,8-TCDD	0.70	0.65-0.89		0.979	2.49		
Total TCDD				0.979	77.3	Y	
1,2,3,7,8-PeCDF	1.51	1.32-1.78		4.90	4.45	J	
2,3,4,7,8-PeCDF	1.56	1.32-1.78		4.90	9.12	B	
Total PeCDF				4.90	195	BY	
1,2,3,7,8-PeCDD	1.53	1.32-1.78		4.90	16.6		
Total PeCDD				4.90	167		
1,2,3,4,7,8-HxCDF	1.23	1.05-1.43		4.90	32.1		
1,2,3,6,7,8-HxCDF	1.22	1.05-1.43		4.90	17.0		
2,3,4,6,7,8-HxCDF	1.24	1.05-1.43		4.90	12.8		
1,2,3,7,8,9-HxCDF	1.17	1.05-1.43		4.90	6.25		
Total HxCDF				4.90	1,030	Y	
1,2,3,4,7,8-HxCDD	1.26	1.05-1.43		4.90	23.3		
1,2,3,6,7,8-HxCDD	1.26	1.05-1.43		4.90	146	B	
1,2,3,7,8,9-HxCDD	1.24	1.05-1.43		4.90	52.5		
Total HxCDD				4.90	998	BY	
1,2,3,4,6,7,8-HpCDF	1.02	0.88-1.20		4.90	1,020	B	
1,2,3,4,7,8,9-HpCDF	1.03	0.88-1.20		4.90	54.3	B	
Total HpCDF				4.90	3,610	B	
1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20		4.90	3,980	B	#
Total HpCDD				4.90	7,880	B	
OCDF	0.87	0.76-1.02		9.79	3,860	B	#
OCDD	0.89	0.76-1.02		9.79	28,700	B	#

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=0): 110

Total 2,3,7,8-TCDD Equivalence (WHO2005 ND=1/2 EDL): 110

#-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: HC-SC-15-3'

Lab Sample ID: SB69H
LIMS ID: 10-31602
Matrix: Sediment
Data Release Authorized: VJB
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: 12/15/10
Date Received: 12/17/10

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 23:29
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	69.9	24-169
13C-2,3,7,8-TCDD	0.79	0.65-0.89	90.5	25-164
13C-1,2,3,7,8-PeCDF	1.56	1.32-1.78	88.9	24-185
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	91.7	21-178
13C-1,2,3,7,8-PeCDD	1.58	1.32-1.78	103	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	82.6	26-152
13C-1,2,3,6,7,8-HxCDF	0.53	0.43-0.59	73.2	26-123
13C-2,3,4,6,7,8-HxCDF	0.53	0.43-0.59	78.9	28-136
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	60.3	29-147
13C-1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	87.6	32-141
13C-1,2,3,6,7,8-HxCDD	1.26	1.05-1.43	79.5	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	70.4	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	79.8	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	84.4	23-140
13C-OCDD	0.90	0.76-1.02	73.6	17-157
37Cl4-2,3,7,8-TCDD			97.7	35-197

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

Sample ID: OPR-122210

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: OPR-122210
LIMS ID: 10-31595
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 15:35
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	0.76	0.65-0.89	1.00	21.1	
Total TCDF			1.00	22.6	Y
2,3,7,8-TCDD	0.77	0.65-0.89	1.00	19.8	
Total TCDD			1.00	20.5	Y
1,2,3,7,8-PeCDF	1.57	1.32-1.78	5.00	99.0	
2,3,4,7,8-PeCDF	1.54	1.32-1.78	5.00	98.0	B
Total PeCDF			5.00	204	BY
1,2,3,7,8-PeCDD	1.56	1.32-1.78	5.00	98.7	
Total PeCDD			5.00	99.4	Y
1,2,3,4,7,8-HxCDF	1.20	1.05-1.43	5.00	99.8	
1,2,3,6,7,8-HxCDF	1.22	1.05-1.43	5.00	103	
2,3,4,6,7,8-HxCDF	1.22	1.05-1.43	5.00	100	
1,2,3,7,8,9-HxCDF	1.23	1.05-1.43	5.00	101	
Total HxCDF			5.00	407	
1,2,3,4,7,8-HxCDD	1.26	1.05-1.43	5.00	99.6	
1,2,3,6,7,8-HxCDD	1.28	1.05-1.43	5.00	101	B
1,2,3,7,8,9-HxCDD	1.21	1.05-1.43	5.00	104	
Total HxCDD			5.00	305	BY
1,2,3,4,6,7,8-HpCDF	1.03	0.88-1.20	5.00	118	B
1,2,3,4,7,8,9-HpCDF	1.02	0.88-1.20	5.00	100	B
Total HpCDF			5.00	223	B
1,2,3,4,6,7,8-HpCDD	1.05	0.88-1.20	5.00	106	B
Total HpCDD			5.00	108	B
OCDF	0.88	0.76-1.02	10.0	187	B
OCDD	0.89	0.76-1.02	10.0	202	B

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: OPR-122210

Lab Sample ID: OPR-122210
LIMS ID: 10-31595
Matrix: Sediment
Data Release Authorized: UTS
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 15:35
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	85.6	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	82.8	25-164
13C-1,2,3,7,8-PeCDF	1.58	1.32-1.78	93.4	24-185
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	72.6	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	81.3	25-181
13C-1,2,3,4,7,8-HxCDF	0.53	0.43-0.59	77.8	26-152
13C-1,2,3,6,7,8-HxCDF	0.52	0.43-0.59	77.2	26-123
13C-2,3,4,6,7,8-HxCDF	0.52	0.43-0.59	77.6	28-136
13C-1,2,3,7,8,9-HxCDF	0.53	0.43-0.59	73.8	29-147
13C-1,2,3,4,7,8-HxCDD	1.27	1.05-1.43	87.0	32-141
13C-1,2,3,6,7,8-HxCDD	1.27	1.05-1.43	80.0	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.45	0.37-0.51	69.8	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	71.0	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	80.0	23-140
13C-OCDD	0.89	0.76-1.02	69.8	17-157
37Cl4-2,3,7,8-TCDD			89.2	35-197

Reported in Percent Recovery

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B

ANALYTICAL RESOURCES INCORPORATED

Sample ID: OPR-122210

Lab Sample ID: OPR-122210
LIMS ID: 10-31595
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 12/22/10
Date Analyzed: 12/28/10 15:35
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	21.1	20.0	106	30-160
2,3,7,8-TCDD	19.8	20.0	99.0	30-160
1,2,3,7,8-PeCDF	99.0	100	99.0	30-160
2,3,4,7,8-PeCDF	98.0	100	98.0	30-160
1,2,3,7,8-PeCDD	98.7	100	98.7	30-160
1,2,3,4,7,8-HxCDF	99.8	100	99.8	30-160
1,2,3,6,7,8-HxCDF	103	100	103	30-160
2,3,4,6,7,8-HxCDF	100	100	100	30-160
1,2,3,7,8,9-HxCDF	101	100	101	30-160
1,2,3,4,7,8-HxCDD	99.6	100	99.6	30-160
1,2,3,6,7,8-HxCDD	101	100	101	30-160
1,2,3,7,8,9-HxCDD	104	100	104	30-160
1,2,3,4,6,7,8-HpCDF	118	100	118	30-160
1,2,3,4,7,8,9-HpCDF	100	100	100	30-160
1,2,3,4,6,7,8-HpCDD	106	100	106	30-160
OCDF	187	200	93.5	30-160
OCDD	202	200	101	30-160

Reported in pg/g

4DF - FORM IV-HR CDD
CDD/CDF METHOD BLANK SUMMARY
HIGH RESOLUTION

Sample No.
SB69MB

Lab Name: ANALYTICAL RESOURCES, INC. Contract: HART CROWSER

Lab Code: SB69 Case No.: CUSTOM PLYWOOD TO No.: SDG No.:

Matrix:(Soil/Water/Ash/Tissue/Oil) SOIL Lab Sample ID: SB69MB

Sample wt/vol: 10 (g/ml) g Lab File ID: 10122804

Water Sample Prep: (SEPF/SPE) Date Received: 17-DEC-10

GC Column: RTX-DIOXIN2 ID: 0.25 (mm) Date Extracted: 22-DEC-10

Instrument ID: AUTOSPEC1 Date Analyzed: 28-DEC-10

Client Sample No.	Lab Sample ID	Lab File ID	Date Analyzed
SB69OPR	SB69OPR	10122805	12/28/10
HC-SS-14	SB69A	10122806	12/28/10
HC-SC-2-3	SB69B	10122807	12/28/10
HC-SC-4-3	SB69C	10122808	12/28/10
HC-SC-5-3	SB69D	10122810	12/28/10
HC-SC-6-3	SB69E	10122811	12/28/10
HC-SC-7-3	SB69F	10122812	12/28/10
HC-SC-15-0-10	SB69G	10122813	12/28/10
HC-SC-15-3	SB69H	10122814	12/28/10
HC-SC-2-3	SB69BDL	10122905	12/29/10
HC-SC-4-3	SB69CDL	10122906	12/29/10
HC-SC-15-0-10	SB69GDL	10122907	12/29/10
HC-SC-15-3	SB69HDL	10122908	12/29/10

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-122210

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: MB-122210
LIMS ID: 10-31595
Matrix: Sediment
Data Release Authorized: VB
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 12/22/10
Date Analyzed: 12/29/10 13:36
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	0.0114	1.00	< 0.0114	U
Total TCDF			0.0114	1.00	< 0.0114	U
2,3,7,8-TCDD		0.65-0.89	0.0256	1.00	< 0.0256	U
Total TCDD			0.0256	1.00	< 0.0256	U
1,2,3,7,8-PeCDF		1.32-1.78	0.0195	5.00	< 0.0195	U
2,3,4,7,8-PeCDF	1.51	1.32-1.78		5.00	0.0580	J
Total PeCDF			0.0195	5.00	0.0580	
1,2,3,7,8-PeCDD		1.32-1.78	0.0208	5.00	< 0.0208	U
Total PeCDD			0.0208	5.00	< 0.0208	U
1,2,3,4,7,8-HxCDF		1.05-1.43	0.0245	5.00	< 0.0245	U
1,2,3,6,7,8-HxCDF		1.05-1.43	0.0204	5.00	< 0.0204	U
2,3,4,6,7,8-HxCDF		1.05-1.43	0.0205	5.00	< 0.0205	U
1,2,3,7,8,9-HxCDF		1.05-1.43	0.0209	5.00	< 0.0209	U
Total HxCDF			0.0245	5.00	1.02	Y
1,2,3,4,7,8-HxCDD		1.05-1.43	0.0228	5.00	< 0.0228	U
1,2,3,6,7,8-HxCDD	1.21	1.05-1.43		5.00	0.152	J
1,2,3,7,8,9-HxCDD		1.05-1.43	0.0302	5.00	< 0.0302	U
Total HxCDD			0.0302	5.00	0.390	Y
1,2,3,4,6,7,8-HpCDF	1.04	0.88-1.20		5.00	2.49	J
1,2,3,4,7,8,9-HpCDF	1.04	0.88-1.20		5.00	0.246	J
Total HpCDF				5.00	12.8	
1,2,3,4,6,7,8-HpCDD	1.07	0.88-1.20		5.00	5.91	
Total HpCDD				5.00	8.30	
OCDF	0.89	0.76-1.02		10.0	13.9	
OCDD	0.89	0.76-1.02		10.0	9.99	J

Reported in pg/g

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Dioxins/Furans by EPA 1613B
Page 1 of 1

Sample ID: MB-122210

Lab Sample ID: MB-122210
LIMS ID: 10-31595
Matrix: Sediment
Data Release Authorized: VTS
Reported: 01/11/11

QC Report No: SB69-Hart Crowser, Inc.
Project: Custom Plywood
17330-27
Date Sampled: NA
Date Received: NA

Date Extracted: 12/22/10
Date Analyzed: 12/29/10 13:36
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
13C-2,3,7,8-TCDF	0.78	0.65-0.89	95.8	24-169
13C-2,3,7,8-TCDD	0.78	0.65-0.89	93.4	25-164
13C-1,2,3,7,8-PeCDF	1.57	1.32-1.78	85.8	24-185
13C-2,3,4,7,8-PeCDF	1.56	1.32-1.78	81.2	21-178
13C-1,2,3,7,8-PeCDD	1.57	1.32-1.78	91.8	25-181
13C-1,2,3,4,7,8-HxCDF	0.52	0.43-0.59	73.0	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	0.52	0.43-0.59	74.2	28-136
13C-1,2,3,7,8,9-HxCDF	0.52	0.43-0.59	77.0	29-147
13C-1,2,3,4,7,8-HxCDD	1.30	1.05-1.43	81.2	32-141
13C-1,2,3,6,7,8-HxCDD	1.22	1.05-1.43	76.6	28-130
13C-1,2,3,4,6,7,8-HpCDF	0.46	0.37-0.51	69.6	28-143
13C-1,2,3,4,7,8,9-HpCDF	0.45	0.37-0.51	79.6	26-138
13C-1,2,3,4,6,7,8-HpCDD	1.04	0.88-1.20	87.0	23-140
13C-OCDD	0.89	0.76-1.02	91.4	17-157
37Cl4-2,3,7,8-TCDD			98.7	35-197

Reported in Percent Recovery

5DFA - FORM V-HR CDD-1
CDD/CDF WINDOW DEFINING MIX (WDM) SUMMARY
HIGH RESOLUTION

Sample No.
CS3

Lab Name: ANALYTICAL RESOURCES, INC. Contract: HART CROWSER

Lab Code: SB69 Case No.: CUSTOM PLYWOOD TO No.: SDG No.:

GC Column: RTX-Dioxin2 ID: 0.25 (mm) Lab File ID: 10122803

Instrument ID: AUTOSPEC1 Date Analyzed: 28-DEC-10

Time Analyzed: 1343

CDD/CDF	RT First Eluting	RT Last Eluting
TCDD	24.21	27.68
TCDF	22.94	27.94
PeCDD	29.45	32.56
PeCDF	27.78	32.96
HxCDD	34.64	37.36
HxCDF	33.86	37.79
HpCDD	40.42	41.70
HpCDF	39.86	42.61

5DFB - FORM V-HR CDD-2
CDD/CDF CHROMATOGRAPHIC RESOLUTION SUMMARY
HIGH RESOLUTION

Sample No.: CS3

Lab Name: ANALYTICAL RESOURCES, INC.   Contract: HART CROWSER

Lab Code: SB69   Case No.: CUSTOM PLYWOOD   TO No.:   SDG No.:

GC Column: RTX-DIOXIN2   ID: 0.25 (mm)   Lab File ID: 10122803

Instrument ID: Autospec1   Date Analyzed: 28-DEC-10

Time Analyzed: 1343

Percent Valley determination for DB-5 (or equivalent) column -
For the column performance solution beginning 12-hour period:

1238-TCDD/2378-TCDD: 0

Quality Control (QC) Limits:

Percent Valley between the TCDD isomers must be less than or equal to 25%

Percent Valley determination for DB-225 (or equivalent) column -
For the column performance solution beginning 12-hour period:

2347-TCDF/2378-TCDF: 20.7

QC Limits:

Percent Valley between the TCDD/TCDF isomers must be less than or equal to 25%

5DFB - FORM V-HR CDD-3
CDD/CDF ANALTYICAL SEQUENCE SUMMARY
HIGH RESOLUTION

Lab Name: ANALYTICAL RESOURCES, INC. Contract: HART CROWSER

Lab Code: SB69 Case No.: CUSTOM PLYWOOD TO No.: SDG No.:

GC Column: RTX-DIOXIN2 ID: 0.25 (mm) Instrument ID: AUTOSPEC1

Init. Calib. Date(s): 07-DEC-10

Init: Calib. Times: 1415 1745

The Analytical Sequence of standards, samples, blanks, and Laboratory Control Samples (LCS) is as follows:

Client Sample No.	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
1756-1	TCDFS	10122802	12/28/10	1252
I5743	CS3	10122803	12/28/10	1343
SB69MB	SB69MB	10122804	12/28/10	1445
SB69OPR	SB69OPR	10122805	12/28/10	1535
HC-SS-14	SB69A	10122806	12/28/10	1627
HC-SC-2-3	SB69B	10122807	12/28/10	1718
HC-SC-4-3	SB69C	10122808	12/28/10	1809
I5743	CS3	10122809	12/28/10	1901
HC-SC-5-3	SB69D	10122810	12/28/10	2001
HC-SC-6-3	SB69E	10122811	12/28/10	2055
HC-SC-7-3	SB69F	10122812	12/28/10	2147
HC-SC-15-0-10	SB69G	10122813	12/28/10	2238
HC-SC-15-3	SB69H	10122814	12/28/10	2329
I5743	CS3	10122815	12/29/10	0021
1756-1	TCDFS	10122902	12/29/10	1048
I5743	CS3	10122903	12/29/10	1240
SB69MB	SB69MB	10122904	12/29/10	1336
HC-SC-2-3	SB69BDL	10122905	12/29/10	1426
HC-SC-4-3	SB69CDL	10122906	12/29/10	1518
HC-SC-15-0-10	SB69GDL	10122907	12/29/10	1615
HC-SC-15-3	SB69HDL	10122908	12/29/10	1706
I5743	CS3	10122910	12/29/10	1849

USEPA
6DFA - Form VI-HR CDD-1
CDD/CDF INITIAL CALIBRATION RESPONSE FACTOR SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1		
Init.Calib.Date CS1:	07-Dec-10	Init.Calib.Time CS1:	14:15:21
Init.Calib.Date CS2:	07-Dec-10	Init.Calib.Time CS2:	15:12:32
Init.Calib.Date CS3:	07-Dec-10	Init.Calib.Time CS3:	16:03:04
Init.Calib.Date CS4:	07-Dec-10	Init.Calib.Time CS4:	16:54:22
Init.Calib.Date CS5:	07-Dec-10	Init.Calib.Time CS5:	17:45:58

Target Analytes	RRF					Mean RRF	% RSD	QC Limits
	CS1	CS2	CS3	CS4	CS5			
2378-TCDD	1.01	1.07	1.07	1.06	1.07	1.05	2.4	20.0
2378-TCDF	0.89	0.89	0.93	0.90	0.92	0.91	1.9	20.0
12378-PeCDF	0.89	0.93	0.93	0.93	0.95	0.93	2.3	20.0
12378-PeCDD	0.98	1.00	0.99	1.01	1.00	1.00	1.3	20.0
23478-PeCDF	0.98	0.99	0.98	0.98	0.98	0.98	0.8	20.0
123478-HxCDF	1.08	1.12	1.14	1.13	1.14	1.12	2.2	20.0
123678-HxCDF	0.99	1.10	1.06	1.07	1.11	1.07	4.4	20.0
123478-HxCDD	0.99	0.99	0.99	1.00	0.99	0.99	0.7	20.0
123678-HxCDD	0.92	0.94	0.93	0.97	0.94	0.94	2.0	20.0
123789-HxCDD[2]	0.82	0.86	0.89	0.89	0.89	0.87	3.6	20.0
234678-HxCDF	1.08	1.10	1.12	1.10	1.10	1.10	1.3	20.0
123789-HxCDF	1.02	0.99	1.05	1.06	1.05	1.04	2.5	20.0
1234678-HpCDF	1.24	1.31	1.31	1.28	1.30	1.29	2.3	20.0
1234678-HpCDD	0.96	1.00	1.02	1.04	1.03	1.01	3.1	20.0
1234789-HpCDF	1.29	1.27	1.29	1.32	1.33	1.30	2.0	20.0
OCDD	1.00	1.00	1.01	1.04	1.05	1.02	2.2	20.0
OCDF[1]	1.11	1.11	1.13	1.23	1.25	1.17	6.2	20.0

(1) The RRF is calculated based on the labeled analog of OCDD.
(2) The relative response factor (RRF) is calculated based on the labeled analogs of the other two HxCDDs.

Labeled Compounds	RRF					Mean RRF	% RSD	QC Limits
	CS1	CS2	CS3	CS4	CS5			
13C-2378-TCDD	0.85	0.82	0.85	0.84	0.89	0.85	3.4	20.0
13C-12378-PeCDD	0.65	0.64	0.64	0.64	0.70	0.65	4.0	20.0
13C-123478-HxCDD	1.03	1.06	1.00	1.06	1.03	1.04	2.3	20.0
13C-123678-HxCDD	1.15	1.16	1.15	1.16	1.12	1.15	1.6	20.0
13C-1234678-HpCDD	0.83	0.87	0.79	0.87	0.77	0.83	5.4	20.0
13C-OCDD	0.67	0.72	0.64	0.73	0.67	0.68	5.6	20.0
13C-2378-TCDF	1.45	1.40	1.43	1.40	1.45	1.42	1.8	20.0
13C-12378-PeCDF	1.13	1.11	1.16	1.16	1.25	1.16	4.4	20.0
13C-23478-PeCDF	1.07	1.03	1.05	1.06	1.18	1.08	5.5	20.0
13C-123478-HxCDF	1.35	1.42	1.34	1.39	1.33	1.37	2.9	20.0
13C-123678-HxCDF	1.54	1.59	1.54	1.59	1.45	1.54	3.6	20.0
13C-234678-HxCDF	1.38	1.41	1.33	1.41	1.33	1.37	2.8	20.0
13C-123789-HxCDF	1.09	1.13	1.08	1.14	1.07	1.10	2.6	20.0
13C-1234678-HpCDF	1.11	1.19	1.09	1.20	1.07	1.13	4.9	20.0
13C-1234789-HpCDF	0.75	0.79	0.74	0.80	0.73	0.76	4.1	20.0
37CL-2378-TCDD	0.93	0.89	0.99	0.93	1.01	0.95	5.2	20.0

USEPA
6DFB - Form VI-HR CDD-2
CDD/CDF INITIAL CALIBRATION ION ABUNDANCE RATIO SUMMARY

HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1		
Init.Calib.Date CS1:	07-Dec-10	Init.Calib.Time CS1:	14:15:21
Init.Calib.Date CS2:	07-Dec-10	Init.Calib.Time CS2:	15:12:32
Init.Calib.Date CS3:	07-Dec-10	Init.Calib.Time CS3:	16:03:04
Init.Calib.Date CS4:	07-Dec-10	Init.Calib.Time CS4:	16:54:22
Init.Calib.Date CS5:	07-Dec-10	Init.Calib.Time CS5:	17:45:58

Target Analytes	Selected Ions	Ion Abundance Ratio					Ratio Flag	Ratio QC Limits#
		CS1	CS2	CS3	CS4	CS5		
2378-TCDD	320/322	0.79	0.77	0.77	0.79	0.78		0.65 - 0.89
2378-TCDF	304/306	0.82	0.79	0.78	0.77	0.76		0.65 - 0.89
12378-PeCDF	340/342	1.57	1.58	1.53	1.54	1.56		1.32 - 1.78
12378-PeCDD	356/358	1.57	1.58	1.56	1.50	1.55		1.32 - 1.78
23478-PeCDF	340/342	1.52	1.53	1.54	1.53	1.53		1.32 - 1.78
123478-HxCDF	374/376	1.28	1.25	1.21	1.22	1.22		1.05 - 1.43
123678-HxCDF	374/376	1.35	1.20	1.22	1.22	1.22		1.05 - 1.43
123478-HxCDD	390/392	1.22	1.19	1.28	1.25	1.25		1.05 - 1.43
123678-HxCDD	390/392	1.18	1.28	1.20	1.24	1.24		1.05 - 1.43
123789-HxCDD	390/392	1.36	1.22	1.28	1.24	1.25		1.05 - 1.43
234678-HxCDF	374/376	1.20	1.25	1.24	1.22	1.22		1.05 - 1.43
123789-HxCDF	374/376	1.21	1.23	1.23	1.23	1.24		1.05 - 1.43
1234678-HpCDF	408/410	1.06	1.02	1.01	1.01	1.03		0.89 - 1.21
1234678-HpCDD	424/426	1.07	1.07	1.06	1.06	1.05		0.89 - 1.21
1234789-HpCDF	408/410	0.95	1.03	1.04	1.03	1.02		0.89 - 1.21
OCDD	458/460	0.88	0.91	0.89	0.89	0.90		0.76 - 1.02
OCDF	442/444	0.89	0.88	0.88	0.89	0.89		0.76 - 1.02

Labeled Compounds	Selected Ions	Ion Abundance Ratio					Ratio Flag	Ratio QC Limits
		CS1	CS2	CS3	CS4	CS5		
13C-2378-TCDD	332/334	0.79	0.78	0.79	0.79	0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	1.59	1.58	1.58	1.58	1.58		1.32 - 1.78
13C-123478-HxCDD	402/404	1.27	1.27	1.26	1.27	1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	1.24	1.22	1.27	1.22	1.28		1.05 - 1.43
13C-1234678-HpCDD	436/438	1.04	1.04	1.06	1.04	1.07		0.89 - 1.21
13C-OCDD	470/472	0.89	0.90	0.90	0.87	0.88		0.76 - 1.02
13C-2378-TCDF	316/318	0.79	0.78	0.76	0.78	0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.58	1.60	1.53	1.57	1.56		1.32 - 1.78
13C-23478-PeCDF	352/354	1.57	1.57	1.57	1.56	1.56		1.32 - 1.78
13C-123478-HxCDF	384/386	0.52	0.52	0.52	0.52	0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	0.53	0.55	0.53	0.51	0.53		0.43 - 0.59
13C-234678-HxCDF	384/386	0.52	0.52	0.53	0.52	0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	0.54	0.51	0.54	0.53	0.52		0.43 - 0.59
13C-1234678-HpCDF	418/420	0.45	0.45	0.46	0.44	0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.45	0.46	0.45	0.45	0.45		0.37 - 0.51

Internal Standards	Selected Ions	Ion Abundance Ratio					Ratio Flag	Ion Ratio QC Limits
		CS1	CS2	CS3	CS4	CS5		
13C-1234-TCDD	332/334	0.79	0.80	0.80	0.80	0.79		0.65 - 0.89
13C-123789-HxCDD	402/404	1.22	1.23	1.22	1.24	1.25		1.05 - 1.43

(#) Quality Control (QC) limits represent ±15% window around the theoretical ion abundance ratio. The laboratory must flag any analyte in any calibration solution which does not meet the ion abundance ratio QC limit by placing an asterisk in the flag column.

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122803
Date Analysed	28-Dec-10	Time Analysed	13:43:38
Init.Calib.Date:	07-Dec-10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.02	1.05	-3.4		0.77		0.65 - 0.89
2378-TCDF	304/306	0.89	0.91	-1.9		0.77		0.65 - 0.89
12378-PeCDF	340/342	0.94	0.93	1.2		1.55		1.32 - 1.78
12378-PeCDD	356/358	0.97	1.00	-3.3		1.55		1.32 - 1.78
23478-PeCDF	340/342	0.97	0.98	-1.8		1.54		1.32 - 1.78
123478-HxCDF	374/376	1.12	1.12	-0.2		1.22		1.05 - 1.43
123678-HxCDF	374/376	1.09	1.07	2.4		1.23		1.05 - 1.43
123478-HxCDD	390/392	0.97	0.99	-2.4		1.24		1.05 - 1.43
123678-HxCDD	390/392	0.94	0.94	0.4		1.23		1.05 - 1.43
123789-HxCDD	390/392	0.94	0.87	7.9		1.23		1.05 - 1.43
234678-HxCDF	374/376	1.09	1.10	-0.9		1.22		1.05 - 1.43
123789-HxCDF	374/376	1.03	1.04	-0.8		1.23		1.05 - 1.43
1234678-HpCDF	408/410	1.28	1.29	-0.9		1.02		0.89 - 1.21
1234678-HpCDD	424/426	1.02	1.01	0.3		1.03		0.89 - 1.21
1234789-HpCDF	408/410	1.29	1.30	-0.7		1.01		0.89 - 1.21
OCDD	458/460	1.00	1.02	-1.5		0.89		0.76 - 1.02
OCDF	442/444	1.13	1.17	-3.5		0.88		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	1.01	0.85	19.3		0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	0.81	0.65	24.6		1.57		1.32 - 1.78
13C-123478-HxCDD	402/404	1.01	1.04	-2.7		1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	1.01	1.15	-12.2		1.24		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.86	0.83	4.3		1.04		0.89 - 1.21
13C-OCDD	470/472	0.79	0.68	15.4		0.89		0.76 - 1.02
13C-2378-TCDF	316/318	1.57	1.42	10.1		0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.23	1.16	6.1		1.57		1.32 - 1.78
13C-23478-PeCDF	352/354	1.21	1.08	11.8		1.57		1.32 - 1.78
13C-123478-HxCDF	384/386	1.19	1.37	-13.1		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.26	1.54	-18.3		0.52		0.43 - 0.59
13C-234678-HxCDF	384/386	1.24	1.37	-9.8		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.13	1.10	2.6		0.53		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.03	1.13	-9.5		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.82	0.76	7.1		0.45		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.11	0.95	17.2		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.26		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122803
Date Analysed	28-Dec-10	Time Analysed	13:43:38
Init.Calib.Date:	07-Dec-10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.08
2378-TCDF	1.00	26.45
12378-PeCDF	1.00	30.57
12378-PeCDD	1.00	32.16
23478-PeCDF	1.00	31.92
123478-HxCDF	1.00	35.58
123678-HxCDF	1.00	35.73
123478-HxCDD	1.00	36.80
123678-HxCDD	1.00	36.92
123789-HxCDD	1.01	37.35
234678-HxCDF	1.00	36.67
123789-HxCDF	1.00	37.79
1234678-HpCDF	1.00	39.86
1234678-HpCDD	1.00	41.70
1234789-HpCDF	1.00	42.62
OCDD	1.00	47.72
OCDF	1.01	48.01

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.06
13C-12378-PeCDD	1.23	32.15
13C-123478-HxCDD	0.99	36.78
13C-123678-HxCDD	0.99	36.91
13C-1234678-HpCDD	1.12	41.68
13C-OCDD	1.28	47.70
13C-2378-TCDF	1.01	26.44
13C-12378-PeCDF	1.16	30.56
13C-23478-PeCDF	1.22	31.90
13C-123478-HxCDF	0.95	35.56
13C-123678-HxCDF	0.96	35.72
13C-234678-HxCDF	0.98	36.66
13C-123789-HxCDF	1.01	37.78
13C-1234678-HpCDF	1.07	39.85
13C-1234789-HpCDF	1.14	42.60

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.08

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.24

Internal Standards	RRT[#]	RT
13C-123789-HxCDD	0.00	37.34

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122809
Date Analysed	28-Dec-10	Time Analysed	19:01:37
Init.Calib.Date:	07-Dec-2010	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.02	1.05	-3.1		0.77		0.65 - 0.89
2378-TCDF	304/306	0.90	0.91	-0.1		0.77		0.65 - 0.89
12378-PeCDF	340/342	0.93	0.93	1.0		1.55		1.32 - 1.78
12378-PeCDD	356/358	0.98	1.00	-2.1		1.56		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-2.8		1.55		1.32 - 1.78
123478-HxCDF	374/376	1.12	1.12	-0.2		1.23		1.05 - 1.43
123678-HxCDF	374/376	1.09	1.07	2.1		1.23		1.05 - 1.43
123478-HxCDD	390/392	1.01	0.99	1.9		1.24		1.05 - 1.43
123678-HxCDD	390/392	0.92	0.94	-2.4		1.24		1.05 - 1.43
123789-HxCDD	390/392	0.95	0.87	9.0		1.23		1.05 - 1.43
234678-HxCDF	374/376	1.10	1.10	0.1		1.22		1.05 - 1.43
123789-HxCDF	374/376	1.04	1.04	0.3		1.23		1.05 - 1.43
1234678-HpCDF	408/410	1.29	1.29	0.6		1.01		0.89 - 1.21
1234678-HpCDD	424/426	1.03	1.01	1.9		1.04		0.89 - 1.21
1234789-HpCDF	408/410	1.28	1.30	-1.5		1.02		0.89 - 1.21
OCDD	458/460	1.01	1.02	-1.2		0.90		0.76 - 1.02
OCDF	442/444	1.14	1.17	-2.4		0.90		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	1.00	0.85	17.5		0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	0.83	0.65	26.3		1.58		1.32 - 1.78
13C-123478-HxCDD	402/404	1.01	1.04	-2.7		1.27		1.05 - 1.43
13C-123678-HxCDD	402/404	1.01	1.15	-12.1		1.25		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.80	0.83	-3.7		1.05		0.89 - 1.21
13C-OCDD	470/472	0.64	0.68	-6.3		0.88		0.76 - 1.02
13C-2378-TCDF	316/318	1.45	1.42	1.9		0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.24	1.16	7.2		1.58		1.32 - 1.78
13C-23478-PeCDF	352/354	1.25	1.08	15.5		1.57		1.32 - 1.78
13C-123478-HxCDF	384/386	1.18	1.37	-13.6		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.22	1.54	-20.9		0.53		0.43 - 0.59
13C-234678-HxCDF	384/386	1.24	1.37	-9.3		0.53		0.43 - 0.59
13C-123789-HxCDF	384/386	1.10	1.10	0.0		0.53		0.43 - 0.59
13C-1234678-HpCDF	418/420	0.94	1.13	-17.1		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.76	0.76	-0.5		0.46		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.10	0.95	16.5		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.25		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122809
Date Analysed	28-Dec-10	Time Analysed	19:01:37
Init.Calib.Date:	07-Dec-2010	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.09
2378-TCDF	1.00	26.47
12378-PeCDF	1.00	30.60
12378-PeCDD	1.00	32.19
23478-PeCDF	1.00	31.93
123478-HxCDF	1.00	35.60
123678-HxCDF	1.00	35.75
123478-HxCDD	1.00	36.81
123678-HxCDD	1.00	36.94
123789-HxCDD	1.01	37.36
234678-HxCDF	1.00	36.69
123789-HxCDF	1.00	37.80
1234678-HpCDF	1.00	39.88
1234678-HpCDD	1.00	41.71
1234789-HpCDF	1.00	42.63
OCDD	1.00	47.75
OCDF	1.01	48.04

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.06
13C-12378-PeCDD	1.23	32.16
13C-123478-HxCDD	0.99	36.79
13C-123678-HxCDD	0.99	36.92
13C-1234678-HpCDD	1.12	41.70
13C-OCDD	1.28	47.74
13C-2378-TCDF	1.01	26.44
13C-12378-PeCDF	1.16	30.57
13C-23478-PeCDF	1.22	31.91
13C-123478-HxCDF	0.95	35.58
13C-123678-HxCDF	0.96	35.73
13C-234678-HxCDF	0.98	36.67
13C-123789-HxCDF	1.01	37.79
13C-1234678-HpCDF	1.07	39.86
13C-1234789-HpCDF	1.14	42.61

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.09

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.26

SB69 : [illegible]

Internal Standards	RRT#	RT
13C-123789-HxCDD	0.00	37.35

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122815
Date Analysed	29-Dec-10	Time Analysed	00:21:09
Init.Calib.Date:		Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.02	1.05	-3.5		0.76		0.65 - 0.89
2378-TCDF	304/306	0.91	0.91	0.3		0.76		0.65 - 0.89
12378-PeCDF	340/342	0.92	0.93	-0.8		1.57		1.32 - 1.78
12378-PeCDD	356/358	0.99	1.00	-0.9		1.57		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-3.1		1.53		1.32 - 1.78
123478-HxCDF	374/376	1.11	1.12	-0.8		1.22		1.05 - 1.43
123678-HxCDF	374/376	1.10	1.07	3.4		1.23		1.05 - 1.43
123478-HxCDD	390/392	0.98	0.99	-1.0		1.25		1.05 - 1.43
123678-HxCDD	390/392	0.94	0.94	0.4		1.24		1.05 - 1.43
123789-HxCDD	390/392	0.91	0.87	5.1		1.23		1.05 - 1.43
234678-HxCDF	374/376	1.09	1.10	-0.9		1.23		1.05 - 1.43
123789-HxCDF	374/376	1.04	1.04	0.1		1.23		1.05 - 1.43
1234678-HpCDF	408/410	1.29	1.29	-0.1		1.02		0.89 - 1.21
1234678-HpCDD	424/426	1.03	1.01	1.3		1.05		0.89 - 1.21
1234789-HpCDF	408/410	1.29	1.30	-0.8		1.03		0.89 - 1.21
OCDD	458/460	1.01	1.02	-1.0		0.89		0.76 - 1.02
OCDF	442/444	1.17	1.17	0.3		0.91		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	0.98	0.85	15.2		0.79		0.65 - 0.89
13C-12378-PeCDD	368/370	0.84	0.65	29.0		1.56		1.32 - 1.78
13C-123478-HxCDD	402/404	1.05	1.04	1.6		1.25		1.05 - 1.43
13C-123678-HxCDD	402/404	1.02	1.15	-11.3		1.25		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.82	0.83	-0.2		1.04		0.89 - 1.21
13C-OCDD	470/472	0.72	0.68	5.8		0.89		0.76 - 1.02
13C-2378-TCDF	316/318	1.52	1.42	6.9		0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.26	1.16	8.9		1.58		1.32 - 1.78
13C-23478-PeCDF	352/354	1.25	1.08	15.6		1.56		1.32 - 1.78
13C-123478-HxCDF	384/386	1.15	1.37	-15.9		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.19	1.54	-22.6		0.52		0.43 - 0.59
13C-234678-HxCDF	384/386	1.21	1.37	-11.6		0.52		0.43 - 0.59
13C-123789-HxCDF	384/386	1.13	1.10	2.3		0.53		0.43 - 0.59
13C-1234678-HpCDF	418/420	0.97	1.13	-14.3		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.80	0.76	4.6		0.46		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.07	0.95	12.8		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.24		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122815
Date Analysed	29-Dec-10	Time Analysed	00:21:09
Init.Calib.Date:		Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.09
2378-TCDF	1.00	26.47
12378-PeCDF	1.00	30.60
12378-PeCDD	1.00	32.19
23478-PeCDF	1.00	31.94
123478-HxCDF	1.00	35.61
123678-HxCDF	1.00	35.75
123478-HxCDD	1.00	36.81
123678-HxCDD	1.00	36.94
123789-HxCDD	1.01	37.37
234678-HxCDF	1.00	36.69
123789-HxCDF	1.00	37.81
1234678-HpCDF	1.00	39.88
1234678-HpCDD	1.00	41.72
1234789-HpCDF	1.00	42.64
OCDD	1.00	47.76
OCDF	1.01	48.05

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.08
13C-12378-PeCDD	1.22	32.16
13C-123478-HxCDD	0.99	36.80
13C-123678-HxCDD	0.99	36.93
13C-1234678-HpCDD	1.12	41.71
13C-OCDD	1.28	47.74
13C-2378-TCDF	1.01	26.45
13C-12378-PeCDF	1.16	30.59
13C-23478-PeCDF	1.22	31.92
13C-123478-HxCDF	0.95	35.58
13C-123678-HxCDF	0.96	35.74
13C-234678-HxCDF	0.98	36.68
13C-123789-HxCDF	1.01	37.80
13C-1234678-HpCDF	1.07	39.87
13C-1234789-HpCDF	1.14	42.63

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.09

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.26

SB69 : [illegible]

Internal Standards	RRT#	RT
13C-123789-HxCDD	0.00	37.36

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122903
Date Analysed	29-Dec-10	Time Analysed	12:40:35
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.03	1.05	-2.7		0.78		0.65 - 0.89
2378-TCDF	304/306	0.90	0.91	-1.1		0.76		0.65 - 0.89
12378-PeCDF	340/342	0.92	0.93	-0.1		1.52		1.32 - 1.78
12378-PeCDD	356/358	0.97	1.00	-2.6		1.57		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-3.4		1.52		1.32 - 1.78
123478-HxCDF	374/376	1.12	1.12	-0.2		1.24		1.05 - 1.43
123678-HxCDF	374/376	1.10	1.07	2.8		1.22		1.05 - 1.43
123478-HxCDD	390/392	0.98	0.99	-1.0		1.25		1.05 - 1.43
123678-HxCDD	390/392	0.95	0.94	0.7		1.24		1.05 - 1.43
123789-HxCDD	390/392	0.95	0.87	9.0		1.24		1.05 - 1.43
234678-HxCDF	374/376	1.09	1.10	-0.6		1.24		1.05 - 1.43
123789-HxCDF	374/376	1.03	1.04	-0.4		1.23		1.05 - 1.43
1234678-HpCDF	408/410	1.28	1.29	-0.4		1.03		0.89 - 1.21
1234678-HpCDD	424/426	1.05	1.01	3.3		1.04		0.89 - 1.21
1234789-HpCDF	408/410	1.32	1.30	1.6		1.02		0.89 - 1.21
OCDD	458/460	1.01	1.02	-0.8		0.90		0.76 - 1.02
OCDF	442/444	1.14	1.17	-1.9		0.89		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	1.01	0.85	18.9		0.78		0.65 - 0.89
13C-12378-PeCDD	368/370	0.84	0.65	29.0		1.57		1.32 - 1.78
13C-123478-HxCDD	402/404	0.98	1.04	-5.7		1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	1.00	1.15	-12.7		1.24		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.86	0.83	3.6		1.04		0.89 - 1.21
13C-OCDD	470/472	0.79	0.68	15.9		0.89		0.76 - 1.02
13C-2378-TCDF	316/318	1.53	1.42	7.1		0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.28	1.16	10.1		1.56		1.32 - 1.78
13C-23478-PeCDF	352/354	1.26	1.08	17.0		1.57		1.32 - 1.78
13C-123478-HxCDF	384/386	1.19	1.37	-13.2		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.25	1.54	-19.0		0.52		0.43 - 0.59
13C-234678-HxCDF	384/386	1.22	1.37	-11.4		0.53		0.43 - 0.59
13C-123789-HxCDF	384/386	1.11	1.10	0.5		0.53		0.43 - 0.59
13C-1234678-HpCDF	418/420	1.03	1.13	-9.3		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.81	0.76	6.9		0.45		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.11	0.95	17.4		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.25		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column.

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122903
Date Analysed	29-Dec-10	Time Analysed	12:40:35
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.06
2378-TCDF	1.00	26.42
12378-PeCDF	1.00	30.56
12378-PeCDD	1.00	32.14
23478-PeCDF	1.00	31.90
123478-HxCDF	1.00	35.56
123678-HxCDF	1.00	35.70
123478-HxCDD	1.00	36.78
123678-HxCDD	1.00	36.90
123789-HxCDD	1.01	37.33
234678-HxCDF	1.00	36.65
123789-HxCDF	1.00	37.77
1234678-HpCDF	1.00	39.84
1234678-HpCDD	1.00	41.67
1234789-HpCDF	1.00	42.59
OCDD	1.00	47.69
OCDF	1.01	47.98

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.03
13C-12378-PeCDD	1.23	32.13
13C-123478-HxCDD	0.99	36.76
13C-123678-HxCDD	0.99	36.89
13C-1234678-HpCDD	1.12	41.66
13C-OCDD	1.28	47.67
13C-2378-TCDF	1.01	26.41
13C-12378-PeCDF	1.16	30.54
13C-23478-PeCDF	1.22	31.88
13C-123478-HxCDF	0.95	35.54
13C-123678-HxCDF	0.96	35.69
13C-234678-HxCDF	0.98	36.64
13C-123789-HxCDF	1.01	37.75
13C-1234678-HpCDF	1.07	39.82
13C-1234789-HpCDF	1.14	42.57

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.06

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.23

Internal Standards	RRT#	RT
13C-123789-HxCDD	0.00	37.32

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

USEPA
7DFA - Form VII-HR CDD-1
CDD/CDF CONTINUING CALIBRATION SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122910
Date Analysed	29-Dec-10	Time Analysed	18:49:02
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
2378-TCDD	320/322	1.01	1.05	-4.7		0.77		0.65 - 0.89
2378-TCDF	304/306	0.90	0.91	-0.2		0.80		0.65 - 0.89
12378-PeCDF	340/342	0.94	0.93	1.1		1.54		1.32 - 1.78
12378-PeCDD	356/358	0.99	1.00	-1.3		1.55		1.32 - 1.78
23478-PeCDF	340/342	0.95	0.98	-3.3		1.54		1.32 - 1.78
123478-HxCDF	374/376	1.12	1.12	0.0		1.23		1.05 - 1.43
123678-HxCDF	374/376	1.09	1.07	2.1		1.23		1.05 - 1.43
123478-HxCDD	390/392	1.00	0.99	1.2		1.23		1.05 - 1.43
123678-HxCDD	390/392	0.92	0.94	-2.0		1.23		1.05 - 1.43
123789-HxCDD	390/392	0.99	0.87	13.3		1.25		1.05 - 1.43
234678-HxCDF	374/376	1.08	1.10	-1.3		1.23		1.05 - 1.43
123789-HxCDF	374/376	1.04	1.04	0.7		1.24		1.05 - 1.43
1234678-HpCDF	408/410	1.30	1.29	0.8		1.03		0.89 - 1.21
1234678-HpCDD	424/426	1.03	1.01	1.4		1.04		0.89 - 1.21
1234789-HpCDF	408/410	1.28	1.30	-1.3		1.03		0.89 - 1.21
OCDD	458/460	1.00	1.02	-1.6		0.89		0.76 - 1.02
OCDF	442/444	1.14	1.17	-2.1		0.91		0.76 - 1.02

Labeled Compounds	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
13C-2378-TCDD	332/334	1.03	0.85	21.4		0.79		0.65 - 0.89
13C-12378-PeCDD	368/370	0.84	0.65	28.0		1.57		1.32 - 1.78
13C-123478-HxCDD	402/404	0.96	1.04	-7.5		1.26		1.05 - 1.43
13C-123678-HxCDD	402/404	1.01	1.15	-12.4		1.26		1.05 - 1.43
13C-1234678-HpCDD	436/438	0.85	0.83	3.2		1.04		0.89 - 1.21
13C-OCDD	470/472	0.79	0.68	15.7		0.89		0.76 - 1.02
13C-2378-TCDF	316/318	1.53	1.42	7.5		0.78		0.65 - 0.89
13C-12378-PeCDF	352/354	1.28	1.16	9.9		1.56		1.32 - 1.78
13C-23478-PeCDF	352/354	1.24	1.08	15.4		1.57		1.32 - 1.78
13C-123478-HxCDF	384/386	1.16	1.37	-15.5		0.52		0.43 - 0.59
13C-123678-HxCDF	384/386	1.23	1.54	-20.1		0.53		0.43 - 0.59
13C-234678-HxCDF	384/386	1.24	1.37	-9.6		0.53		0.43 - 0.59
13C-123789-HxCDF	384/386	1.12	1.10	1.4		0.52		0.43 - 0.59
13C-1234678-HpCDF	418/420	0.98	1.13	-13.3		0.45		0.37 - 0.51
13C-1234789-HpCDF	418/420	0.82	0.76	7.8		0.44		0.37 - 0.51

Clean-up	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ratio Flag#	Ratio QC Limits
37CL-2378-TCDD	328	1.13	0.95	19.0		NA	NA	NA

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-1234-TCDD	332/334	NA	NA	NA	NA	0.79		0.65 - 0.89

Internal Standards	Selected Ions	RRF	Mean RRF	%D	%D Flag#	Ion Ratio	Ion Ratio Flag#	Ion Ratio QC Limits
13C-123789-HxCDD	402/404	NA	NA	NA	NA	1.26		1.05 - 1.43

(#) The laboratory must flag any analyte which does not meet the criteria for Percentage Difference (%D) or ion abundance ratio by placing an asterisk in the appropriate flag column

USEPA
7DFB - Form VII-HR CDD-2
CDD/CDF CONTINUING CALIBRATION RETENTION TIME SUMMARY
HIGH RESOLUTION

Lab Name:	ARI	Contract:	HART CROWSER
Lab Code:	SB69	Case No.:	CUSTOM PLYWOOD
TO No.:		SDG No.:	
GC Column:	RTX-DIOXIN2	ID (mm):	.25
Instrument ID:	AUTOSPEC1	Lab File ID:	10122910
Date Analysed	29-Dec-10	Time Analysed	18:49:02
Init.Calib.Date:	07-DEC-10	Init.Calib.Time:	

Target Analytes	RRT#	RT
2378-TCDD	1.00	27.03
2378-TCDF	1.00	26.41
12378-PeCDF	1.00	30.54
12378-PeCDD	1.00	32.13
23478-PeCDF	1.00	31.88
123478-HxCDF	1.00	35.54
123678-HxCDF	1.00	35.69
123478-HxCDD	1.00	36.76
123678-HxCDD	1.00	36.89
123789-HxCDD	1.01	37.32
234678-HxCDF	1.00	36.64
123789-HxCDF	1.00	37.75
1234678-HpCDF	1.00	39.81
1234678-HpCDD	1.00	41.66
1234789-HpCDF	1.00	42.57
OCDD	1.00	47.66
OCDF	1.01	47.96

Labeled Compounds	RRT#	RT
13C-2378-TCDD	1.03	27.02
13C-12378-PeCDD	1.23	32.11
13C-123478-HxCDD	0.99	36.75
13C-123678-HxCDD	0.99	36.87
13C-1234678-HpCDD	1.12	41.63
13C-OCDD	1.28	47.65
13C-2378-TCDF	1.01	26.39
13C-12378-PeCDF	1.16	30.52
13C-23478-PeCDF	1.22	31.87
13C-123478-HxCDF	0.95	35.53
13C-123678-HxCDF	0.96	35.67
13C-234678-HxCDF	0.98	36.61
13C-123789-HxCDF	1.01	37.73
13C-1234678-HpCDF	1.07	39.80
13C-1234789-HpCDF	1.14	42.56

Clean up Standard	RRT#	RT
37CL-2378-TCDD	1.03	27.03

Internal Standards	RRT#	RT
13C-1234-TCDD	0.00	26.20

Internal Standards	RRT#	RT
13C-123789-HxCDD	0.00	37.29

(#) RRT = (RT of Analyte)/(RT of appropriate labeled compound).

Total Solids

ARI Job ID: SB69

Extractions Total Solids-extts
Data By: Allison J. Benny
Created: 12/20/10

Worklist: 393
Analyst: RVR
Comments:

Oven ID:_______________

Balance ID:_______________

Samples In: Date:_______ Time:_______ Temp:_______ Analyst:_______

Samples Out: Date:_______ Time:_______ Temp:_______ Analyst:_______

	ARI ID CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% Solids	pH
1.	SB69A 10-31595 HC-SS-14	1.19	13.34	7.52	52.1	NR
2.	SB69B 10-31596 HC-SC-2-3'	1.17	11.25	4.01	28.2	NR
3.	SB69C 10-31597 HC-SC-4-3'	1.16	12.15	3.60	22.2	NR
4.	SB69D 10-31598 HC-SC-5-3'	1.16	11.47	3.53	23.0	NR
5.	SB69E 10-31599 HC-SC-6-3'	1.16	13.32	8.68	61.8	NR
6.	SB69F 10-31600 HC-SC-7-3'	1.17	12.99	9.83	73.3	NR
7.	SB69G 10-31601 HC-SC-15-0-10cm	1.17	13.09	7.86	56.1	NR
8.	SB69H 10-31602 HC-SC-15-3'	1.17	11.09	5.08	39.4	NR

Extractions Total Solids-extts
Data By: Allison J. Benny
Created: 12/20/10

Worklist: 393
Analyst: AJB
Comments:

Oven ID: Ø15

Balance ID: 21754520

Samples In: Date: 12/20/10 Time: 14:45 Temp: 101 Analyst: AB

Samples Out: Date 12/21/10 Time: Ø6:3Ø Temp: 1Ø2° Analyst: RR

ARI ID CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% Solids	pH
1. SB69A 10-31595 HC-SS-14	1.19	13.34	7.52		NR
2. SB69B 10-31596 HC-SC-2-3'	1.17	11.25	4.Ø1		NR
3. SB69C 10-31597 HC-SC-4-3'	1.16	12.15	3.~~63~~ 6Ø RR12/21/10		NR
4. SB69D 10-31598 HC-SC-5-3'	1.16	11.47	3.53		NR
5. SB69E 10-31599 HC-SC-6-3'	1.16	13.32	8.68		NR
6. SB69F 10-31600 HC-SC-7-3'	1.17	12.99	9.83		NR
7. SB69G 10-31601 HC-SC-15-0-10cm	1.17	13.09	7.86		NR
8. SB69H 10-31602 HC-SC-15-3'	1.17	11.09	5.Ø8		NR