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**SITE INSPECTION
MAKAH RESEVERVATION
WARMHOUSE BEACH DUMP**

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List of Abbreviations and Acronyms

<u>Term</u>	<u>Definition</u>
%R	Percent Recovery
µg/kg	Micrograms per Kilogram
BA	Biological Assessment
bgs	Below Ground Surface
BS	Blank Spike
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	Cubic Feet Per Second
CLP	Contract Laboratory Program
COC	Contaminant of Concern
CRQL	Contract Required Quantitation Limit
Dioxins/Furans	Polychlorinated Dibenzo-p-Dioxins/Polychlorinated Dibenzofurans
DoD	Department of Defense
DQO	Data Quality Objective
E & E	Ecology and Environment, Inc.
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
GPS	Global Positioning System
IDW	Investigation-Derived Waste
IHS	Indian Health Service
MEL	Manchester Environmental Laboratory
MCL	Maximum Contaminant Level
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MTCA	Model Toxics Control Act
NPL	National Priorities List
PA	Preliminary Assessment
PAH	Polynuclear Aromatic Hydrocarbon
PBDE	Polybrominated Diphenyl Ether
PCB	Polychlorinated Biphenyl
PEL	Probable Effects Level
PM	Project Manager
PPE	Probable Point of Entry
QA	Quality Assurance
QC	Quality Control

List of Abbreviations and Acronyms (cont.)

<u>Term</u>	<u>Definition</u>
RA	Removal Assessment
RBC	Risk-Based Concentration
Ridolfi	Ridolfi Engineering, Inc.
RPD	Relative Percent Difference
RSL	Regional Screening Level
SI	Site Inspection
SPAF	Sample Plan Alteration Form
SPIP	Strategic Project Implementation Plan
SPLP	Synthetic Precipitation Leaching Procedure
SQAP	Sampling and Quality Assurance Plan
SQL	Sample Quantitation Limit
START	Superfund Technical Assessment and Response Team
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCDD	2,3,7,8-Tetrachlorodibenzo-p-Dioxin, Dioxin
TDL	Target Distance Limit
TEL	Threshold Effect Level
TM	Task Monitor
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
USAF	United States Air Force
VOC	Volatile Organic Compound
WBD	Warmhouse Beach Dump

1

Introduction

Ecology and Environment, Inc., (E & E) was tasked by the United States Environmental Protection Agency (EPA) to provide technical support for completion of a Site Inspection (SI) at the Makah Reservation Warmhouse Beach Dump (WBD). E & E completed SI activities under Technical Direction Document Number 11-01-0013, issued under EPA, Region 10, Superfund Technical Assessment and Response Team (START)-3, Contract Number EP-S7-06-02.

The specific goals for the Makah Reservation WBD SI, identified by the EPA, are to:

- Determine the potential threat to public health or the environment posed by the site;
- Determine the potential for a release of hazardous constituents into the environment; and
- Determine the potential for placement of the site on the National Priorities List (NPL).

Completion of the SI included reviewing existing site information, determining regional characteristics, collecting receptor information within the range of site influence, executing a sampling plan, and producing this report. The report is organized as follows:

- Section 1, Introduction – Authority for performance of this work, goals for the project, and summary of the report contents;
- Section 2, Site Background – Site description, site operations and waste characteristics, and a summary of investigation locations;
- Section 3, Field Activities and Analytical Protocol – Summary of the field effort;
- Section 4, Quality Assurance/Quality Control (QA/QC) – Summary of the laboratory data;
- Section 5, Analytical Results Reporting and Background Samples – Discussion of results reporting criteria and background sample locations and analytical results;
- Section 6, Potential Sources – Discussion of site sources, sample locations, and analytical results;



- Section 7, Surface Water Migration Pathways and Targets – Discussion of the migration/exposure pathways, sample locations, and analytical results;
- Section 8, Summary and Conclusions – Summary of the investigation and recommendation for the site based on the information gathered during the investigation; and
- Section 9, References – Alphabetical listing of the references cited throughout the text.

2

Site Background

This section describes the background of the site including location, description, ownership history, operations and source characteristics, previous investigations, and the SI site visit. In particular, a preliminary assessment (PA) was completed in November 2010 on behalf of the EPA (TechLaw 2010a). The information contained in this section has largely been excerpted, with original references and minor modifications, from that document for the descriptions provided in this section. Refer to the PA for these reference citations.

2.1 Site Location

Site Name:	Makah Reservation Warmhouse Beach Dump
CERCLIS ID Number:	WAN001002857
Site Address:	Unnamed Road leading to Koitlah Point Neah Bay, Washington 98357
Latitude:	48° 23' 20" North
Longitude:	-124° 29' 24" West
Legal Description:	Township 33 North, Range 15 West, Section 4
County:	Clallam
Congressional District:	6
Site Owner:	Makah Tribal Council P.O. Box 115 Neah Bay, Washington 98357 360-645-2201
Site Operator:	Makah Tribal Council P.O. Box 115 Neah Bay, Washington 98357 360-645-2201
Site Contact:	Michael Lawrence Tribal Council Chairman 360-645-3235 Steve Pendleton Environmental Program Manager 360-645-3289

2.2 Site Description

The Makah Reservation WBD is located 2 to 3 miles northwest of Neah Bay in Clallam County, Washington (Figure 2-1), and is situated on a ridge line overlooking the Strait of Juan de Fuca. The site is used by local residents as a landfill. The dump is accessible off an unpaved gravel road from the road leading to Koitlah Point. The oval-shaped dump occupies 7 acres in a saddle, or ravine, at the top of the ridge. Drainage from the saddle occurs to both the west and the east, reaching an unnamed creek in each direction. These creeks will hereby be referred to as “West Creek” and “East Creek.” West Creek discharges to Warmhouse Beach along the Strait of Juan de Fuca. This beach is used for camping, shellfish harvesting, surfing, and other recreational activities (Ridolfi 2006). East Creek discharges to an unnamed beach on the Strait of Juan de Fuca. This beach will hereby be referred to as “East Beach.” This beach is used for shellfish harvesting.

The dump is bordered by forests and is approximately 800 feet inland from the Strait of Juan de Fuca shoreline at an elevation of approximately 260 feet above mean sea level (Ridolfi 2003; Ridolfi 2001b; Ridolfi 2006).

2.3 Site Ownership History

As part of the 1855 Treaty of Neah Bay (ratified March 8, 1855), the Makah Reservation was established, and the Makah Tribe reserved ownership of the tract of land on which the present dump site is located. The U.S. Government leased various areas from the Makah Reservation for national defense purposes, including a United States Air Force (USAF) station, until 1988 when the station was closed. Available records do not indicate that the dump site was ever owned or leased by any entity other than the Makah Tribe (TechLaw 2010a).

2.4 Site Operations and Source Characteristics

The USAF and the United States Department of the Navy began using the WBD in the 1940s. Other dumps at Koitlah Point, Cape Flattery, and at the breakwater also were used; however, Department of Defense (DoD) records indicate the WBD was more actively used after the Koitlah Point Dump closed in the 1960s. Since the 1960s, the United States Army, USAF, Bureau of Indian Affairs, and Indian Health Service (IHS) have used the dump. The Makah Solid Waste Management Department has been recommending closure since 1963 (Ridolfi 2003; Ridolfi 2001a).

The Makah Air Force Station operated on the Makah Reservation from World War II until 1988. The dump was used to dispose of household and hazardous wastes. A DoD Site Assessment Report stated “hazardous waste is known to have been disposed of by DoD in the landfill.” Polychlorinated biphenyls (PCBs) and asbestos were reportedly disposed at the dump (Ridolfi 2003; Ridolfi 2001a). According to the 1995 White Shield Waste Delineation and Characterization Report, batteries, used motor oil, hypodermic needles, tires, appliances, roofing

and construction materials, car bodies, household waste, and glass also were disposed. Table 2-1 provides a summary of waste in the WBD (TechLaw 2010a).

Waste materials were originally dumped into the ravine from the access road on the ravine's south side. As the ravine filled with waste material, a road embankment was constructed on top of the waste and across the ravine. This road embankment increased the dump's accessibility and allowed additional filling of the ravine to the east and west. Subsequently, the access road was extended to the top of the ridge. Since then, waste materials have been dumped from the top of the ridge down toward the ravine to the south. A layer of waste covers the steep hillside that faces south toward the ravine. Waste also has been dumped from the top of the ridge down toward the north and northeast. The wastes are now partially burned (Ridolfi 2001a; Ridolfi 2006). The dump is currently used by the Makah Tribe and serves approximately 1,500 tribal members from 492 residences (TechLaw 2010a).

2.5 Previous Investigations

The following sections describe previous environmental investigations and other related investigations that have been conducted at the site.

2.5.1 1993 EPA Landfill Closure Plan

In 1993, EPA began developing engineering alternatives to close the WBD. After a site visit, three alternatives were proposed: minimal soil cover; consolidation and capping; and excavation and haul to a conforming landfill. Consolidation and capping was selected as the method that would protect human health and the environment (Ridolfi 2003; SAIC 1993).

2.5.2 1995 Open Dump Inventory

In 1995, the U.S. Department of Health and Human Services and IHS inventoried the WBD pursuant to the Indian Lands Open Dump Clean-Up Act of 1994. Based on this assessment, the dump was listed on the IHS Sanitary Deficiency System as Number WA05344-0301 and was ranked as a high potential threat to human health and the environment (Ridolfi 2003; DHHS and IHS 1995).

2.5.3 1995 Waste Delineation and Characterization Report

In 1995, White Shield, Inc. completed a Waste Delineation and Characterization Report with the purpose of determining which waste streams and subsoil materials were present. A topographic survey was completed and nine test pits were excavated. From this investigation, it was determined the dump occupies approximately 3 acres of mixed waste that varies in depth from the surface to over 22 feet below ground surface (bgs). No samples were collected for laboratory analysis (Ridolfi 2003; White Shield 1995).

2.5.4 1999 Draft Makah Reservation Waste Management Plan

In 1999, a draft plan for solid waste management was completed that included an evaluation of waste streams, a review of current and future regional disposal opportunities, and proposed alternatives to close the WBD. Closure in place and excavation and export were evaluated (Ridolfi 2003; B&C 1999).

2.5.5 2001 Biological Assessment

In spring 2001, Makah wildlife biologists prepared a Biological Assessment (BA) for industrial development on the Makah Reservation. Although the BA did not specifically address the WBD, the dump was identified as a source of adverse effects to marbled murrelets (*Brachyramphus marmoratus*) (Ridolfi 2003; McCoy 2001).

2.5.6 2001 Draft Makah Strategic Project Implementation Plan

In 2001, Ridolfi Engineering, Inc. (Ridolfi) prepared a Draft Strategic Project Implementation Plan (SPIP) for DoD to address environmental mitigation on the Makah Reservation. The SPIP summarized the historical uses of the Makah Reservation by DoD, discussed environmental impacts, and outlined a clean-up approach. Consolidation and closure in place were proposed for the WBD (Ridolfi 2003; Ridolfi 2001a). The SPIP subsequently was updated in August 2006 (Ridolfi 2006).

2.5.7 2001 Hydrogeological Investigation

In 2001, the Makah Environmental Restoration Team conducted a hydrogeological investigation to support plans for closing the WBD. Four monitoring wells were installed along the perimeter of the dump. The investigation determined a layer of waste and soil overlies a hard gray siltstone. Water was encountered in one well; however, the well did not yield 0.1 gallon per minute of potable ground water and, therefore, did not meet the regulatory definition of an aquifer (Ridolfi 2003; Ridolfi 2001b). Monitoring well MW4 was covered with waste debris shortly after installation and subsequently has not been sampled during routine sampling events (Ridolfi 2008).

Ground water, surface water, subsurface soil, and sediment samples were collected during the hydrogeological investigation and analyzed for polynuclear aromatic hydrocarbons (PAHs), PCBs, total petroleum hydrocarbons (TPH), TPH as Diesel Range Organics, TPH as Gasoline Range Organics, and Target Analyte List (TAL) Metals. Barium, chromium, lead, selenium, vanadium, and zinc were detected at concentrations exceeding the EPA drinking water standards. Surface water and sediment samples contained cadmium, chromium, copper, lead, and zinc at concentrations “considerably higher” than the Criteria for Maximum Concentrations (Ridolfi 2003; Ridolfi 2001b).



2.5.8 2002 Draft Solid Waste Management Plan

Ridolfi prepared a solid waste management plan to address existing solid waste, provide alternative solid waste options, and discuss increasing reuse and recycling (Ridolfi 2003; Ridolfi 2002a).

2.5.9 2002 Preliminary Engineering Report / Environmental Report

Ridolfi prepared five alternatives to using the WBD for solid waste disposal. In addition, three locations for a transfer station were evaluated (Ridolfi 2003; Ridolfi 2002c). The Environmental Report evaluated the five alternatives from an environmental perspective and analyzed the environmental impacts associated with the three proposed transfer station locations (Ridolfi 2002c; Ridolfi 2002d).

2.5.10 2003 Draft Warmhouse Beach Dump Closure Plan

In 2003, Ridolfi developed a Draft Closure Plan for the WBD. The plan further developed previous studies that evaluated various closure options. The two remedies selected for comparison in the plan were a "Slope Option" and a "Ravine Option." The Slope Option consolidated approximately 22,000 cubic yards of waste and contaminated soil currently located along the access road, the hillside, and the east and west areas of the dump. The Ravine Option relocated the waste along the access road and hillside to the top of the existing waste in the ravine. For this option, approximately 28,000 cubic yards of waste and contaminated soil would be excavated and placed in the ravine, adding an additional 20 vertical feet of waste (Ridolfi 2003).

2.5.11 2004 Site Investigation, Semi-Annual Sampling Event

In October 2004, Ridolfi collected four ground water samples to verify that contaminants were not migrating from the dump. Two surface water and sediment samples also were collected from the East Creek and West Creek. Arsenic and lead were detected in at least one ground water sample at a concentration exceeding EPA Maximum Contaminant Levels (MCLs). Arsenic was the only constituent detected above "screening levels" in the surface water samples collected (the original document was not available in the file material; the referenced document does not specify which screening levels were used). Lead, manganese, nickel, and zinc were detected at a concentration exceeding the "screening levels" in at least one sediment sample (Ridolfi 2009a).

2.5.12 2006 Semi-Annual Sampling Event

In March 2006, Ridolfi and the Makah Environmental Restoration Team collected three ground water, two surface water, and two sediment samples. Ground water samples were collected from existing monitoring wells, and surface water and sediment samples were collected from the East Creek and West Creek. Arsenic and lead were detected in one ground water sample at concentrations exceeding "screening levels" (the original document was not available in file material; the referenced document does not specify which screening levels were used). Concentrations of arsenic, copper, and lead exceeded "screening levels" in the surface water samples collected. West Creek contained higher concentrations than East Creek. Chromium, copper, and nickel were detected at concentrations



exceeding the screening levels in sediment samples. In addition, several metals that can be indicators of landfill leachate (calcium, iron, manganese, and sodium) were detected at concentrations several times greater than the background concentrations (Ridolfi 2009a).

2.5.13 2007 Makah Seafood Study, Phase I

In 2007, Ridolfi conducted the first phase of a three-year seafood study. Fifty-seven seafood samples were collected from 10 locations. Samples were analyzed for PAHs, PCBs, chlorinated pesticides, various metals, percent lipids, and moisture content. One chiton sample and three blue mussel samples were collected from Warmhouse Beach. Several seafood samples were also collected from the Strait of Juan de Fuca, including pink salmon, black cod, lingcod, Dungeness crab, black rockfish, kelp greenling, China rockfish, cabezon rockfish, and blue rockfish. Sample results were compared to EPA Region 3 Risk-Based Concentrations (RBCs) for fish tissue. Arsenic and cadmium were detected at concentrations exceeding their RBCs in the chiton and all three blue mussel samples collected from Warmhouse Beach. Arsenic also was detected in several seafood samples collected from the Strait of Juan de Fuca.

It was concluded that the small data set collected during Phase I of the study limited the ability to identify concentration trends. The study made several recommendations for work to be completed during a Phase II study including: collection of background samples from Freshwater Bay for comparison purposes; further research into cadmium levels detected in the blue mussel samples; use of more-sensitive analytical procedures to achieve lower reporting limits for PCBs; further analysis of arsenic and mercury detected in samples; and continued training of field crews (Ridolfi 2007).

2.5.14 December 2007 Semi-Annual Sampling Event

In 2007, Ridolfi collected three co-located surface water and sediment samples: one from East Creek; one from West Creek; and one background sample from Classet Creek. Three additional sediment samples were collected from West Creek. Ground water samples were collected from the three existing monitoring wells. Arsenic was detected at a concentration that exceeded the Makah Indian Tribe Water Quality Standards for Surface Waters in a surface water sample. Sediment samples were compared to the threshold effect level (TEL) or probable effect level (PEL) for freshwater ecosystems. In addition, sediment and surface water samples were compared to background concentrations from samples collected in Classet Creek. Ground water samples compared MCLs, EPA Secondary Drinking Water Regulations, and Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Methods A and B cleanup levels. Total PCB concentrations exceeded sediment screening levels in samples from both East Creek and West Creek. Several metals were detected at concentrations exceeding criteria values in sediment and the ground water samples (Ridolfi 2008).

It was concluded in the sampling event report that metal concentrations in surface water samples collected from East Creek and West Creek have remained relatively constant over time, with more metals detected at upstream locations compared to downstream locations. Diesel-range and motor oil range hydrocarbons, PAHs, PCBs, and metals concentrations in both creeks were concluded to have remained relatively constant over time. Concentrations were determined to be higher at upstream locations compared to downstream locations. PCBs were considered a contaminant of concern (COC) in sediment, particularly in West Creek. Most metals concentrations were determined to be comparable or higher in West Creek than in East Creek, and were most often detected at higher concentrations upstream than downstream. Further, it was concluded that most metals concentrations in ground water had decreased over time (Ridolfi 2008).

2.5.15 Open Dump Closure Project (Date Unknown, post 2008)

The Makah Tribe prepared an Open Dump Closure Project Report to discuss the construction of a transfer station and closure of the WBD. In the report, the objectives specifically identified were the closure of the WBD and the design, construction, and operation of a solid waste transfer station and resource recovery facility (Makah; in progress).

2.5.16 May 2009 Semi-Annual Sampling Event

In 2009, Ridolfi conducted a round of monitoring and sampling at the WBD. Surface water and sediment samples were collected from three locations: East Creek (one sample); West Creek (five samples); and Kydikabbit Creek (one sample; background location). Surface water samples were analyzed for TAL Metals, chloride, and nitrogen as nitrate. Sediment samples were analyzed for PCBs, total organic carbon (TOC), and grain size (Ridolfi 2009b).

Barium and manganese were detected in surface water samples at concentrations that were “significantly higher” than the background concentrations. Arsenic was detected in surface water at concentrations that exceeded the conservative water quality standards for the protection of human health. Total PCBs exceeded the TEL in sediment samples collected from West Creek; one sediment sample exceeded the PEL. Arsenic, barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, vanadium, and zinc all exceeded, at a minimum, the TEL or PEL in sediment samples collected from West Creek. Barium, copper, lead, manganese, mercury, nickel, vanadium, and zinc were detected at concentrations that exceeded either the PEL or TEL in the sediment sample collected from East Creek. Several of the background sediment concentrations also exceeded the sediment criteria values (Ridolfi 2009b).

2.5.17 2009 Petition for Preliminary Assessment and Removal Assessment

On October 22, 2009, the Makah Tribal Council submitted a written request to EPA to complete a PA and a Removal Assessment (RA) at the WBD (Lawrence 2009).

2.5.18 2010 EPA Removal Assessment

In 2010, an RA was completed by the EPA. The principle goals of the RA were to collect surface water and sediment samples from West Creek and East Creek to determine if COCs were present at concentrations that presented risks to human health or the environment and whether they were migrating off site; to collect surface soil samples from the waste pile to determine whether COCs were present; and to determine the potential for contaminants to migrate off site during precipitation events. Figure 2-2 depicts sample locations for the RA. Appendix A contains data tables for this work (TechLaw 2010b).

For the RA, five equally spaced locations along West Creek were identified for sediment and surface water sample collection. Four equally spaced locations along East Creek were identified for sediment and surface water sample collection. Background sediment and surface water samples were collected from a creek along the road into the WBD that was not expected to be influenced by the dump. Four surface soil samples were randomly collected from various locations on the waste pile (TechLaw 2010b).

Sediment samples were analyzed for TAL Metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, PCBs, explosives, polybrominated diphenyl ethers (PBDEs), TPHs, and perchlorate. The four sediment samples closest to the dump also were analyzed for polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran (dioxin/furan) compounds. Surface water samples were analyzed for total and dissolved TAL Metals, VOCs, SVOCs, pesticides, PCBs, explosives, TPHs, and perchlorate. Surface soil samples were analyzed for TAL Metals, VOCs, SVOCs, pesticides, PCBs, explosives, PBDEs, TPHs, perchlorate, and dioxins/furans. Surface soil samples also were extracted using the Synthetic Precipitation Leaching Procedure (SPLP). The SPLP extracts were analyzed for TAL Metals, VOCs, and SVOCs. The SPLP method is designed to simulate leaching under acid rainwater conditions. It is used to evaluate the potential for metals leaching from soil into ground water and surface water. The background samples were not analyzed for dioxin/furans (TechLaw 2010b).

The RA identified numerous exceedances of EPA Regional Screening Levels (RSLs) which represent a one-in-a-million health risk (1×10^{-6}). Analytes that exceeded RSLs included arsenic, antimony, cadmium, cobalt, perchlorate, benzo(a)pyrene, 1,2-dichloroethane, and 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD, or dioxin). However, the exceedances in the SPLP extracts and the samples from areas that represent off-site migration (waters and sediments in the creeks) were generally within one order of magnitude of the RSLs, with the exception of arsenic concentrations which were less than two orders of magnitude.



Removal action levels are generally set at 1×10^{-4} ; therefore, a removal action to address the contamination moving off site was determined to not be justifiable based on RA data. The exceedances in the surface soil samples taken from the WBD were substantially higher than the screening levels and, in the case of antimony, more than two orders of magnitude above the ecological screening level. The RA determined that the greatest threat to human health was by direct contact with WBD surface soil containing arsenic and dioxins. The RA recommended that measures be taken to protect human health by preventing direct human contact with and ingestion of the surface soils in the WBD (TechLaw 2010b).

2.5.19 2010 EPA Preliminary Assessment

In 2010, a PA was completed by TechLaw, Inc. for the EPA. The principal goals of the PA were to determine the potential threat to public health and the environment posed by the WBD; determine the potential for a release of hazardous substances into the environment; and determine the potential for placement of the WBD on the NPL (TechLaw 2010a).

Samples collected during the RA were incorporated into the PA for evaluation. Sample results were compared to background concentrations for evaluation. It was determined that SVOCs, metals, dioxin/furans (note: the background sample was not analyzed for dioxins/furans), and PBDEs were present at significant concentrations in soil samples from the WBD. VOCs were not detected at significant concentrations in these samples (TechLaw 2010a).

Three VOCs (1,2-dichloroethane, isopropyl benzene, and toluene) and one SVOC (benzo[a]pyrene) were detected in West Creek; perchlorate, several metals, and several dioxin/furans were detected in both West Creek and East Creek samples at elevated concentrations. However, the VOCs were not likewise detected at significant concentrations in WBD soil samples (TechLaw 2010a). It should be noted that since perchlorate was not analyzed in WBD soil samples, its presence in the creeks cannot be definitively attributed to the dump. Likewise, since the background WBD soil sample was not analyzed for dioxins/furans, their presence in the creeks cannot currently be definitively attributed to the dump. However, additional sampling of the WBD and background samples may make it possible to attribute the presence of perchlorate and dioxin/furans in the creeks to the dump.

2.6 Potential Sources

Potential contamination sources include contaminated soils within the WBD. Primary dump contents include municipal solid waste, construction materials (including roofing), and animal carcasses, although lubricants and other petroleum-based products have been observed (TechLaw 2010a). Debris, including drums and tires, is scattered along the access road and in the ravine west of the access road (Ridolfi 2003; Ridolfi 2002b).

In 2003, it was estimated the WBD contained 55,000 to 65,000 cubic yards of waste (Ridolfi 2003; White Shield 1995; Ridolfi 2002b). The surface area of the dump is estimated to be 5.22 acres (i.e., [650 feet wide x 350 feet long = 227,500 square feet] / 43,560 square feet per acre) (Ridolfi 2008). The waste depth ranges from 22 feet to 40 feet bgs (Ridolfi 2003; White Shield 1995).

2.7 START Site Visit

On June 15, 2011, a site visit of the WBD was conducted. Photographs of the site taken during the site visit are provided in Appendix B. Attendees included the following people:

- Brandon Perkins, EPA, Task Monitor (TM)
- Linda Costello, E & E, Project Manager (PM)
- Bill Noel, Makah Tribe, Water Quality Department
- Steve Pendleton, Makah Tribe (pre-site visit meeting only)
- Sherrie Duncan, Ridolfi, Senior Fisheries Biologist
- Paul Bianco, Ridolfi, Senior Environmental Engineer

The landfill was viewed. The landfill is still active and will remain so until the planned solid waste transfer station is constructed. It is expected that this transfer station will be completed by the summer of 2012. At that time, the WBD will be permanently closed.

The discharge point of West Creek on Warmhouse Beach was viewed. The embankment down to this location is very steep and the trail to it is difficult to traverse due to its slope and muddy condition. The trailhead is approximately 220 feet above the beach. The beach was viewed during a minus tide. At this tide, flow of West Creek infiltrates the ground prior to reaching the Strait of Juan de Fuca. The high tide line was observed to extend to grasses along the shoreline that is an area in contact with the flowing waters of West Creek. The beach material is gravelly sand with no observable organic content. Shellfish beds in this area were expected to extend from the strait to within approximately 93 feet of the grassy shoreline. West Creek was observed to be flowing at an estimated 3 cubic feet per second (cfs).

Classet Creek also discharges to Warmhouse Beach at a distance of approximately 300 feet to the west. This stream has been used as a background location during previous sampling events. At low tide, stream water infiltrates the ground prior to reaching the Strait of Juan de Fuca. The high tide line was observed to extend to grasses along the shoreline that is an area in contact with the flowing waters of Classet Creek. The beach material is gravelly sand with no observable organic content. The stream flow rate is estimated to be 10 cfs.

East Creek was viewed and is located approximately 0.6 mile to the east of West Creek. The beach was accessed by walking along the shoreline which is covered with boulders for most of its distance. At the time of the site visit, East Creek



reached the waters of the Strait of Juan de Fuca as a flowing stream (i.e., it did not infiltrate the ground prior to reaching the strait). The high tide line was observed to extend to grasses along the shoreline that is an area in contact with the flowing waters of East Creek. The beach material was more sandy than that of Warmhouse Beach. However, there still was no observable organic material. Shellfish beds in this area were expected to extend from the strait to within approximately 45 feet of the grassy shoreline. East Creek was observed to be flowing at an estimated 5 cfs.

All beach locations visited are used by tribal members to harvest horse, steamer, and butter clams for consumption. Locations further offshore are rocky. These areas are used by tribal members to harvest barnacles, mussels, urchins, and chiton for consumption.

2.8 Summary of SI Investigation Locations

Sampling under the WBD SI was conducted at those areas considered potential contamination sources and at areas that may have been contaminated through the migration of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-regulated hazardous substances from sources on site. Based on a review of background information, the following areas or features were identified for inspection under the SI.

2.8.1 Sources

Samples collected during the RA can be used to evaluate the WBD as a source of CERCLA hazardous substances for several analytical suites including VOCs, SVOCs, metals, and PBDEs. Perchlorate and dioxins/furans have been detected in East Creek and West Creek. The RA did not include perchlorate analysis for soil samples collected from the dump. It did include analysis for dioxin/furans in soil samples from the dump; however, the corresponding background sample was not likewise analyzed for this suite, making it difficult to attribute the presence of dioxin/furans in the creeks to the dump.

This SI was designed to assist in determining whether the presence of perchlorate and dioxins/furans in the creeks, or other target areas, are attributable to the dump by analyzing soil samples from the dump, as well as a corresponding background sample, for perchlorate and dioxins/furans analysis. Additionally, since the detection limits for PCBs were elevated in RA samples from the dump, the dump samples and corresponding background sample were analyzed for PCBs to meet standard detection limits.

2.8.2 Targets

Samples collected during the RA can be used to document whether CERCLA hazardous substances have migrated from the dump to East Creek and West Creek for several analytical suites including VOCs, SVOCs, metals, PBDEs, perchlorate, and dioxins/furans. Detection limits for PCBs were elevated in RA



2. Site Background

samples. For this reason, sediments in both the East and West creeks were re-sampled and analyzed for PCBs to meet standard detection limits.

The RA did not include sediment or shellfish samples from Warmhouse Beach or East Beach along the Strait of Juan de Fuca. This SI was designed to assist in determining whether sediments or shellfish on these shores have been impacted by contamination migrating from the dump. Sediment and shellfish tissue samples were collected from locations near the mouths of the creeks. The samples were analyzed for contaminants that are known or suspected to be migrating to the creeks from the dump based on RA sample results. This suite included metals, PBDEs, perchlorate, dioxins/furans, and PCBs.

3

Field Activities and Analytical Protocol

A sampling and quality assurance plan (SQAP) for the Makah Reservation WBD SI was developed by the START prior to field sampling (E & E 2011). The SQAP describes the sampling strategy, sampling methodology, and analytical program used to investigate potential hazardous substance sources and potential targets. With few exceptions, the SI field activities were conducted in accordance with the approved SQAP. Deviations from the SQAP are described, when applicable, in this section and in the sampling location discussions in Section 6 (source areas) and Section 7 (target areas). Deviations are also documented in the Sample Plan Alteration Form (SPAF) provided in Appendix C. All deviations to this SQAP were pre-approved by the EPA TM during the field sampling event.

The SI field sampling event was conducted from August 29, 2011 through September 1, 2011. A total of 20 samples, including five background samples, were collected for the SI. Sample types and methods of collection are described below. A list of all samples collected for laboratory analysis under this SI is contained in Table 3-1. Photographic documentation of SI field activities is included as Appendix B.

Alphanumeric identification numbers applied by the START to each sample location (e.g., LF01SS) are used in the report as the sample location identifiers. Sample locations are provided on Figures 3-1 and 3-2. Table 3-2 summarizes the sample coding system used for formulating sample numbers. For example, the sample number LF01SS indicates the following: LF for the source code (in this case, for the landfill), 01 for the sequential number of samples from a given source by matrix (in this case, the first landfill surface soil sample), and SS for the sample matrix (in this case, surface soil).

This section describes sampling methodology, analytical protocol, global positioning system coordinates (GPS), and investigation-derived waste (IDW).

3.1 Sampling Methodology

Grass, leaves, and other vegetative material, rocks, and other debris unsuitable for analysis were removed from samples before being placed into sample containers. Samples were stored on ice in coolers continuously maintained under the custody of START personnel. Sampling methods used for each sample type are described below.

3.1.1 Soil Sampling

Surface soil samples (0 to 6 inches bgs) were collected using dedicated stainless steel spoons. Collected material was placed in a dedicated stainless steel bowl, thoroughly homogenized, and placed into a pre-labeled container.

3.1.2 Sediment Sampling

Surface sediment samples (0 to 6 inches bgs) were collected using dedicated stainless steel spoons. Collected material was homogenized thoroughly in dedicated stainless steel bowls and placed into pre-labeled containers. Prior to homogenizing, the sample material was allowed to rest so sediment and water could separate, then the water was decanted prior to mixing. Despite these precautions, samples from stations EC01SD and WC01SD had unusually high moisture content. In order to provide a sufficient volume of sample material for PCB analysis, extra sample material not used for grain size analysis was shipped from the grain size subcontracted laboratory to the laboratory performing the PCB analysis. Two 8-ounce sample jars had been provided for grain size analysis; however, only one sample jar was required by the grain size laboratory, leaving one extra 8-ounce jar. The extra sample jar was maintained under chain-of-custody and in a cooler by the grain size laboratory. These sample aliquots were shipped to the PCB laboratory on ice and under chain-of-custody.

3.1.3 Tissue Sampling

Makah tribal members had indicated that butter and steamer clambeds were present on East Beach and Warmhouse Beach; however, no such clambeds could be found after making several attempts at locating them. Specifically, up to eight holes were dug on both East Beach and Warmhouse Beach between the average high tide line and the Strait of Juan de Fuca; however, no clams of any kind were observed. Further, no evidence of existing clambeds was encountered such as broken clam shells or clam holes. Since mussels are also harvested from these beaches by tribal members for consumption, a decision was made, following consultation with the EPA TM, to collect this type of shellfish for tissue sampling.

Following collection, mussels were double wrapped in heavy aluminum foil, placed in ziplock bags, and then frozen. Mussels were transported to the EPA Manchester Environmental Laboratory (MEL) for homogenization. Since MEL was conducting all tissue analysis, with the exception of dioxins and perchlorate, sample containers for these two analyses were supplied to MEL by E & E. Once the homogenized aliquots for dioxin and perchlorate analysis were prepared, MEL shipped these aliquots to appropriate laboratories for analysis.

3.2 Analytical Protocol

Analytical protocols applied to the SI samples included off-site fixed laboratory analysis of TAL Metals, PBDEs, perchlorate, dioxins/furans, PCBs, TOC, and grain size in varying combinations based on information requirements. Analyses applied to the samples are presented in Table 3-1.



3. Field Activities and Analytical Protocol

The following samples were submitted to MEL, Contract Laboratory Program (CLP), and subcontract laboratories for analysis:

- **PCB by CLP Methods and EPA SW-846 8081/8082:** Eighteen soil/sediment samples, including QA/QC samples, were submitted for analysis to ALS Laboratory Group, a CLP laboratory located in Salt Lake City, Utah. Seven tissue samples and one laboratory equipment rinsate sample were analyzed by MEL located in Manchester, Washington.
- **Dioxins/Furans by CLP Methods:** Sixteen soil/sediment/tissue samples, including QA/QC samples, were submitted for analysis to Cape Fear Analytical, a CLP laboratory located in Wilmington, North Carolina.
- **TAL Metals by CLP Methods and EPA SW-846 6000 Series:** Seven sediment samples, including QA/QC samples, were submitted for analysis to Sentinel, Inc., a CLP laboratory located in Huntsville, Alabama. Seven tissue samples and one laboratory equipment rinsate sample were analyzed by MEL located in Manchester, Washington.
- **PBDE by EPA SW-846 Method 8270D:** Fifteen sediment/tissue samples, including QA/QC samples, were analyzed by MEL located in Manchester, Washington.
- **Perchlorate by EPA Method 6850:** Seventeen soil/sediment/tissue samples, including QA/QC samples, were submitted for analysis to Columbia Analytical Services, Inc, a subcontracted laboratory located in Rochester, New York.
- **TOC by EPA SW-856 Method 9060A:** Eleven sediment samples, including QA/QC samples, were analyzed by MEL located in Manchester, Washington.
- **Percent Lipids by EPA Method 3550C Modified:** Seven tissue samples and one laboratory equipment rinsate sample were analyzed by ALS Laboratory Group, a CLP laboratory located in Salt Lake City, Utah.
- **Grain Size by ASTM D-422:** Thirteen sediment samples, including QA/QC samples, were submitted for analysis to Analytical Resources, Inc., a subcontract laboratory located in Tukwila, Washington.

3.3 Global Positioning System

GPS coordinates of SI sample locations were collected utilizing a Trimble™ Geo XH handheld unit with a Zephyr™ external antenna. Recorded GPS coordinates by sample point are listed in Appendix D.

3.4 Investigation-Derived Waste

IDW generated during the SI sampling effort included disposable personal protective clothing and dedicated sampling equipment. IDW generated during field activities was rendered unusable by tearing (when appropriate), bagged in opaque plastic garbage bags, and disposed at the EPA equipment warehouse dumpster located in Seattle, Washington.

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4

Quality Assurance/ Quality Control

QA/QC data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of sampling equipment, glassware, and reagents. Specific QC requirements for laboratory analyses are incorporated in the *Contract Laboratory Program Statement of Work for Organic Analyses* (EPA 2007), the *Analytical Services Branch Statement of Work For Analysis of Chlorinated Dibenzo-p-dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs), Multi-Media, Multi-Concentration, DLM02.2* (EPA 2011), and the *Contract Laboratory Program Statement of Work for Inorganic Analyses* (EPA 2010a). These QC requirements or equivalent requirements found in the analytical methods were followed for analytical work on the project. This section describes the QA/QC measures taken for the project and provides an evaluation of the usability of data presented in this report.

Data from the START-subcontracted commercial laboratory were reviewed and validated by a START chemist. Data qualifiers were applied, as necessary, according to the following guidance:

- EPA (2008) *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*.
- EPA (2011) *USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data Review*.
- EPA (2010b) *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*.

In the absence of other QC guidance, method- and/or SOP-specific QC limits were also utilized to apply qualifiers to the data.

4.1 Satisfaction of Data Quality Objectives

The following EPA (EPA 2000) guidance document was used to establish data quality objectives (DQOs) for this project:

- *Guidance for the Data Quality Objectives Process* (EPA QA/G-4), EPA/600/R-96/055.

The EPA TM determined that definitive data without error and bias determination would be used for the sampling and analyses conducted during the field activities.

The data quality achieved during the field work produced sufficient data that met the DQOs stated in the SQAP (E & E 2011). A detailed discussion of accomplished project objectives is presented in the following sections.

4.2 QA/QC Samples

Trip blank QA samples are only required for VOC analyses and were not collected for this project. One rinsate blank QA sample was collected for the laboratory homogenizing equipment and is associated with the tissue samples. QC samples included matrix spike/matrix spike duplicate (MS/MSD) and/or blank spike (BS) samples at a rate of one MS/MSD and/or BS per 20 samples per matrix.

4.3 Project-Specific Data Quality Objectives

The laboratory data were reviewed to ensure that DQOs for the project were met. The following describes the laboratories' abilities to meet project DQOs for precision, accuracy and completeness and the field team's ability to meet project DQOs for representativeness and comparability. The laboratories and the field team were able to meet DQOs for the project.

4.3.1 Precision

Precision measures the reproducibility of the sampling and analytical methodology. Laboratory and field precision is defined as the relative percent difference (RPD) between duplicate sample analyses. The laboratory duplicate samples or MS/MSD samples measure the precision of the analytical method. The RPD values were reviewed for all fixed laboratory samples. A total of 28 sample results (approximately 2.3% of the data) were qualified based on precision outliers; therefore, the project DQO for precision of 90% was met.

4.3.2 Accuracy

Accuracy indicates the conformity of the measurements to fact. Laboratory accuracy is defined as the surrogate spike percent recovery (%R) or the MS/MSD/BS %Rs for all laboratory analyses. The surrogate %R values were reviewed for all appropriate sample analyses. All surrogate results were within QC limits.

The %R values were reviewed for all MS/MSD/BS analyses. A total of 14 sample results (approximately 1.1% of the data) were qualified based on accuracy outliers; therefore, the project DQO for accuracy of 90% was met.

4.3.3 Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). All laboratory data were reviewed for data validation and usability. No sample results were rejected; therefore, the project DQO for completeness of 90% was met.

4.3.4 Representativeness

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or environmental condition. The number and selection of samples were determined in the field to accurately account for site variations and sample matrices. The DQO for representativeness was met.

4.3.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data produced for this site followed applicable field sampling techniques and specific analytical methodology. The DQO for comparability was met.

4.4 Laboratory QA/QC Parameters

The laboratory data also were reviewed for holding times/temperatures/sample containers/percent moisture, laboratory blank samples, serial dilution analyses, rinsate blanks, and dioxin/furan interferences. These QA/QC parameters are summarized below.

4.4.1 Holding Times/Temperatures/Sample Containers/Percent Moisture

All holding times, sample temperatures, and containers were acceptable, except the perchlorate soil/sediment samples that exceeded the temperature limits and the soil samples that exceeded percent moisture limits. Approximately 0.7% of the sample results were qualified as estimated quantities based on holding time outliers, and approximately 1.5% of the sample results were qualified as estimated quantities based on percent moisture outliers.

4.4.2 Laboratory Blanks

All laboratory blanks met the frequency criteria. The following potential COC was detected in the laboratory blanks:

- **Inorganics:** Arsenic, cadmium, lead, mercury, potassium, and selenium.
- **PCDDs/PCDFs:** OCDD, TCDF, 1,2,3,7,8-PeCDD, HpCDD, 1,2,3,6,7,8-HxCDF, 1,2,3,6,7,8,9-HxCDF, 1,2,3,4,6,7,8-OCDF, 1,2,3,7,8,9-HxCDD, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, OCDF, and 1,2,3,4,7,8,9-HpCDF.

See the data validation memoranda for results qualified based on blank contamination.

4.4.3 Serial Dilution Analyses

Serial dilution analyses met the frequency criteria. A total of 21 sample results (approximately 1.7% of the data) were qualified based on serial dilution outliers.



4. Quality Assurance/Quality Control

4.4.4 Rinsate Blanks

Rinsate blank analyses were performed at a frequency of one per 20 tissue samples homogenized in the laboratory. There were no detections in the rinsate blank analyses that affected sample results.

4.4.5 Dioxin/Furan Interferences

A total of 19 sample results (approximately 1.6% of the data) were qualified based on dioxin/furan sample interferences.

5

Analytical Results Reporting and Background Samples

This section describes the reporting and methods applied to analytical results presented in Section 6 (sources) and Section 7 (targets) of this report, and discusses background locations and sample results. Table 3-1 lists all samples collected for laboratory analysis.

5.1 Analytical Results Evaluation Criteria

Analytical results presented in the summary tables of Sections 6 and 7 show all analytes detected above laboratory detection limits in bold type. Analytical results indicating significant/elevated concentrations of contaminants in source samples (Section 6) and target samples (Section 7) with respect to background concentrations are shown underlined and in bold type. For the purposes of this investigation, significant/elevated concentrations include those concentrations that are:

- Equal to or greater than the sample's Contract Required Quantitation Limit (CRQL) or the Sample Quantitation Limit (SQL) when a non-CLP laboratory was used; and
- Equal to or greater than the background sample's CRQL or SQL when the background concentration was below detection limits; or
- At least three times greater than the background concentration when the background concentration equals or exceeds the detection limits.

The analytical summary tables present all detected compounds, but only those detected analytes at potential sources and targets meeting the significant/elevated concentration criteria are discussed in the report text. All detected concentrations are also discussed for the background samples. When samples were diluted for re-analysis at a laboratory, the dilution results were considered for evaluation and are provided in the tables.

5.1.1 Sample Results Reporting

The analytes aluminum, calcium, iron, magnesium, potassium, and sodium are common earth crust elements. Based on EPA, Region 10, policy, these common earth crust elements will not be discussed in this report.

5.2 Background Samples

Background samples were collected for each of the naturally occurring media from which SI samples were collected. These media are soil, sediment, and tissue. Results for the appropriate background samples are shown in the first column of the analytical results summary tables in Sections 6 and 7 for comparison against source or target results.

5.2.1 Background Soil Sample

5.2.1.1 Sample Location

One background soil sample (BK01SS) was collected from an area expected to be outside the site's range of influence. The background sample consisted of medium brown sandy soil. This sample will be used for comparison to all soil samples collected from the landfill.

5.2.1.2 Sample Results

The background soil sample was analyzed for PCBs, dioxins/furans, and perchlorate (Table 6-1). Four dioxins/furans were detected in the background sample. Perchlorate and PCBs were not detected.

5.2.1 Background Sediment Samples

5.2.1.1 Sample Locations

Four background sediment samples were collected to account for the various water bodies sampled. Two samples were collected from Classet Creek: BK01SD was collected upstream of the landfill, and BK02SD was collected at the mouth of the creek. BK01SD is considered the background sample for comparison to the sediment samples collected at the headwaters of East Creek and West Creek (i.e., samples EC01SD and WC01SD, respectively). BK02SD is considered the background sample for comparison to the sediment samples collected at mouth of East Creek and West Creek (i.e., samples EC02SD and WC02SD, respectively). Finally, one sediment sample (BK03SD) was collected on Warmhouse Beach below the average high tide line and in the flow route of Classet Creek to the sea. This sample is considered the background sample for comparison to all samples collected from East Beach and Warmhouse Beach (i.e., EB01SD, EB02SD, EB03SD, WB01SD, WB02SD, and WB03SD).

5.2.1.2 Sample Results

Background samples BK01SD and BK02SD were analyzed for PCBs, grain size, and TOC; and background sample BK03SD was additionally analyzed for TAL Metals, dioxins/furans, PBDEs, and perchlorate (Table 7-6). PCBs were not detected in these samples. Six TAL Metals (chromium, cobalt, copper, manganese, vanadium, and zinc) were detected in sample BK03SD; though no other analytes were detected in this sample.



5. Analytical Results Reporting and Background Samples

5.2.1 Background Tissue Sample

5.2.1.1 Sample Location

One background mussel sample (BK01TS) was collected from an area east of Classet Creek. This sample was used for comparison to all tissue samples collected from East Beach and West Beach.

5.2.1.2 Sample Results

The background tissue sample BK01TS was analyzed for TAL Metals, PCBs, dioxins/furans, PBDEs, and percent lipids (Table 7-7). Thirteen TAL Metals (arsenic, cadmium, chromium, cobalt, copper, manganese, mercury, molybdenum, nickel, selenium, thallium, vanadium, and zinc) were detected in this sample. No other analytes were detected.

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6

Potential Sources

This section describes potential sources, sample locations, and analytical results of SI samples obtained from potential sources that were detected at concentrations that were significant relative to background concentrations. Chain-of-custody forms are provided in Appendix E. Data validation memoranda and laboratory data sheets of analytical results for all samples are provided in Appendix F.

6.1 Landfill

The landfill contains municipal solid waste, construction materials (including roofing), animal carcasses, lubricants, and other petroleum-based products. Debris, including drums and tires, are scattered along the access road and in the filled ravine west of the access road.

In 2003, it was estimated the landfill contained 55,000 to 65,000 cubic yards of waste. The surface area of the dump is estimated to be 5.22 acres (i.e., [650 feet wide x 350 feet long = 227,500 square feet] / 43,560 square feet per acre). The waste depth ranges from 22 feet to 40 feet bgs.

During the PA, which was based on data from the RA, it was determined that SVOCs (2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, and pyrene), metals (antimony, barium, cadmium, copper, lead, manganese, silver, and zinc), dioxin/furans (2,3,7,8-TCDD; 2,3,7,8-TCDF; 1,2,3,7,8-PeCDF; 1,2,3,7,8-PeCDD; 2,3,4,7,8-PeCDF; 1,2,3,4,7,8-HxCDF; 1,2,3,6,7,8-HxCDF; 1,2,3,4,7,8-HxCDD; 1,2,3,6,7,8-HxCDD; 1,2,3,7,8,9-HxCDD; 2,3,4,6,7,8-HxCDF; 1,2,3,7,8,9-HxCDF; 1,2,3,4,6,7,8-HpCDF; 1,2,3,4,6,7,8-HpCDD; 1,2,3,4,7,8,9-HpCDF; OCDD; and OCDF), and PBDEs (BDE#47, BDE#99, BDE#100, BDE#153, BDE#154, BDE#183, and BDE#209) were present at significant concentrations in soil samples from the landfill (see Appendix A for sample results).

During the field event for this SI, the dump was observed to be unmanned and used by individuals for disposing of household waste. In addition, individuals were observed scavenging items from the dump, such as aluminum cans. The landfill was smoldering in an area close to its center. Spent fireworks debris was observed at the landfill. Fireworks often contain perchlorate.

6.1.1 Sample Locations

Four surface soil samples (LF01SS through LF04SS) were collected from the landfill at points that corresponded to those sampled during the RA (i.e., locations WB14SS, WB15SS, WB16SS, and WB17SS/WB18SS).

6.1.2 Sample Results

Surface soil samples collected from the landfill were analyzed for low-level PCBs and perchlorate (Table 6-1). The PCB, aroclor-1016, was detected at a significant concentration in sample LF03SS collected on the top of the landfill. Perchlorate was detected at significant concentrations in samples LF02SS and LF03SS. Sample LF02SS was collected mid-way along the entry road leading to the top of the landfill.

Dioxin/furan RA sample results were compared to the background soil sample collected during this SI (see Table A-5, Appendix A). Based on this comparison, all landfill samples collected during the RA contained significant concentrations of dioxins and furans. Sample WB-15-SS and WB-07-SS contained 15 and 16 congeners, respectively, at significant concentrations. Both of these samples were collected on the top of the landfill.

7

Surface Water Migration Pathway and Targets

At the direction of the TM, and because of the relatively few targets associated with ground water migration, soil exposure, and air migration pathways, this section focuses solely on the surface water migration pathway.

Information presented in this section (i.e., Section 7) has been largely excerpted, with original references and minor modifications, from the PA (TechLaw 2010a). Refer to the PA for these reference citations.

During the PA, which was based on data from the RA, it was determined that the following contaminants, which are attributable to the WBD, were present at elevated concentrations in the streams draining it:

East Creek

- Surface Water – perchlorate, barium, cadmium, lead, and zinc.
- Sediment – anthracene, zinc, PBE#47, and BPE#99.

West Creek

- Surface Water – perchlorate, barium, copper, lead, manganese, and zinc.
- Sediment – perchlorate, benzo(a)pyrene, barium, cadmium, copper, lead, manganese, silver, zinc, BDE#28, BDE#47, BDE#99, BDE#100, BDE#153, BDE#154, BDE#183, and BDE#209.

The surface water migration pathway Target Distance Limit (TDL) begins at the probable point of entry (PPE) of surface water runoff from the site to a surface water body, and then extends downstream for 15 miles. Figure 7-1 depicts the surface water migration pathway TDL.

7.1 Overland Pathway

Average precipitation in the Neah Bay area is just over 100 inches per year (WorldClimate 2010). The landfill is located at the top of a ridge causing surface water from the dump to drain to the east and west into East Creek and West Creek. A PPE is located on each creek for WBD runoff (Figure 7-1). Landfill contents extend into the headwaters of both West Creek and East Creek. West Creek discharges approximately 1,000 feet from the landfill to Warmhouse Beach on the Strait of Juan de Fuca. East Creek flows into Kydikabbit Creek, which outfalls west of Kydikabbit Point on East Beach approximately 500 feet northeast

7. Surface Water Migration Pathway and Targets

of the landfill on the Strait of Juan de Fuca. From these beaches, the remainder of the 15-mile TDL is a radial arc into the Strait of Juan de Fuca.

The flow rates for East Creek and West Creek have not been measured, but are estimated to be 5 and 3 cfs, respectively, based on observations made during the SI field event.

7.2 Targets

Several environmental targets, or receptors, are present within the surface water migration pathway TDL. These targets are discussed below.

7.2.1 Drinking Water

There are no drinking water intakes along the 15-mile TDL. Because it is saline, surface water within the TDL is not useable for drinking water purposes. Locations within the TDL on the Strait of Juan de Fuca could be considered major recreational areas.

7.2.2 Human Food Chain

Warmhouse Beach is an important natural and cultural resource of the Makah Tribe. Warmhouse Beach was used as a traditional summer fishing camp for many generations; however, deterioration of kelp beds and shellfish habitats has hindered these activities (Ridolfi 2003).

7.2.2.1 Sport Catch

Sport fishing is known to occur within the 15-mile TDL. The most current sport catch data are from the 2009 license year (Washington Department of Fish and Wildlife [WDFW] 2010b and 2010c). Fish catch data are reported by catch areas. For salmonid species, the catch area is reported as Area 4 which is defined as Cape Alava north and inside Juan de Fuca Strait to the Sekiu River (WDFW 2011). For marine fishes, the TDL is within catch areas 4a and 4b. Area 4a extends from Cape Alava north to the Bonilla-Tatoosh line and west into the Pacific Ocean. The percentage of catch area 4a located in the TDL is unknown due to the fact that this area extends west into the Pacific Ocean infinitely. Area 4b extends from the Bonilla-Tatoosh line east to the Sekiu River (WDFW 2008). Because commercial fishing boats seldom travel more than 40 miles offshore, and recreational boats are usually within 10 to 15 miles of shore (WDFW 2010c), it is estimated that 100% of catch area 4b is within the 15-mile TDL.

Sport catch data are presented as the number of fish caught. To calculate the total pounds of fish caught for each statistical area, the number of fish caught in each catch area was multiplied by the average weight of each fish species. Sport catch harvest data by fish species are presented in Tables 7-1 and 7-2.

7.2.2.2 Commercial Harvest

Non-tribal and tribal commercial groundfish harvest occurs within the 15-mile TDL. The catch numbers for tribal and non-tribal groundfish harvest are reported together. Unlike sport fishing, commercial fishing harvest is reported as pounds



7. Surface Water Migration Pathway and Targets

caught (WDFW 2010b). The percentage of catch located in the TDL is unknown due to the fact that catch numbers are reported by port of landing and not area. A port of landing does not always match up with the area of catch because commercial vessels can travel great distances from port (WDFW 2010b). The pounds of groundfish harvest caught per species are estimated in Table 7-3.

Commercial salmon fishing is known to occur within the 15-mile TDL. The most current commercial catch data are from the 2009 license year (WDFW 2010b). Fish catch data are reported by catch area. Commercial salmon fishing is restricted to catch area 4a. This is the same area as described in the sport catch subsection above. The pounds of commercial salmon caught per species are presented in Table 7-4.

7.2.2.3 Tribal Harvest

Tribal harvest is documented to occur on Warmhouse Beach and East Beach immediately downstream from the WBD. Members of the Makah Tribe have been known to harvest blue mussels, sea urchins, and goose neck barnacles from rocky areas along these beaches, and to harvest horse, steamer, and butter clams from sandy areas along these beaches (EPA 2010b; E & E 2011a). The amount of organisms harvested annually is unknown. It is assumed that between 0 and 100 pounds of shellfish are harvested for human consumption by tribal fishers along Warmhouse Beach and East Beach.

Additional tribal harvest is known to occur within the 15-mile TDL. The most current tribal catch data are from the 2009 harvest year (EPA 2010a). Fish catch data are reported together for catch areas 4a and 4b. Tribal harvest data are reported as the number of fish caught, except for halibut which is reported as pounds caught. To calculate the total pounds of fish caught, the number of fish caught in each catch area was multiplied by the average weight of each fish species. Treaty harvest data by fish species are presented in Table 7-5.

7.2.3 Sensitive Environments

The Flattery Rocks National Wildlife Refuge and Olympic Coast National Marine Sanctuary are located within the 15-mile TDL, with the sanctuary being present along the shoreline of Warmhouse Beach. Flattery Rocks National Wildlife Refuge is a group of 870 islands, rocks, and reefs extending for more than 100 miles from Flattery Rocks south to Copalis Beach. The islands and rocks in this area provide habitat for over 70% of Washington's nesting seabirds and are among the largest colonies in the continental United States (USFWS 2010a).

There are several Federal- and State-listed threatened and endangered species within the 15-mile TDL (E & E 2010c). The Federal-listed threatened marbled murrelet (*Brachyramphus marmoratus*) and the steller sea lion (*Eumetopias jubatus*) occur within the 15-mile TDL. Warmhouse Beach is a prime habitat for marbled murrelet; however, murrelet nesting in the area is inhibited because crows and seagulls use the dump site (WDFW 2008). The State-listed endangered Sea otter (*Enhydra lutris*) also occurs within the 15-mile TDL.

7. Surface Water Migration Pathway and Targets

Habitats for these three species are located within both the Strait of Juan de Fuca and Pacific Ocean. Critical habitat for the Federal-listed threatened Ozette Lake sockeye salmon Evolutionarily Significant Unit and southern resident killer whales is present within the 15-mile TDL (DOC 2005; 2006). No wetlands are located within the 15-mile TDL (USFWS 2010b).

7.3 Sediment Sampling

This section describes sediment sample locations and the analytical results associated with these samples.

7.3.1 Creek Sample Locations

Samples collected during the RA can be used to document whether CERCLA hazardous substances have migrated from the dump to East Creek and West Creek for several analytical suites including VOCs, SVOCs, metals, PBDEs, perchlorate, and dioxins/furans (see Appendix A for RA analytical data tables). Although no PCBs were detected, the PCB detection limits were elevated in sediment samples collected during the RA (i.e., ranging from 55 to 200 micrograms per kilogram [$\mu\text{g}/\text{kg}$]). For this reason, sediments in both the East and West creeks were re-sampled and analyzed for PCBs to meet lower detection limits.

Two sediment samples were collected from East Creek and two were collected from West Creek, for a total of four sediment samples. These samples were collected from the PPE for each creek (i.e., EC01SD for East Creek and WC01SD for West Creek) and from the mouth of each creek (i.e., EC02SD for East Creek and WC02SD for West Creek) where the creeks discharge to the shore of the Strait of Juan de Fuca.

7.3.2 Creek Sample Results

The creek sediment samples were analyzed for low-level PCBs and grain size. Additionally, EC02SD and WC02SD were analyzed for TOC (Table 7-6). PCBs were not detected in these samples. The PCB detection limits for these samples ranged from 24 to 34 $\mu\text{g}/\text{kg}$.

7.3.3 Beach Sample Locations

The SQAP called for collecting sediment samples at Warmhouse Beach and East Beach along transect lines running parallel to the shoreline and intersecting the creek routes to the Strait of Juan de Fuca. Two transect lines were to be placed across each creek route, providing clambeds were present, and three sediment samples were to be collected from each transect line, for a total of 12 samples. The first transect line was to be drawn just below the average high tide line. The second transect line was to be drawn seaward of clam samples, if clam samples were collected. If clams were not found on either beach, then a second transect line was not sampled on that beach.

Since clams were not found on either beach, a decision was made to collect mussel samples, instead. For this reason, the configuration of sediment sample

7. Surface Water Migration Pathway and Targets

locations was modified after consulting with the TM. Instead of collecting sediment samples from transect lines intended to bracket clam sample locations, the sediment samples were collected from within East Creek and West Creek flow routes toward the sea to assist in documenting migration of contaminants from the landfill toward the locations of mussels which were present on rocky surfaces seaward of the shoreline. At both creeks, three such samples were collected below the average high tide line (samples EB01SD, EB02SD, EB03SD, WB01SD, WB02SD, and WB03SD).

7.3.4 Beach Sample Results

The beach surface sediment samples were analyzed for TAL Metals, PBDEs, perchlorate, dioxins/furans, PCBs, TOC, and grain size (Table 7-6). Sediment samples from East Beach contained elevated concentrations of chromium, cobalt, copper, nickel, and vanadium. These analytes were present at elevated concentrations in all three samples, with the exception of copper which was not elevated in one sample. These metals were likewise not detected at elevated concentrations in sediment samples from East Creek during the RA. Nickel was detected at an elevated concentration in surface water samples collected from East Creek; however, since this analyte was not similarly detected at a significant concentration in soil samples from the landfill during the RA, the source of nickel on the beach is not clear. PBDEs, perchlorate, dioxins/furans, and PCBs were not detected in these samples.

As with sediment samples from East Beach, sediment samples from Warmhouse Beach also contained elevated concentrations of chromium, cobalt, copper, nickel, and vanadium. Of these analytes, chromium, nickel, and vanadium were present at elevated concentrations in all three samples. Cobalt, copper, and nickel were likewise detected at elevated concentrations in sediment samples from West Creek during the RA. Further, chromium, copper, nickel, and vanadium were detected at elevated concentrations in surface water samples collected from West Creek during the RA. Since copper was also detected at significant concentrations in soil samples collected at the landfill during the RA, it appears this analyte is migrating via West Creek to Warmhouse Beach. PBDEs, perchlorate, dioxins/furans, and PCBs were not detected in these samples.

7.4 Tissue Sampling

This section describes tissue sample locations and the analytical results associated with these samples.

7.4.1 Mussel Sample Locations

Three mussel samples were collected from Warmhouse Beach (WB01TS, WB02TS, and WB03TS) and from East Beach (EB01TS, EB02TS, and EB03TS), for a total of six samples. The mussel specimens were harvested as close to the outflows of East Creek and West Creek as possible. The mussels were gathered from rock areas that are generally exposed during low tide.



7. Surface Water Migration Pathway and Targets

7.4.2 Mussel Sample Results

Mussel samples were analyzed for TAL Metals, PBDEs, perchlorate, dioxins/furans, PCBs (detection limits were 18 and 19 $\mu\text{g}/\text{kg}$), and percent total lipids (Table 7-7). One or more mussel sample from East Beach contained elevated concentrations of barium, lead, and tetrachlorodibenzo-p-dioxin. Although, none of these analytes were likewise detected at elevated concentrations in sediment samples collected from East Beach, barium and lead were detected at significant concentrations during the RA in soil samples from the landfill and at elevated concentrations in surface water samples collected from East Creek. These results suggest that these contaminants are migrating from the landfill via surface water to mussels on East Beach. PBDEs, perchlorate, and PCBs were not detected in the mussel tissue samples.

One or more mussel sample from Warmhouse Beach contained elevated concentrations of chromium and lead. Chromium was detected at elevated concentrations in sediment samples collected from Warmhouse Beach and in surface water samples collected during the RA from West Creek; however, it was not detected at significant concentrations in soil samples collected from the landfill during the RA. For this reason, the source of elevated concentrations of chromium in mussel tissue samples is not clear. Although, lead was not likewise detected at elevated concentrations in sediment samples collected from Warmhouse Beach, it was detected at significant concentrations during the RA in soil samples from the landfill and at elevated concentrations in surface water and sediment samples collected from West Creek. These results suggest that lead is migrating from the landfill via surface water to mussels on Warmhouse Beach. PBDEs, perchlorate, dioxins/furans, and PCBs were not detected in the mussel tissue samples.

8

Summary and Conclusions

The Makah Reservation WBD is located 2 to 3 miles northwest of Neah Bay in Clallam County, Washington, and is situated on a ridgeline overlooking the Strait of Juan de Fuca. The dump is actively used by local residents as a landfill. The dump is accessible off an unpaved gravel road from the road leading to Koitlah Point. The oval-shaped dump occupies 7 acres in a saddle at the top of the ridge. Drainage from the saddle occurs to both the west and the east, reaching West Creek and East Creek in their respective directions. Both creeks discharge to the shoreline of the Strait of Juan de Fuca along East Beach and Warmhouse Beach. Warmhouse Beach is used for camping, shellfish harvesting, surfing, and other recreational activities, while East Beach is used for shellfish harvesting.

The dump is bordered by forests and is approximately 800 feet inland from the Strait of Juan de Fuca shoreline at an elevation of approximately 260 feet above mean sea level. Dumping at the site first began in the 1940s and has continued through the years to the present. The Makah Solid Waste Management Department has been recommending closure of the dump since 1963, though this has not yet occurred. Plans are underway to establish a solid waste transfer station, followed by permanent closure of the WBD.

Wastes disposed in the WBD have included household waste, PCBs, asbestos, batteries, used motor oil, hypodermic needles, tires, appliances, roofing, spent fireworks, construction materials, car bodies, and glass.

Multiple earlier investigations have taken place at the landfill. These works have documented the presence of hazardous substances in the landfill, in ground water at the site, and in West and East creeks.

8.1 Sources

During a Waste Delineation and Characterization study performed at WBD in 1995, it was determined the dump occupies approximately 3 acres of mixed waste that varies in depth from the surface to over 22 feet bgs. In 2003, the area and volume of the WBD was recalculated and estimated to contain 55,000 to 65,000 cubic yards of waste. The surface area of the dump was estimated to be 5.22 acres. The waste depth ranged from 22 feet to 40 bgs.

During the PA, which was based on data from the RA, it was determined that SVOCs, pesticides, diesel, motor oil, metals, dioxin/furans, and PBDEs were



8. Summary and Conclusions

present at significant concentrations in soil samples from the landfill. The presence of aroclor-1016 and perchlorate at significant concentrations in the landfill were confirmed during this SI.

8.2 Targets

As mentioned above, several earlier sampling events at the WBD have documented the presence of hazardous substances attributable to the landfill in East Creek and West Creek, including metals, PCBs, SVOCs, PBDEs, and perchlorate.

Sediment samples collected during the SI from East Beach and Warmhouse Beach contained elevated concentrations of chromium, cobalt, copper, nickel, and vanadium. Of these metals, copper was also detected at elevated concentrations in the sediments and surface water of West Creek, and at significant concentrations in soil samples collected at the landfill during the RA. For this reason, it appears this analyte is migrating via West Creek to Warmhouse Beach. PBDEs, perchlorate, dioxins/furans, and PCBs were not detected in these samples.

One or more mussel sample from East Beach contained elevated concentrations of barium, lead, and tetrachlorodibenzo-p-dioxin. These contaminants were detected at significant concentrations during the RA in soil samples from the landfill and at elevated concentrations in surface water samples collected from East Creek. Further, one or more mussel sample from Warmhouse Beach contained elevated concentrations of chromium and lead, although, only lead was likewise detected at significant concentrations during the RA in soil samples from the landfill and at elevated concentrations in surface water and sediment samples from West Creek. PBDEs, perchlorate, and PCBs were not detected in the mussel tissue samples.

Based on PA and SI sampling, actual contamination is documented to be present to the Olympic Coast National Marine Sanctuary where this feature occurs along Warmhouse Beach.

8.3 Conclusions

The PA and SI have documented the presence of a variety of hazardous substances within the landfill. The landfill is still in use for disposing of wastes and also is being used by people to scavenge for items that can be recycled. The creeks draining the landfill have been impacted by hazardous substances from the landfill and are conveying a subset of these contaminants to East Beach and Warmhouse Beach. Mussels at East Beach and Warmhouse Beach contained elevated concentrations of hazardous substances when compared to background mussels. Further, Warmhouse Beach contains an area of contamination within a national marine sanctuary.

9

References

Ecology and Environment, Inc. (E & E), August 2011, *Sampling and Quality Assurance Plan, Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington.*

TechLaw, Inc. (TechLaw), November 2010a, *Final Preliminary Assessment Report, Makah Reservation Warmhouse Beach Open Dump, Neah Bay, Clallam County, Washington, TDD: 09-10-0010.*

_____, November 2010b, *Warmhouse Beach Open Dump, Removal Assessment Report, Neah Bay, Clallam County, Washington.*

United States Environmental Protection Agency (EPA), September 2011, *USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data Review*, EPA-540-R-11-016.

_____, January 2010a, *USEPA Contract Laboratory Program Statement of Work for Inorganic Superfund Methods, Multi-Media, Multi-Concentration, ISM01.2.*

_____, January 2010b, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, OSWER 9240.1-51, EPA 540-R-10-011.*

_____, December 2009, *Analytical Services Branch Statement of Work For Analysis of Chlorinated Dibenzo-p-dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs), Multi-Media, Multi-Concentration, DLM02.2.*

_____, June 2008, *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, OSWER 9240.1-48, USEPA-540-R-08-01.*

_____, April 2007, *USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, SOM01.2.*

_____, August 2000, *Guidance for the Data Quality Objectives Process, EPA QA/G 4, Office of Research and Development, Washington, D.C., EPA/600/R 96/055.*

United States Fish and Wildlife Service, August 16, 2010, information web page for Flattery Rocks National Wildlife Refuge, <http://www.fws.gov/washingtonmaritime/flatteryrocks/>

United States Department of Commerce (DOC), National Oceanic and Atmospheric Administration, November 29, 2006, Federal Register, *Endangered and Threatened Species; Recovery Plan, Proposed Recovery Plan for Southern Resident Killer Whales.*

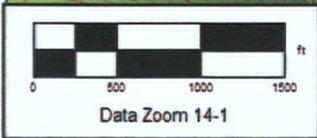
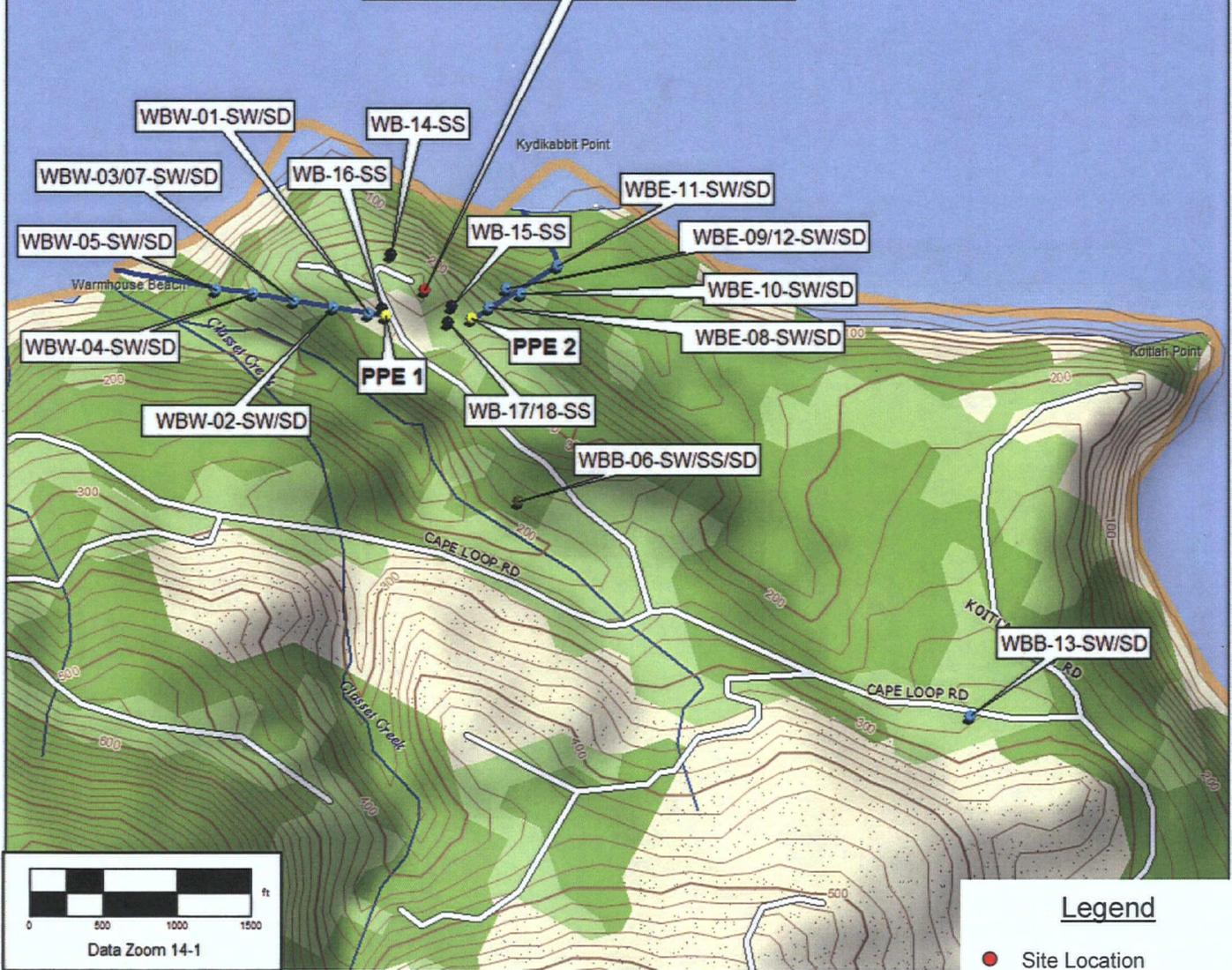
———, September 2, 2005, Federal Register, *Endangered and Threatened Species; Designation of Critical Habitat for 12 Evolutionarily Significant Units of West Coast Salmon and Steelhead in Washington, Oregon, and Idaho; Final Rule.*

Figures

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Warmhouse Beach Dump



Legend

- Site Location
- PPE
- SW & SD Sample
- SS Sample
- SW, SS, & SD Sample

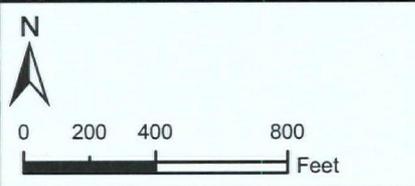
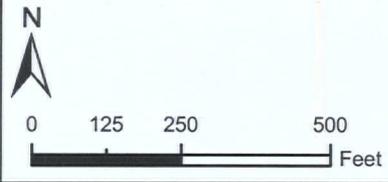


Figure 3-1 Sample Location Map
Makah Reservation Warmhouse Beach Dump Site
Neah Bay, Washington
Site Inspection

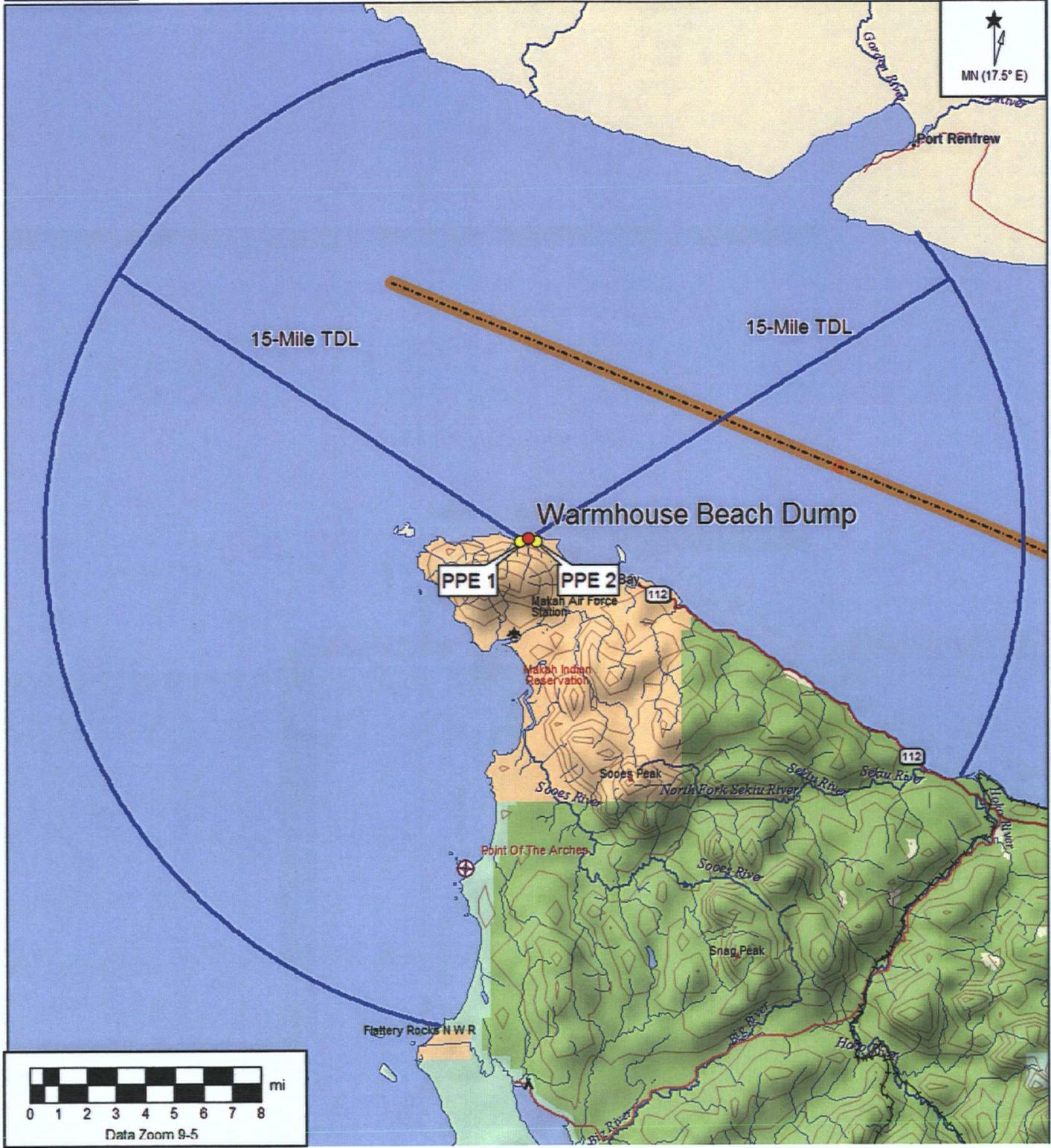
- ▲ Sediment
- ◆ Surface Soil
- Tissue
- Streams
- Road



Figure 3-2 Sample Location Detail
 Makah Reservation Warmhouse Beach Dump Site
 Neah Bay, Washington
 Site Inspection



- ▲ Sediment
- Surface Soil
- Tissue
- Streams
- Road



Legend

- Site Location
- PPE

ecology and environment, inc.
 Global Specialists in the Environment
 Seattle, Washington

MAKAH RESERVATION
 WARMHOUSE BEACH DUMP SITE
 Neah Bay, Washington

Figure 7-1
 15-MILE MAP

Source: TechLaw 2010.

Date:
 10-11-11

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Tables

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Table 2-1 Summary of Waste in Warmhouse Beach Dump

Potentially Hazardous Materials	Estimated Percent by Volume
Batteries	Less than 0.1%
Used Motor Oil (or unknown material)	Less than 0.1%
Hypodermic Needles	Less than 0.001%
Tires	7 to 10%
Appliances (may contain ammonia)	(included in metals)
Roofing; Construction Materials	Less than 1%
Other Waste	
Organic Material and Household Waste	20 to 30%
Metal (car bodies, appliances, framework)	20 to 30%
Glass	20 to 30%

Source: TechLaw 2010a.

Table 3-1 Fixed Laboratory Sample Collection Summary

EPA Sample Number	Station	CLP Sample ID	Matrix	Depth (Feet)	Sampler	Date	Time	TAL Metals	PCBs	Dioxins/Furans	PBDEs	Perchlorate	Grain Size	TOC	Percent Lipids	Location/Description
11354200	LF01SS	JE864	SS	0-6	DP	8/30/2011	3:10		X			X				Landfill. Medium brown sandy soil, moist, no odor.
11354201	LF02SS	JE865	SS	0-6	DP	8/30/2011	3:25		X			X				Landfill. Medium brown sandy soil, moist, no odor.
11354202	LF03SS	JE866	SS	0-6	DP	8/30/2011	3:40		X			X				Landfill. Medium brown sandy soil, moist, no odor.
11354203	LF04SS	JE867	SS	0-6	DP	8/30/2011	3:50		X			X				Landfill. Medium brown sandy soil, moist, no odor.
11354204	EC01SD	JE868	SD	0-6	DP	8/30/2011	5:00		X				X			East Creek. Dark brown silt with trace of sand, wet, no odor.
11354205	EC02SD	JE869	SD	0-6	LC	8/30/2011	9:20		X				X	X		East Creek. Medium reddish-brown, sandy soil, wet, no odor.
11354206	WC01SD	JE870	SD	0-6	DP	8/30/2011	4:20		X				X			West Creek. Dark brown, sandy silt, wet, no odor.
11354207	WC02SD	JE871	SD	0-6	LC	8/30/2011	12:05		X				X	X		West Creek. Gray sandy material, wet, no odor.
11354208	EB01TS	JE872	TS	NA	LC	8/30/2011	10:40	X	X	X	X	X			X	East Beach. Mussels.
11354209	EB02TS	JE873	TS	NA	DP	8/30/2011	10:45	X	X	X	X	X			X	East Beach. Mussels.
11354210	EB03TS	JE874	TS	NA	DP	8/30/2011	10:55	X	X	X	X	X			X	East Beach. Mussels.
11354211	WB01TS	JE875	TS	NA	JF	8/31/2011	9:20	X	X	X	X	X			X	Warmhouse Beach. Mussels.
11354212	WB02TS	JE876	TS	NA	LC	8/31/2011	9:10	X	X	X	X	X			X	Warmhouse Beach. Mussels.
11354213	WB03TS	JE877	TS	NA	DP	8/31/2011	9:25	X	X	X	X	X			X	Warmhouse Beach. Mussels.
11354214	EB01SD	JE878	SD	0-6	DP	8/30/2011	9:45	X	X	X	X	X	X	X		East Beach. Gray sandy material, damp, no odor.
11354215	EB02SD	JE879	SD	0-6	JF	8/30/2011	9:50	X	X	X	X	X	X	X		East Beach. Gray sandy material, damp, no odor.
11354216	EB03SD	JE880	SD	0-6	DP	8/30/2011	10:05	X	X	X	X	X	X	X		East Beach. Gray sandy material, damp, no odor.
11354220	WB01SD	JE884	SD	0-0	JF	8/30/2011	12:15	X	X	X	X	X	X	X		Warmhouse Beach. Gray sandy material, damp, no odor.
11354221	WB02SD	JE885	SD	0-6	DP	8/30/2011	12:20	X	X	X	X	X	X	X		Warmhouse Beach. Gray sandy material, damp, no odor.
11354222	WB03SD	JE886	SD	0-0	DP	8/30/2011	12:25	X	X	X	X	X	X	X		Warmhouse Beach. Gray sandy material, damp, no odor.
11354226	BK01SS	JE890	SS	0-6	JF	8/30/2011	5:55		X	X		X				Near Classet Creek. Medium brown, sandy soil, moist, no odor.
11354227	BK01SD	JE891	SD	0-6	DP	8/30/2011	6:10		X				X	X		Classet Creek. Dark to medium, brown, sandy silt, wet, no odor.
11354228	BK02SD	JE892	SD	0-6	LC	8/31/2011	10:00		X				X	X		Classet Creek. Medium reddish-brown, sandy material, wet, no odor.
11354229	BK03SD	JE893	SD	0-6	DP	8/31/2011	10:00	X	X	X	X	X	X	X		Warmhouse Beach. Dray sandy material, wet, no odor.

Table 3-1 Fixed Laboratory Sample Collection Summary

EPA Sample Number	Station	CLP Sample ID	Matrix	Depth (Feet)	Sampler	Date	Time	TAL Metals	PCBs	Dioxins/Furans	PBDEs	Perchlorate	Grain Size	TOC	Percent Lipids	Location/Description
11354231	BK01TS	JE895	TS	NA	JF	8/31/2011	10:05	X	X	X	X	X			X	Warmhouse Beach. Mussels.
11354232	TS01RS	JE896	RS	NA	KN	9/21/2011	11:05			X		X				Laboratory tissue homogenizing equipment rinsate.

Key:

CLP = Contract Laboratory Program.

DP = Derek Pulvino.

EPA = United States Environmental Protection Agency.

ID = Identification.

JF = Jeff Fetters.

KN = Karen Norton.

LC = Linda Costello.

NA = Not applicable.

PBDEs = Polybrominated diphenyl ether.

PCBs = Polychlorinated biphenyls.

RS = Rinsate.

SD = Sediment.

SS = Surface soil.

TAL = Target Analyte List.

TOC = Total organic carbon.

TS = Tissue.

X = The sample was analyzed for this parameter.

Table 3-2 Sample Coding

Digits	Description	Code	Example
1,2	Source Code	BK	Background
		EB	East Beach
		EC	East Creek
		LF	Landfill
		TS	Tissue
		WB	Warmhouse Beach
		WC	West Creek
3,4	Consecutive Number	01	First Number of Source Code
5,6	Matrix Code	TS	Tissue
		RS	Rinsate
		SD	Sediment
		SS	Surface Soil

Table 6-1 Surface Soil Samples Analytical Results Summary

EPA Sample ID	11354226	11354200	11354201	11354202	11354203
CLP Sample ID	JE890	JE864	JE865	JE866	JE867
Station Location	BK01SS	LF01SSS	LF02SS	LF03SS	LF04SS
Description	Background	Landfill	Landfill	Landfill	Landfill
Polychlorinated Biphenyls (µg/kg)					
Aroclor-1016	30 U	24 U	25 U	<u>150</u>	25 U
Dioxins/Furans (ng/kg)					
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	11.6	NA	NA	NA	NA
Total HxCDD	1.73 JH	NA	NA	NA	NA
Total TeCDF	3.34	NA	NA	NA	NA
Total HpCDF	1.37 JH	NA	NA	NA	NA
Perchlorate (µg/kg)					
Perchlorate	3.3 UJL	0.76 JQ	<u>24 JL</u>	<u>5.2 JL</u>	1.9 JQ

Note: Bold type indicates the sample result is above the instrument detection limit.
 Underline type indicates the sample result is significant as defined in Section 5.

Key:

- µg/kg = micrograms per kilogram.
- CLP = Contract Laboratory Program.
- EPA = United States Environmental Protection Agency.
- H = High bias.
- ID = Identification.
- J = The analyte was positively identified. The associated numerical result is an estimate.
- L = Low bias.
- NA = The sample was not analyzed for this parameter.
- ng/kg = nanograms per kilogram.
- Q = The result is estimated because the concentration is below the Contract Required Quantitation Limit.
- U = The analyte was not detected at or above the reported result.

Table 7-1 2009 Neah Bay Recreational Groundfish Catch

Species	Number Harvested
Blackrock	24,864
Bluerock	354
Bocaccio	93
Cabezon	1,004
Canary	64
China	1,519
Copper	397
Flatfish	41
General Cod	35
General Rockfish	8
Halibut	1,642
Kelp Greenling	1,122
Ling Cod	3,586
Miscellaneous	99
Pacific Cod	7
Perch	3
Quillback	534
Sharks and Skates	7
Tiger	46
Tuna	0
Vermillion	107
Yelloweye	39
Yellowtail	1,343

Source: TechLaw 2010a.

Notes:

General cod includes any cods other than Pacific cod.

General rockfish includes any rockfish that could not be identified by the sampler (e.g., came in filleted).

Miscellaneous includes any species of fish not listed in the identification list (e.g. Hake, sablefish, silvergray rockfish, greenstrip rockfish, red Irish lord, etc.).

Flatfish includes all species of flounder and sole.

Sharks and Skates includes all species of shark and skate.

Table 7-2 2009 Neah Bay Recreational Catch

Species	Number Harvested
Salmonidae	
Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	1,060
Coho salmon (<i>Oncorhynchus kisutch</i>)	7,101
Bottom/Other Fish	
Black Rockfish	27,894
Blue Rockfish	240
Bocaccio	13
Cabexon	696
Canary Rockfish	67
China	1,066
Copper Rockfish	1,023
Flatfish	412
General Cod	13
General Rockfish	0
Pacific Halibut	318
Kelp Greenling	2,201
Lingcod	2,929
Miscellaneous	208
Pacific Cod	6
Perch	3
Quillback Rockfish	766
Shark and Skates	5
Tiger Rockfish	76
Tuna	0
Vermillion Rockfish	41
Yelloweye Rockfish	17
Yellowtail Rockfish	898

Source: TechLaw 2010a.

Notes:

General cod includes any cods other than Pacific cod.

General rockfish includes any rockfish that could not be identified by the sampler (e.g., came in filleted).

Miscellaneous include any species of fish not listed in the identification list (e.g., Hake, sablefish, silvergray rockfish, greenstripe rockfish, red Irish lord, etc.).

Flatfish includes all species of flounder and sole.

Sharks and Skates includes all species of shark and skate.

Table 7-3 Commercial Groundfish Catch Data

Species	Pounds Harvested
Sablefish	954,806
Pacific Cod	420,858
Dover Sole	302,959
English Sole	216,916
Petrale Aole	175,827
Unidentified Skate	130,367
Dogfish	98,835
Lingcod	94,511
Rex Sole	69,062
Unidentified Sanddab	29,827
Arrowtooth Flatfish	5,929
Rock Sole	1,725
Starry Flounder	1,143
Sand Sole	531
Total	2,521,631

Source: TechLaw 2010a.

Table 7-4 Commercial Salmon Catch Area 4A

Species	Number Harvested
Chinook Salmon (<i>Oncorhynchus tshawytscha</i>)	1,201
Coho Salmon (<i>Oncorhynchus kisutch</i>)	584
Total	1,785

Source: TechLaw 2010a.

Note: Commercial troll fishery is restricted to the area west of the Bonilla-Tatoosh line and Washington catch area 4.

Table 7-5 Treaty Harvest Data Areas 4-A and 4-B

Species	Number Harvested	Average Pounds per Fish	Total Pounds Harvested
Salmonidae			
Chinook Salmon (<i>Oncorhynchus tshawytscha</i>)	12,733	22	280,126
Coho Salmon (<i>Oncorhynchus kisutch</i>)	59,987	11	659,957
Bottom/Other Fish			
Halibut			168,321
Total			1,108,404

Source: TechLaw 2010a.

Table 7-6 Sediment Samples Analytical Results Summary

EPA Sample ID	11354227	11354204	11354206	11354228	11354205	11354207	11354229	11354214	11354215	11354216	11354220	11354221	11354222
CLP Sample ID	JE891	JE868	JE870	JE892	JE869	JE871	JE893	JE878	JE879	JE880	JE884	JE885	JE886
Station Location	BK01SD	EC01SD	WC01SD	BK02SD	EC02SD	WC02SD	BK03SD	EB01SD	EB02SD	EB03SD	WB01SD	WB02SD	WB03SD
Description	Background	East Creek	West Creek	Background	East Creek	West Creek	Background	East Beach	East Beach	East Beach	West Beach	West Beach	West Beach
Target Analyte List Metals (mg/kg)													
Aluminum	NA	NA	NA	NA	NA	NA	2380 JL	8250 JL	7670 JL	8450 JL	7140 JL	7000 JL	7320 JL
Calcium	NA	NA	NA	NA	NA	NA	799	4570	6340	4720	3350	3150	3330
Chromium	NA	NA	NA	NA	NA	NA	1.5	<u>15.7</u>	<u>12.5</u>	<u>12.2</u>	<u>10.4</u>	<u>8.9</u>	<u>10.4</u>
Cobalt	NA	NA	NA	NA	NA	NA	1.6 JL	<u>5.7 JL</u>	<u>5.4 JL</u>	<u>5.1 JL</u>	<u>4.8 JL</u>	<u>4.4 JL</u>	<u>4.8 JL</u>
Copper	NA	NA	NA	NA	NA	NA	2.1 JK	<u>6.4 JK</u>	<u>6.0 JK</u>	<u>6.7 JK</u>	<u>5.7 JK</u>	<u>5.0 JK</u>	<u>6.5 JK</u>
Iron	NA	NA	NA	NA	NA	NA	4630 JL	15000 JL	14200 JL	16100 JL	12200 JL	12000 JL	12800 JL
Magensium	NA	NA	NA	NA	NA	NA	1560	5680	5310	5980	4640	4450	4650
Manganese	NA	NA	NA	NA	NA	NA	91.5	258	239	251	236	226	220
Nickel	NA	NA	NA	NA	NA	NA	2.3 JQ (4.3 SQL)	<u>11.1</u>	<u>10.4</u>	<u>9.9</u>	<u>8.4</u>	<u>7.5</u>	<u>9.2</u>
Vanadium	NA	NA	NA	NA	NA	NA	6.5	<u>34.4</u>	<u>32.0</u>	<u>31.4</u>	<u>31.5</u>	<u>29.8</u>	<u>29.5</u>
Zinc	NA	NA	NA	NA	NA	NA	11.1	30.7	29.3	29.4	27.8	26.5	26.9
Grain Size (percent)													
Between 2" and 3"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Between 1 ½" and 2"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Between 1" and 1 ½"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Between ¾" and 1"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Between ½" and ¾"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	1.63	0.0	0.0
Between ¼" and ½"	0.0	0.0	0.0	0.6	0.0	0.0	0.0	2.1	3.1	0.0	0.0	0.0	1.3
Between 4750 microns and ¾"	12.5	0.0	0.0	2.1	4.3	0.6	2.3	0.4	3.9	0.0	0.9	0.5	2.6
Between 2000 and 4750 microns	17.8	6.6	0.1	11.1	16.9	2.8	30.9	0.8	3.8	0.0	1.5	1.7	5.2
Between 850 and 2000 microns	17.5	22.1	17.5	30.7	39.4	16.1	58.8	3.3	17.4	1.6	10.7	11.6	12.0
Between 425 and 850 microns	9.2	6.5	11.9	31.0	19.2	58.6	4.7	34.9	34.4	42.9	56.6	57.5	41.3
Between 250 and 425 microns	5.8	2.8	5.2	9.0	8.3	19.2	0.2	52.0	31.1	51.5	26.6	25.3	33.8
Between 150 and 250 microns	4.0	2.1	3.7	2.5	1.6	0.3	0.0	3.6	1.4	1.5	0.5	0.7	1.7
Between 75 and 150 microns	4.3	2.5	4.5	1.6	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Between 32 and 75 microns	4.7	2.5	9.2	0.7	0.6	0.3	2.5	0.9	0.3	0.8	1.1	0.2	0.3
Between 22 and 32 microns	3.9	5.0	13.1	1.5	1.5	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.4
Between 13 and 22 microns	5.1	15.0	2.9	0.8	1.2	0.4	0.0	0.4	0.4	0.4	0.0	0.0	0.0
Between 9 and 13 microns	2.8	10.	10.2	2.3	1.2	1.6	0.6	1.2	1.1	1.3	0.9	1.7	1.5
Between 7 and 9 microns	3.4	7.5	5.8	1.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0
Between 3.2 and 7 microns	3.9	7.5	7.3	2.3	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
< 3.2 microns	5.1	10.0	8.7	2.3	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Organic Carbon (mg/kg)													
Total Organic Carbon	64400	NA	NA	3420	9620	970	396	794	821	814	806	895	715

Notes: The inorganic CLP ID begins with an "M."
 Bold type indicates the sample result is above the instrument detection limit.
 Underline type indicates the sample result is elevated as defined in Section 5.

Key:
 CLP = Contract Laboratory Program.
 EPA = United States Environmental Protection Agency.
 ID = Identification.
 J = The analyte was positively identified. The associated numerical result is an estimate.
 K = Unknown bias.
 L = Low bias.
 mg/kg = milligrams per kilogram.
 NA = The sample was not analyzed for this parameter.
 Q = The result is estimated because the concentration is below the Contract Required Quantitation Limit.
 SQL = Sample Quantitation Limit.
 U = The analyte was not detected above the reported result.

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Table 7-7 Mussel Tissue Samples Analytical Results Summary

EPA Sample ID	11354231	11354208	11354209	11354210	11354211	11354212	11354213
CLP Sample ID	JE895	JE872	JE873	JE874	JE875	JE876	JE877
Station Location	BK01TS	EB01TS	EB02TS	EB03TS	WB01TS	WB02TS	WB03TS
Description	Background	East Beach	East Beach	East Beach	West Beach	West Beach	West Beach
Target Analyte List Metals (mg/kg)							
Aluminum	32	156	12 U	27	77.9	23	82.7
Arsenic	2.1	2.1	2.1	2.3	3.19	2.95	3.55
Barium	0.38 U	<u>0.96</u>	0.39 U	0.40 U	0.35	0.39 U	0.37
Cadmium	0.99	<u>0.85</u>	0.67	0.86	0.64	0.62	0.76
Calcium	1500 JK	1000 JK	710 JK	2100 JK	940 JK	3600 JK	2600 JK
Chromium	0.51	1.4	0.28	0.68	<u>2.53</u>	0.90	<u>1.9</u>
Cobalt	0.11 JK	0.097 JK	0.048 JK	0.074 JK	0.10 JK	0.085 JK	0.11 JK
Copper	1.6	1.7	1.8	1.6	4.03	2.1	3.40
Iron	62 JK	170 JK	26 JK	58 JK	130 JK	58 JK	180 JK
Lead	0.24 U	<u>0.59</u>	0.25 U	0.25 U	0.22	<u>0.50</u>	<u>0.67</u>
Magnesium	955	<u>823</u>	804	849	852	921	911
Manganese	1.2	3.17	0.6	0.96	2.37	1.3	3.37
Mercury	0.360	0.0276	0.0244	0.0282	0.0243	0.0263	0.0267
Molybdenum	0.11	0.091	0.073	0.097	0.099	0.11	0.11
Nickel	0.57	0.91	0.38	0.53	1.6	0.91	1.4
Potassium	1480	1400	1520	1200	2070	1910	2220
Selenium	0.38	0.37	0.35	0.32	0.48	0.48	0.56
Sodium	6800 JH	5200 JH	5900 JH	6100 JH	5500 JH	6600 JH	6100 JH
Thallium	0.0522	0.0607	0.0246 U	0.0691	0.0996	0.124	0.0897
Vanadium	0.22	0.56	0.12	0.24	0.37	0.21	0.38
Zinc	21.6	22.0	19.9	18.4	30.5	29.2	34.8
Dioxins (ng/kg)							
Total TeCDD	0.0811 U	<u>0.267 JH</u>	0.444 JQ	<u>0.684 JH</u>	0.129 U	0.108 U	0.0879 U
Lipids (Percent)							
Lipids	1.14	0.65	0.21	0.76	1.6	2.63	2.39

Notes: The inorganic CLP ID begins with an "M."
 Bold type indicates the sample result is above the instrument detection limit.
 Underline type indicates the sample result is elevated as defined in Section 5.

Key:

- CLP = Contract Laboratory Program.
- EPA = United States Environmental Protection Agency.
- H = High bias.
- ID = Identification.
- J = The analyte was positively identified. The associated numerical result is an estimate.
- K = Unknown bias.
- mg/kg = milligrams per kilogram.
- ng/kg = nanograms per kilogram.
- Q = The result is estimated because the concentration is below the Contract Required Quantitation Limit.
- U = The analyte was not detected above the reported result.

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A

Removal Assessment Analytical Data Tables

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Table A-1
Organic Analytical Results Summary - Surface Soil Samples
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	JC658	JC651	JC652	JC653	JC655	JC656
Location ID	WBB-06-SS	WB-14-SS	WB-15-SS	WB-16-SS	WB-17-SS	WB-18-SS
Sample Date	1/26/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010
Location	Background			Waste Pile		
Volatile Organic Compounds (µg/kg)						
1,1-Dichloroethene	2.7 JQ	0.76 JQ	1.1 JQ	1.2 JQ	6.8 U	9.6 U
1,4-Dioxane	420 R	110 R	160 R	140 R	140 R	190 R
2-Butanone	27 JQ	11 U	24	14 U	25	27
Benzene	21 U	5.3 U	4 JQ	6.9 U	6.8 U	9.6 U
Cyclohexane	21 U	5.3 U	7.8 U	6.9 U	6.2 JQ	9.6 U
Ethylbenzene	21 U	5.3 U	0.85 JQ	6.9 U	0.84 JQ	0.98 JQ
m,p-Xylene	21 U	5.3 U	0.99 JQ	6.9 U	2.2 JQ	2.9 JQ
Methylcyclohexane	21 U	5.3 U	7.8 U	6.9 U	11	9.6 U
o-Xylene	21 U	5.3 U	7.8 U	6.9 U	1.1 JQ	1.4 JQ
Styrene	21 U	5.3 U	7.8 U	0.82 JQ	6.8 U	9.6 U
Toluene	21 U	5.3 U	5.1 JQ	6.9 U	2.3 JQ	3.3 JQ
Semivolatile Organic Compounds (µg/kg)						
2-Methylnaphthalene	9.1 U	3.9 U	3.8 JQ	4.3 U	14	8.2
4-Methylphenol	470 U	200 U	260 U	440 U	120 JQ	76 JQ
Acenaphthene	9.1 U	1.2 U	5.2	4.3 U	14	12
Acenaphthylene	9.1 U	3.9 U	5 U	4.3 U	4.6 U	2.6 JQ
Acetophenone	470 U	3.3 JQ	47 JQ	99 JQ	480 U	230 U
Anthracene	9.1 U	3.3 JQ	2.8 JQ	2.5 JQ	21	17
Benzo(a)anthracene	9.1 U	28	5.8	5.9	58	55
Benzo(a)pyrene	9.1 U	27	33	11	59	45
Benzo(b)fluoranthene	9.1 U	29	9.9	11	60	32
Benzo(g,h,i)perylene	9.1 U	7.4	5 U	6.2	18	16
Benzo(k)fluoranthene	9.1 U	11	4.5 JQ	3.5 JQ	22	20
Bis(2-ethylhexyl)phthalate	470 U	63 JQ	260 U	110 JQ	2,200	410
Butylbenzylphthalate	470 U	200 U	260 U	440 U	130 JQ	61 JQ
Chrysene	9.1 U	18	16	15	86	52
Dibenzo(a,h)anthracene	9.1 U	4.5	5 U	4.3 U	4.6 U	4.4 U
Di-n-butylphthalate	470 U	200 U	58 JQ	440 U	480 U	230 U
Fluoranthene	9.1 U	38	24	16	140	130
Fluorene	9.1 U	3.9 JQ	5 U	4.3 U	15	18
Indeno(1,2,3-cd)pyrene	9.1 U	15	5 U	4.9	24	22
Naphthalene	9.1 U	2.8 JQ	7	4.3 U	10	8.2
Pentachlorophenol	18 U	7.8 U	10 U	4.4 JQ	15	13
Phenanthrene	9.1 U	9	17	4 JQ	76	65
Pyrene	9.1 U	37	22	17	130	91
Pesticide and PCB (µg/kg)						
4,4'-DDD	9.4 U	4.2 U	0.37 JQ	4.4 U	4.8 U	4.2 U
4,4'-DDT	9.4 U	4.2 JK	5.2 U	4.4 U	4.8 U	4.2 U
Aldrin	4.7 U	0.53 JQ	2.6 U	2.2 U	2.4 U	0.091 JQ
alpha-BHC	4.7 U	2 U	2.6 U	0.72 JQ	2.9	1.4 JQ
alpha-Chlordane	4.7 U	35	2.6 U	2.2 U	2.4 U	2.1 U
Aroclor - 1016	92 U	38 U	17 JQ	42 U	12 JQ	42 U
Aroclor - 1254	92 U	38 U	49 U	12 JQ	28 JQ	41 JQ
delta-BHC	0.29 JQ	2 U	2.6 U	2.2 U	2.4 U	2.1 U
Endosulfan I	4.7 U	2 U	2.4 JQ	2.2 U	0.45 JQ	0.25 JQ
Endosulfan II	9.4 U	4.2 U	0.43 JQ	4.4 U	0.76 JQ	4.2 U
Endosulfan sulfate	9.4 U	0.16 JQ	5.2 U	4.4 U	4.8 U	0.061 JQ
Endrin	9.1 U	2.1 JQ	5.2 U	4.4 U	0.42 JQ	4.2 U
Endrin ketone	0.076 JQ	0.037 JQ	5.2 U	4.4 U	4.8 U	4.2 U
gamma-Chlordane	4.7 U	39	1.8 JQ	2.2 U	2.4 U	2.1 U
Heptachlor	4.7 U	9.8	2.6 U	2.2 U	2.4 U	2.1 U
Total Petroleum Hydrocarbons (mg/kg)						
Unleaded Gasoline Composite	10 U	4.7 U	6.4 U	6.6 U	9.2	7.4
TPH-GC/Diesel Range Organics	9 U	73	3.8 U	24 U	26 U	19 U
TPH-GC/Motor Oil Range	18 U	48	270	520	1,300	490

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

K = Unknown bias

Location ID = START-3 sample identification number

mg/kg = Milligrams per kilogram

Q = Detected concentration is below the method reporting limit/Contract required quantitation limit, but is above the method detection limit.

R = Sample results were rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified.

SS = Surface soil

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/kg = Micrograms per kilogram

WB = Warmhouse Beach Open Dump

WBB = Warmhouse Beach Background

Table A-2
Organic Analytical Results Summary - Surface Soil SPLP Samples
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	JC6A1/6	JC6A2/7	JC6A3/8	JC6A4/BO
Location ID	WB-14-SS	WB-15-SS	WB-16-SS	WB-17-SS
Sample Date	1/27/2010	1/27/2010	1/27/2010	1/27/2010
Location	Waste Pile			
<i>Volatile Organic Compounds (µg/L)</i>				
2-Butanone	5 U	5 U	5 U	2.5 JQ
Benzene	0.5 U	0.31 JQ	0.5 U	0.17 JQ
Ethylbenzene	0.11 JQ	0.5 U	0.5 U	0.14 JQ
m,p-Xylene	0.33 JQ	0.5 U	0.5 U	0.4 JQ
o-Xylene	0.37 JQ	0.5 U	0.5 U	0.21 JQ
Toluene	0.079 JQ	0.065 JQ	0.5 U	0.44 JQ
Trichlorofluoromethane	0.5 U	0.5 U	0.5 U	0.11 JQ
<i>Semivolatile Organic Compounds (µg/L)</i>				
Benzaldehyde	5 UJK	5 UJK	5 UJK	5 UJK
Bis(2-ethylhexyl)phthalate	1.1 JQ	2.1 JQ	0.81 JQ	0.59 JQ
Fluorene	0.1 U	0.1 UJK	0.1 U	0.13

Key:

CLP Sample ID = Contract Laboratory Program sample identification number

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

K = Unknown bias

Location ID = START-3 sample identification number

Q = Detected concentration is below the method reporting limit/Contract required quantitation limit, but is above the method detection limit.

SPLP = Synthetic Precipitation Leaching Procedure

SS = Surface soil

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/L = Micrograms per liter

WB = Warmhouse Beach Open Dump

Table A-3
Inorganic Analytical Results Summary - Surface Soil Samples
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	MJC658	MJC651	MJC652	MJC653	MJC655	MJC656
Location ID	WBB-06-SS	WB-14-SS	WB-15-SS	WB-16-SS	WB-17-SS	WB-18-SS
Sample Date	1/26/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010
Location	Background	Waste Pile				
<i>Inorganic Compounds (mg/kg)</i>						
Antimony	15.1 UJ	6.8 UJ	<u>33.7 J</u>	1.2 J	0.99 J	1 J
Arsenic	8	9.6	6.9	7.2	8.3	6.1
Barium	30.9 J	81.1	<u>178</u>	70.1	<u>112</u>	81.4
Beryllium	0.42 J	0.4 J	0.22 U	0.42 J	0.34 U	0.27 U
Cadmium	1.3 U	0.26 J	<u>10.8</u>	0.54 J	0.75	0.62
Chromium	31.9 J	36.4 J	35 J	44.5 J	35.7 J	27.5 J
Cobalt	6.1 J	13.1	10.8	15.3	13.4	10.4
Copper	30.2	69.7	<u>520</u>	83	<u>182</u>	<u>140</u>
Lead	10.6 J	23.5 J	<u>127 J</u>	<u>58.9 J</u>	<u>137 J</u>	<u>104 J</u>
Manganese	274 J	<u>954 J</u>	540 J	575 J	481 J	346 J
Mercury	0.26	0.12 U	0.095 J	0.27	0.15	0.12 J
Nickel	14.1	35.8	40.7	31	32.7	24
Silver	0.27 J	0.17 J	<u>2</u>	0.074 J	0.11 J	0.12 J
Thallium	3.4 J	4.5	3.3	4.5	4.3	3.1
Vanadium	78.3 J	73 J	35.5 J	83.8 J	74.2 J	52.3 J
Zinc	39.2 J	80.7 J	<u>923 J</u>	<u>165 J</u>	<u>375 J</u>	<u>262 J</u>

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

Location ID = START-3 sample identification number

SS = Surface soil

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

mg/kg = Milligrams per kilogram

WB= Warmhouse Beach Open Dump

WBB = Warmhouse Beach Background

Source: Makah Reservation - Warmhouse Beach Open Dump Removal Assessment (January 2010)

Table A-4
Inorganic Analytical Results Summary - Surface Soil SPLP Samples
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	MJC651	MJC652	MJC653	MJC655
Location ID	WB-14-SS	WB-15-SS	WB-16-SS	WB-17-SS
Sample Date	1/27/2010	1/27/2010	1/27/2010	1/27/2010
Location	Waste Pile			
<i>Inorganic Compounds (µg/L)</i>				
Antimony	1.2	20.3	2.7	10.2
Arsenic	0.63 U	0.63 U	0.63 U	0.9
Barium	17 J	29 J	20 J	38 J
Chromium	1.3 U	1.3 U	1.4	1.3 U
Copper	2.7	15.3	8.44	4.7
Lead	1.3	1.7	3.5	3.7
Nickel	1.2	1.7	1.2	1.8
Zinc	22 J	22 J	33 J	23 J

Key:

CLP Sample ID = Contract Laboratory Program sample identification

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

Location ID = START-3 sample identification number

SPLP = Synthetic Precipitation Leaching Procedure

SS = Surface soil

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/L = Micrograms per liter

WB= Warmhouse Beach Open Dump

Table A-5
Dioxin Analytical Results Summary - Surface Soil and Sediment Samples
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	<i>JE890</i>	JC651	JC652	JC653	JC655	MJC667	MJC668	MJC660	MJC662
Location ID	<i>BK01SS</i>	WB-14-SS	WB-15-SS	WB-16-SS	WB-17-SS	WBW-01-SD	WBW-02-SD	WBE-08-SD	WBE-09-SD
Sample Date	<i>8/30/2011</i>	1/27/2010	1/27/2010	1/27/2010	1/27/2010	1/26/2010	1/26/2010	1/27/2010	1/27/2010
Location	<i>Background</i>	Waste Pile			West Creek			East Creek	
Dioxin (ng/kg)									
2378-TCDD	<i>0.189 U</i>	0.345 JQ	150	0.318 U	2.56	2.24	4.04	0.249 U	0.404 U
2378-TCDF	<i>0.281 JQ</i>	1.79	386 JL	1.6	19	8.32	20.1	1.95	2.18
12378-PeCDF	<i>0.0968 U</i>	1.6 JQ	574 U	1.11 JQ	16.9	5.61	11.5	1.08 U	0.752 JQ
12378-PeCDD	<i>0.0997 U</i>	1.1 JQ	763	1.33 JQ	12.3	4.3 JQ	8.1	0.556 JQ	0.850 U
23478-PeCDF	<i>0.0745 U</i>	2.51 JQ	1,180	1.37	29.9	7.29	16.8	1.03 JQ	1.19 JQ
123478-HxCDF	<i>0.0844 U</i>	1.92 JQ	1050 U	2.20 JQ	32.8	4.3 JQ	11.6	0.767 JQ	0.61 JQ
123678-HxCDF	<i>0.0796 U</i>	2.29 JQ	790	2.34 JQ	30.3	7.38	11.2	0.553 JQ	0.467 JQ
123478-HxCDD	<i>0.135 U</i>	0.8 JQ	963	1.18 JQ	9.07	2.75 JQ	4.89	0.358 JQ	0.268 JQ
123678-HxCDD	<i>0.0956 U</i>	2.18 JQ	2,160 JL	4.6	30.5	8.62	16	0.597 JQ	0.58 JQ
123789-HxCDD	<i>0.163 U</i>	1.45 JQ	1,530	2.45 JQ	16.5	5.28	9.53	0.403 JQ	0.481 JQ
234678-HxCDF	<i>0.0896 U</i>	3.01 JQ	1,450	3.36 JQ	35.4	5.7	11.1	0.784 JQ	0.599 JQ
123789-HxCDF	<i>0.126 U</i>	0.733 JQ	191	0.84	8.41	1.56 U	2.75 U	0.211 U	0.137 U
1234678-HpCDF	<i>0.506 U</i>	11.9	4,990 JL	21.3	183	24	41.5	2.13 JQ	2.06 JQ
1234678-HpCDD	<i>1.48 JQ</i>	31.7	10,700 JL	82.7	702	183	296	6.05	5.28
1234789-HpCDF	<i>0.144 U</i>	0.98 U	167	7.89	18.6 U	2.00 U	3.47 JQ	0.306 U	0.279 U
OCDD	<i>1.44 U</i>	230	17,100 JL	800	7,480 JH	1,900	2,990	43.9	33.6
OCDF	<i>11.6</i>	15.4	1,100	54.4	340 JH	31.8	48	2.64 JQ	2.35 JQ

Italics = Sample results are from the Site Inspection

Bold and Underlined = Concentration elevated when compared to background

Key:

- CLP Sample ID = Contract Laboratory Program sample
- ID = Identification
- H = High bias
- J = The analyte was positively identified. The associated numerical result is an estimate.
- L = Low bias
- Location ID = START-3 sample identification number
- ng/kg = Nanograms per kilogram
- Q = Detected concentration is below the method reporting limit/Contract required quantitation limit, but is above the method detection limit.
- SS = Surface soil
- U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
- WB = Warmhouse Beach Open Dump

Table A-6
Organic Analytical Results Summary - Surface Soil PBDE Samples
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	MJC658	MJC651	MJC652	MJC653	MJC655	MJC656
Location ID	WBB-06-SS	WB-14-SS	WB-15-SS	WB-16-SS	WB-17-SS	WB-18-SS
Sample Date	1/26/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010
Location	Background	Waste Pile				
PBDE (µg/kg)						
BDE# 28	1.4 U	1 U	0.36 J	0.27 J	0.64 J	0.73 J
BDE# 47	1.4 U	<u>3.5</u>	<u>20</u>	<u>14</u>	<u>29</u>	<u>35</u>
BDE# 99	1.4 U	<u>6.4</u>	<u>37</u>	<u>37</u>	<u>58</u>	<u>66</u>
BDE#100	1.4 U	<u>1.4</u>	<u>7.8</u>	<u>7.2</u>	<u>11</u>	<u>13</u>
BDE#153	1.4 U	0.95 J	<u>5.1</u>	<u>4.7</u>	<u>6.8</u>	<u>7.4</u>
BDE#154	1.4 U	0.85 J	<u>4.5</u>	<u>4</u>	<u>5.6</u>	<u>6</u>
BDE#183	1.4 U	1 U	<u>2.3</u>	0.6 J	1.1	1.1
BDE#209	14 U	6.4 J	12 J	<u>18 J</u>	<u>17 J</u>	<u>24 J</u>

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

Location ID = START-3 sample identification number

PBDE = polybrominated diphenyl ethers

SS = Surface soil

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/kg = Micrograms per kilogram

WB= Warmhouse Beach Open Dump

WBB = Warmhouse Beach Background

Table A-7
Organic Analytical Results Summary - Surface Water Samples - West Creek
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	JC621	JC628	JC629	JC630	JC631	JC632	JC633
Location ID	WBB-06-SW	WBW-01-SW	WBW-02-SW	WBW-03-SW	WBW-04-SW	WBW-05-SW	WBW-07-SW
Sample Date	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010
Location	Background	West Creek					
Volatile Organic Compounds (µg/L)							
1,2-Dichloroethane	0.5 U	<u>1.1</u>	0.19 JQ	0.5 U	0.5 U	0.5 U	0.083 JQ
Semivolatile Organic Compounds (µg/L)							
3,3'-Dichlorobenzidine	5 UJK	5 UJK	5 UJK	5 UJK	5 UJK	5 R	5 UJK
4-Chloroaniline	5 UJK	5 UJK	5 UJK	5 UJK	5 UJK	5 R	5 UJK
Hexachlorocyclopentadiene	5 UJK	5 UJK	5 UJK	5 UJK	5 UJK	5 R	5 UJK
Perchlorate	0.1 U	<u>52.9</u>	<u>44.1</u>	<u>42.1</u>	<u>26.6</u>	<u>24.7</u>	<u>41</u>
Pesticide and PCB (µg/L)							
Endosulfan II	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.0053 JQ

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample identification number

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

K = Unknown bias

Location ID = START-3

Q = Detected concentration is below the method reporting limit/Contract required quantitation limit, but is above the method detection limit.

R = Sample results were rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified.

SW = Surface Water

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/L = Micrograms per liter

WBB = Warmhouse Beach Background

WBW = Warmhouse Beach Open Dump - West Creek

Table A-8
Inorganic Analytical Results Summary - Surface Water Samples - West Creek
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	MJC621	MJC628	MJC629	MJC630	MJC631	MJC632	MJC633
Location ID	WBB-06-SW	WBW-01-SW	WBW-02-SW	WBW-03-SW	WBW-04-SW	WBW-05-SW	WBW-07-SW
Sample Date	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010
Location	Background	West Creek					
<i>Inorganic Compounds (µg/L)</i>							
Arsenic	1 U	<u>1.5</u>	<u>1.3</u>	<u>1.4</u>	<u>1.1</u>	<u>1.1</u>	<u>1.4</u>
Barium	2.1 J	<u>51.7</u>	<u>49.7</u>	<u>55.1</u>	<u>68.9</u>	<u>67.6</u>	<u>56.3</u>
Cadmium	1 U	0.088 J	1 U	0.069 J	1 U	1 U	0.084 J
Chromium	0.22 U	<u>0.62 J</u>	<u>1 J</u>	<u>0.91 J</u>	0.39 U	<u>1.2 J</u>	<u>0.85 J</u>
Cobalt	1 U	0.63 J	0.38 J	0.87 J	0.33 J	0.8 J	0.83 J
Copper	0.23 J	<u>2.6</u>	<u>1.5 J</u>	<u>2.2</u>	<u>1 J</u>	<u>2 J</u>	<u>1.9 J</u>
Lead	1 U	<u>1.2</u>	0.31 J	0.69 J	1 U	0.57 J	0.62 J
Manganese	2.4 J	<u>178 J</u>	<u>34.6 J</u>	<u>98.6 J</u>	<u>19.8 J</u>	<u>62.9 J</u>	<u>89.4 J</u>
Nickel	0.18 J	<u>4.8</u>	<u>4.4</u>	<u>4.4</u>	<u>4.9</u>	<u>5.2</u>	<u>4.6</u>
Selenium	5 U	<u>5.4</u>	<u>5.2</u>	4.7 J	4.3 J	4.1 J	<u>5.2</u>
Vanadium	0.28 J	<u>0.89 J</u>	0.34 J	<u>1.6 J</u>	0.5 J	<u>1.9 J</u>	<u>1.5 J</u>
Zinc	2 UJ	<u>50.8 J</u>	<u>28.2 J</u>	<u>31.1 J</u>	<u>14.1 J</u>	<u>22.8 J</u>	<u>30.4 J</u>

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample identification number

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

Location ID = START-3 sample identification number

SW = Surface Water

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/L = Micrograms per liter

WBB = Warmhouse Beach Background

WBW = Warmhouse Beach Open Dump - West Creek

Table A-9
Inorganic Analytical Results Summary - Filtered Surface Water Samples - West Creek
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	MJC638	MJC645	MJC646	MJC647	MJC648	MJC649	MJC650
Location ID	WBB-06-SW	WBW-01-SW	WBW-02-SW	WBW-03-SW	WBW-04-SW	WBW-05-SW	WBW-07-SW
Sample Date	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010
Location	Background	West Creek					
<i>Inorganic Compounds (µg/L)</i>							
Arsenic	0.08 J	<u>1.3</u>	<u>1.2</u>	<u>1.1</u>	<u>1</u>	<u>0.98 J</u>	<u>1.2</u>
Barium	14.5	<u>47.7</u>	<u>50.2</u>	<u>50.9</u>	<u>64.7</u>	<u>63.7</u>	<u>50</u>
Cobalt	1 U	0.34 J	0.25 J	0.21 J	0.19 J	0.18 J	0.2 J
Copper	0.93 J	1.6 J	1.4 J	<u>3.4</u>	1.3 J	1.1 J	<u>4.8</u>
Manganese	2.6	<u>114</u>	<u>14.7</u>	2.1	2.4	1.2	2.2
Nickel	0.8 J	<u>4.3</u>	<u>4</u>	<u>3.3</u>	<u>4.4</u>	<u>3.5</u>	<u>3.4</u>
Selenium	0.41 U	<u>5.2</u>	<u>5</u>	<u>4.8 J</u>	<u>4.4 J</u>	<u>4.2 J</u>	<u>4.7 J</u>
Silver	1 R	1 R	1 R	1 R	1 R	1 R	1 R
Vanadium	0.32 J	5 U	0.1 J	0.081 J	0.14 J	0.2 J	0.1 J
Zinc	4	<u>35.4</u>	<u>21.4</u>	<u>14</u>	<u>12.6</u>	9.3	<u>16.2</u>

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample identification number

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

Location ID = START-3

R = Sample results were rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified.

SW = Surface Water

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/L = Micrograms per liter

WBB = Warmhouse Beach Background

WBW = Warmhouse Beach Open Dump - West Creek

Table A-10
Organic Analytical Results Summary - Sediment Samples - West Creek
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	JC657	JC667	JC668	JC669	JC670	JC671	JC672
Location ID	WBB-06-SD	WBW-01-SD	WBW-02-SD	WBW-03-SD	WBW-04-SD	WBW-05-SD	WBW-07-SD
Sample Date	1/26/2010	1/26/2010	01/26/10	01/26/10	01/26/10	01/26/10	01/26/10
Location	Background	West Creek					
Volatle Organic Compounds (µg/kg)							
1,4-Dioxane	370 R	1,100 R	860 R	190 R	220 R	350 R	220 R
Isopropylbenzene	19 U	850	43 U	9.7 U	11 U	18 U	11 U
Styrene	19 U	8.4 JQ	43 U	9.7 U	11 U	18 U	11 U
Toluene	2.3 JQ	8.3 JQ	43 U	1.3 JQ	11 U	2.5 JQ	11 U
Semivolatle Organic Compounds (µg/kg)							
Benzo(a)pyrene	6.7 U	27	16 UJK	6	5.6 UJK	5.9 UJK	7.7 U
Perchlorate	2.1 U	5.6 U	5.2 U	13.6	5.61	2.6 U	13.9
Pesticide and PCB (µg/kg)							
4,4'-DDD	6.5 U	2 JQ	1.1 JQ	5.6 U	5.6 U	5.9 U	0.099 JQ
Aldrin	3.3 U	10 U	8.3 U	2.9 U	2.9 U	0.068 JQ	0.059 JQ
alpha-BHC	3.3 U	0.27 JQ	8.3 U	2.9 U	0.038 JQ	0.13 JQ	0.087 JQ
alpha-Chlordane	3.3 U	10 U	0.55 JQ	2.9 U	2.9 U	0.089 JQ	3.9 U
Aroclor - 1254	67 U	56 JQ	30 JQ	58 U	55 U	58 U	75 U
delta-BHC	3.3 U	0.4 JQ	8.3 U	2.9 U	2.9 U	3 U	3.9 U
Endosulfan I	3.3 U	0.62 JQ	8.3 U	2.9 U	2.9 U	3 U	3.9 U
Endosulfan II	6.5 U	20 U	1.1 JQ	5.6 U	5.6 U	0.14 JQ	7.5 U
Endosulfan sulfate	6.5 U	20 U	16.6 U	0.14 JQ	0.051 JQ	5.9 U	7.5 U
Endrin ketone	6.5 U	0.8 JQ	16.6 U	5.6 U	5.6 U	5.9 U	7.5 U
gamma-BHC(Lindane)	3.3 U	0.26 JQ	8.3 U	2.9 U	2.9 U	3 U	3.9 U
gamma-Chlordane	3.3 U	0.22 JQ	0.2 JQ	2.9 U	2.9 U	3 U	3.9 U
Heptachlor	3.3 U	10 U	8.3 U	2.9 U	0.072 JQ	3 U	0.1 JQ

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample identification number

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

K = Unknown bias

Location ID = START-3 sample identification number

Q = Detected concentration is below the method reporting limit/Contract required quantitation limit, but is above the method detection limit.

R = Sample results were rejected due to serious deficiencies in the ability to

SD = Sediment

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/kg = Micrograms per kilogram

WBB = Warmhouse Beach Background

WBW = Warmhouse Beach Open Dump - West Creek

Table A-11
Inorganic Analytical Results Summary - Sediment Samples - West Creek
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	MJC657	MJC667	MJC668	MJC669	MJC670	MJC671	MJC672
Location ID	WBB-06-SD	WBW-01-SD	WBW-02-SD	WBW-03-SD	WBW-04-SD	WBW-05-SD	WBW-07-SD
Sample Date	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010
Location	Background	West Creek					
<i>Inorganic Compounds (mg/kg)</i>							
Antimony	13 UJ	8.1 J	3.9 J	9.3 UJ	10.2 UJ	13.8 UJ	9.4 UJ
Arsenic	4.7	13.4	11.3	6.1	8.9	4.6	4.2
Barium	77.8	<u>701</u>	<u>316</u>	105	83.4	91.2	98
Beryllium	0.62 J	0.68 J	0.79 J	0.61 J	0.61 J	0.35 J	0.49 J
Cadmium	1.1 U	<u>6</u>	<u>2.7</u>	0.25 J	0.85 U	1.2 U	0.18 J
Chromium	46 J	32.6 J	34.1 J	60.9 J	64 J	30.1 J	60.4 J
Cobalt	8 J	<u>68.7</u>	<u>47.2</u>	16.5	17.6	10 J	16.4
Copper	36.7	<u>111</u>	78	36.2	62.4	35.6	53
Lead	8.1 J	<u>50.5 J</u>	<u>38 J</u>	8.2 J	9.2 J	8.2 J	8 J
Manganese	188 J	<u>26,500 J</u>	<u>10,000 J</u>	508 J	304 J	<u>752 J</u>	550 J
Mercury	0.13 J	<u>0.48 J</u>	0.5 U	0.1 J	0.17 U	0.14 J	0.16 U
Nickel	23.9	<u>129</u>	<u>88</u>	47.3	43.1	32.6	40.9
Selenium	1.5 J	19.8 U	17.6 U	5.4 U	5.9 U	1.1 J	5.5 U
Silver	0.34 J	<u>1.6 J</u>	0.74 J	1.6 U	0.14 J	0.17 J	1.6 U
Thallium	1.8 J	<u>6.3 J</u>	3.9 J	5.2	4.9	1.5 J	4.8
Vanadium	86.1 J	62.3 J	65.9 J	102 J	121 J	55.1 J	93.4 J
Zinc	62.6 J	<u>2,610 J</u>	<u>1,200 J</u>	153 J	80.3 J	160 J	141 J

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample identification number

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

Location ID = START-3 sample identification number

SD = Sediment

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

mg/kg = Milligrams per kilogram

WBB = Warmhouse Beach Background

WBW = Warmhouse Beach Open Dump - West Creek

Table A-12
Organic Analytical Results Summary - Sediment PBDE Samples - West Creek
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	MJC657	MJC667	MJC668	MJC669	MJC670	MJC671	MJC672
Location ID	WBB-06-SD	WBW-01-SD	WBW-02-SD	WBW-03-SD	WBW-04-SD	WBW-05-SD	WBW-07-SD
Sample Date	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010	1/26/2010
Location	Background	West Creek					
PBDE (µg/kg)							
BDE# 28	1.1 U	<u>1.1 J</u>	1 J	1.1 U	1.1 U	1.3 U	1.2 U
BDE# 47	1.1 U	<u>48</u>	<u>36</u>	0.19 J	1.1 U	<u>1.4</u>	0.31 J
BDE# 99	1.1 U	<u>160</u>	<u>100</u>	0.38 J	1.1 U	<u>2.3</u>	0.31 J
BDE#100	1.1 U	<u>33</u>	<u>22</u>	1.1 U	1.1 U	0.67 J	1.2 U
BDE#153	1.1 U	<u>18</u>	<u>12</u>	1.1 U	1.1 U	1.3 U	1.2 U
BDE#154	1.1 U	<u>16</u>	<u>11</u>	1.1 U	1.1 U	1.3 U	1.2 U
BDE#183	1.1 U	<u>2.6 J</u>	<u>1.7 J</u>	1.1 U	1.1 U	1.3 U	1.2 U
BDE#209	1.1 U	<u>18 J</u>	<u>15 J</u>	1.1 U	1.1 U	1.3 U	1.2 U

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

Location ID = START-3 sample identification number

PBDE = polybrominated diphenyl ethers

SD = Sediment

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/kg = Micrograms per kilogram

WBB = Warmhouse Beach Background

WBW = Warmhouse Beach Open Dump - West Creek

Table A-13
Organic Analytical Results Summary - Surface Water Samples - East Creek
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	JC622	JC623	JC624	JC625	JC626	JC627
Location ID	WBB-13-SW	WBE-08-SW	WBE-09-SW	WBE-10-SW	WBE-11-SW	WBE-12-SW
Sample Date	1/26/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010
Location	Background	East Creek				
Semivolatile Organic Compounds (µg/L)						
Acenaphthene	0.1 U	0.1 U	0.1 U	0.1 U	0.084 JQ	0.1 U
Perchlorate	0.1 U	<u>2.93</u>	<u>2.06</u>	<u>1.96</u>	<u>1.92</u>	<u>2.04</u>
Pyrene	0.1 UJK	0.07 JQ	0.1 U	0.1 U	0.1 UJK	0.1 U

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample identification number

ID = Identification

J = The analyte

K = Unknown bias

Location ID = START-3 sample identification number

Q = Detected concentration is below the method reporting limit/Contract required quantitation limit.

SW = Surface Water

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/L = Micrograms per liter

WBB = Warmhouse Beach Background

WBE = Warmhouse Beach Open Dump - East Creek

Table A-14
Inorganic Analytical Results Summary - Surface Water Samples - East Creek
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	MJC622	MJC623	MJC624	MJC625	MJC626	MJC627
Location ID	WBB-13-SW	WBE-08-SW	WBE-09-SW	WBE-10-SW	WBE-11-SW	WBE-12-SW
Sample Date	1/26/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010
Location	Background	East Creek				
<i>Inorganic Compounds (µg/L)</i>						
Arsenic	0.28 J	<u>1.4</u>	<u>1.1</u>	<u>1</u>	<u>1</u>	<u>1.1</u>
Barium	14.8	<u>87</u>	<u>50.7</u>	<u>45.9</u>	<u>45.9</u>	<u>48</u>
Cadmium	1 U	<u>1.1</u>	0.13 J	0.11 J	0.081 J	0.14 J
Chromium	1.6 J	0.48 U	0.41 U	0.28 U	0.31 U	0.38 U
Cobalt	0.47 J	1.2	0.29 J	0.22 J	0.2 J	0.26 J
Copper	1.9 J	4.6	2.2	1.8 J	1.7 J	2.2
Lead	0.53 J	<u>2.5</u>	1.1	0.82 J	0.61 J	0.95 J
Manganese	29.3 J	519 J	29.1 J	20.7 J	15.4 J	25.9 J
Nickel	1.3	<u>14.6</u>	<u>4.1</u>	3.5	3.4	<u>3.9</u>
Selenium	0.4 U	<u>5.2</u>	<u>4.4 J</u>	<u>4 J</u>	<u>4.1 J</u>	<u>4.4 J</u>
Vanadium	2.9 J	1.3 J	0.92 J	0.68 J	0.59 J	0.78 J
Zinc	4.3 J	<u>282 J</u>	<u>71.7 J</u>	<u>63 J</u>	<u>55.7 J</u>	<u>68.8 J</u>

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample identification number

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

Location ID = START-3 sample identification number

SW = Surface Water

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/L = Micrograms per liter

WBB = Warmhouse Beach Background

WBE = Warmhouse Beach Open Dump - East Creek

Table A-15
Inorganic Analytical Results Summary - Filtered Surface Water Samples - East Creek
Makah Reservation Warmhouse Beach Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	MJC639	MJC640	MJC641	MJC642	MJC643	MJC644
Location ID	WBB-13-SW	WBE-08-SW	WBE-09-SW	WBE-10-SW	WBE-11-SW	WBE-12-SW
Sample Date	1/26/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010
Location	Background	East Creek				
<i>Inorganic Compounds (µg/L)</i>						
Arsenic	0.12 J	<u>1.4</u>	<u>1.1</u>	<u>1</u>	<u>1.1</u>	<u>0.99 J</u>
Barium	9.5 J	<u>64.2</u>	<u>49.6</u>	<u>46.2</u>	<u>44.7</u>	<u>46.2</u>
Cadmium	1 U	0.18 J	0.097 J	0.083 J	0.074 J	0.084 J
Cobalt	1 U	0.18 J	0.11 J	0.12 J	0.097 J	0.11 J
Copper	3.4	1.9 J	1.4 J	1.4 J	1.3 J	1.3 J
Manganese	5.8	<u>21.6</u>	3.9	1.5	1.1	3.6
Nickel	0.51 J	<u>4.8</u>	<u>3.3</u>	<u>3.1</u>	<u>2.9</u>	<u>3.1</u>
Selenium	0.31 U	<u>5.8</u>	<u>4.4 J</u>	<u>4.1 J</u>	<u>4.3 J</u>	<u>4 J</u>
Silver	1 R	1 R	1 R	1 R	1 R	1 R
Vanadium	0.59 J	0.14 J	0.22 J	0.22 J	0.21 J	0.19 J
Zinc	3.7	<u>90.3</u>	<u>58</u>	<u>47.9</u>	<u>43.5</u>	<u>53</u>

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample identification number

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

Location ID = START-3 sample identification number

R = Sample results were rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified.

SW = Surface Water

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

µg/L = Micrograms per liter

WBB = Warmhouse Beach Background

WBE = Warmhouse Beach Open Dump - East Creek

Table A-16
Organic Analytical Results Summary - Sediment Samples- East Creek
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	JC659	JC660	JC662	JC663	JC665	JC666
Location ID	WBB-13-SD	WBE-08-SD	WBE-09-SD	WBE-10-SD	WBE-11-SD	WBE-12-SD
Sample Date	1/26/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010	01/27/10
Location	Background	East Creek				
Volatile Organic Compounds (µg/kg)						
1,1-Dichloroethene	2.9 JQ	1 JQ	6.8 U	1 JQ	12 U	15 U
1,4-Dioxane	390 R	200 R	140 R	160 R	240 R	310 R
2-Butanone	39 U	33	14 U	21	37	60
Acetone	170 U	340	37 U	59 U	220	130 U
Isopropylbenzene	2.7 JQ	9.8 U	6.8 U	7.9 U	12 U	15 U
Toluene	20 U	1.1 JQ	0.89 JQ	0.91 JQ	1.3 JQ	1.8 JQ
Semivolatile Organic Compounds (µg/kg)						
Acenaphthylene	9.6 U	6.1 U	5 U	3.9 U	6.3 JK	5.4 UJK
Anthracene	9.6 U	6.1 U	5 U	3.9 U	18 JK	5.4 UJK
Benzo(a)Pyrene	9.6 U	6.1 U	6.5	3.9 U	6.1 U	5.4 U
Fluorene	9.6 U	6.1 U	5 U	3.9 U	7.5 JK	5.4 UJK
Pesticide and PCB (µg/kg)						
4,4'-DDD	9.6 U	0.07 JQ	4.9 U	3.8 U	6.2 U	0.048 JQ
Aldrin	5 U	3.1 U	0.051 JQ	0.05 JQ	3.1 U	0.053 JQ
alpha-BHC	5 U	3.1 U	2.5 U	1.9 U	3.1 U	0.035 JQ
alpha-Chlordane	5 U	3.1 U	2.5 U	1.9 U	0.057 JQ	2.7 U
delta-BHC	0.2 JQ	3.1 U	2.5 U	0.07 JQ	0.2 JQ	2.7 U
Endosulfan I	0.18 JQ	3.1 U	2.5 U	1.9 U	0.13 JQ	2.7 U
Endosulfan sulfate	0.13 JQ	6.1 U	4.9 U	3.8 U	6.2 U	0.096 JQ
Endrin	9.6 U	6.1 U	4.9 U	3.8 U	0.13 JQ	5.3 U
Endrin ketone	9.6 U	6.1 U	4.9 U	0.04 JQ	6.2 U	5.3 U
gamma-BHC(Lindane)	5 U	3.1 U	2.5 U	0.15 JQ	1.3 JQ	2.7 U
gamma-Chlordane	5 U	3.1 U	2.5 U	0.02 JQ	3.1 U	2.7 U
Heptachlor	5 U	3.1 U	0.046 JQ	0.03 JQ	3.1 U	2.7 U

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample identification number

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

Location ID = START-3 sample identification number

Q = Detected concentration is below the method reporting limit/Contract required quantitation limit, but is above the method detection limit.

R = Sample results were rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified

SD = Sediment

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detect

µg/kg = Micrograms per kilogram

WBB = Warmhouse Beach Background

WBE = Warmhouse Beach Open Dump - East Creek

Table A-17
Inorganic Analytical Results Summary - Sediment Samples - East Creek
Makah Reservation - Warmhouse Beach Open Dump
Neah Bay, Clallam County, Washington

CLP Sample ID	MJC659	MJC660	MJC662	MJC663	MJC665	MJC666
Location ID	WBB-13-SD	WBE-08-SD	WBE-09-SD	WBE-10-SD	WBE-11-SD	WBE-12-SD
Sample Date	1/26/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010	1/27/2010
Location	Background	East Creek				
<i>Inorganic Compounds (mg/kg)</i>						
Arsenic	5.1	4.1	2.3	2.3	4.8	2.5
Barium	113	45.3	50.2	38.2	71.1	65.5
Beryllium	0.64 J	0.26 U	0.24 U	0.22 U	1.5 U	0.94 U
Cadmium	1.3 U	0.2 J	0.68 J	0.46 J	0.94 J	1.2
Chromium	47.4 J	34.8 J	19.4 J	18 J	28.7 J	19.7 J
Cobalt	14.3	6 J	7.6 J	7.4	10.3 J	8.6 J
Copper	35.7	23	18.3	13.2	28.3	22.2
Lead	8.8 J	14.5 J	12.1 J	8.4 J	20.9 J	16.5 J
Manganese	837 J	377 J	927 J	771 J	1,270 J	1,060 J
Mercury	0.15 J	0.12 J	0.088 J	0.14 U	0.14 J	0.19 U
Nickel	32.7	18.9	23.8	21.9	28.5	29.6
Silver	0.19 J	1.8 U	0.093 J	1.3 U	0.14 J	0.13 J
Thallium	2.1 J	2.1 J	1.3 J	1.7 J	1.6 J	1 J
Vanadium	78.2 J	68.8 J	36.6 J	38.7 J	53.2 J	37.8 J
Zinc	81.8 J	179 J	<u>345 J</u>	<u>343 J</u>	<u>425 J</u>	<u>477 J</u>

Key:

Bold and Underlined = Concentration elevated when compared to background

CLP Sample ID = Contract Laboratory Program sample identification number

ID = Identification

J = The analyte was positively identified. The associated numerical result is an estimate.

Location ID = START-3 sample identification number

SD = Sediment

U = The material was analyzed for but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

mg/kg = Milligrams per kilogram

WBB = Warmhouse Beach Background

WBE = Warmhouse Beach Open Dump - East Creek

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B

Photographic Documentation

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MAKAH RESERVATION WARMHOUSE BEACH DUMP SITE
Neah Bay, Washington

TDD Number: 11-01-0013
Photographed by: Linda Costello



Photo 1 West Creek.

Direction: South *Date:* 6/15/11 *Time:* 07:51



Photo 2 West Creek toward the Strait of Juan de Fuca.

Direction: North *Date:* 6/15/11 *Time:* 07:52



Photo 3 The estimated upper reach of clam beds on Warmhouse Beach is where people are standing in the frame.

Direction: Southwest *Date:* 6/15/11 *Time:* 08:02



Photo 4 Kelp extends to within a few feet of grass at beach edge.

Direction: South *Date:* 6/15/11 *Time:* 08:03



Photo 5 Classet Creek where it discharges to Warmhouse Beach.

Direction: South *Date:* 6/15/11 *Time:* 08:16

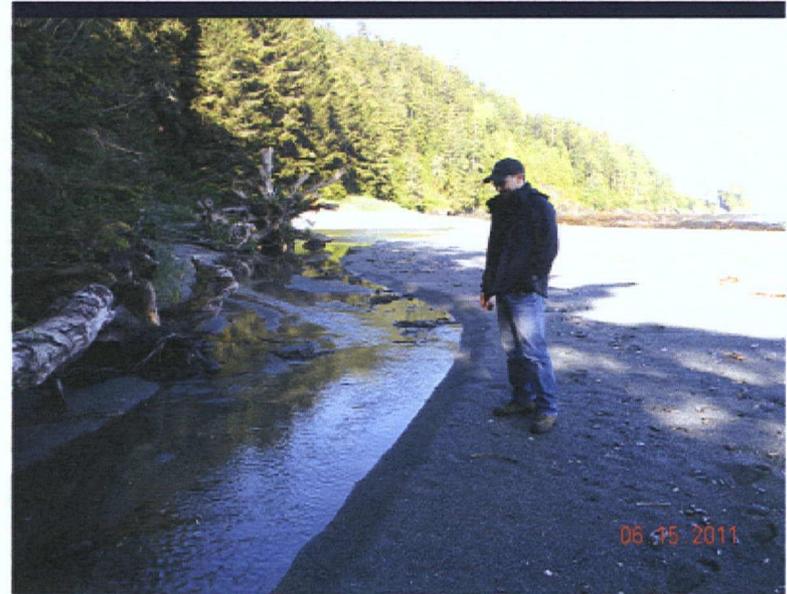


Photo 6 Classet Creek looking toward its flow to the Strait of Juan de Fuca.

Direction: West *Date:* 6/15/11 *Time:* 08:17



Photo 7 Indication of tides reaching Classet Creek at grassy edge as evidenced by the presence of wood, seaweed, and shells pushed up by the tide to creek.

Direction: East *Date:* 6/15/11 *Time:* 08:18



Photo 8 Dry stream bed of Classet Creek where it enters the Strait of Juan de Fuca.

Direction: West *Date:* 6/15/11 *Time:* 08:23

MAKAH RESERVATION WARMHOUSE BEACH DUMP SITE
Neah Bay, Washington

TDD Number: 11-01-0013
Photographed by: Linda Costello



Photo 9 Evidence of seeps, actively flowing, along the Warmhouse Beach shoreline.

Direction: Down Date: 6/15/11 Time: 08:29



Photo 10 Gravelly sand of Warmhouse Beach. This location is near where West Creek enters the Strait of Juan de Fuca.

Direction: Down Date: 6/15/11 Time: 08:34



Photo 11 Trailhead marked by a boat buoy on a tree at Warmhouse Beach.

Direction: Southeast Date: 6/15/11 Time: 08:47



Photo 12 East Creek where it flows to the beach.

Direction: South Date: 6/15/11 Time: 09:11



Photo 13 East Creek entering the Strait of Juan de Fuca.

Direction: North Date: 6/15/11 Time: 09:12

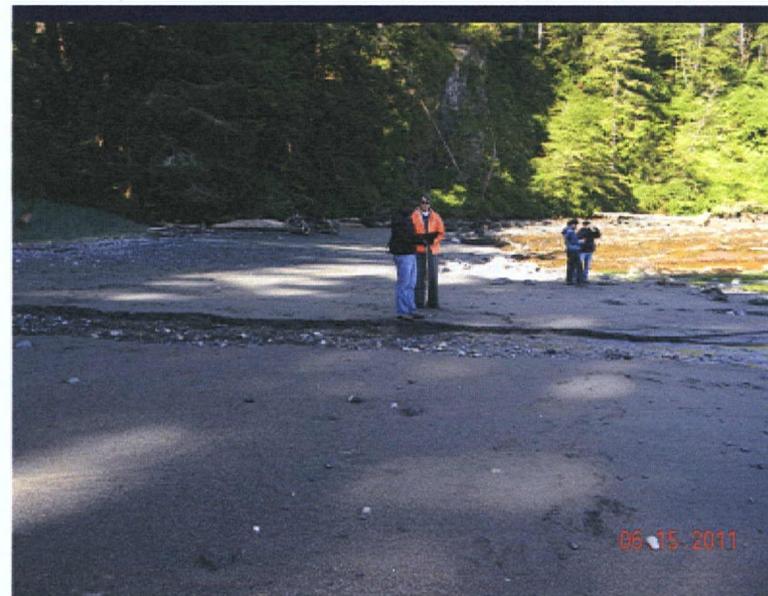


Photo 14 The estimated upper reach of clam beds on this beach is where people are standing in the frame.

Direction: West Date: 6/15/11 Time: 09:15



Photo 15 Burning landfill.

Direction: South Date: 6/15/11 Time: 10:21



Photo 16 Top of landfill looking east. Smoke is from the lower portion of the landfill.

Direction: East Date: 6/15/11 Time: 10:26

MAKAH RESERVATION WARMHOUSE BEACH DUMP SITE
Neah Bay, Washington

TDD Number: 11-01-0013
Photographed by: Linda Costello



Photo 17 South end of landfill.

Direction: South

Date: 6/15/11

Time: 10:27

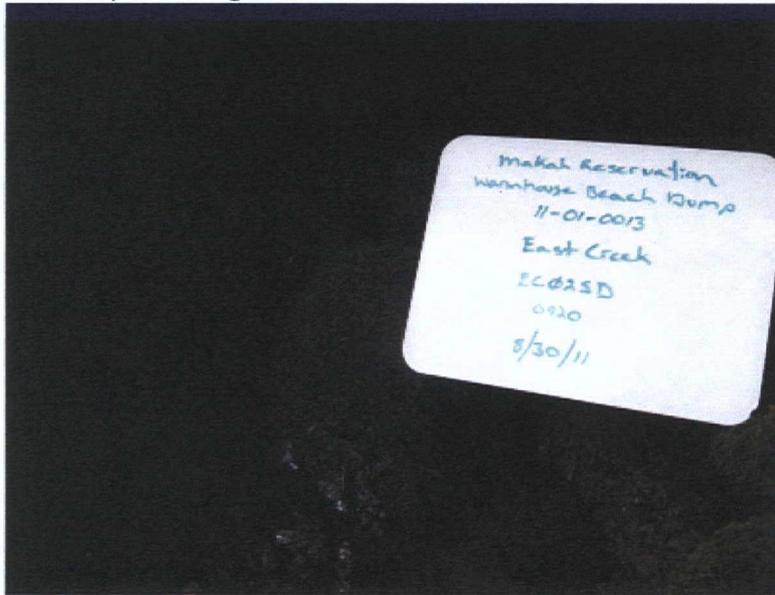


Photo 1 Location of EC02SD at the mouth of East Creek.

Direction: South Date: 8/30/11 Time: 09:20



Photo 2 Holes dug in attempt to collect clams.

Direction: West Date: 8/30/11 Time: 09:50



Photo 3 Location of EB01SD on east side of East Creek's drainage route.

Direction: Down Date: 8/30/11 Time: 09:53

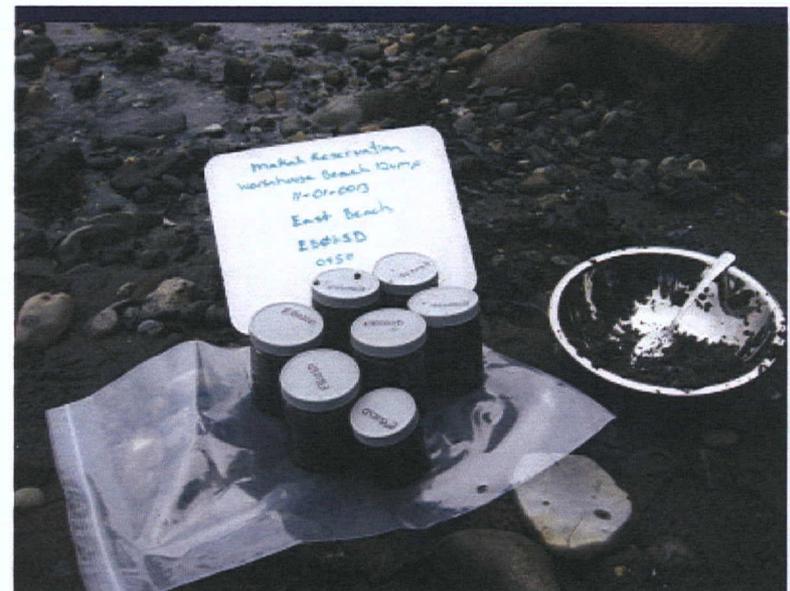


Photo 4 Location of EB02SD on East Beach within the flow path of East Creek.

Direction: East Date: 8/30/11 Time: 09:55

MAKAH RESERVATION WARMHOUSE BEACH DUMP
Neah Bay, Washington

TDD Number: 11-01-0013
Photographed by: Linda Costello



Photo 5 Location of EB03SD on East Beach within the flow path of East Creek, further seaward of sample EB02D.

Direction: East Date: 8/30/11 Time: 10:10

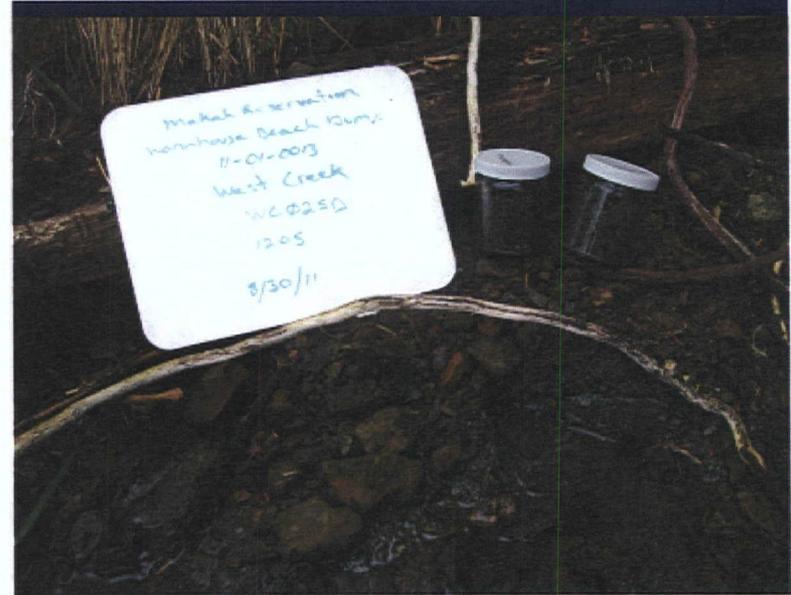


Photo 6 Location of WC02SD at mouth of West Creek.

Direction: South Date: 8/30/11 Time: 12:05

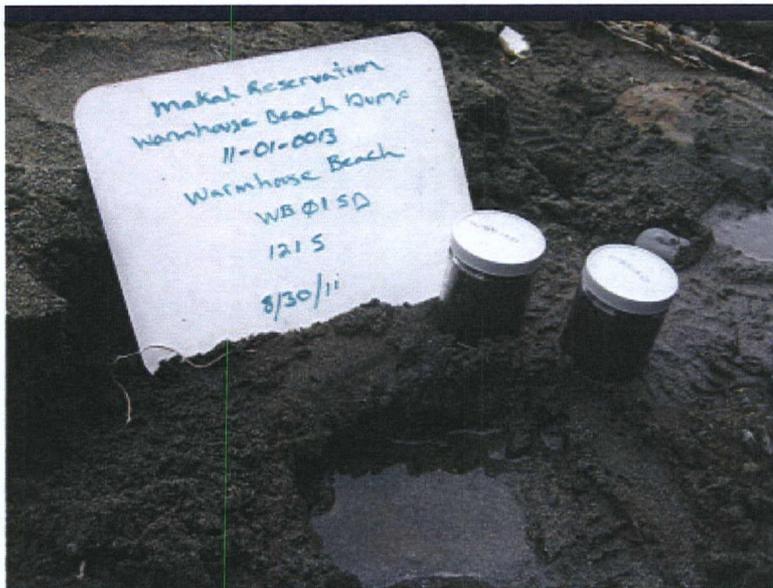


Photo 7 Location of WB01SD in flow path of West Creek on Warmhouse Beach.

Direction: North Date: 8/30/11 Time: 12:15



Photo 8 Collecting WB03SD from flow path of West Creek.

Direction: North Date: 8/30/11 Time: 12:20

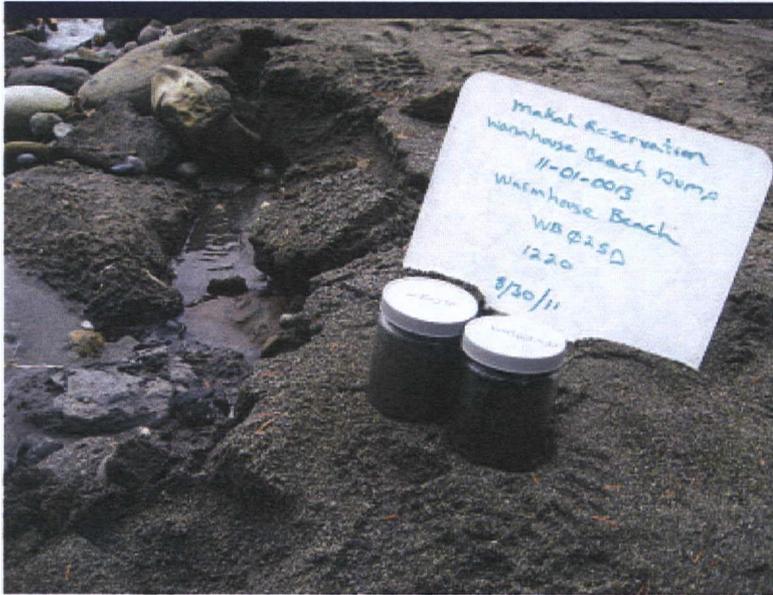


Photo 9 Location of WB02SD on Warmhouse Beach.

Direction: North

Date: 8/30/11

Time: 12:22



Photo 10 Location of WB03SD on Warmhouse Beach.

Direction: West

Date: 8/30/11

Time: 12:25



Photo 11 Location of LF01SS at lower level of landfill.

Direction: Northeast

Date: 8/30/11

Time: 15:10



Photo 12 Location of LF02SS at mid-to-upper level of landfill.

Direction: West

Date: 8/30/11

Time: 15:25

MAKAH RESERVATION WARMHOUSE BEACH DUMP
Neah Bay, Washington

TDD Number: 11-01-0013
Photographed by: Linda Costello



Photo 13 Spent fireworks debris in landfill.

Direction: West

Date: 8/30/11

Time: 15:30



Photo 14 Location of LF03SS on top of landfill at upper level.

Direction: North

Date: 8/30/11

Time: 15:40

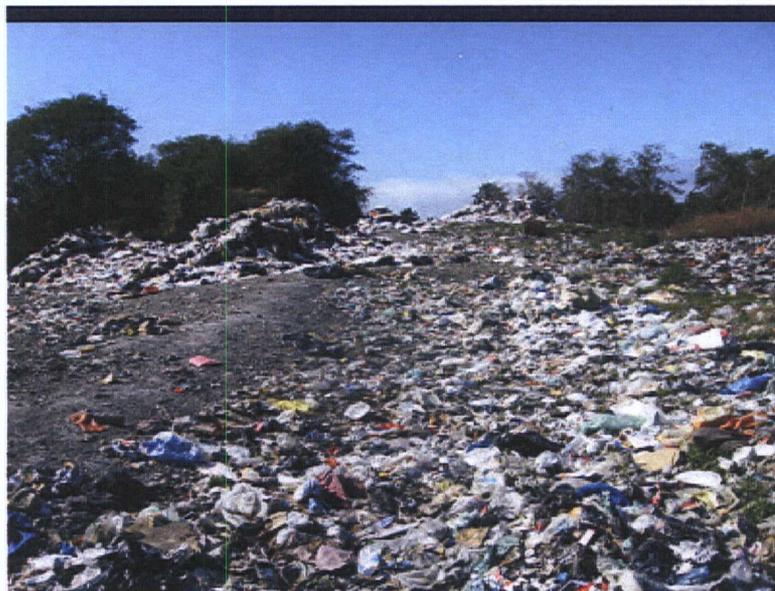


Photo 15 Top of landfill view.

Direction: West

Date: 8/30/11

Time: 15:41



Photo 16 Location of LF04SS at upper level of landfill.

Direction: Southwest

Date: 8/30/11

Time: 15:50

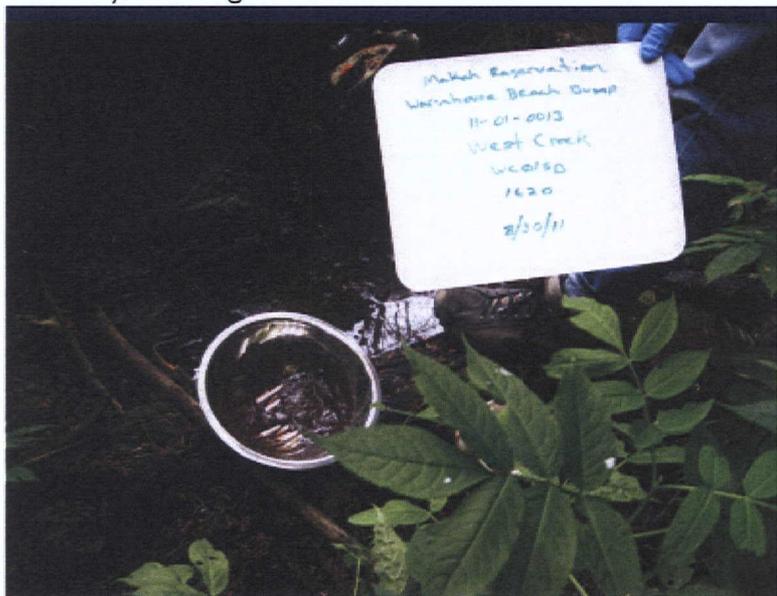


Photo 17 Location of WC01SD near headwaters of West Creek.

Direction: West

Date: 8/30/11

Time: 16:25

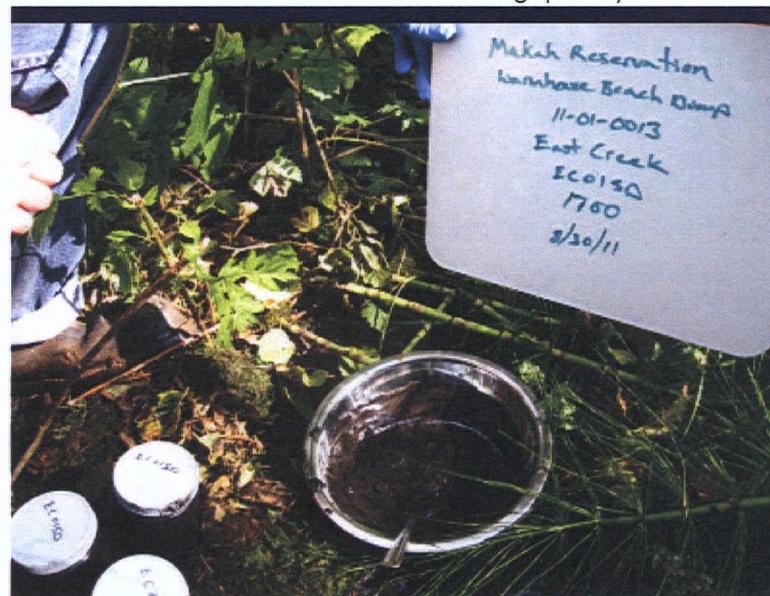


Photo 18 Location of EC01SD near headwaters of East Creek.

Direction: East

Date: 8/30/11

Time: 17:05

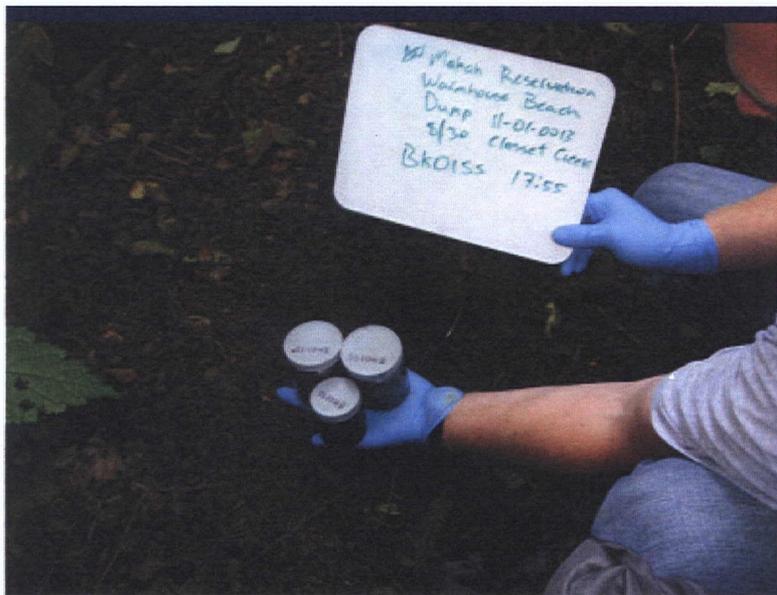


Photo 19 Location of BK01SS near Classet Creek.

Direction: North

Date: 8/30/11

Time: 18:00

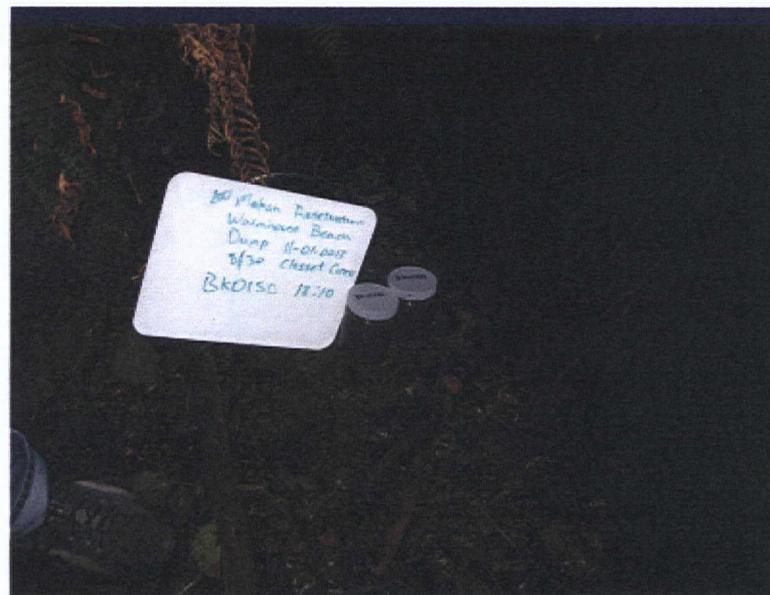


Photo 20 Location of BK01SD on Classet Creek.

Direction: East

Date: 8/30/11

Time: 18:10

MAKAH RESERVATION WARMHOUSE BEACH DUMP
Neah Bay, Washington

TDD Number: 11-01-0013
Photographed by: Linda Costello



Photo 21 Sample WB027S, mussel specimens from Warmhouse Beach.

Direction: Down

Date: 8/31/11

Time: 09:15

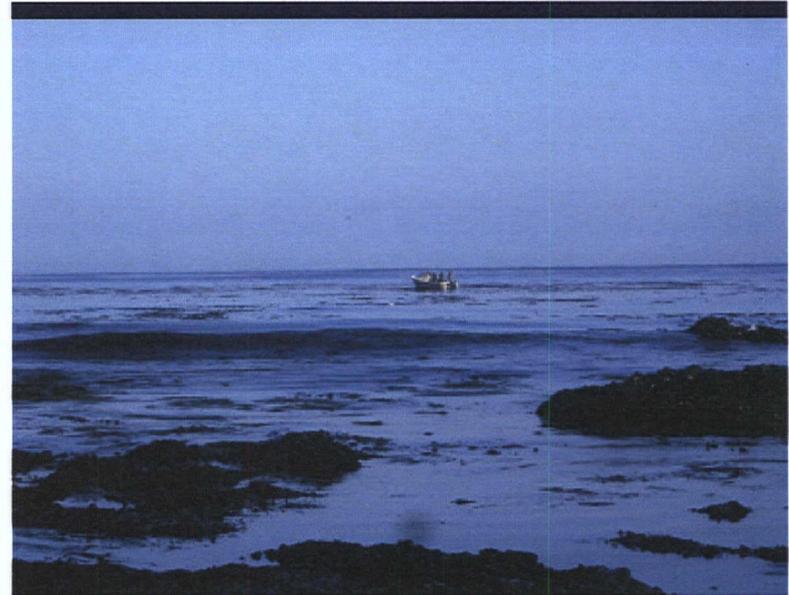


Photo 22 Small boat with three people fishing off Warmhouse Beach.

Direction: North

Date: 8/31/11

Time: 09:22

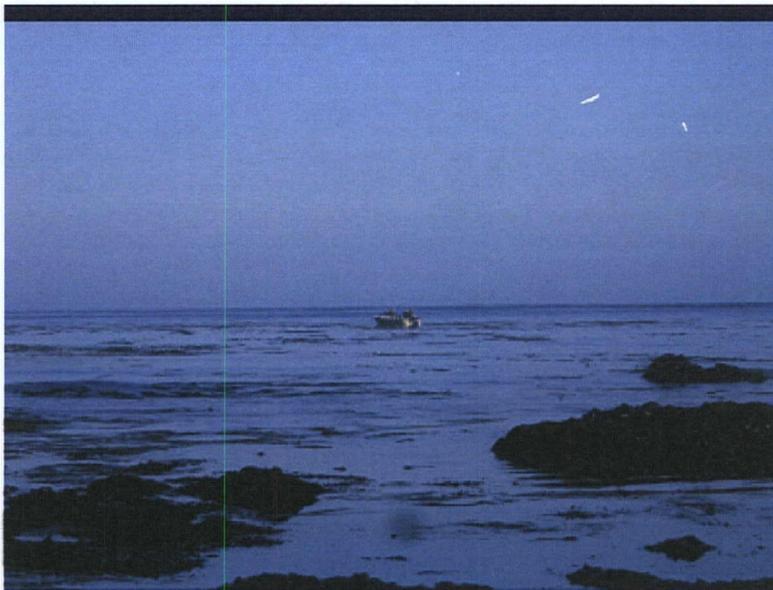


Photo 23 Small boat with three people fishing off Warmhouse Beach.

Direction: North

Date: 8/31/11

Time: 09:22



Photo 24 Sample BK02SD from mouth of Classlet Creek.

Direction: Down

Date: 8/31/11

Time: 10:00

MAKAH RESERVATION WARMHOUSE BEACH DUMP
Neah Bay, Washington

TDD Number: 11-01-0013
Photographed by: Linda Costello

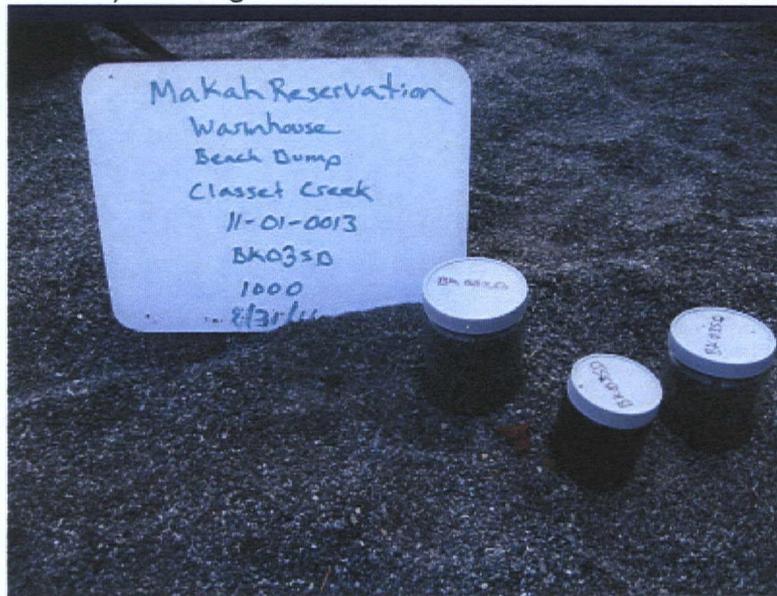


Photo 25 Sample BK03SD from below high tide line and in flow path of Classet Creek.

Direction: Down

Date: 8/31/11

Time: 10:03

C

Sample Plan Alteration Form

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SAMPLE PLAN ALTERATION FORM

Project Name and Number: Makah Reservation Warmhouse Beach Dump, 11-01-0013

Material to be Sampled:

Clam tissue and sediments.

Measurement Parameters:

No change.

Standard Procedure for Field Collection and Laboratory Analysis (cite references):

Clam tissue samples were to be collected from East Beach and Warmhouse Beach; however, no clams were present. After consulting with the EPA Task Monitor, a decision was made to collect mussel tissue samples instead. Mussel specimens were collected as close to the shore as possible and as close to streams as possible (East Creek, West Creek, and Classet Creek).

Since clams were not found, the configuration of sediment sample locations was modified. Sediment samples at East Beach and on Warmhouse Beach near the mouth of West Creek were to be collected along two transects: one near the high tide line and one below the sampled clam bed locations. Instead, sediment samples were collected within the creek flow routes toward the sea to assist in documenting migration of contaminants toward the mussels.

Reason for Change in Field Procedure or Analytical Variation:

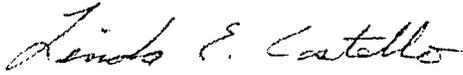
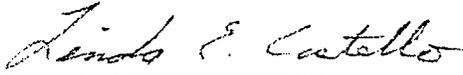
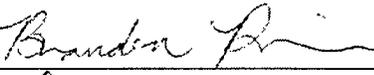
No clams were found requiring a modification to the sampling approach.

Variation from Field or Analytical Procedure:

Mussels were collected instead and the configuration of sediment sample locations was modified. There were no changes to the analytical suite applied.

Special Equipment, Materials, or Personnel Required:

None.

CONTACT	APPROVED SIGNATURE	DATE
Initiator: Linda Costello		9/12/11
START PL: Linda Costello		9/12/11
EPA TM: Brandon Perkins		9/12/2011
EPA QA Manager : Gina Grepa-Grove		09/15/2011

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D

**Global Positioning System
Coordinates**

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Global Positioning System Sample Coordinates

Sample Station	Matrix	Latitude	Longitude	Notes
EC02SD	Sediment	48° 23' 23.2" North	-124° 39' 14.8" West	
EB01SD	Sediment	48° 23' 23.5" North	-124° 39' 14.4" West	
EB02SD	Sediment	48° 23' 23.4" North	-124° 39' 14.6" West	
EB03SD	Sediment	48° 23' 23.5" North	-124° 39' 14.8" West	
EB01TS	Tissue	48° 23' 24.3" North	-124° 39' 16.5" West	
EB02TS	Tissue	48° 23' 24.2" North	-124° 39' 16.0" West	
EB03TS	Tissue	48° 23' 24.6" North	-124° 39' 16.3" West	
WC02SD	Sediment	48° 23' 21.8" North	-124° 39' 43.2" West	
WB01SD	Sediment	48° 23' 22.0" North	-124° 39' 43.2" West	
WB02SD	Sediment	48° 23' 21.9" North	-124° 39' 43.1" West	
WB03SD	Sediment	48° 23' 22.0" North	-124° 39' 43.0" West	
LF01SS	Soil	48° 23' 17.3" North	-124° 39' 25.9" West	
LF02SS	Soil	48° 23' 20.7" North	-124° 39' 25.9" West	
LF03SS	Soil	48° 23' 18.5" North	-124° 39' 22.3" West	
LF04SS	Soil	48° 23' 18.6" North	-124° 39' 23.7" West	
WC01SD	Sediment	48° 23' 17.6" North	-124° 39' 30.1" West	Vegetative cover too dense to pick up satellites at sample point. Coordinates were obtained from Google Earth.
EC01SD	Sediment	48° 23' 17.5" North	-124° 39' 19.1" West	
BK01SS	Soil	48° 22' 59.5" North	-124° 39' 6.9" West	Vegetative cover too dense to pick up satellites at sample point. Coordinates were obtained from Google Earth.
BK01SD	Sediment	48° 22' 60.0" North	-124° 39' 7.1" West	Vegetative cover too dense to pick up satellites at sample point. Coordinates were obtained from Google Earth.
WB01TS	Tissue	48° 23' 23.7" North	-124° 39' 43.0" West	
WB02TS	Tissue	48° 23' 23.4" North	-124° 39' 43.5" West	
WB03TS	Tissue	48° 23' 23.4" North	-124° 39' 43.3" West	
BK02SD	Sediment	48° 23' 19.0" North	-124° 39' 48.3" West	
BK03SD	Sediment	48° 23' 19.6" North	-124° 39' 51.1" West	
BK01TS	Tissue	48° 23' 20.9" North	-124° 39' 53.6" West	

Key:

NR = Not Recorded.

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E

Chain-of-Custody Documentation

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Environmental Laboratory Program
Organic Analytical Report & Chain of Custody Record

Case No: 41893
 DAS No:
 SDG No: **JE864**

L

Date Shipped: ~~8/29/2011~~ 9/1/2011
 Carrier Name: FedEx
 Airbill No: 8704 8283 9738
 Shipped to: ALS Laboratory Group - Salt Lake City
 960 West LeVoy Drive
 Salt Lake City UT 84123

Chain Of Custody Record		Sampler Signature:	
Relinquished By	(Date/Time)	Received By	(Date/Time)
1		<i>[Signature]</i>	09/02/11 0950
2			
3			
4			

For Lab Use Only
 Lab Contract No: **EPW11837**
 Unit Price: **NA**
 Transfer To: **AA 09/02/11**
 Lab Contract No:
 Unit Price:

ORGANIC SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No	FOR LAB USE ONLY Sample Condition On Receipt
JE864	Surface Soil/ D. Pulvino	G	CLP ARO (21)	11354200 (Ice Only) (1)	LF01SS	S: 08/30/2011 15:10		
JE865	Surface Soil/ D. Pulvino	G	CLP ARO (21)	11354201 (Ice Only) (1)	LF02SS	S: 08/30/2011 15:28		
JE866	Surface Soil/ D. Pulvino	G	CLP ARO (21)	11354202 (Ice Only) (1)	LF03SS	S: 08/30/2011 15:40		
JE867	Surface Soil/ D. Pulvino	G	CLP ARO (21)	11354203 (Ice Only) (1)	LF04SS	S: 08/30/2011 15:50		
JE868	Sediment/ D. Pulvino	G	CLP ARO (21)	11354204 (Ice Only) (1)	EC01SD	S: 08/30/2011 17:00		
JE869	Sediment/ L. Costello	G	CLP ARO (21)	11354205 (Ice Only) (1)	EC02SD	S: 08/30/2011 09:20		
JE870	Sediment/ D. Pulvino	G	CLP ARO (21)	11354206 (Ice Only) (1)	WC01SD	S: 08/30/2011 16:20		

AA 09/02/11

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC:	Additional Sampler Signature (s): <i>[Signature]</i>	Cooler Temperature Upon Receipt: 2	Chain of Custody Seal Number:
Analysis Key:	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate :	Composite = C, Grab = G, Both = B	Custody Seal Intact? <input checked="" type="checkbox"/> Shipment Iced? <input checked="" type="checkbox"/>
CLP ARO = CLP TOL PCB (Aroclors)				

00014

COC Number : 10-4097213-083111-0003

LABORATORY COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

FORMS II Lite Help Desk, C&C, 15000 Conference Center Dr., Chantilly, VA 20161-3819; Phone 703/818-4200; Fax 703/818-4602; e-Mail f2lite@fedcsc.com

USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Case No: 41693
DAS No:
SDG No: **JEB64**

L

Date Shipped: 8/28/2011 9/1/2011 Carrier Name: FedEx Airbill No: 8704 8263 9738 Shipped to: ALS Laboratory Group - Salt Lake City 980 West LeVoy Drive Salt Lake City UT 84123	Chain Of Custody Record		Sampler Signature:	For Lab Use Only Lab Contract No: EPW 11837 Unit Price: ISK Transfer To: AA Dalton Lab Contract No: Unit Price:	
	Relinquished By	(Date/Time)	Received By		(Date/Time)
	1		<i>Amal</i>		09/02/11 09:30
	2				
	3				
4					

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No	FOR LAB USE ONLY Sample Condition On Receipt
JE877	Sediment/ L. Costello	G	CLP ARO (21)	11354207 (Ice Only) (1)	WC028D	S: 08/30/2011 12:05		
JE878	Sediment/ D. Pulvino	G	CLP ARO (21)	11354214 (Ice Only) (1)	EB01SD	S: 08/30/2011 09:45		
JE879	Sediment/ J. Fattara	G	CLP ARO (21)	11354215 (Ice Only) (1)	EB02SD	S: 08/30/2011 09:50		
JE880	Sediment/ D. Pulvino	G	CLP ARO (21)	11354216 (Ice Only) (1)	EB03SD	S: 08/30/2011 10:05		
JE884	Sediment/ J. Fattara	G	CLP ARO (21)	11354220 (Ice Only) (1)	WB01SD	S: 08/30/2011 12:15		
JE885	Sediment/ D. Pulvino	G	CLP ARO (21)	11354221 (Ice Only) (1)	WB02SD	S: 08/30/2011 12:20		
JE886	Sediment/ D. Pulvino	G	CLP ARO (21)	11354222 (Ice Only) (1)	WB03SD	S: 08/30/2011 12:25		

AA 09/02/11

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC:	Additional Sampler Signature (s): <i>[Signatures]</i>	Cooler Temperature Upon Receipt: 2	Chain of Custody Seal Number :
Analysis Key:	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate :	Composite = C, Grab = G, Both = B	Custody Seal Intact? <input checked="" type="checkbox"/>
Shipment Iced? <input checked="" type="checkbox"/>				
CLP ARO = CLP TCL PCB (Aroclors)				

COC Number : 10-4097213-083111-0003

LABORATORY COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

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00012

USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Case No: 41893

DAS No:

SDG No: JE 864

L

Date Shipped: 8/29/2011 9/1/2011 Carrier Name: FedEx Airbill No: 8704 8263 9738 Shipped to: ALS Laboratory Group - Salt Lake City 960 West LeVoy Drive Salt Lake City UT 84123	Chain Of Custody Record		Sampler Signature:	For Lab Use Only Lab Contract No: DPW11837 Unit Price: NY Transfer To: AA 09/02/11 Lab Contract No: _____ Unit Price: _____	
	Relinquished By	(Date/Time)	Received By		(Date/Time)
	1		<i>[Signature]</i>		09/02/11 09:58
	2				
	3				
4					

ORGANIC SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No	FOR LAB USE ONLY Sample Condition On Receipt
JE890	Surface Soil/ J. Fatters	G	CLP ARO (21)	11354226 (Ice Only) (1)	BK018S	S: 08/30/2011 17:55		
JE891	Sediment/ D. Pulvino	G	CLP ARO (21)	11354227 (Ice Only) (1)	BK018D	S: 08/30/2011 18:10		
JE892	Sediment/ L. Costello	G	CLP ARO (21)	11354228 (Ice Only) (1)	BK028D	S: 08/31/2011 10:00		
JE893	Sediment/ D. Pulvino	G	CLP ARO (21)	11354229 (Ice Only) (1)	BK038D	S: 08/31/2011 10:00		

AA 09/02/11
SDG Final Sample

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC: JE890, JE893	Additional Sampler Signature (s): <i>[Signature]</i> <i>[Signature]</i>	Cooler Temperature Upon Receipt: 2	Chain of Custody Seal Number:
Analysis Key:	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium Type/Designate : Composite = C, Grab = G, Both = B		Custody Seal Intact? <u>Y</u>	Shipment Iced? <u>Y</u>
CLP ARO = CLP TCL PCB (Aroclors)				

COC Number : 10-4097213-083111-0003

LABORATORY COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

FORMS II Lite Help Desk, C&C, 16000 Conference Center Dr., Chantilly, VA 20181-3819; Phone 703/818-4200; Fax 703/818-4602; e-Mail tlite@tedco.com

00013

USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Case No: 41693
DAS No:
EDG No:

L

Date Shipped: 9/29/2011 Carrier Name: FedEx Airbill No: 8704 8263 9738 Shipped to: ALS Laboratory Group - Salt Lake City 960 West LeVoy Drive Salt Lake City UT 84123	Chain Of Custody Record Relinquished By (Date/Time) Received By (Date/Time)	Sampler Signature: <i>[Signature]</i> 9/1/11	For Lab Use Only Lab Contract No: Unit Price: Transfer To: Lab Contract No: Unit Price:
	1 <i>[Signature]</i> 9/1/11 2 3 4		

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/Bottle	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No	FOR LAB USE ONLY Sample Condition On Receipt
JE864	Surface Soil/ D. Pulvino	G	CLP ARO (21)	11854200 (Ice Only) (1)	LF018S	S: 08/30/2011 15:10		
JE865	Surface Soil/ D. Pulvino	G	CLP ARO (21)	11854201 (Ice Only) (1)	LF028S	S: 08/30/2011 15:25		
JE866	Surface Soil/ D. Pulvino	G	CLP ARO (21)	11854202 (Ice Only) (1)	LF038S	S: 08/30/2011 16:40		
JE867	Surface Soil/ D. Pulvino	G	CLP ARO (21)	11854203 (Ice Only) (1)	LF048S	S: 08/30/2011 16:50		
JE868	Sediment/ D. Pulvino	G	CLP ARO (21)	11854204 (Ice Only) (1)	EC018D	S: 08/30/2011 17:00		
JE869	Sediment/ L. Costello	G	CLP ARO (21)	11854205 (Ice Only) (1)	EC028D	S: 08/30/2011 09:20		
JE870	Sediment/ D. Pulvino	G	CLP ARO (21)	11854206 (Ice Only) (1)	WC018D	S: 08/30/2011 16:20		

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC:	Additional Sampler Signature (s): <i>[Signature]</i>	Cooler Temperature Upon Receipt:	Chain of Custody Seal Number:
Analysis Key:	Concentration: L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate: Composite = C, Grab = G, Bolt = B	Custody Seal Intact? _____	Shipment Iced? _____
CLP ARO = CLP TCL PCB (Aroclors)				

COC Number : 10-4097213-083111-0003

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

FORMS II Lite Help Desk, CSC, 16000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4802; e-Mail f2lite@fedcsc.com

: 000111

USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Case No: 41693
DAS No:
SDG No:

L

<p>Date Shipped: 9/29/2011 Carrier Name: FedEx Airbill No: 8704 8283 9788 Shipped to: ALS Laboratory Group - Salt Lake City 960 West LeVoy Drive Salt Lake City UT 84123</p>	<p style="text-align: center;">Chain Of Custody Record</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Relinquished By</td> <td style="width: 50%;">(Date/Time)</td> <td style="width: 50%;">Received By</td> <td style="width: 50%;">(Date/Time)</td> </tr> <tr> <td>1 <i>[Signature]</i></td> <td>9/1/11</td> <td></td> <td></td> </tr> <tr> <td>2 <i>[Signature]</i></td> <td>9/1/11</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td></td> <td></td> <td></td> </tr> </table>	Relinquished By	(Date/Time)	Received By	(Date/Time)	1 <i>[Signature]</i>	9/1/11			2 <i>[Signature]</i>	9/1/11			3				4				<p>Sampler Signature: <i>[Signature]</i> 9/1/11</p>	<p>For Lab Use Only</p> <p>Lab Contract No: _____</p> <p>Unit Price: _____</p> <p>Transfer To: _____</p> <p>Lab Contract No: _____</p> <p>Unit Price: _____</p>
Relinquished By	(Date/Time)	Received By	(Date/Time)																				
1 <i>[Signature]</i>	9/1/11																						
2 <i>[Signature]</i>	9/1/11																						
3																							
4																							

ORGANIC SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No	FOR LAB USE ONLY Sample Condition On Receipt
JE871	Sediment/L. Costello	G	CLP ARO (21)	11354207 (Ice Only) (1)	WC02SD	S: 08/30/2011 12:05		
JE878	Sediment/D. Pulvino	G	CLP ARO (21)	11354214 (Ice Only) (1)	EB01SD	S: 08/30/2011 09:45		
JE879	Sediment/J. Fetters	G	CLP ARO (21)	11354215 (Ice Only) (1)	EB02SD	S: 08/30/2011 09:50		
JE880	Sediment/D. Pulvino	G	CLP ARO (21)	11354218 (Ice Only) (1)	EB03SD	S: 08/30/2011 10:05		
JE884	Sediment/J. Fetters	G	CLP ARO (21)	11354220 (Ice Only) (1)	WB01SD	S: 08/30/2011 12:15		
JE885	Sediment/D. Pulvino	G	CLP ARO (21)	11354221 (Ice Only) (1)	WB02SD	S: 08/30/2011 12:20		
JE888	Sediment/D. Pulvino	G	CLP ARO (21)	11354222 (Ice Only) (1)	WB03SD	S: 08/30/2011 12:25		

Shipment for Cases Complete? N	Sample (s) to be used for laboratory QC:	Additional Sampler Signature (s): <i>[Signature]</i> 9/1/11 <i>[Signature]</i> 9/1/11	Cooler Temperature Upon Receipt:	Chain of Custody Seal Number:
Analysis Key:	Concentration: L = Low, M = Medium, H = High, LM = Low/Medium	Type/Designate: Composite = C, Grab = G, Both = B	Custody Seal Intact? _____	Shipment Iced? _____
CLP ARO = CLP TCL PCB (Aroclors)				

COC Number : 10-4097213-083111-0003

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

FORMS II Lite Help Desk, CSC, 16000 Conference Center Dr., Chantilly, VA 20151-3878; Phone 703/818-4200; Fax 703/818-4602; e-Mail f2llite@fedcsa.com

00015

USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Case No: 41693
DAS No:
SDG No:

L

<p>Date Shipped: 9/29/2011 Carrier Name: FedEx Airbill No: 8704 8263 9738 Shipped to: ALS Laboratory Group - Salt Lake City 980 West LeVoy Drive Salt Lake City UT 84129</p>	<p style="text-align: center;">Chain Of Custody Record</p> <p>Sampler Signature: <i>[Signature]</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">Relinquished By</th> <th style="width: 50%;">(Date/Time)</th> <th style="width: 50%;">Received By</th> <th style="width: 50%;">(Date/Time)</th> </tr> <tr> <td>1. <i>[Signature]</i></td> <td>11/29</td> <td></td> <td></td> </tr> <tr> <td>2. <i>[Signature]</i></td> <td>9/14</td> <td></td> <td></td> </tr> <tr> <td>3.</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4.</td> <td></td> <td></td> <td></td> </tr> </table>	Relinquished By	(Date/Time)	Received By	(Date/Time)	1. <i>[Signature]</i>	11/29			2. <i>[Signature]</i>	9/14			3.				4.				<p>For Lab Use Only</p> <p>Lab Contract No: _____</p> <p>Unit Price: _____</p> <p>Transfer To: _____</p> <p>Lab Contract No: _____</p> <p>Unit Price: _____</p>
Relinquished By	(Date/Time)	Received By	(Date/Time)																			
1. <i>[Signature]</i>	11/29																					
2. <i>[Signature]</i>	9/14																					
3.																						
4.																						

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No	FOR LAB USE ONLY Sample Condition On Receipt
JEB90	Surface Soil/ J. Peltora	G	CLP ARO (21)	11354226 (Ice Only) (1)	BK01SS	S: 08/30/2011 17:56		
JEB91	Sediment/ D. Pulvino	G	CLP ARO (21)	11354227 (Ice Only) (1)	BK01SD	S: 08/30/2011 18:10		
JEB92	Sediment/ L. Costello	G	CLP ARO (21)	11354228 (Ice Only) (1)	BK02SD	S: 08/31/2011 10:00		
JEB93	Sediment/ D. Pulvino	G	CLP ARO (21)	11354229 (Ice Only) (1)	BK03SD	S: 08/31/2011 10:00		

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC: JEB90, JEB93	Additional Sampler Signature (s): <i>[Signature]</i> 9/16 <i>[Signature]</i> 9/14	Cooler Temperature Upon Receipt:	Chain of Custody Seal Number:
Analysis Key:	Concentration: L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate: Composite = C, Grab = G, Both = B	Custody Seal Intact? _____	Shipment Iced? _____
CLP ARO = CLP TCL PCB (Aroclors)				

COC Number : 10-4097213-083111-0003

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

FORMS II Lite Help Desk, CSC, 16000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/616-4200; Fax 703/616-4002; e-Mail tlite@fedcsc.com

: 00015



1125220

Attract Laboratory Program

Generic Chain of Custody

Case No: 41693

DAS No:

SDG No:

JESUS

L

Date Shipped: 9/1/2011 Carrier Name: Hand Delivery Airbill No: Shipped to: Analytical Resources, Inc. 4611 S. 134th Place Tukwila WA 98168-3240 2066956201	Chain Of Custody Record		Sampler Signature: <i>DR</i>	For Lab Use Only Lab Contract No: <i>EWING</i> Unit Price: <i>AK</i> Transfer To: <i>AK</i> Lab Contract No: Unit Price:	
	Relinquished By	(Date/Time)	Received By		(Date/Time)
	1 <i>JESUS</i>	9/1/11 14:18	<i>DR</i>		9/2/11 14:18
	2 <i>AK</i>	9/2/11 13:50 (TO UPS)	<i>MURRAY</i>		9/2/11 16:11
	3				
4					

SHIPPED 09/08/11
to ALS SDG

SAMPLE No.	MATRIX/ SAMPLER	TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	FOR LAB USE ONLY	
							SAMPLE No	Sample Condition On Receipt
BK01SD	Sediment/ D. Pulvino	G	GZ (21)	11354227 (Ice Only) (1) <i>(b)</i>	BK01SD	S: 08/30/2011 18:10		
BK02SD	Sediment/ L. Costello	G	GZ (21)	11354228 (Ice Only) (1) <i>(b)</i>	BK02SD	S: 08/31/2011 10:00		
BK03SD	Sediment/ D. Pulvino	G	GZ (21)	11354229 (Ice Only) (1) <i>(b)</i>	BK03SD	S: 08/31/2011 10:00		
EB01SD	Sediment/ D. Pulvino	G	GZ (21)	11354214 (Ice Only) (1) <i>(b)</i>	EB01SD	S: 08/30/2011 09:45		
EB02SD	Sediment/ J. Fetters	G	GZ (21)	11354215 (Ice Only) (1) <i>(b)</i>	EB02SD	S: 08/30/2011 09:50		
EB03SD	Sediment/ D. Pulvino	G	GZ (21)	11354216 (Ice Only) (1) <i>(b)</i>	EB03SD	S: 08/30/2011 10:05		
EC01SD	Sediment/ D. Pulvino	G	GZ (21)	11354204 (Ice Only) (1) <i>(1)</i>	EC01SD	S: 08/30/2011 17:00		

RECALL

Shipment for Case Complete? <i>NYH</i>	Sample (s) to be used for laboratory QC: BK03SD	Additional Sampler Signature (s): <i>[Signature]</i>	Cooler Temperature Upon Receipt: 0.1°C <i>(AK)</i>	Chain of Custody Seal Number:
Analysis Key: GZ = Grain Size	Concentration: L = Low, M = Medium, H = High, L/M = Low/Medium		Type/Designate: Composite = C, Grab = G, Both = B	Custody Seal Intact? <i>y</i>
				Shipment Iced? <i>y</i>

COC Number : 10-4097213-083111-0002

LABORATORY COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.

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USEPA Contract Laboratory Program Generic Chain of Custody

TK83

Case No: 41693

DAS No:

SDG No:

JES208

L

Date Shipped: 9/1/2011 Carrier Name: Hand Delivery Airbill No: Shipped to: Analytical Resources, Inc. 4811 S. 134th Place Tukwila WA 98188-3240 2086956201	Chain Of Custody Record		Sampler Signature: <i>[Signature]</i>
	Relinquished By	(Date/Time)	Received By
	1 <i>[Signature]</i>	9/2/11 14:18	<i>[Signature]</i>
	2 <i>[Signature]</i>	9/8/11 13:50 (to UPS)	<i>[Signature]</i>
	3		
	4		

For Lab Use Only

Lab Contract No: *EPW 11037*

Unit Price: *110*

Transfer To: *[Signature]*

Lab Contract No:

Unit Price:

SHIPPED TO ALS

SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	FOR LAB USE ONLY	
							SAMPLE No	Sample Condition On Receipt
EC02SD	Sediment/ L. Costello	G	GZ (21)	11354205 (Ice Only) <i>[Signature]</i> (1)	EC02SD	S: 08/30/2011 09:20		
WB01SD	Sediment/ J. Fetters	G	GZ (21)	11354220 (Ice Only) <i>[Signature]</i> (1)	WB01SD	S: 08/30/2011 12:15		
WB02SD	Sediment/ D. Pulvino	G	GZ (21)	11354221 (Ice Only) <i>[Signature]</i> (1)	WB02SD	S: 08/30/2011 12:20		
WB03SD	Sediment/ D. Pulvino	G	GZ (21)	11354222 (Ice Only) <i>[Signature]</i> (1)	WB03SD	S: 08/30/2011 12:25		
WC01SD	Sediment/ D. Pulvino	G	GZ (21)	11354206 (Ice Only) <i>[Signature]</i> (1)	WC01SD	S: 08/30/2011 16:20		
WC02SD	Sediment/ L. Costello	G	GZ (21)	11354207 (Ice Only) <i>[Signature]</i> (1)	WC02SD	S: 08/30/2011 12:05		

Substrate sample

Shipment for Case Complete? <i>NYN</i>	Sample (s) to be used for laboratory QC: BK03SD	Additional Sampler Signature (s): <i>[Signature]</i>	Cooler Temperature Upon Receipt: <i>0°C</i>	Chain of Custody Seal Number:
Analysis Key: GZ = Grain Size	Concentration: L = Low, M = Medium, H = High, L/M = Low/Medium Type/Designate: Composite = C, Grab = G, Both = B		Custody Seal Intact? <i>y</i>	Shipment Iced? <i>y</i>

COC Number: 10-4097213-083111-0002

LABORATORY COPY

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00021

USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Case No: 41693

DAS No:
SDG No:

L

6 of 588

Date Shipped: Carrier Name: UPS Airbill No: Shipped to: Cape Fear Analytical 3306 Killy Hawk Rd., Suite 120 Wilmington NC 28405	Chain Of Custody Record		Sampler Signature:	For Lab Use Only Lab Contract No: Unit Price: Transfer To: Lab Contract No: Unit Price:	
	Relinquished By	(Date/Time)	Received By		(Date/Time)
	<i>K. N. ...</i>	<i>9/21/11</i>	<i>Cynde Larkins</i>		<i>9/22/11 11:23</i>
	2				
	3				
	4				

ORGANIC SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No	FOR LAB USE ONLY Sample Condition On Receipt
JE872	Other Biota/ L. Costello	G	PCDD (21)	11354208 (Ice Only) (1)-	EB01TS	S: 08/30/2011 10:40		
JE873	Other Biota/ D. Pulvino	G	PCDD (21)	11354209 (Ice Only) (1)-	EB02TS	S: 08/30/2011 10:45		
JE874	Other Biota/ D. Pulvino	G	PCDD (21)	11354210 (Ice Only) (1).	EB03TS	S: 08/30/2011 10:55		
JE875	Other Biota/ J. Fetters	G	PCDD (21)	11354211 (Ice Only) (1) *	WB01TS	S: 08/31/2011 09:20		
JE876	Other Biota/ L. Costello	G	PCDD (21)	11354212 (Ice Only) (1) -	WB02TS	S: 08/31/2011 09:10		
JE877	Other Biota/ D. Pulvino	G	PCDD (21)	11354213 (Ice Only) (1) .	WB03TS	S: 08/31/2011 09:25		
JE895	Other Biota/ J. Fetters	G	PCDD (21)	11354231 (Ice Only) (1)-	BK01TS	S: 08/31/2011 10:05		

JE896 Water PCDD Rinseate TSOIRS 9/21/11 11:10

Shipment for Case Complete? <i>BY</i>	Sample (s) to be used for laboratory QC: JE895	Additional Sampler Signature (s):	Cooler Temperature Upon Receipt: <i>3.5°</i>	Chain of Custody Seal Number: <i>9/21/11</i>
Analysis Key: Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium Type/Designate :			Composite = C, Grab = G, Both = B	Custody Seal Intact? <input checked="" type="checkbox"/> Shipment Iced? <input checked="" type="checkbox"/>

PCDD = Dioxins and Furans

CFA WO# 2793

COC Number : 10-4097213-091411-0002

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USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Case No: 41693
DAS No:
SDG No:

L

6 of 611

Date Shipped: 9/1/2011 Carrier Name: FedEx Airbill No: 8704 B263 9749 Shipped to: Cape Fear Analytical 3306 Kitty Hawk Rd., Suite 120 Wilmington NC 28405	Chain Of Custody Record		Sampler Signature: <i>[Signature]</i> 9/1/11 1639	For Lab Use Only Lab Contract No: _____ Unit Price: _____ Transfer To: _____ Lab Contract No: _____ Unit Price: _____	
	Relinquished By	(Date/Time)	Received By		(Date/Time)
	1		<i>Cynde Perkins</i>		<i>02 Sept 2011 1000</i>
	2				
	3				
4					

ORGANIC SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No	FOR LAB USE ONLY Sample Condition On Receipt
JE878	Sediment/ D. Pulvino	G	PCDD (21)	11354214 (Ice Only) (1)	EB01SD	8: 08/30/2011 09:45		
JE879	Sediment/ J. Fetters	G	PCDD (21)	11354215 (Ice Only) (1)	EB02SD	8: 08/30/2011 09:50		
JE880	Sediment/ D. Pulvino	G	PCDD (21)	11354216 (Ice Only) (1)	EB03SD	8: 08/30/2011 10:05		
JE884	Sediment/ J. Fetters	G	PCDD (21)	11354220 (Ice Only) (1)	WB01SD	8: 08/30/2011 12:15		
JE885	Sediment/ D. Pulvino	G	PCDD (21)	11354221 (Ice Only) (1)	WB02SD	8: 08/30/2011 12:20		
JE886	Sediment/ D. Pulvino	G	PCDD (21)	11354222 (Ice Only) (1)	WB03SD	8: 08/30/2011 12:25		
JE890	Surface Soil/ J. Fetters	G	PCDD (21)	11354226 (Ice Only) (1)	BK01SS	8: 08/30/2011 17:55		

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC: JE890	Additional Sampler Signature (s): <i>[Signature]</i>	Cooler Temperature Upon Receipt:	Chain of Custody Seal Number: 9-1-11 (2 seals)
Analysis Key: PCDD = Dioxins and Furans	Concentration: L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate: Composite = C, Grab = G, Both = B	Custody Seal Intact? <input checked="" type="checkbox"/>	Shipment Iced? <input checked="" type="checkbox"/>
CFA NO#2730 temp. = 2.5°				

COC Number : 10-4097213-083111-0004

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USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Case No: 41693
DAS No:
SDG No:

L

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Date Shipped: 9/1/2011 Carrier Name: FedEx Airbill No: 8704 8263 9749 Shipped to: Cape Fear Analytical 3306 Kitty Hawk Rd., Suite 120 Wilmington NC 28405	Chain Of Custody Record		Sampler Signature: <i>[Signature]</i> 8/31/11 1634	For Lab Use Only Lab Contract No: Unit Price: Transfer To: Lab Contract No: Unit Price:	
	Relinquished By	(Date/Time)	Received By		(Date/Time)
	1		<i>Cyrille Jenkins</i>		02 Sep 2011 10:00
	2				
	3				
4					

ORGANIC SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	INORGANIC SAMPLE No	FOR LAB USE ONLY Sample Condition On Receipt
JE893	Sediment/ D. Pulvino	G	PCDD (21)	11354229 (Ice Only) (1)	BK03SD	S: 08/31/2011 10:00		

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC: JE890, JE893	Additional Sampler Signature (s): <i>[Signature]</i>	Cooler Temperature Upon Receipt:	Chain of Custody Seal Number: 9-1-11 (2 seals)
Analysis Key:	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate :	Composite = C, Grab = G, Both = B	Custody Seal Intact? <input checked="" type="checkbox"/> Shipment Iced? <input checked="" type="checkbox"/>
PCDD = Dioxins and Furans		CFA NO #2730		Temp. = 2.5°

COC Number : 10-4097213-083111-0004

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USEPA Contract Laboratory Program Inorganic Traffic Report & Chain of Custody Record

Case No: 41693

DAS No:

SDG No:

MJE878

L

11/11/08-7

Date Shipped: 9/1/2011 Carrier Name: FedEx Airbill No: 8704 8263 9727 Shipped to: Sentinel, Inc. 4733 Commercial Drive Huntsville AL 35816	Chain Of Custody Record		Sampler Signature: 	For Lab Use Only	
	Relinquished By	(Date/Time)	Received By	(Date/Time)	Lab Contract No: EPW09040
	1			9-2-11 0853	Unit Price:
	2				Transfer To:
	3				Lab Contract No:
4				Unit Price:	

INORGANIC SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No	FOR LAB USE ONLY Sample Condition On Receipt
MJE878	Sediment/ D. Pulvino	G	TM/Hg (21)	11354214 (Ice Only) (1)	ES01SD	S: 08/30/2011 09:45		
MJE879	Sediment/ J. Fatters	G	TM/Hg (21)	11354215 (Ice Only) (1)	EB02SD	S: 08/30/2011 09:50		
MJE880	Sediment/ D. Pulvino	G	TM/Hg (21)	11354216 (Ice Only) (1)	EB03SD	S: 08/30/2011 10:05		
MJE884	Sediment/ J. Fatters	G	TM/Hg (21)	11354220 (Ice Only) (1)	WB01SD	S: 08/30/2011 12:15		
MJE885	Sediment/ D. Pulvino	G	TM/Hg (21)	11354221 (Ice Only) (1)	WB02SD	S: 08/30/2011 12:20		
MJE896	Sediment/ D. Pulvino	G	TM/Hg (21)	11354222 (Ice Only) (1)	WB03SD	S: 08/30/2011 12:25		
MJE893	Sediment/ D. Pulvino	G	TM/Hg (21)	11354223 (Ice Only) (1)	BK03SD	S: 08/31/2011 10:00		

Temp Blank = 0.0°C

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC: MJE893	Additional Sampler Signature (s): 	Cooler Temperature Upon Receipt: 0.0°C	Chain of Custody Seal Number: NA
Analysis Key:	Concentration: L = Low, M = Medium, H = High, L/M = Low/Medium		Type/Designate: Composite = C, Grab = G, Both = B	Custody Seal Intact? <input checked="" type="checkbox"/> Shipment Iced? <input checked="" type="checkbox"/>
TM/Hg = CLP TAL Total Metals/Hg				

11/11/08-7

COC Number : 10-4097213-083111-0001

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USEPA Contract Laboratory Program Inorganic Traffic Report & Chain of Custody Record

Case No: 41693
DAS No:
SDG No: MJE 878

L

8/24/11

Date Shipped: 9/1/2011 Carrier Name: FedEx Airbill No: 8704 8263 9727 Shipped to: Sentinel, Inc. 4733 Commercial Drive Huntsville AL 35816	Chain Of Custody Record		Sampler Signature: <i>[Signature]</i> 9/1/11	For Lab Use Only Lab Contract No: EPW09040 Unit Price: Transfer To: Lab Contract No: Unit Price:
	Relinquished By (Date/Time)	Received By (Date/Time)		
	1 <i>[Signature]</i> 9/1/11	<i>[Signature]</i> 9-2-11 0853		
	2			
	3			
4				

INORGANIC SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No	FOR LAB USE ONLY Sample Condition On Receipt
MJE878	Sediment/D. Pulvino	G	TM/Hg (21)	11354214 (Ice Only) (1)	EB01SD	S: 08/30/2011 09:48		
MJE879	Sediment/J. Fatters	G	TM/Hg (21)	11354215 (Ice Only) (1)	EB02SD	S: 08/30/2011 09:50		
MJE880	Sediment/D. Pulvino	G	TM/Hg (21)	11354216 (Ice Only) (1)	EB03SD	S: 08/30/2011 10:05		
MJE884	Sediment/J. Fatters	G	TM/Hg (21)	11354220 (Ice Only) (1)	WB01SD	S: 08/30/2011 12:15		
MJE885	Sediment/D. Pulvino	G	TM/Hg (21)	11354221 (Ice Only) (1)	WB02SD	S: 08/30/2011 12:20		
MJE886	Sediment/D. Pulvino	G	TM/Hg (21)	11354222 (Ice Only) (1)	WB03SD	S: 08/30/2011 12:25		
MJE893	Sediment/D. Pulvino	G	TM/Hg (21)	11354229 (Ice Only) (1)	BK03SD	S: 08/31/2011 10:00		

Temp Blank = 0.0 °C

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC: MJE893	Additional Sampler Signature (s): <i>[Signature]</i> 9/1/11	Cooler Temperature Upon Receipt: 0.0 °C	Chain of Custody Seal Number: NA
Analysis Key: Concentration: L = Low, M = Medium, H = High, LM = Low/Medium		Type/Designate: Composite = C, Grab = G, Both = B	Custody Seal Intact? <input checked="" type="checkbox"/>	Shipment Iced? <input checked="" type="checkbox"/>
TM/Hg = CLP TAL Total Metals/Hg				

COC Number : 10-4097213-083111-0001

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8/24/11

USEPA Contract Laboratory Program Generic Chain of Custody

Case No: 41693

DAS No:

SDG No:

L

Date Shipped: Carrier Name: UPS Airbill No: Shipped to: Columbia Analytical Services, Inc. 1565 Jefferson Road Rochester NY 14623	Chain Of Custody Record		Sampler Signature:	For Lab Use Only Lab Contract No: _____ Unit Price: _____ Transfer To: _____ Lab Contract No: _____ Unit Price: _____	
	Relinquished By	(Date/Time)	Received By		(Date/Time)
	1				
	2				
	3				

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SAMPLE No.	MATRIX/ SAMPLER	TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	FOR LAB USE ONLY	
							SAMPLE No	Sample Condition On Receipt
BK01TS	Other Biota/ J. Fetters	G	Perchlorate (21)	11354231 (Ice Only) (1)	BK01TS	S: 08/31/2011 10:05		
EB01TS	Other Biota/ L. Costello	G	Perchlorate (21)	11354208 (Ice Only) (1)	EB01TS	S: 08/30/2011 10:40		
EB02TS	Other Biota/ D. Pulvino	G	Perchlorate (21)	11354209 (Ice Only) (1)	EB02TS	S: 08/30/2011 10:45		
EB03TS	Other Biota/ D. Pulvino	G	Perchlorate (21)	11354210 (Ice Only) (1)	EB03TS	S: 08/30/2011 10:55		
WB01TS	Other Biota/ J. Fetters	G	Perchlorate (21)	11354211 (Ice Only) (1)	WB01TS	S: 08/31/2011 09:20		
WB02TS	Other Biota/ L. Costello	G	Perchlorate (21)	11354212 (Ice Only) (1)	WB02TS	S: 08/31/2011 09:10		
WB03TS	Other Biota/ D. Pulvino	G	Perchlorate (21)	11354213 (Ice Only) (1)	WB03TS	S: 08/31/2011 09:25		

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC: BK01TS	Additional Sampler Signature (s):	Cooler Temperature Upon Receipt:	Chain of Custody Seal Number :
Analysis Key:	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate :	Composite = C, Grab = G, Both = B	Custody Seal Intact? _____
Perchlorate = Perchlorate				

COC Number : 10-4097213-091411-0001

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USEPA Contract Laboratory Program Generic Chain of Custody

TK83

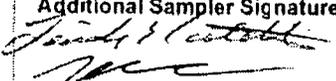
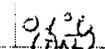
Case No: 41693
DAS No:
SDG No:

L

Date Shipped: 9/1/2011 Carrier Name: Hand Delivery Airbill No: Shipped to: Analytical Resources, Inc. 4611 S. 134th Place Tukwila WA 98188-3240 2066956201	Chain Of Custody Record		Sampler Signature: 	For Lab Use Only Lab Contract No: Unit Price: Transfer To: Lab Contract No: Unit Price:	
	Relinquished By	(Date/Time)	Received By		(Date/Time)
	1 	9/1/11 1418			9/1/11 1418
	2				
	3				
	4				

SAMPLE No.	MATRIX/ SAMPLER	TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/Bottle	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	FOR LAB USE ONLY	
							SAMPLE No	Sample Condition On Receipt
EC02SD	Sediment/ L. Costello	G	GZ (21)	11354205 (Ice Only) $\frac{1}{2}$ 	EC02SD	S: 08/30/2011 09:20		
WB01SD	Sediment/ J. Fetters	G	GZ (21)	11354220 (Ice Only) $\frac{1}{2}$ 	WB01SD	S: 08/30/2011 12:15		
WB02SD	Sediment/ D. Pulvino	G	GZ (21)	11354221 (Ice Only) $\frac{1}{2}$ 	WB02SD	S: 08/30/2011 12:20		
WB03SD	Sediment/ D. Pulvino	G	GZ (21)	11354222 (Ice Only) $\frac{1}{2}$ 	WB03SD	S: 08/30/2011 12:25		
WC01SD	Sediment/ D. Pulvino	G	GZ (21)	11354206 (Ice Only) $\frac{1}{2}$ 	WC01SD	S: 08/30/2011 16:20		
WC02SD	Sediment/ L. Costello	G	GZ (21)	11354207 (Ice Only) $\frac{1}{2}$ 	WC02SD	S: 08/30/2011 12:05		

9/1/2011
SHIPPED TO ALS
SD

Shipment for Case Complete? 	Sample (s) to be used for laboratory QC: BK02SD	Additional Sampler Signature (s): 	Cooler Temperature Upon Receipt: 	Chain of Custody Seal Number :
Analysis Key: GZ = Grain Size	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate :	Composite = C, Grab = G, Both = B	Custody Seal Intact? Shipment Iced?

COC Number : 10-4097213-083111-0002

USEPA Contract Laboratory Program Generic Chain of Custody

Case No: 41693

DAS No:

SDG No:

L

Date Shipped: 9/1/2011
 Carrier Name: Hand Delivery
 Airbill No:
 Shipped to: Analytical Resources, Inc.
 4811 S. 134th Place
 Tukwila WA 98168-3240
 2066956201

Chain Of Custody Record

Sampler Signature:

[Signature]

Relinquished By	(Date/Time)	Received By	(Date/Time)
1 <i>[Signature]</i>	7/21/11 1418	<i>[Signature]</i>	9/2/11 1418
2			
3			
4			

For Lab Use Only

Lab Contract No:

Unit Price:

Transfer To:

Lab Contract No:

Unit Price:

SAMPLE No.	MATRIX/ SAMPLER	TYPE	ANALYSIS/ TURNAROUND	TAG No. PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	FOR LAB USE ONLY	
							SAMPLE No	Sample Condition On Receipt
BK01SD	Sediment/ D. Pulvino	G	GZ (21)	11354227 (Ice Only) (1) <i>(6)</i>	BK01SD	S: 08/30/2011 18:10		
BK02SD	Sediment/ L. Costello	G	GZ (21)	11354228 (Ice Only) (1) <i>(6)</i>	BK02SD	S: 08/31/2011 10:00		
BK03SD	Sediment/ D. Pulvino	G	GZ (21)	11354229 (Ice Only) (1) <i>(6)</i>	BK03SD	S: 08/31/2011 10:00		
EB01SD	Sediment/ D. Pulvino	G	GZ (21)	11354214 (Ice Only) (1) <i>(6)</i>	EB01SD	S: 08/30/2011 09:45		
EB02SD	Sediment/ J. Fetters	G	GZ (21)	11354215 (Ice Only) (1) <i>(6)</i>	EB02SD	S: 08/30/2011 09:50		
EB03SD	Sediment/ D. Pulvino	G	GZ (21)	11354216 (Ice Only) (1) <i>(6)</i>	EB03SD	S: 08/30/2011 10:05		
EC01SD	Sediment/ O. Pulvino	G	GZ (21)	11354204 (Ice Only) (1) <i>(1)</i>	EC01SD	S: 08/30/2011 17:00		

Shipment for Case Complete? <i>NYAF</i>	Sample (s) to be used for laboratory QC: BK01SD	Additional Sampler Signature (s): <i>[Signature]</i>	Cooler Temperature Upon Receipt: 0.1°C (1°C)	Chain of Custody Seal Number:
Analysis Key: GZ = Grain Size	Concentration: L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate:	Composite = C, Grab = G, Both = B	Custody Seal Intact? <input type="checkbox"/>
				Shipment Iced? <input type="checkbox"/>

COC Number : 10-4097213-083111-0002

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Cooler Receipt Form

ARI Client: Ecology and Environment Project Name: _____
 COC No(s) _____ (NA) Delivered by: Fed-Ex UPS Courier (Hand Delivered) Other: _____
 Assigned ARI Job No: TK83 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) 0.1
 If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 95941619

Cooler Accepted by: AV Date: 9/2/11 Time: 1418
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: Styrofoam
 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: 9/2/11 Time: 1455

**** 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:

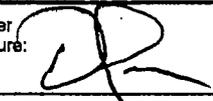
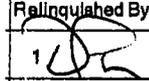
Two containers of each received - SD

By: _____ Date: _____

			Small → "sm"
			Peabubbles → "pb"
			Large → "lg"
			Headspace → "hs"

USEPA Contract Laboratory Program Generic Chain of Custody

Reference Case: 41693
Client No: **R**

Region: 10	Date Shipped: 9/1/2011	Chain of Custody Record	Sampler Signature: 
Project Code: TEC-971B	Carrier Name: Hand Delivery		
Account Code:	Airbill:	Relinquished By (Date/Time)	Received By (Date/Time)
CERCLIS ID:	Shipped to: Manchester Environmental Laboratory 7411 Beach Drive East Port Orchard WA 98366 3603718747	 9/1/11 14:40	K Wood 9/1/11 1440
Spill ID:		2	
Site Name / City/State: Makah Reservation Warehouse Beach Dump Neah Bay, WA		3	Good
Project Leader: L. Costello		4	
Action: Screening Site Investigation			
Sampling Co: Ecology & Environment, Inc.			

SAMPLE No.	MATRIX/ SAMPLER	TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	QC Type
WB01SD	Sediment/ J. Feters	G	PBDE/TOC (21)	11354220 (Ice Only) (1) NI	WB01SD	S: 08/30/2011 12:15	-
WB01TS	Other Biota/ J. Feters	G	% T Lipids (21), PBDE (21), Perchlorate (21)	11354211 (Ice Only) (3) Lipids N3 PBDE N4	WB01TS	S: 08/31/2011 09:20	-
WB02SD	Sediment/ D. Pulvino	G	PBDE/TOC (21)	11354221 (Ice Only) (1) NI	WB02SD	S: 08/30/2011 12:20	-
WB02TS	Other Biota/ L. Costello	G	% T Lipids (21), PBDE (21), Perchlorate (21)	11354212 (Ice Only) (3) Lipids N3 PBDE N4	WB02TS	S: 08/31/2011 09:10	-
WB03SD	Sediment/ D. Pulvino	G	PBDE/TOC (21)	11354222 (Ice Only) (1) NI	WB03SD	S: 08/30/2011 12:25	-
WB03TS	Other Biota/ D. Pulvino	G	% T Lipids (21), PBDE (21), Perchlorate (21)	11354213 (Ice Only) (3) Lipids N3 PBDE N4	WB03TS	S: 08/31/2011 09:25	-

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC: BK01TS, BK03SD	Additional Sampler Signature (s): 	Chain Of Custody Seal Number :
Analysis Key:	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate : Composite = C, Grab = G, Both = B	Shipment Iced? _____
<p>% T Lipids = Percent Total Lipids, PBDE = Polybrominated diphenyl ethers, PBDE/TOC = PBDE and TOC, Perchlorate = Perchlorate, TOC = Total Organic Carbon</p>			

COC Number : 10-4097213-083111-0006

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PR provides preliminary results. Requests for preliminary results will increase analytical costs.

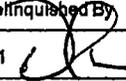
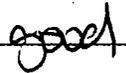
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USEPA Contract Laboratory Program Generic Chain of Custody

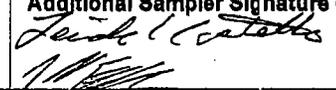
Reference Case: 41693

Client No:

R

Region: 10	Date Shipped: 9/1/2011	Chain of Custody Record	Sampler Signature: 
Project Code: TEC-971B	Carrier Name: Hand Delivery		
Account Code:	Airbill:	Relinquished By (Date/Time)	Received By (Date/Time)
CERCLIS ID:	Shipped to: Manchester Environmental Laboratory 7411 Beach Drive East Port Orchard WA 98366 3609718747	1  9/1/11 14:40	K Wood 9/1/11 1440
Spill ID:		2	
Site Name / City/State: Makah Reservation Warmhouse Beach Dump Neah Bay, WA		3	
Project Leader: L. Costello		4	
Action: Screening Site Investigation			
Sampling Co: Ecology & Environment, Inc.			

SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	QC Type
EB01SD	Sediment/ D. Pulvino	G	PBDE/TOC (21)	✓ 11354214 (Ice Only) (1) NI	EB01SD	S: 08/30/2011 09:45	-
EB01TS	Other Biota/ L. Costello	G	% T Lipids (21), PBDE (21), Perchlorate (21)	✓ 11354208 (Ice Only) (3) Lipids N3 20 PBDE N4	EB01TS	S: 08/30/2011 10:40	-
EB02SD	Sediment/ J. Fetters	G	PBDE/TOC (21)	✓ 11354215 (Ice Only) (1) NI	EB02SD	S: 08/30/2011 09:50	-
EB02TS	Other Biota/ D. Pulvino	G	% T Lipids (21), PBDE (21), Perchlorate (21)	✓ 11354209 (Ice Only) (3) Lipids N3 PBDE N4	EB02TS	S: 08/30/2011 10:45	-
EB03SD	Sediment/ D. Pulvino	G	PBDE/TOC (21)	✓ 11354216 (Ice Only) (1) NI	EB03SD	S: 08/30/2011 10:05	-
EB03TS	Other Biota/ D. Pulvino	G	% T Lipids (21), PBDE (21), Perchlorate (21)	✓ 11354210 (Ice Only) (3) Lipids N3 PBDE N4	EB03TS	S: 08/30/2011 10:55	-

Shipment for Case Complete? <input checked="" type="checkbox"/> <i>NY</i>	Sample (s) to be used for laboratory QC: BK01TS, BK03SD	Additional Sampler Signature (s): 	Chain Of Custody Seal Number :
Analysis Key:	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate : Composite = C, Grab = G, Both = B	Shipment Iced? <input type="checkbox"/>

% T Lipids = Percent Total Lipids, PBDE = Polybrominated diphenyl ethers, PBDE/TOC = PBDE and TOC, Perchlorate = Perchlorate, TOC = Total Organic Carbon

COC Number : 10-4097213-083111-0006

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USEPA Contract Laboratory Program Generic Chain of Custody

Reference Case: 41693

Client No:

R

Region: 10	Date Shipped: 9/1/2011	Chain of Custody Record	Sampler Signature: <i>[Signature]</i>		
Project Code: TEC-971B	Carrier Name: Hand Delivery				
Account Code:	Airbill:	Relinquished By	(Date/Time)	Received By	(Date/Time)
CERCLIS ID:	Shipped to: Manchester Environmental Laboratory 7411 Beach Drive East Port Orchard WA 98366 3609718747	1 <i>[Signature]</i>	9/1/11 14:40	K. Wood	9/1/11
Spill ID:		2			1440
Site Name / City/State: Makah Reservation Warmhouse Beach Dump Neah Bay, WA		3			<i>good</i>
Project Leader: L. Costello		4			
Action: Screening Site Investigation					
Sampling Co: Ecology & Environment, Inc.					

SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	QC Type
BK01SD	Sediment/ D. Pulvino	G	TOC (21)	11354227 (Ice Only) (1) NI	BK01SD	S: 08/30/2011 18:10	--
BK01TS	Other Biota/ J. Fellers	G	% T Lipids (21), PBDE (21), Perchlorate (21)	11354231 (Ice Only) (3) Lipids N3 PBDE N4	BK01TS	S: 08/31/2011 10:05	--
BK02SD	Sediment/ L. Costello	G	TOC (21)	11354228 (Ice Only) (1) NI	BK02SD	S: 08/31/2011 10:00	--
BK03SD	Sediment/ D. Pulvino	G	PBDE/TOC (21)	11354229 (Ice Only) (1) NI	BK03SD	S: 08/31/2011 10:00	--
EC02SD	Sediment/ L. Costello	G	TOC (21)	11354205 (Ice Only) (1) NI	EC02SD	S: 08/30/2011 09:520	-- 2L
WC02SD	Sediment/ L. Costello	G	TOC (21)	11354207 (Ice Only) (1) NI	WC02SD	S: 08/30/2011 12:05	-- 7L

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC: BK01TS, BK03SD	Additional Sampler Signature (s): <i>[Signature]</i>	Chain Of Custody Seal Number :
Analysis Key:	Concentration : L = Low, M = Medium, H = High, LM = Low/Medium	Type/Designate : Composite = C, Grab = G, Both = B	Shipment Iced? _____
<small>% T Lipids = Percent Total Lipids, PBDE = Polybrominated diphenyl ethers, PBDE/TOC = PBDE and TOC, Perchlorate = Perchlorate, TOC = Total Organic Carbon</small>			

COC Number : 10-4097213-083111-0006

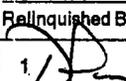
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USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Reference Case: 41693
Client No: **R**

Region: 10	Date Shipped: 9/1/2011	Chain of Custody Record	Sampler Signature: 
Project Code: TEC-971B	Carrier Name: Hand Delivery		
Account Code:	Airbill:	Relinquished By (Date/Time)	Received By (Date/Time)
CERCLIS ID:	Shipped to: Manchester Environmental Laboratory 7411 Beach Drive East Port Orchard WA 98366 3603718747	1  9/1/11 14:40	K. Wood 9/1/11 1440
Spill ID:		2	
Site Name / City/State: Makah Reservation Warmhouse Beach Dump Neah Bay, WA		3	
Project Leader: L. Costello		4	good
Action: Screening Site Investigation			
Sampling Co: Ecology & Environment, Inc.			

ORGANIC SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	QC Type
JE872	Other Biota/ L. Costello	G	CLP ARO (21), PCDD (21)	11354208 (Ice Only) (2) PCDD N2	EB01TS	S: 08/30/2011 10:40	-
JE873	Other Biota/ D. Pulvino	G	CLP ARO (21), PCDD (21)	11354209 (Ice Only) (2) PCDD N2	EB02TS	S: 08/30/2011 10:45	-
JE874	Other Biota/ D. Pulvino	G	CLP ARO (21), PCDD (21)	11354210 (Ice Only) (2) PCDD N2	EB03TS	S: 08/30/2011 10:55	-
JE875	Other Biota/ J. Fetters	G	CLP ARO (21), PCDD (21)	11354211 (Ice Only) (2) PCDD N2	WB01TS	S: 08/31/2011 09:20	-
JE876	Other Biota/ L. Costello	G	CLP ARO (21), PCDD (21)	11354212 (Ice Only) (2) PCDD N2	WB02TS	S: 08/31/2011 09:10	-
IE877	Other Biota/ D. Pulvino	G	CLP ARO (21), PCDD (21)	11354213 (Ice Only) (2) PCDD N2	WB03TS	S: 08/31/2011 09:25	-

Shipment for Case Complete? YES	Sample (s) to be used for laboratory QC:	Additional Sampler Signature (s): 	Chain Of Custody Seal Number :
Analysis Key:	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate : Composite = C, Grab = G, Both = B	Shipment Iced? _____
CLP ARO = CLP TCL PCB (Aroclors), PCDD = Dioxins and Furans			

COC Number : 10-4097213-083111-0007

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USEPA Contract Laboratory Program Organic Traffic Report & Chain of Custody Record

Reference Case: 41693

Client No:

R

Region: 10	Date Shipped: 9/1/2011	Chain of Custody Record		Sampler Signature:	
Project Code: TEC-971B	Carrier Name: Hand Delivery	Relinquished By	(Date/Time)	Received By	(Date/Time)
Account Code:	Airbill:	1	9/1/11 1440	K. Wased	9/1/11
CERCLIS ID:	Shipped to: Manchester Environmental Laboratory	2		1440	
Spill ID:	7411 Beach Drive East	3		good	
Site Name / City/State: Makah Reservation Warmhouse Beach Dump Neah Bay, WA	Port Orchard WA 98366	4			
Project Leader: L. Costello	3603718747				
Action: Screening Site Investigation					
Sampling Co: Ecology & Environment, Inc.					

ORGANIC SAMPLE No.	MATRIX/ SAMPLER	TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	QC Type
JE895	Other Biota/ J. Fetters	G	CLP ARO (21), PCDD (21)	11354231 (Ice Only) (2) PCDD N2	BK01TS	S: 08/31/2011 10:05	--

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC: JE895	Additional Sampler Signature (s): <i>Linda Costello</i>	Chain Of Custody Seal Number :
Analysis Key:	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate : Composite = C, Grab = G, Both = B	Shipment Iced? _____
CLP ARO = CLP TCL PCB (Aroclors), PCDD = Dioxins and Furans			

COC Number : 10-4097213-083111-0007

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USEPA Contract Laboratory Program Inorganic Traffic Report & Chain of Custody Record

Reference Case: 41693

Client No:

R

Region: 10	Date Shipped: 9/1/2011	Chain of Custody Record	Sampler Signature: <i>DR</i>
Project Code: TEC-971B	Carrier Name: Hand Delivery		Requisitioned By (Date/Time)
Account Code:	Airbill:	1 <i>DR</i> 9/1/11 14:40	K. Wood 9/1/11
CERCLIS ID:	Shipped to: Manchester Environmental Laboratory 7411 Beach Drive East Port Orchard WA 98366 3609718747	2	1440
Spill ID:		3	good
Site Name / City/State: Makah Reservation Warmhouse Beach Dump Neah Bay, WA		4	
Project Leader: L. Costello			
Action: Screening Site Investigation			
Sampling Co: Ecology & Environment, Inc.			

INORGANIC SAMPLE No.	MATRIX/SAMPLER	TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	QC Type
MJE872	Other Blota/ L. Costello	G	TM/Hg (21)	11354208 (Ice Only) (1) NI	EBC1TS	S: 08/30/2011 10:40	-
MJE873	Other Blota/ D. Pulvino	G	TM/Hg (21)	11354209 (Ice Only) (1) NI	EBC2TS	S: 08/30/2011 10:45	-
MJE874	Other Blota/ D. Pulvino	G	TM/Hg (21)	11354210 (Ice Only) (1) NI	EBC3TS	S: 08/30/2011 10:55	-
MJE875	Other Blota/ J. Fetters	G	TM/Hg (21)	11354211 (Ice Only) (1) NI	WB01TS	S: 08/31/2011 09:20	-
MJE876	Other Blota/ L. Costello	G	TM/Hg (21)	11354212 (Ice Only) (1) NI	WB02TS	S: 08/31/2011 09:10	-
MJE877	Other Blota/ D. Pulvino	G	TM/Hg (21)	11354213 (Ice Only) (1) NI	WB03TS	S: 08/31/2011 09:25	-

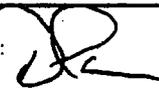
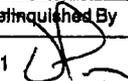
Shipment for Case Complete? <i>gny</i>	Sample (s) to be used for laboratory QC:	Additional Sampler Signature (s): <i>Linda Costello</i> <i>[Signature]</i>	Chain Of Custody Seal Number :
Analysis Key:	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate : Composite = C, Grab = G, Both = B	Shipment Iced? _____
TM/Hg = CLP TAL Total Metals/Hg			

COC Number : 10-4097213-083111-0008

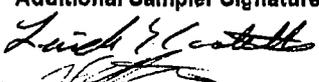
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USEPA Contract Laboratory Program Inorganic Traffic Report & Chain of Custody Record

Reference Case: 41693
Client No: **R**

Region: 10	Date Shipped: 9/1/2011	Chain of Custody Record	Sampler Signature: 
Project Code: TEC-971B	Carrier Name: Hand Delivery		
Account Code:	Airbill:	Relinquished By (Date/Time)	Received By (Date/Time)
CERCLIS ID:	Shipped to: Manchester Environmental Laboratory 7411 Beach Drive East Port Orchard WA 98366 3603718747	1  9/1/11 12:40	K. Wood 9/1/11
Spill ID:		2	
Site Name / City/State: Makah Reservation Warmhouse Beach Dump Neah Bay, WA		3	1440
Project Leader: L. Costello		4	good
Action: Screening Site Investigation			
Sampling Co: Ecology & Environment, Inc.			

INORGANIC SAMPLE No.	MATRIX/ SAMPLER	TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/Bottles	SAMPLING LOCATION	SAMPLE COLLECT DATE/TIME	QC Type
MJE895	Other Biota/ J. Fetters	G	TM/Hg (21)	11354231 (Ice Only) (1) 11	BKC1TS	S: 08/31/2011 10:05	-

Shipment for Case Complete? N	Sample (s) to be used for laboratory QC: MJE895	Additional Sampler Signature (s): 	Chain Of Custody Seal Number :
Analysis Key:	Concentration : L = Low, M = Medium, H = High, L/M = Low/Medium	Type/Designate : Composite = C, Grab = G, Both = B	Shipment Iced? _____
TM/Hg = CLP TAL Total Metals/Hg			

COC Number : 10-4097213-083111-0008

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F

Data Validation Memoranda

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ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700

Seattle, Washington 98104

Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: November 21, 2011

TO: Linda Costello, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Summary Check,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data summary check of 7 soil/sediment samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Analysis for PBDE (EPA SW-846 Method 8270-SIM) was performed at the Manchester Environmental Laboratory, Port Orchard, Washington.

The samples were numbered:

11354214 11354215 11354216 11354220 11354221 11354222 11354229

No discrepancies were noted.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

MEMORANDUM

Subject: Data Release for PBDE soil/sediment Results from the Region 10 USEPA Laboratory

Project Name: Makah Reservation Warmhouse Beach Dump SI

Project Code: TEC-971B

From: Gerald Dodo, Supervisory Chemist
Office of Environmental Assessment, USEPA Region 10 Laboratory

To: Brandon Perkins
Office of Environmental Cleanup, USEPA Region 10

CC: Renee Nordeen – E&E

I have authorized release of this data package. Attached you will find the PBDE soil/sediment analysis results for the Makah Reservation Warmhouse Beach Dump SI project collected 08/30/11 to 08/31/11. For further information regarding the attached data, contact Chris Pace at 360-871-8703.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

QUALITY ASSURANCE MEMORANDUM
FOR ORGANIC CHEMICAL ANALYSES

Date: November 17, 2011

To: Brandon Perkins
Office of Environmental Cleanup, USEPA Region 10

From: Chris Pace, Chemist
Office of Environmental Assessment, USEPA Region 10 Laboratory

Subject: Quality Assurance Review for the PBDE Analysis of Samples from the Makah Reservation
Warmhouse Beach Dump SI

Project Code: TEC-971B
Account Code: 2011T10P302DD2C10HVLA00

CC: Renee Nordeen – E&E

The following is a quality assurance review of the data for PBDE analysis of soil/sediment samples from the above referenced site. The analyses were performed by the EPA Region 10 Laboratory using EPA SW846 method 8270-SIM.

This review was conducted for the following samples:

11354214 11354215 11354216 11354220 11354221 11354222
11354229

Data Qualifications

Comments below refer to the quality control specifications outlined in the Laboratory's current Quality Assurance Manual, Standard Operating Procedures (SOPs) and the Quality Assurance Project Plan (QAPP). No excursions were required from the method Standard Operating Procedure.

The quality control measures which did not meet Laboratory/QAPP criteria are annotated in the title of each affected subsection with "*Laboratory/QAPP Criteria Could Not be Met*".

For those tests for which the EPA Region 10 Laboratory has been accredited by the National Environmental Laboratory Accreditation Conference (NELAC), all requirements of the current NELAC Standard have been met.

1. Sample Receipt

Upon sample receipt, no conditions were noted that would impact data quality.

2. Sample Holding Times

The concentration of an analyte in a sample or extract of a sample may increase or decrease over time depending on the nature of the analyte. For this reason, holding time limits are recommended for samples and extracts. Samples were frozen prior to extraction. Extracts were analyzed within 40 days of preparation.

3. Sample Preparation

Samples were prepared according to the method.

4. Initial Calibration/Continuing Calibration Verification (CCV)

Initial calibration was performed on 11/07/11. Percent relative standard deviations (%RSDs) of the relative response factors (RRFs) met the criteria of $\leq 15\%$ or correlation coefficients met the criteria of ≥ 0.990 .

The CCV for reported samples met the criteria for frequency of analysis. The percent accuracies met the criteria of 80-120% of the true value.

5. Blank Analysis

Method blanks were analyzed with each sample batch to evaluate the potential for laboratory contamination and effects on the sample results. Target analytes were not detected in method blanks.

6. Surrogate Spikes

Surrogate recoveries are used to help in the evaluation of laboratory performance on individual samples. The surrogate analyte used for these analyses was 5,5'-difluoro-PBDE-47. All surrogate recoveries were within the criteria of 50-150%.

7. Matrix Spike/Matrix Spike Duplicate Analysis (MS/MSD)

MS/MSD analyses are performed to provide information on the effects of sample matrices toward the analytical method. An MS/MSD analyses were performed using sample 11354229. The MS/MSD recoveries were within the criteria of 50-150% with a relative percent difference $\leq 30\%$.

8. LCS/LCSD

Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) are generated to provide information on the accuracy and precision of the analytical method and the laboratory performance. The LCS/LCSD recoveries were within the criteria of 70-130% with a relative percent difference $\leq 30\%$.

9. Internal Standard Performance

Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. The retention time variations of all internal standards were within 30 seconds of the continuing calibration standard. The percent areas of all the internal standards were within the specified 50% to 200% of the continuing calibration standard for all reported results.

10. Compound Quantitation

The initial calibration functions were used for calculations. Reported quantitation limits were based on the initial calibration standards and sample size used for the analysis.

All manual integrations have been reviewed and found to comply with acceptable integration practices.

11. Identification

All of the compounds detected in the analyses were within the RRT windows, met the USEPA spectral matching criteria and/or were judged to be acceptable.

12. Compound Quantitation

The initial calibration functions were used for calculations. Reported quantitation limits were based on the initial calibration standards and sample size used for the analysis.

All manual integrations have been reviewed and found to comply with acceptable integration practices.

13. Data Qualifiers

All requirements for data qualifiers from the preceding sections were accumulated. Each sample data summary sheet and each compound was checked for positive or negative results. From this, the overall need for data qualifiers for each analysis was determined. In cases where more than one of the preceding sections required data qualifiers, the most restrictive qualifier has been added to the data.

The usefulness of qualified data should be treated according to the severity of the qualifier in light of the project's data quality objectives. Should questions arise regarding the data, contact Chris Pace at the Region 10 Laboratory, phone number (360) 871 - 8703.

Qualifier	Definition
U	The analyte was not detected at or above the reported value.
J	The identification of the analyte is acceptable; the reported value is an estimate.
UJ	The analyte was not detected at or above the reported value. The reported value is an estimate.
R	The presence or absence of the analyte can not be determined from the data due to severe quality control problems. The data are rejected and considered unusable. <u>No value is reported with this qualification.</u>
NA	Not Applicable, the parameter was not analyzed for, or there is no analytical result for this parameter. <u>No value is reported with this qualification.</u>



US EPA Region 10 Laboratory

Multi-Analyte Final Report



Project Code : TEC-971B

Site : MAKAH RESERVATION WARMHOUSE BEACH DUMP SI

Contact : Brandon Perkins

Account : 11T10P302DD2C10HVLA00

Sample : 11354214

COC Description : EB01SD

Matrix : Sediment

Collected : 8/30/11 9:45

Weight Basis : Dry

Parameter : PBDE

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	1.0	ug/kg	U	11/14/11	1
5436431	BDE# 47	1.0	ug/kg	U	11/14/11	1
60348609	BDE# 99	1.0	ug/kg	U	11/14/11	1
189084648	BDE#100	1.0	ug/kg	U	11/14/11	1
68631492	BDE#153	1.0	ug/kg	U	11/14/11	1
207122154	BDE#154	1.0	ug/kg	U	11/14/11	1
207122165	BDE#183	1.0	ug/kg	U	11/14/11	1
1163195	BDE#209	10	ug/kg	U	11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	90	%Rec		11/14/11	1

Sample : 11354215

COC Description : EB02SD

Matrix : Sediment

Collected : 8/30/11 9:50

Weight Basis : Dry

Parameter : PBDE

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	1.0	ug/kg	U	11/14/11	1
5436431	BDE# 47	1.0	ug/kg	U	11/14/11	1
60348609	BDE# 99	1.0	ug/kg	U	11/14/11	1
189084648	BDE#100	1.0	ug/kg	U	11/14/11	1
68631492	BDE#153	1.0	ug/kg	U	11/14/11	1
207122154	BDE#154	1.0	ug/kg	U	11/14/11	1
207122165	BDE#183	1.0	ug/kg	U	11/14/11	1
1163195	BDE#209	10	ug/kg	U	11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	93	%Rec		11/14/11	1

Sample : 11354216

COC Description : EB03SD

Matrix : Sediment

Collected : 8/30/11 10:05

Weight Basis : Dry

Parameter : PBDE

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.99	ug/kg	U	11/14/11	1
5436431	BDE# 47	0.99	ug/kg	U	11/14/11	1
60348609	BDE# 99	0.99	ug/kg	U	11/14/11	1
189084648	BDE#100	0.99	ug/kg	U	11/14/11	1
68631492	BDE#153	0.99	ug/kg	U	11/14/11	1
207122154	BDE#154	0.99	ug/kg	U	11/14/11	1
207122165	BDE#183	0.99	ug/kg	U	11/14/11	1
1163195	BDE#209	9.9	ug/kg	U	11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	92	%Rec		11/14/11	1

Sample : 11354220

COC Description : WB01SD

Matrix : Sediment

Collected : 8/30/11 12:15

Weight Basis : Dry

Parameter : PBDE

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.99	ug/kg	U	11/14/11	1
5436431	BDE# 47	0.99	ug/kg	U	11/14/11	1
60348609	BDE# 99	0.99	ug/kg	U	11/14/11	1
189084648	BDE#100	0.99	ug/kg	U	11/14/11	1
68631492	BDE#153	0.99	ug/kg	U	11/14/11	1
207122154	BDE#154	0.99	ug/kg	U	11/14/11	1
207122165	BDE#183	0.99	ug/kg	U	11/14/11	1
1163195	BDE#209	9.9	ug/kg	U	11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	89	%Rec		11/14/11	1

Sample : 11354221

COC Description : WB02SD

Matrix : Sediment

Collected : 8/30/11 12:20

Weight Basis : Dry

Parameter : PBDE

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.99	ug/kg	U	11/14/11	1
5436431	BDE# 47	0.99	ug/kg	U	11/14/11	1
60348609	BDE# 99	0.99	ug/kg	U	11/14/11	1
189084648	BDE#100	0.99	ug/kg	U	11/14/11	1
68631492	BDE#153	0.99	ug/kg	U	11/14/11	1
207122154	BDE#154	0.99	ug/kg	U	11/14/11	1
207122165	BDE#183	0.99	ug/kg	U	11/14/11	1
1163195	BDE#209	9.9	ug/kg	U	11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	86	%Rec		11/14/11	1

Sample : 11354222

COC Description : WB03SD

Matrix : Sediment

Collected : 8/30/11 12:25

Weight Basis : Dry

Parameter : PBDE

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.99	ug/kg	U	11/14/11	1
5436431	BDE# 47	0.99	ug/kg	U	11/14/11	1
60348609	BDE# 99	0.99	ug/kg	U	11/14/11	1
189084648	BDE#100	0.99	ug/kg	U	11/14/11	1
68631492	BDE#153	0.99	ug/kg	U	11/14/11	1
207122154	BDE#154	0.99	ug/kg	U	11/14/11	1
207122165	BDE#183	0.99	ug/kg	U	11/14/11	1
1163195	BDE#209	9.9	ug/kg	U	11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	84	%Rec		11/14/11	1

Sample : 11354229

COC Description : BK03SD

Matrix : Sediment

Collected : 8/31/11 10:00

Weight Basis : Dry

Parameter : PBDE

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.99	ug/kg	U	11/14/11	1
5436431	BDE# 47	0.99	ug/kg	U	11/14/11	1
60348609	BDE# 99	0.99	ug/kg	U	11/14/11	1
189084648	BDE#100	0.99	ug/kg	U	11/14/11	1
68631492	BDE#153	0.99	ug/kg	U	11/14/11	1
207122154	BDE#154	0.99	ug/kg	U	11/14/11	1
207122165	BDE#183	0.99	ug/kg	U	11/14/11	1
1163195	BDE#209	9.9	ug/kg	U	11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	90	%Rec		11/14/11	1

Sample : 11354229 Matrix Spike

COC Description : BK03SD

Matrix : Sediment

Collected : 8/31/11 10:00

Weight Basis : Dry

Parameter : PBDE

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	86	%Rec		11/14/11	1
5436431	BDE# 47	88	%Rec		11/14/11	1
60348609	BDE# 99	91	%Rec		11/14/11	1
189084648	BDE#100	92	%Rec		11/14/11	1
68631492	BDE#153	97	%Rec		11/14/11	1
207122154	BDE#154	94	%Rec		11/14/11	1
207122165	BDE#183	109	%Rec		11/14/11	1
1163195	BDE#209	89	%Rec		11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	87	%Rec		11/14/11	1

Sample : 11354229 Matrix Spike#2

COC Description : BK03SD

Matrix : Sediment

Collected : 8/31/11 10:00

Weight Basis : Dry

Parameter : PBDE

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	91	%Rec		11/14/11	1
5436431	BDE# 47	91	%Rec		11/14/11	1
60348609	BDE# 99	95	%Rec		11/14/11	1
189084648	BDE#100	96	%Rec		11/14/11	1
68631492	BDE#153	100	%Rec		11/14/11	1
207122154	BDE#154	95	%Rec		11/14/11	1
207122165	BDE#183	113	%Rec		11/14/11	1
1163195	BDE#209	93	%Rec		11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	88	%Rec		11/14/11	1

Sample : OBS11313A1 Blank

COC Description : Blank

Matrix : Sediment

Weight Basis : Dry

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	1.0	ug/kg	U	11/14/11	1
5436431	BDE# 47	1.0	ug/kg	U	11/14/11	1
60348609	BDE# 99	1.0	ug/kg	U	11/14/11	1
189084648	BDE#100	1.0	ug/kg	U	11/14/11	1
68631492	BDE#153	1.0	ug/kg	U	11/14/11	1
207122154	BDE#154	1.0	ug/kg	U	11/14/11	1
207122165	BDE#183	1.0	ug/kg	U	11/14/11	1
1163195	BDE#209	10	ug/kg	U	11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	89	%Rec		11/14/11	1

Sample : OBS11313F1 Lab Control Std

COC Description : Lab Control Standard

Matrix : Sediment

Weight Basis : Dry

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	83	%Rec		11/14/11	1
5436431	BDE# 47	85	%Rec		11/14/11	1
60348609	BDE# 99	94	%Rec		11/14/11	1
189084648	BDE#100	90	%Rec		11/14/11	1
68631492	BDE#153	100	%Rec		11/14/11	1
207122154	BDE#154	95	%Rec		11/14/11	1
207122165	BDE#183	109	%Rec		11/14/11	1
1163195	BDE#209	90	%Rec		11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	87	%Rec		11/14/11	1

Sample : OBS11313F2 Lab Control Std#2

COC Description : Lab Control Standard Dup.

Matrix : Sediment

Weight Basis : Dry

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	85	%Rec		11/14/11	1
5436431	BDE# 47	92	%Rec		11/14/11	1
60348609	BDE# 99	93	%Rec		11/14/11	1
189084648	BDE#100	91	%Rec		11/14/11	1
68631492	BDE#153	92	%Rec		11/14/11	1
207122154	BDE#154	93	%Rec		11/14/11	1
207122165	BDE#183	104	%Rec		11/14/11	1
1163195	BDE#209	87	%Rec		11/14/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	90	%Rec		11/14/11	1



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MEMORANDUM

DATE: September 29, 2011

TO: Linda Costello, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Grain Size Data Validation Memo,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data summary check of 13 sediment samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Grain size analysis (ASTM Method D-422) was performed by Analytical Resources, Inc., Tukwila, Washington. All sample analyses were evaluated following EPA's Stage 2 Data Validation Manual Process (S2VM).

The samples were numbered:

BK03SD	EC02SD	WB01SD	WB02SD	WB03SD
WC01SD	WC02SD	BK01SD	BK02SD	EB01SD
EB02SD	EB03SD	EC01SD		

Data Qualifications:

The samples were collected on August 30 and 31, 2011, and were analyzed by September 27, 2011. Some sample contained woody or other organic matter with may have broken down during the sieving process and affecting the analyses. These samples weren't noted, so no action was taken based on these discrepancies. Sample BK03SD required resplitting due to the low percentage of fines. No other potential issues were noted in the laboratory case narrative.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Ecology and Environment, Inc.

Percent Retained in Each Size Fraction

Description	% Coarse Gravel				% Gravel			% Coarse Sand	% Medium Sand			% Fine Sand			% Very Coarse Silt	% Coarse Silt	% Medium Silt	% Fine Silt	% Fine Silt	% Very Fine Silt	% Clay
	3-2"	2-1 1/2"	1 1/2"-1"	1-3/4"	3/4-1/2"	1/2-3/8"	3/8"-4750	4750-2000	2000-850	850-425	425-250	250-150	150-75	75-32	32-22	22-13	13-9	9-7	7-3.2	<3.2	
BK03SD	0.0	0.0	0.0	0.0	0.0	0.0	2.3	30.9	58.8	4.7	0.2	0.0	0.0	2.5	0.0	0.0	0.6	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	3.2	32.6	55.1	4.0	0.1	0.0	0.0	4.3	0.0	0.0	0.6	0.0	0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	4.2	29.6	58.5	3.6	0.1	0.0	0.0	3.4	0.0	0.0	0.6	0.0	0.0	0.0	
EC02SD	0.0	0.0	0.0	0.0	0.0	0.0	4.3	16.9	39.4	19.2	8.3	1.6	1.2	0.6	1.5	1.2	1.2	1.2	1.9	1.5	
WB01SD	0.0	0.0	0.0	0.0	1.3	0.0	0.9	1.5	10.7	56.6	26.6	0.5	0.0	1.1	0.0	0.0	0.9	0.0	0.0	0.0	
WB02SD	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.7	11.6	57.5	25.3	0.7	0.0	0.2	0.0	0.0	1.7	0.8	0.0	0.0	
WB03SD	0.0	0.0	0.0	0.0	0.0	1.3	2.6	5.2	12.0	41.3	33.8	1.7	0.0	0.3	0.4	0.0	1.5	0.0	0.0	0.0	
WC01SD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	17.5	11.9	5.2	3.7	4.5	9.2	13.1	2.9	10.2	5.8	7.3	8.7	
WC02SD	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.8	16.1	58.6	19.2	0.3	0.0	0.3	0.0	0.4	1.6	0.0	0.0	0.0	
BK01SD	0.0	0.0	0.0	0.0	0.0	0.0	12.5	17.8	17.5	9.2	5.8	4.0	4.3	4.7	3.9	5.1	2.8	3.4	3.9	5.1	
BK02SD	0.0	0.0	0.0	0.0	0.0	0.6	2.1	11.1	30.7	31.0	9.0	2.5	1.6	0.7	1.5	0.8	2.3	1.5	2.3	2.3	
EB01SD	0.0	0.0	0.0	0.0	0.0	2.1	0.4	0.8	3.3	34.9	52.0	3.6	0.0	0.9	0.4	0.4	1.2	0.0	0.0	0.0	
EB02SD	0.0	0.0	0.0	0.0	3.2	3.1	3.9	3.8	17.4	34.4	31.1	1.4	0.0	0.3	0.0	0.4	1.1	0.0	0.0	0.0	
EB03SD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	42.9	51.5	1.5	0.0	0.8	0.0	0.4	1.3	0.0	0.0	0.0	
EC01SD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	22.1	6.5	2.8	2.1	2.5	2.5	5.0	15.0	10.0	7.5	7.5	10.0	

TK83:0015
11-6-99 MW

Client:	Ecology and Environment, Inc.		
ARI Triplicate Sample ID:	TK831	Batch No.:	TK83-01
Client Triplicate Sample ID:	BK03SD	Page:	1 of 1

Relative Standard Deviation, By Size

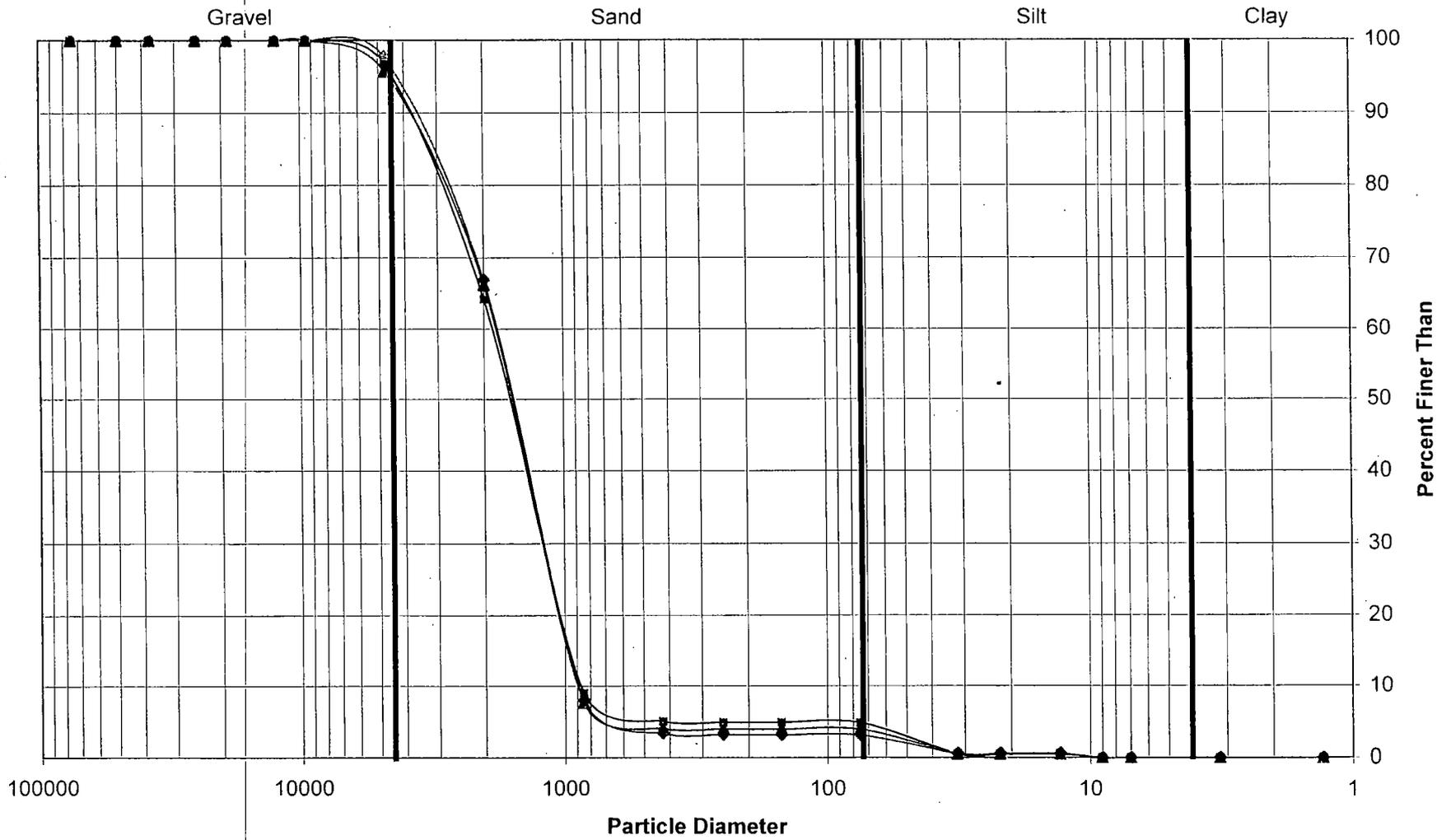
Sample ID	75000	50000	37500	25000	19000	12500	9500	4750	2000	850	425	250	150	75	32	22	13	9	7	3.2	1.3
BK03SD	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.7	66.8	8.0	3.3	3.1	3.1	3.1	0.6	0.6	0.6	0.0	0.0	0.0	0.0
BK03SD	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.8	64.2	9.1	5.1	4.9	4.9	4.9	0.6	0.6	0.6	0.0	0.0	0.0	0.0
BK03SD	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.8	66.2	7.7	4.1	4.0	4.0	4.0	0.6	0.6	0.6	0.0	0.0	0.0	0.0
AVE	100.00	100.00	100.00	100.00	100.00	100.00	100.00	96.78	65.72	8.25	4.16	4.02	3.99	3.97	0.58	0.58	0.58	0.00	0.00	0.00	0.00
STDEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	1.40	0.71	0.87	0.89	0.90	0.90	0.02	0.02	0.02	0.00	0.00	0.00	0.00
%RSD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	2.12	8.65	20.88	22.16	22.56	22.72	2.78	2.78	2.78	NA	NA	NA	NA

This Triplicate applies to the Batch Containing the Following Samples

Sample ID	Date Sampled	Date Set up	Date Started	Date Complete	Data Qualifiers
BK03SD	8/31/2011	9/8/2011	9/13/2011	9/15/2011	
	8/31/2011	9/8/2011	9/13/2011	9/15/2011	
	8/31/2011	9/8/2011	9/13/2011	9/15/2011	
EC02SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	
WB01SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	
WB02SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	
WB03SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	
WC01SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	
WC02SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	
BK01SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	
BK02SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	
EB01SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	
EB02SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	
EB03SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	
EC01SD	8/30/2011	9/8/2011	9/13/2011	9/15/2011	

TK83:00013
11-29-11

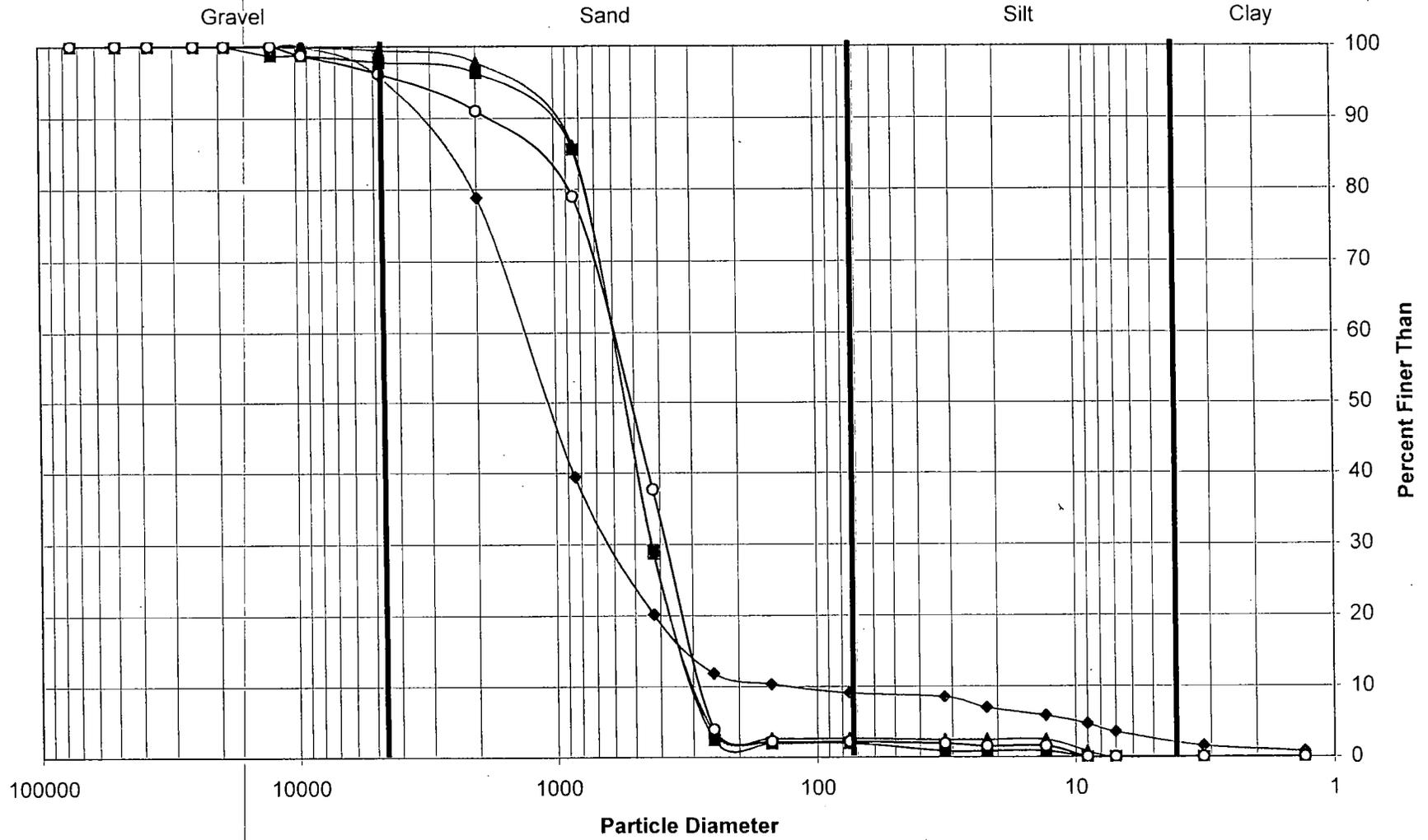
Grain Size Distribution by Hydrometer



◆ BK03SD ■ BK03SD ▲ BK03SD

TK 00015
M-29-11

Grain Size Distribution by Hydrometer



◆ EC02SD

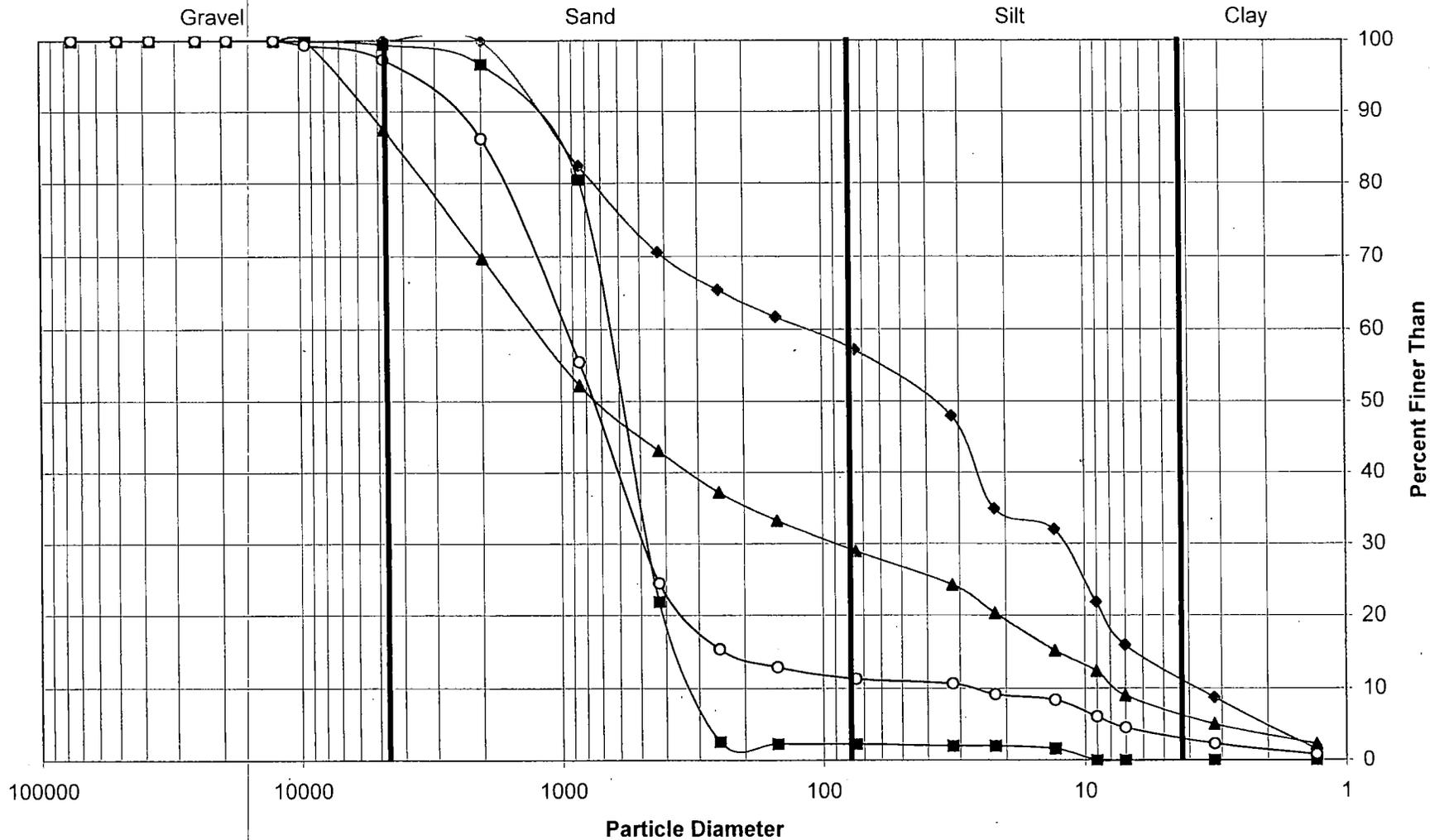
■ WB01SD

▲ WB02SD

○ WB03SD

100000
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50000
30000
20000
15000
10000
7500
5000
4750
3000
2000
1500
1000
750
500
300
250
200
150
100
75
50
30
25
20
15
10
7.5
5
3
2
1.5
1

Grain Size Distribution by Hydrometer



◆ WC01SD

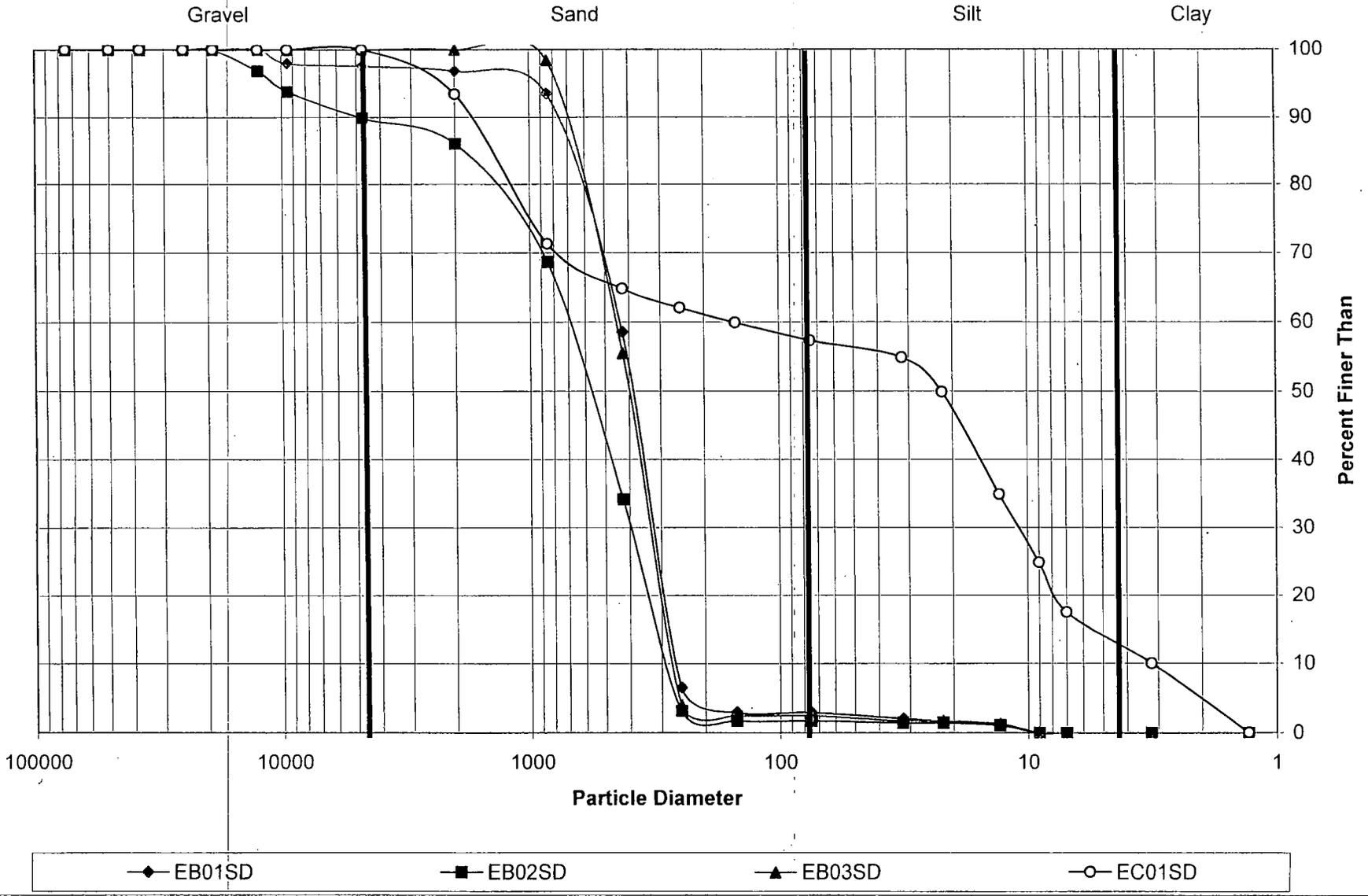
■ WC02SD

▲ BK01SD

○ BK02SD

MW 9-29-11
 TRCS: 00019

Grain Size Distribution by Hydrometer



Geotechnical Raw Data
Analyst Notes and Raw Data

ARI Job ID: TK83

Mwqza

TK83: 00020

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: I-1 Setup Date: 9-8-11 Initials: lg
 Sample Description: Sand & gravel
 Method of size reduction: Quartering Sample Splitter Whole Sample

resplit to
add more
sample

Tare Number	I-1
Tare Weight (g)	10.48
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	232.01
Hydro Test Sample Weight (g) (not including beaker weight)	99.16 / 16.16
Tare + Oven-Dried #10 Washed (g)	89.04
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	194.50

Tare Number	I-1
Tare Weight (g)	1.56
Wet Soil + Tare (g)	37.23
Dry Soil + Tare (g)	37.16

Hydro Beaker: DV Calgon Batch #: 250 Calgon Date: 9-9-2011 Technician: PR

Hydrometer Analysis

Hydro #: 193285 Technician: lg

9/13/2011	Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
	10:00:00	START			
	10:01:00	1	6	5	21.5
	10:02:00	2	6	5	21.5
	10:05:00	5	6	5	21.5
	10:15:00	15	6	5	21.5
	10:30:00	30	6	6	21.5
	11:00:00	60			
	14:10:00	250			
	10:00:00	1440			

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 3 Technician: ME

Sieve Size	Cumulative Weight (g)
Empty Tare	10.49
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	15.50
#10	83.87
#20	185.94
#40	194.01
#60	194.35
#100	194.43
#200	194.47
Pan	194.47

1101F-A
Rev. 0

MW 9/29/11

* Sample consumed * Limited Sample Volume

TK83: 00021

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: I-2 Setup Date: 9.8.11 Initials: eg
 Sample Description: sand & gravel
 Method of size reduction: Quartering Sample Splitter Whole Sample

Tare Number	<u>I-2</u>
Tare Weight (g)	<u>10.39</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>232.99</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>1104.89</u>
Tare + Oven-Dried #10 Washed (g)	<u>91.54</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>195.91</u>

Hygroscopic Moisture Content	
Tare Number	<u>I-2</u>
Tare Weight (g)	<u>1.56</u>
Wet Soil + Tare (g)	<u>36.45</u>
Dry Soil + Tare (g)	<u>36.37</u>

split to
add more
sample

Hydro Beaker: DW Calgon Batch #: 250 Calgon Date: 9.9.2011 Technician: AR

Hydrometer Analysis

9/13/2011 Hydro #: 193285 Technician: eg

Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
10:07:00	START			
10:08:00	1	<u>6</u>	<u>5</u>	<u>21.5</u>
10:09:00	2	<u>6</u>	<u>5</u>	<u>21.5</u>
10:12:00	5	<u>6</u>	<u>5</u>	<u>21.5</u>
10:22:00	15	<u>6</u>	<u>5</u>	<u>21.5</u>
10:37:00	30	<u>6</u>	<u>6</u>	<u>21.5</u>
11:07:00	60			
14:17:00	250			
10:07:00	1440			

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 3 Technician: me

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.41</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	<u>17.54</u>
#10	<u>90.09</u>
#20	<u>188.54</u>
#40	<u>195.66</u>
#60	<u>195.92</u>
#100	<u>195.97</u>
#200	<u>196.00</u>
Pan	<u>196.03</u>

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Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: I-3 Setup Date: 9.8.11 Initials: eg
 Sample Description: Sand & gravel
 Method of size reduction: Quartering Sample Splitter [] Whole Sample []

Tare Number	<u>I-3</u>
Tare Weight (g)	<u>10.05</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>238.72</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>112.03</u> ⁽⁹⁵⁾
Tare + Oven-Dried #10 Washed (g)	<u>91.92</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>192.88</u> * <u>191.51</u>

Hygroscopic Moisture Content	
Tare Number	<u>I-3</u>
Tare Weight (g)	<u>1.57</u>
Wet Soil + Tare (g)	<u>43.75</u>
Dry Soil + Tare (g)	<u>43.67</u>

resplit to add more samples →

Hydro Beaker: D2 Calgon Batch #: 250 Calgon Date: 9.9.2011 Technician: BR

Hydrometer Analysis

Hydro #: 193285 Technician: eg

9/13/2011				
Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
10:14:00	START			
10:15:00	1	6	5	21.5
10:16:00	2	6	5	21.5
10:19:00	5	6	5	21.5
10:29:00	15	6	5	21.5
10:44:00	30	6	6	21.5
11:14:00	60			
14:24:00	250			
10:14:00	1440			

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 3 Technician: ME

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.05</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	<u>19.56</u>
#10	<u>86.65</u>
#20	<u>185.46</u>
#40	<u>191.59</u>
#60	<u>191.73</u>
#100	<u>191.76</u>
#200	<u>191.77</u>
Pan	<u>191.79</u>

Handwritten signature: MW 9/29/11

* Small Spill

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: A Setup Date: 9.8.11 Initials: eg
 Sample Description: Silty fines, Sand, gravel.
 Method of size reduction: Quartering Sample Splitter [] Whole Sample []

Tare Number	<u>A</u>
Tare Weight (g)	<u>10.26</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>446.12</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>107.29</u>
Tare + Oven-Dried #10 Washed (g)	<u>105.30</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>190.74</u>

Hygroscopic Moisture Content	
Tare Number	<u>A</u>
Tare Weight (g)	<u>1.52</u>
Wet Soil + Tare (g)	<u>41.95</u>
Dry Soil + Tare (g)	<u>40.20</u>

Hydro Beaker: BQ Calgon Batch #: 250 Calgon Date: 9.9.2011 Technician: BL

Hydrometer Analysis

9/13/2011 Hydro #: 193285 Technician: eg

Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
10:21:00	START			
10:22:00	1	17	5	21.5
10:23:00	2	16	5	21.5
10:26:00	5	14	5	21.5
10:36:00	15	12.5	5	21.5
10:51:00	30	12	6	21.5
11:21:00	60	10.5	6	21.5
14:31:00	250	8	6	21.5
10:21:00	1440	8	7	22

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 4 Technician: me

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.28</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	<u>28.19</u>
#10	<u>99.46</u>
#20	<u>150.83</u>
#40	<u>175.88</u>
#60	<u>186.64</u>
#100	<u>188.69</u>
#200	<u>190.31</u>
Pan	<u>191.01</u>

MW 9-29-11

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: B Setup Date: 9.8.11 Initials: eg
 Sample Description: Sand
 Method of size reduction: Quartering Sample Splitter [] Whole Sample []

Tare Number	<u>B</u>
Tare Weight (g)	<u>10.52</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>303.93</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>108.27</u>
Tare + Oven-Dried #10 Washed (g)	<u>21.52</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>127.33</u>

Hygroscopic Moisture Content	
Tare Number	<u>B</u>
Tare Weight (g)	<u>1.58</u>
Wet Soil + Tare (g)	<u>34.27</u>
Dry Soil + Tare (g)	<u>34.19</u>

Hydro Beaker: B4 Calgon Batch #: 250 Calgon Date: 9.9.2011 Technician: BL

Hydrometer Analysis

Hydro #: 193285 Technician: eg

9/13/2011				
Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
10:28:00	START			
10:29:00	1	6	5	21.5
10:30:00	2	6	5	21.5
10:33:00	5	6	5	21.5
10:43:00	15	6	5	21.5
10:58:00	30	6 <u>eg</u>	6	21.5
11:28:00	60			
14:38:00	250			
10:28:00	1440			

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 3 Technician: me

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.52</u>
2"	
1½"	
1"	
¾"	
½"	<u>14.25</u>
3/8"	<u>17.03</u>
#4	<u>17.03</u>
#10	<u>21.32</u>
#20	<u>33.29</u>
#40	<u>96.72</u>
#60	<u>126.55</u>
#100	<u>127.07</u>
#200	<u>127.10</u>
Pan	<u>127.11</u>

MW 9/29/11

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: C Setup Date: 9.8.11 Initials: eg
 Sample Description: Sand
 Method of size reduction: Quartering Sample Splitter Whole Sample

Tare Number	<u>C</u>
Tare Weight (g)	<u>10.54</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>299.84</u>
Hydro Test Sample Weight (g) (not including beaker weight)	116.05 <u>118.05</u>
Tare + Oven-Dried #10 Washed (g)	<u>17.14</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>132.64</u>

Hygroscopic Moisture Content	
Tare Number	<u>C</u>
Tare Weight (g)	<u>1.53</u>
Wet Soil + Tare (g)	<u>64.16</u>
Dry Soil + Tare (g)	<u>64.03</u>

Hydro Beaker: EC Calgon Batch #: 256 Calgon Date: 9/9/2011 Technician: AHS

Hydrometer Analysis

Hydro #: 193285 Technician: eg

9/13/2011				
Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
10:35:00	START			
10:36:00	1	8	5	21.5
10:37:00	2	8	5	21.5
10:40:00	5	8	5	21.5
10:50:00	15	8	5	21.5
11:05:00	30	7.5 ^{eg}	6	21.5
11:35:00	60	6 ^{eg}	6	21.5
14:45:00	250			
10:35:00	1440			

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 4 Technician: me

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.57</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	<u>12.14</u>
#10	<u>16.94</u>
#20	<u>30.91</u>
#40	<u>100.12</u>
#60	<u>130.64</u>
#100	<u>131.50</u>
#200	<u>131.54</u>
Pan	<u>131.55</u>

** curve fitting*

me 9/11

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: D Setup Date: 9.8.11 Initials: eg
 Sample Description: sand.
 Method of size reduction: Quartering Sample Splitter [] Whole Sample []

Tare Number	<u>D</u>
Tare Weight (g)	<u>10.30</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>301.47</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>117.71 121.00 *</u>
Tare + Oven-Dried #10 Washed (g)	<u>37.37</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>154.61</u>

Tare Number	<u>D</u>
Tare Weight (g)	<u>1.51</u>
Wet Soil + Tare (g)	<u>43.19</u>
Dry Soil + Tare (g)	<u>43.10</u>

Hydro Beaker: EF Calgon Batch #: 250 Calgon Date: 9/9/2011 Technician: AAS

Hydrometer Analysis

Hydro #: 193285 Technician: eg

9/13/2011	Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
	10:42:00	START			
	10:43:00	1	7.5	5	21.5
	10:44:00	2	7.5	5	21.5
	10:47:00	5	7	5	21.5
	10:57:00	15	7	5	21.5
	11:12:00	30	6.5 (eg)	6	21.5
	11:42:00	60		6	21.5
	14:52:00	250			
	10:42:00	1440			

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 3 Technician: me

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.30</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	<u>13.94</u>
#4	<u>21.52</u>
#10	<u>36.57</u>
#20	<u>52.51</u>
#40	<u>107.32</u>
#60	<u>152.16</u>
#100	<u>154.37</u>
#200	<u>154.41</u>
Pan	<u>154.42</u>

* manual filling.

MW 9/15/11

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: E Setup Date: 9.8.11 Initials: eg
 Sample Description: organic debris, clayey silt, pine needles
 Method of size reduction: Quartering Sample Splitter Whole Sample

Tare Number	<u>E</u>
Tare Weight (g)	<u>10.17</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>51.32</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>38.75*</u>
Tare + Oven-Dried #10 Washed (g)	<u>10.18</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>24.96</u>

Hygroscopic Moisture Content	
Tare Number	<u>E</u>
Tare Weight (g)	<u>1.57</u>
Wet Soil + Tare (g)	<u>3.35</u>
Dry Soil + Tare (g)	<u>3.15</u>

Hydro Beaker: DE Calgon Batch #: 250 Calgon Date: 9.12.2011 Technician: BN

Hydrometer Analysis

Hydro #: 193285 Technician: eg

9/13/2011	Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
	10:49:00	START			
	10:50:00	1	26	5	21.5
	10:51:00	2	21.5	5	21.5
	10:54:00	5	17	5	21.5
	11:04:00	15	16	5	21.5
	11:19:00	30	13.5	6	21.5
	11:49:00	60	11.5	6	21.5
	14:59:00	250	9	6	21.5
	10:49:00	1440	7.5	7	22

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 4 Technician: me

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.22</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	
#10	<u>10.26</u>
#20	<u>16.27</u>
#40	<u>20.37</u>
#60	<u>22.17</u>
#100	<u>23.43</u>
#200	<u>24.98</u>
Pan	<u>25.56</u>

MW 9-20-11

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: F Setup Date: 9-8-11 Initials: eg
 Sample Description: Sand
 Method of size reduction: Quartering Sample Splitter [] Whole Sample []

Tare Number	<u>F</u>
Tare Weight (g)	<u>9.92</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>282.97</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>115.84</u>
Tare + Oven-Dried #10 Washed (g)	<u>20.07</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>135.12</u>

Hygroscopic Moisture Content	
Tare Number	<u>F</u>
Tare Weight (g)	<u>1.51</u>
Wet Soil + Tare (g)	<u>55.80</u>
Dry Soil + Tare (g)	<u>55.67</u>

Hydro Beaker: CD Calgon Batch #: 250 Calgon Date: 9/9/2011 Technician: AHS

Hydrometer Analysis

Hydro #: 193285 Technician: eg

9/13/2011	Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
	10:56:00	START			
	10:57:00	1	8	5	21.5
	10:58:00	2	7.5	5	21.5
	11:01:00	5	7.5	5	21.5
	11:11:00	15	7	5	21.5
	11:26:00	30	6	6	21.5
	11:56:00	60			
	15:06:00	250			
	10:56:00	1440			

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 3 Technician: ME

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>9.94</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	<u>11.45</u>
#10	<u>19.15</u>
#20	<u>38.94</u>
#40	<u>110.88</u>
#60	<u>134.47</u>
#100	<u>134.83</u>
#200	<u>134.86</u>
Pan	<u>134.88</u>

MW 9-29-11

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: 6 Setup Date: 9-8-11 Initials: eg
 Sample Description: clayey silt organic debris gravel
 Method of size reduction: Quartering Sample Splitter [] Whole Sample []

Tare Number	<u>6</u>
Tare Weight (g)	<u>10.20</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>238.25</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>85.60</u>
Tare + Oven-Dried #10 Washed (g)	<u>80.96</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>113.14</u>

Tare Number	<u>6</u>
Tare Weight (g)	<u>1.50</u>
Wet Soil + Tare (g)	<u>16.37</u>
Dry Soil + Tare (g)	<u>15.52</u>

Hydro Beaker: AG Calgon Batch #: 250 Calgon Date: 9-12-2011 Technician: BL

Hydrometer Analysis

9/13/2011 Hydro #: 193285 Technician: eg

Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
11:03:00	START			
11:04:00	1	31.5	5	21.5
11:05:00	2	26.5	5	21.5
11:08:00	5	23	5	21.5
11:18:00	15	18.5	5	21.5
11:33:00	30	17	6	21.5
12:03:00	60	14	6	21.5
15:13:00	250	10.5	6	21.5
11:03:00	1440	9	7	22

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 4 Technician: me

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.23</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	<u>37.65</u>
#10	<u>76.56</u>
#20	<u>92.07</u>
#40	<u>100.20</u>
#60	<u>105.37</u>
#100	<u>108.90</u>
#200	<u>112.70</u>
Pan	<u>113.72</u>

MW 920-1

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: H Setup Date: 9.8.11 Initials: eg
 Sample Description: fines sand
 Method of size reduction: Quartering Sample Splitter [] Whole Sample []

Tare Number	<u>H</u>
Tare Weight (g)	<u>10.00</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>263.83</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>115.86</u>
Tare + Oven-Dried #10 Washed (g)	<u>49.25</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>143.74</u>

Tare Number	<u>H</u>
Tare Weight (g)	<u>1.51</u>
Wet Soil + Tare (g)	<u>41.74</u>
Dry Soil + Tare (g)	<u>40.94</u>

Hydro Beaker: F Calgon Batch #: 250 Calgon Date: 9/9/2011 Technician: AAS

Hydrometer Analysis

9/13/2011 Hydro #: 193285 Technician: eg

Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
11:10:00	START			
11:11:00	1	20	5	21.5
11:12:00	2	19	5	21.5
11:15:00	5	17	5	21.5
11:25:00	15	16	5	21.5
11:40:00	30	14	6	21.5
12:10:00	60	12	6	21.5
15:20:00	250	9	6	21.5
11:10:00	1440	8	7	22

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 3 Technician: me

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.01</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	<u>11.61</u>
#10	<u>16.88</u>
#20	<u>44.50</u>
#40	<u>85.02</u>
#60	<u>125.84</u>
#100	<u>137.76</u>
#200	<u>141.01</u>
Pan	<u>143.17</u>
	<u>144.02</u>

MW 9/29/11

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: J Setup Date: 9-8-11 Initials: eg
 Sample Description: Sand Gravel
 Method of size reduction: Quartering Sample Splitter [] Whole Sample []

Tare Number	<u>J</u>
Tare Weight (g)	<u>10.58</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>428.92</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>47.40 20.00*</u>
Tare + Oven-Dried #10 Washed (g)	<u>24.40</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>141.01</u>

Tare Number	<u>J</u>
Tare Weight (g)	<u>1.52</u>
Wet Soil + Tare (g)	<u>48.41</u>
Dry Soil + Tare (g)	<u>48.29</u>

Hydro Beaker: CH Calgon Batch #: 250 Calgon Date: 9/9/2011 Technician: WAS

Hydrometer Analysis

Hydro #: 193285 Technician: eg

Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
9/13/2011				
11:17:00	START			
11:18:00	1	7.5	5	21.5
11:19:00	2	7.5	5	21.5
11:22:00	5	7	5	21.5
11:32:00	15	6.5	5	21.5
11:47:00	30	6	6	21.5
12:17:00	60			
15:27:00	250			
11:17:00	1440			

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 4 Technician: ME

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.58</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	<u>19.31</u>
#10	<u>21.10</u>
#20	<u>24.25</u>
#40	<u>28.33</u>
#60	<u>71.57</u>
#100	<u>135.80</u>
#200	<u>140.31</u>
Pan	<u>140.37</u>

MW 9-28-11

**Residual Filling*

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: K Setup Date: 9.8.11 Initials: eg
 Sample Description: Sand, gravel, shell fragments
 Method of size reduction: Quartering Sample Splitter [] Whole Sample []

Tare Number	<u>K</u>
Tare Weight (g)	<u>9.95</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>432.51</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>118.72</u>
Tare + Oven-Dried #10 Washed (g)	<u>70.25</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>185.13</u>

Hygroscopic Moisture Content	
Tare Number	<u>K</u>
Tare Weight (g)	<u>1.52</u>
Wet Soil + Tare (g)	<u>48.54</u>
Dry Soil + Tare (g)	<u>48.41</u>

Hydro Beaker: DG Calgon Batch #: 250 Calgon Date: 9/9/2011 Technician: AMS

Hydrometer Analysis

Hydro #: 193285 Technician: eg

9/13/2011	Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
	11:24:00	START			
	11:25:00	1	7	5	21.5
	11:26:00	2	7	5	21.5
	11:29:00	5	7	5	21.5
	11:39:00	15	6.5	5	21.5
	11:54:00	30	6	5	21.5
	12:24:00	60			
	15:34:00	250			
	11:24:00	1440			

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 3 Technician: me

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>9.95</u>
2"	
1½"	
1"	
¾"	
½"	<u>23.42</u>
3/8"	<u>36.28</u>
#4	<u>52.73</u>
#10	<u>68.95</u>
#20	<u>92.88</u>
#40	<u>140.26</u>
#60	<u>183.04</u>
#100	<u>184.93</u>
#200	<u>184.95</u>
Pan	<u>184.97</u>

MW 9/21

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: L Setup Date: 9-8-11 Initials: eg
 Sample Description: Sand
 Method of size reduction: Quartering Sample Splitter [] Whole Sample []

Tare Number	<u>L</u>
Tare Weight (g)	<u>10.45</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>224.47</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>117.44</u> <u>119.00*</u>
Tare + Oven-Dried #10 Washed (g)	<u>10.45</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>126.22</u>

Hygroscopic Moisture Content	
Tare Number	<u>L</u>
Tare Weight (g)	<u>1.55</u>
Wet Soil + Tare (g)	<u>44.81</u>
Dry Soil + Tare (g)	<u>44.71</u>

Hydro Beaker: CY Calgon Batch #: 250 Calgon Date: 9/9/2011 Technician: AAS

Hydrometer Analysis

Hydro #: 193285 Technician: eg

9/13/2011				
Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
11:31:00	START			
11:32:00	1	7.5	5	21.5
11:33:00	2	7	5	21.5
11:36:00	5	7	5	21.5
11:46:00	15	6.5	5	21.5
12:01:00	30	6	6	21.5
12:31:00	60			
15:41:00	250			
11:31:00	1440			

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 4 Technician: me

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.45</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	
#10	<u>10.45</u>
#20	<u>12.35</u>
#40	<u>63.26</u>
#60	<u>124.42</u>
#100	<u>126.18</u>
#200	<u>126.21</u>
Pan	<u>126.22</u>

MW 9/28/11

**curve fitting*

Hydrometer Particle-Size Analysis - ASTM D421/422

ARI Job No.: TK83 ARI Sample ID.: M Setup Date: 9.8.11 Initials: egj
 Sample Description: Silty fines, organic debris
 Method of size reduction: Quartering Sample Splitter [] Whole Sample []

Tare Number	<u>M</u>
Tare Weight (g)	<u>10.00</u>
Tare + Air-Dried Sample Weight (g) (before #10 preparation)	<u>33.52</u>
Hydro Test Sample Weight (g) (not including beaker weight)	<u>21.03</u>
Tare + Oven-Dried #10 Washed (g)	<u>10.02</u>
Tare + Oven-Dried #200 Washed (g) (including plus #10 material)	<u>18.84</u>

Hygroscopic Moisture Content	
Tare Number	<u>M</u>
Tare Weight (g)	<u>1.51</u>
Wet Soil + Tare (g)	<u>3.54</u>
Dry Soil + Tare (g)	<u>3.32</u>

Hydro Beaker: AM Calgon Batch #: 250 Calgon Date: 9.12.2011 Technician: RL

Hydrometer Analysis

9/13/2011 Hydro #: 193285 Technician: egj

Time	Δ Time	Test Cylinder	Calgon Blank	Temp (°C)
11:38:00	START			
11:39:00	1	17.5	5	21.5
11:40:00	2	16	5	21.5
11:43:00	5	15	5	21.5
11:53:00	15	12	5	21.5
12:08:00	30	11	6	21.5
12:38:00	60	9.5	6	21.5
15:48:00	250	8	6	21.5
11:38:00	1440	7	7	22

Sieve Analysis

Sieve Date: 9/15/11 Sieve Set #: 3 Technician: me

Sieve Size	Cumulative Weight (g)
Empty Tare	<u>10.04</u>
2"	
1½"	
1"	
¾"	
½"	
3/8"	
#4	
#10	<u>11.44</u>
#20	<u>15.88</u>
#40	<u>17.18</u>
#60	<u>17.74</u>
#100	<u>18.17</u>
#200	<u>18.68</u>
Pan	<u>18.99</u>

MW 9-20-11

Sample Number:	BK03SD	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	97.74	86.83	7.99	3.34	3.14	3.10	3.07	0.56	0.56	0.56	0.00	0.00	0.00	0.00
Test Temperature	21.5	5"	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	4	10	20	40	60	100	200	37.0	23.4	13.5	9.6	6.8	3.3	1.4
Specific Gravity	2.65																						
		Sieve Analysis Portion										Hydrometer Analysis Portion											
					Sieve Size	Weight of Soil + Tare	Total Weight of Soil		Percent Retained	Percent Passing	Time	Hydro Reading	Comp Correct	Percent Finer	"L"	D	K	a					
					5"	10.49	0.00		0.00	100.00													
					3"	10.49	0.00		0.00	100.00													
					2"	10.49	0.00		0.00	100.00													
Wet Wt & Tare	37.23				1.5"	10.49	0.00		0.00	100.00	1	6	5.0	0.58	15.3	52.30802	0.013367	1.001385					
Dry Wt & Tare	37.16				1	10.49	0.00		0.00	100.00	2	6	5.0	0.58	15.3	36.98806	0.013367	1.001385					
Wt Moisture	0.07				3/4	10.49	0.00		0.00	100.00	5	6	5.0	0.58	15.3	23.3933	0.013367	1.001385					
Wt Tare	1.56				1/2	10.49	0.00		0.00	100.00	15	6	5.0	0.58	15.3	13.50813	0.013367	1.001385					
Dry Soil	35.6				3/8	10.49	0.00		0.00	100.00	30	6	6.0	0.00	15.3	9.550276	0.013367	1.001385					
Moisture Content	0.001966292				4	15.5	5.01		2.28	97.74	60	6	6.0	0.00	15.3	6.753085	0.013367	1.001385					
Air Dry Total Sample	221.53				10	83.87	73.38		33.17	86.83	250	6	6.0	0.00	15.3	3.306313	0.013367	1.001385					
Oven Dry Total Sample	221.2392655				20	185.94	102.07	58.84	82.01	7.99	1440	6	6.0	0.00	15.3	1.378464	0.013367	1.001385					
Air Dry Hydro Sample	118.16				40	194.01	110.14	63.49	96.66	3.34													
Oven Dry Wt Hydro	115.9320437				60	194.35	110.48	63.69	96.66	3.14													
Amount Plus #10	73.38				100	194.43	110.58	63.74	96.90	3.10													
W (14.2) =	173.4671149				200	194.47	110.60	63.76	96.93	3.07													

TK03:00036

MWD-20-11

Sample Number: BK03SD	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	98.79	64.15	9.05	5.07	4.92	4.90	4.88	0.58	0.56	0.56	0.00	0.00	0.00	0.00
	125000	75000	50000	37500	25000	19000	12500	9500	4750	2000	850	425	250	150	75	37.0	23.4	13.5	9.8	6.8	3.3	1.4
Test Temperature	21.5	5"	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	4	10	20	40	80	100	200						
Specific Gravity	2.65																					
Sieve Analysis Portion																						
					Sieve Size	Weight of Soil + Tare	Total Weight of Soil	Percent Retained	Percent Passing	Time	Hydro Reading	Comp Correct	Percent Finer	"L"	D	K	a					
					5"	10.41	0.00	0.00	100.00													
					3"	10.41	0.00	0.00	100.00													
					2"	10.41	0.00	0.00	100.00													
Wet Wt & Tare	36.45				1.5"	10.41	0.00	0.00	100.00	1	0	5	0.58	15.3	52.30802	0.013367	1.001385					
Dry Wt & Tare	38.37				1	10.41	0.00	0.00	100.00	2	0	5	0.58	15.3	36.98808	0.013367	1.001385					
Wt Moisture	0.08				3/4	10.41	0.00	0.00	100.00	5	0	5	0.58	15.3	23.3833	0.013367	1.001385					
Wt Tare	1.58				1/2	10.41	0.00	0.00	100.00	15	0	5	0.58	15.3	13.50813	0.013367	1.001385					
Dry Soil	34.81				3/8	10.41	0.00	0.00	100.00	30	0	0	0.00	15.3	9.550278	0.013367	1.001385					
Moisture Content	0.00226819				4	17.54	7.13	3.21	98.79	80	0	0	0.00	15.3	8.753085	0.013367	1.001385					
Air Dry Total Sample	222.8				10	90.08	78.88	35.85	64.15	250	0	0	0.00	15.3	3.308313	0.013367	1.001385					
Oven Dry Total Samp	222.2722958				20	188.54	98.45	55.10	90.95	9.05	1440	0	0	0.00	15.3	1.378484	0.013367	1.001385				
Air Dry Hydro Sample	114.89				40	195.88	105.57	59.08	94.93	5.07												
Oven Dry Wt Hydro	114.8285884				60	195.92	105.83	59.23	95.08	4.92												
Amount Plus #10	79.88				100	195.97	105.88	59.28	95.10	4.90												
W (14.2) =	178.8794265				200	198	105.91	59.27	95.12	4.88												

TK88:00097

NW 9-20-11

Sample Number:	BK03SD	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	95.80	66.16	7.70	4.07	3.99	3.97	3.96	0.59	0.59	0.59	0.00	0.00	0.00	0.00
		125000	75000	50000	37500	25000	19000	12500	8500	4750	2000	850	425	250	150	75	37.0	23.4	13.5	9.6	6.8	3.3	1.4
Test Temperature		21.5	5"	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	4	10	20	40	60	100	200						
Specific Gravity		2.65																					
		Sieve Analysis Portion										Hydrometer Analysis Portion											
						Sieve Size	Weight of Soil + Tare	Total Weight of Soil	Percent Retained	Percent Passing	Time	Hydro Reading	Comp Correct	Percent Finer	"L"	D	K	a					
						5"	10.05	0.00	0.00	100.00													
						3"	10.05	0.00	0.00	100.00													
						2"	10.05	0.00	0.00	100.00													
Wet Wt & Tare	43.75					1 1/2"	10.05	0.00	0.00	100.00	1	6	5	0.59	15.3	52.30902	0.013367	1.001385					
Dry Wt & Tare	43.87					1	10.05	0.00	0.00	100.00	2	6	5	0.59	15.3	36.98806	0.013367	1.001385					
Wt Moisture	0.08					3/4	10.05	0.00	0.00	100.00	5	6	5	0.59	15.3	23.3933	0.013367	1.001385					
Wt Tare	1.57					1/2	10.05	0.00	0.00	100.00	15	6	5	0.59	15.3	13.50613	0.013367	1.001385					
Dry Soil	42.1					3/8	10.05	0.00	0.00	100.00	30	6	6	0.00	15.3	9.550276	0.013367	1.001385					
Moisture Content	0.001900238					4	19.56	9.51	4.20	95.80	60	6	6	0.00	15.3	6.753065	0.013367	1.001385					
Air Dry Total Sample	228.67					10	88.65	76.60	33.84	66.16	250	6	6	0.00	15.3	3.308313	0.013367	1.001385					
Oven Dry Total Samp	228.3853722					20	185.46	98.81	58.47	82.30	7.70	1440	6	0.00	15.3	1.378464	0.013367	1.001385					
Air Dry Hydro Sample	112.03					40	191.59	104.94	62.09	65.93	4.07												
Oven Dry Wt Hydro	111.8175202					60	191.73	105.08	62.18	96.01	3.99												
Amount Plus #10	76.60					100	191.76	105.11	62.19	96.03	3.97												
W (14.2) =	169.0008213					200	191.77	105.12	62.20	96.04	3.96												

TK83:00038

NW 929-11

Sample Number:	EC02SD	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	95.74	78.81	39.37	20.14	11.87	10.30	9.06	8.46	6.92	5.77	4.61	3.46	1.54	0.77
		125000	75000	50000	37500	25000	19000	12500	9500	4750	2000	850	425	250	150	75	35.0	22.4	13.0	9.2	6.6	3.3	1.4
Test Temperature	21.5	5"	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	4	10	20	40	60	100	200							
Specific Gravity	2.65																						
		Sieve Analysis Portion										Hydrometer Analysis Portion											
						Sieve Size	Weight of Soil + Tare	Total Weight of Soil		Percent Retained	Percent Passing	Time	Hydro Reading	Comp Correct	Percent Finer	"L"	D	K	a				
						5"	10.28	0.00		0.00	100.00												
						3"	10.28	0.00		0.00	100.00												
						2"	10.28	0.00		0.00	100.00												
Wet Wt & Tare	41.95					1.5"	10.28	0.00		0.00	100.00	1	17	5	9.23	13.5	49.13361	0.013367	1.001385				
Dry Wt & Tare	40.2					1	10.28	0.00		0.00	100.00	2	16	5	8.46	13.7	34.9528	0.013367	1.001385				
Wt Moisture	1.75					3/4	10.28	0.00		0.00	100.00	5	14	5	8.92	14.0	22.36948	0.013367	1.001385				
Wt Tare	1.52					1/2	10.28	0.00		0.00	100.00	15	12.5	5	5.77	14.2	13.02789	0.013367	1.001385				
Dry Soil	38.68					3/8	10.28	0.00		0.00	100.00	30	12	6	4.61	14.3	9.238562	0.013367	1.001385				
Moisture Content	0.04524302					4	28.19	17.91		4.26	95.74	60	10.5	6	3.46	14.6	6.588445	0.013367	1.001385				
Air Dry Total Sample	435.86					10	99.46	89.18		21.19	78.81	250	8	6	1.54	15.0	3.272715	0.013367	1.001385				
Oven Dry Total Sample	420.8540638					20	150.83	51.37	39.44	60.63	39.37	1440	8	7	0.77	15.0	1.363631	0.013367	1.001385				
Air Dry Hydro Sample	107.29					40	175.88	76.42	58.67	79.86	20.14												
Oven Dry Wt Hydro	102.6459857					60	188.64	87.18	66.94	88.13	11.87												
Amount Plus #10	89.18					100	188.69	89.23	68.51	89.70	10.30												
W (14.2) =	130.2452766					200	190.31	90.85	69.75	90.94	9.06												

TK83: 00039

11-22-11
NW 929-11

Sample Number:	WB01SD	100.00	100.00	100.00	100.00	100.00	100.00	98.73	98.73	97.78	98.31	85.84	29.07	2.47	2.01	1.98	0.89	0.89	0.89	0.00	0.00	0.00	0.00
		125000	75000	50000	37500	25000	18000	12500	9500	4750	2000	850	425	250	150	75	37.0	23.4	13.5	9.8	6.8	3.3	1.4
Test Temperature		21.5	5"	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	4	10	20	40	60	100	200						
Specific Gravity		2.85																					
		Sieve Analysis Portion										Hydrometer Analysis Portion											
						Sieve Size	Weight of Soil + Tare	Total Weight of Soil	Percent Retained	Percent Passing	Time	Hydro Reading	Comp Correct	Percent Finer	"L"	D	K	a					
						5"	10.52	0.00	0.00	100.00													
						3"	10.52	0.00	0.00	100.00													
						2"	10.52	0.00	0.00	100.00													
Wet Wt & Tare	34.27					1.5"	10.52	0.00	0.00	100.00	1	0	5	0.89	15.3	52.30902	0.013387	1.001385					
Dry Wt & Tare	34.19					1	10.52	0.00	0.00	100.00	2	0	5	0.89	15.3	36.98808	0.013387	1.001385					
Wt Moisture	0.08					3/4	10.52	0.00	0.00	100.00	5	0	5	0.89	15.3	23.3833	0.013387	1.001385					
Wt Tare	1.56					1/2	14.25	3.73	1.27	98.73	15	0	5	0.89	15.3	13.50813	0.013387	1.001385					
Dry Soil	32.83					3/8	14.25	3.73	1.27	98.73	30	0	6	0.00	15.3	9.550278	0.013387	1.001385					
Moisture Content	0.002451732					4	17.03	6.51	2.22	97.78	60	0	6	0.00	15.3	6.753085	0.013387	1.001385					
Air Dry Total Sample	293.41					10	21.32	10.80	3.69	98.31	250	0	0	0.00	15.3	3.308313	0.013387	1.001385					
Oven Dry Total Samp	292.7188108					20	33.28	11.97	10.67	14.36	85.84	1440	0	0.00	15.3	1.378464	0.013387	1.001385					
Air Dry Hydro Sample	108.27					40	98.72	75.40	87.24	70.93	29.07												
Oven Dry Wt Hydro	108.0052002					60	128.55	105.23	93.84	97.53	2.47												
Amount Plus #10	10.80					100	127.07	105.75	94.30	97.99	2.01												
W (14.2) =	112.1427608					200	127.1	105.78	94.33	98.02	1.98												

TK83:00040

JW 9-29-11

Sample Number:	WB02SD																							
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	99.46	97.79	86.20	26.74	3.41	2.69	2.66	2.49	2.49	2.49	0.83	0.00	0.00	0.00	
	125000	75000	50000	37500	25000	19000	12500	9500	4750	2000	850	425	250	150	75	36.6	23.1	13.4	9.5	6.8	3.3	1.4		
Test Temperature	21.5	5"	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	4	10	20	40	80	100	200								
Specific Gravity	2.65																							
	Sieve Analysis Portion										Hydrometer Analysis Portion													
					Sieve Size	Weight of Soil + Tare	Total Weight of Soil	Percent Retained	Percent Passing	Time	Hydro Reading	Comp Correct	Percent Finer	"L"	D	K	a							
					5"	10.57	0.00	0.00	100.00															
					3"	10.57	0.00	0.00	100.00															
					2"	10.57	0.00	0.00	100.00															
Wet Wt & Tare	64.16				1.5"	10.57	0.00	0.00	100.00	1	8	5	2.49	15.0	51.74817	0.013367	1.001385							
Dry Wt & Tare	64.03				1	10.57	0.00	0.00	100.00	2	8	5	2.49	15.0	36.59008	0.013367	1.001385							
Wt Moisture	0.13				3/4	10.57	0.00	0.00	100.00	5	8	5	2.49	15.0	23.14159	0.013367	1.001385							
Wt Tare	1.53				1/2	10.57	0.00	0.00	100.00	15	8	5	2.49	15.0	13.3808	0.013367	1.001385							
Dry Soil	62.5				3/8	10.57	0.00	0.00	100.00	30	7	6	0.83	15.2	6.499034	0.013367	1.001385							
Moisture Content	0.00208				4	12.14	1.57	0.54	99.46	60	6	6	0.00	15.3	6.753085	0.013367	1.001385							
Air Dry Total Sample	289.3				10	18.94	6.37	2.21	97.79	250	6	6	0.00	15.3	3.308313	0.013367	1.001385							
Oven Dry Total Samg	288.7127271				20	30.91	13.97	11.60	13.80	86.20	1440	6	0.00	15.3	1.378464	0.013367	1.001385							
Air Dry Hydro Sample	118.05				40	100.12	83.18	69.05	71.28	28.74														
Oven Dry Wt Hydro	117.8049857				60	130.84	113.70	94.39	96.59	3.41														
Amount Plus #10	8.37				100	131.5	114.58	95.10	97.31	2.89														
W (14.2) =	120.4627909				200	131.54	114.60	95.13	97.34	2.68														

11000:884
 MW 929-11

Sample Number:	WB03SD	100.00	100.00	100.00	100.00	100.00	100.00	100.00	98.75	98.14	90.98	78.95	37.88	3.88	2.21	2.18	1.89	1.51	1.51	0.00	0.00	0.00	0.00
Test Temperature	21.5	5	3	2	1.5	1	3/4	1/2	3/8	4	2000	850	425	250	150	75	38.7	23.3	13.4	9.8	6.8	3.3	1.4
Specific Gravity	2.65																						
Sieve Analysis Portion											Hydrometer Analysis Portion												
					Sieve Size	Weight of Soil + Tare	Total Weight of Soil	Percent Retained	Percent Passing	Time	Hydro Reading	Comp Correct	Percent Finer	"L"	D	K	a						
					5	10.3	0.00	0.00	100.00														
					3	10.3	0.00	0.00	100.00														
					2	10.3	0.00	0.00	100.00														
Wet Wt & Tare	43.18				1.5	10.3	0.00	0.00	100.00	1	7.5	5	1.89	15.1	51.88745	0.013387	1.001385						
Dry Wt & Tare	43.1				1	10.3	0.00	0.00	100.00	2	7.5	5	1.89	15.1	36.88997	0.013387	1.001385						
Wt Moisture	0.08				3/4	10.3	0.00	0.00	100.00	5	7	5	1.51	15.2	23.26779	0.013387	1.001385						
Wt Tare	1.51				1/2	10.3	0.00	0.00	100.00	15	7	5	1.51	15.2	13.43366	0.013387	1.001385						
Dry Soil	41.58				3/8	13.84	3.64	1.25	88.75	30	8	8	0.00	15.3	8.550278	0.013387	1.001385						
Moisture Content	0.002183982				4	21.52	11.22	3.88	98.14	60	8	8	0.00	15.3	6.753065	0.013387	1.001385						
Air Dry Total Sample	291.17				10	36.57	28.27	9.04	90.98	250	8	8	0.00	15.3	3.308313	0.013387	1.001385						
Oven Dry Total Samg	290.597899				20	52.51	15.94	12.01	21.05	78.95	1440	8	0.00	15.3	1.378464	0.013387	1.001385						
Air Dry Hydro Sample	121				40	107.32	70.75	53.30	82.34	37.68													
Oven Dry Wt Hydro	120.7387236				80	152.16	115.59	87.08	98.12	3.88													
Amount Plus #10	28.27				100	154.37	117.80	88.75	97.79	2.21													
W (14.2) =	132.7382329				200	154.41	117.84	88.78	97.82	2.18													

TK83:00042

NW 9-29-11

Sample Number:	WC02SD	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	99.45	98.82	80.49	21.88	2.84	2.34	2.32	2.04	2.04	1.83	0.00	0.00	0.00	0.00
Test Temperature	21.5	5"	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	4	10	20	40	60	100	200							
Specific Gravity	2.85																						
Sieve Analysis Portion											Hydrometer Analysis Portion												
					Sieve Size	Weight of Soil + Tare	Total Weight of Soil	Percent Retained	Percent Passing	Time	Hydro Reading	Comp Correct	Percent Finer	"L"	D	K	a						
					5	9.94	0.00	0.00	100.00														
					3	9.94	0.00	0.00	100.00														
					2	9.94	0.00	0.00	100.00														
Wet Wt & Tare	55.8				1.5	9.94	0.00	0.00	100.00	1	8	5	2.45	15.0	51.74817	0.013387	1.001385						
Dry Wt & Tare	55.67				1	9.94	0.00	0.00	100.00	2	7.5	5	2.04	15.1	38.68997	0.013387	1.001385						
Wt Moisture	0.13				3/4	9.94	0.00	0.00	100.00	5	7.5	5	2.04	15.1	23.20477	0.013387	1.001385						
Wt Tare	1.51				1/2	9.94	0.00	0.00	100.00	15	7	5	1.83	15.2	13.43388	0.013387	1.001385						
Dry Soil	54.18				3/8	9.94	0.00	0.00	100.00	30	6	6	0.00	15.3	6.550278	0.013387	1.001385						
Moisture Content	0.002400295				4	11.45	1.51	0.55	99.45	60	6	6	0.00	15.3	6.753085	0.013387	1.001385						
Air Dry Total Sample	273.05				10	19.15	9.21	3.38	98.82	250	6	6	0.00	15.3	3.308313	0.013387	1.001385						
Oven Dry Total Samg	272.4182225				20	38.94	19.79	18.13	19.51	80.49	1440	6	0.00	15.3	1.378464	0.013387	1.001385						
Air Dry Hydro Sample	118.84				40	110.88	91.73	74.76	78.14	21.88													
Oven Dry Wt Hydro	118.5554319				60	134.47	115.32	93.88	97.38	2.84													
Amount Plus #10	9.21				100	134.83	115.68	94.28	97.66	2.34													
W (14.2) =	122.7038416				200	134.88	115.71	94.30	97.68	2.32													

TKS: 00044

MW 9-29-11

Sample Number:	BK02SD	100.00	100.00	100.00	100.00	100.00	100.00	100.00	99.38	97.25	88.17	55.43	24.45	15.40	12.94	11.30	10.64	9.12	8.38	6.08	4.58	2.28	0.78
		125000	75000	50000	37500	25000	18000	12500	9500	4750	2000	850	425	250	150	75	34.3	22.0	12.8	9.1	6.5	3.1	1.4
Test Temperature	21.5	5"	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	4	10	20	40	60	100	200							
Specific Gravity	2.85																						
Sieve Analysis Portion											Hydrometer Analysis Portion												
					Sieve Size	Weight of Soil + Tare	Total Weight of Soil	Percent Retained	Percent Passing	Time	Hydro Reading	Comp Correct	Percent Finer	"L"	D	K	a						
					5"	10.01	0.00	0.00	100.00														
					3"	10.01	0.00	0.00	100.00														
					2"	10.01	0.00	0.00	100.00														
Wet Wt & Tare	41.74				1.5"	10.01	0.00	0.00	100.00	1	20	5	11.40	13.0	48.23133	0.013387	1.001385						
Dry Wt & Tare	40.94				1"	10.01	0.00	0.00	100.00	2	19	5	10.84	13.2	34.31889	0.013387	1.001385						
Wt Moisture	0.8				3/4"	10.01	0.00	0.00	100.00	5	17	5	9.12	13.5	21.97322	0.013387	1.001385						
Wt Tare	1.51				1/2"	10.01	0.00	0.00	100.00	15	18	5	8.38	13.7	12.78298	0.013387	1.001385						
Dry Soil	39.43				3/8"	11.81	1.80	0.64	99.38	30	14	6	6.08	14.0	9.132293	0.013387	1.001385						
Moisture Content	0.02028912				4	18.88	6.87	2.75	97.25	60	12	8	4.58	14.3	6.53285	0.013387	1.001385						
Air Dry Total Sample	253.83				10	44.5	34.49	13.83	88.17	287	9	6	2.28	14.8	3.14945	0.013387	1.001385						
Oven Dry Total Sample	248.4682799				20	85.02	40.52	30.75	44.57	55.43	1440	8	0.78	15.0	1.383631	0.013387	1.001385						
Air Dry Hydro Sample	115.88				40	125.84	81.34	61.73	75.55	24.45													
Oven Dry Wt Hydro	113.5580477				60	137.78	93.28	70.77	84.80	15.40													
Amount Plus #10	34.49				100	141.01	98.51	73.24	87.08	12.84													
W (14.2) =	131.7743909				200	143.17	98.87	74.88	88.70	11.30													

TK83:00048

MW 9-29-11

Sample Number:	EB01SD	100.00	100.00	100.00	100.00	100.00	100.00	100.00	97.91	97.48	98.72	93.43	58.48	6.53	2.94	2.89	2.02	1.82	1.21	0.00	0.00	0.00	0.00
Test Temperature	21.5	5"	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	4	10	20	40	60	100	200							
Specific Gravity	2.85																						
Sieve Analysis Portion																							
					Sieve Size	Weight of Soil + Tare	Total Weight of Soil		Percent Retained	Percent Passing	Time	Hydro Reading	Comp Correct	Percent Finer	"L"	D	K	a					
					5"	10.58	0.00		0.00	100.00													
					3"	10.58	0.00		0.00	100.00													
					2"	10.58	0.00		0.00	100.00													
Wet Wt & Tare	48.41				1.5"	10.58	0.00		0.00	100.00	1	7.5	5	2.02	15.1	51.88745	0.013387	1.001385					
Dry Wt & Tare	48.29				1"	10.58	0.00		0.00	100.00	2	7.5	5	2.02	15.1	38.88997	0.013387	1.001385					
Wt Moisture	0.12				3/4"	10.58	0.00		0.00	100.00	5	7	5	1.82	15.2	23.26779	0.013387	1.001385					
Wt Tare	1.52				1/2"	10.58	0.00		0.00	100.00	15	6.5	5	1.21	15.2	13.46995	0.013387	1.001385					
Dry Soil	48.77				3/8"	19.31	8.73		2.09	97.91	38	6	6	0.00	15.3	8.485643	0.013387	1.001385					
Moisture Content	0.002565747				4	21.1	10.52		2.52	97.48	70	6	6	0.00	15.3	6.252123	0.013387	1.001385					
Air Dry Total Sample	418.34				10	24.25	13.67		3.28	98.72	259	6	6	0.00	15.3	3.250324	0.013387	1.001385					
Oven Dry Total Samg	417.3043762				20	28.33	4.08	3.30	6.57	93.43	1440	6	6	0.00	15.3	1.376464	0.013387	1.001385					
Air Dry Hydro Sample	120				40	71.57	47.32	38.24	41.52	58.48													
Oven Dry Wt Hydro	119.8928983				60	135.88	111.81	90.19	93.47	6.53													
Amount Plus #10	13.67				100	140.31	118.08	93.79	97.06	2.94													
W (14.2) =	123.7465716				200	140.37	116.12	93.84	97.11	2.89													

TK83: 50047

mmw 9-29-11

Sample Number:	100.00	100.00	100.00	100.00	100.00	100.00	96.80	93.75	89.85	86.00	88.82	34.20	3.12	1.75	1.74	1.45	1.45	1.09	0.00	0.00	0.00	0.00	
Test Temperature	21.5	5"	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	4	10	20	40	60	100	200							
Specific Gravity	2.85																						
Sieve Analysis Portion											Hydrometer Analysis Portion												
	Sieve Size	Weight of Soil + Tare	Total Weight of Soil	Percent Retained	Percent Passing	Time	Hydro Reading	Comp Correct	Percent Finer	"L"	D	K	a										
	5	9.95	0.00	0.00	100.00																		
	3	9.95	0.00	0.00	100.00																		
	2	9.95	0.00	0.00	100.00																		
Wet Wt & Tare	48.54	1.5	9.95	0.00	0.00	100.00	1	7	5	1.45	15.2	52.02835	0.013387	1.001385									
Dry Wt & Tare	48.41	1	9.95	0.00	0.00	100.00	2	7	5	1.45	15.2	38.7898	0.013387	1.001385									
Wt Moisture	0.13	3/4	9.95	0.00	0.00	100.00	5	7	5	1.45	15.2	23.26778	0.013387	1.001385									
Wt Tare	1.52	1/2	23.42	13.47	3.20	96.80	15	6.5	5	1.09	15.2	13.46895	0.013387	1.001385									
Dry Soil	48.89	3/8	38.28	26.33	6.25	93.75	30	6	6	0.00	15.3	9.550276	0.013387	1.001385									
Moisture Content	0.002772448	4	52.73	42.78	10.15	89.85	80	6	6	0.00	15.3	6.753065	0.013387	1.001385									
Air Dry Total Sample	422.58	10	68.95	59.00	14.00	86.00	250	6	6	0.00	15.3	3.308313	0.013387	1.001385									
Oven Dry Total Samp	421.5548382	20	92.88	23.93	17.38	31.38	66.82	1440	6	0.00	15.3	1.378464	0.013387	1.001385									
Air Dry Hydro Sample	118.72	40	140.26	71.31	51.80	65.80	34.20																
Oven Dry Wt Hydro	118.3817852	60	183.04	114.09	82.88	98.88	3.12																
Amount Plus #10	59.00	100	184.93	115.88	84.25	98.25	1.75																
W (14.2) =	137.6581311	200	184.95	116.00	84.27	98.28	1.74																

TK83: 02048

11-02-09 MW

Sample Number:	EB03SD	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	98.40	55.52	4.00	2.52	2.50	1.89	1.89	1.27	0.00	0.00	0.00	0.00		
		125000	75000	50000	37500	25000	18000	12500	9500	4750	2000	850	425	250	150	75	36.8	23.3	13.5	9.8	6.8	3.3	1.4	
Test Temperature	21.5 5"	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	4	10	20	40	80	100	200									
Specific Gravity	2.65																							
		Sieve Analysis Portion										Hydrometer Analysis Portion												
		Sieve	Weight of	Total	Percent	Percent	Time	Hydro	Comp	Percent	L	D	K	a										
		5"	10.45	0.00	0.00	100.00																		
		3"	10.45	0.00	0.00	100.00																		
		2"	10.45	0.00	0.00	100.00																		
Wet Wt & Tare	44.81	1.5"	10.45	0.00	0.00	100.00	1	7.5	5	2.11	15.1	51.88745	0.013367	1.001385										
Dry Wt & Tare	44.71	1	10.45	0.00	0.00	100.00	2	7	5	1.89	15.2	36.7898	0.013367	1.001385										
Wt Moisture	0.1	3/4	10.45	0.00	0.00	100.00	5	7	5	1.89	15.2	23.26779	0.013367	1.001385										
Wt Tare	1.55	1/2	10.45	0.00	0.00	100.00	15	8.5	5	1.27	15.2	13.48895	0.013367	1.001385										
Dry Soil	43.16	3/8	10.45	0.00	0.00	100.00	30	8	8	0.00	15.3	9.550276	0.013367	1.001385										
Moisture Content	0.00231886	4	10.45	0.00	0.00	100.00	60	8	8	0.00	15.3	6.753065	0.013367	1.001385										
Air Dry Total Sample	214.02	10	10.45	0.00	0.00	100.00	250	8	8	0.00	15.3	3.308313	0.013367	1.001385										
Oven Dry Total Sample	213.5252705	20	12.35	1.90	1.80	98.40	1440	8	8	0.00	15.3	1.378484	0.013367	1.001385										
Air Dry Hydro Sample	119	40	63.26	52.81	44.48	55.52																		
Oven Dry Wt Hydro	118.7249191	80	124.42	113.97	98.00	98.00	4.00																	
Amount Plus #10	0.00	100	128.18	115.73	97.48	97.48	2.52																	
W (14.2) =	118.7249191	200	128.21	115.76	97.50	97.50	2.50																	

TK88:00045

NW 929-11

Sample Number: EC01SD 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 100.00 93.37 71.26 64.79 62.00 59.86 57.32 54.85 49.87 34.91 24.93 17.45 9.97 0.00
 Test Temperature 21.5 5' 125000 75000 50000 37500 25000 19000 12500 9500 4750 2000 850 425 250 150 75 35.0 22.2 13.1 9.3 6.6 3.3 1.4
 Specific Gravity 2.85 3' 2' 1.5' 1' 3/4' 1/2' 3/8' 4 10 20 40 80 100 200

Wet Wt & Tare	3.54
Dry Wt & Tare	3.32
Wt Moisture	0.22
Wt Tare	1.51
Dry Soil	1.81
Moisture Content	0.121548981
Air Dry Total Sample	23.52
Oven Dry Total Samp	21.12275882
Air Dry Hydro Sample	21.03
Oven Dry Wt Hydro	18.7508867
Amount Plus #10	1.40
W (14.2) =	20.08189936

Sieve Analysis Portion					Time	Hydro Reading	Comp Correct	Percent Finer	*L*	D	K	a
Sieve Size	Weight of Soil + Tare	Total Weight of Soil	Percent Retained	Percent Passing								
5	10.04	0.00	0.00	100.00								
3	10.04	0.00	0.00	100.00								
2	10.04	0.00	0.00	100.00								
1.5	10.04	0.00	0.00	100.00	1	17.5	5	62.33	13.4	48.98439	0.013367	1.001385
1	10.04	0.00	0.00	100.00	2	16	5	54.85	13.7	34.8528	0.013367	1.001385
3/4	10.04	0.00	0.00	100.00	5	15	5	49.87	13.8	22.23818	0.013367	1.001385
1/2	10.04	0.00	0.00	100.00	15	12	5	34.91	14.3	13.0853	0.013367	1.001385
3/8	10.04	0.00	0.00	100.00	30	11	6	24.93	14.5	9.29124	0.013367	1.001385
4	10.04	0.00	0.00	100.00	60	9.5	6	17.45	14.7	6.625361	0.013367	1.001385
10	11.44	1.40	6.63	93.37	250	8	6	9.97	15.0	3.272715	0.013367	1.001385
20	15.88	4.44	22.11	28.74	1440	7	7	0.00	15.2	1.371067	0.013367	1.001385
40	17.18	5.74	28.58	35.21								
60	17.74	6.30	31.37	38.00								
100	18.17	6.73	33.51	40.14								
200	18.68	7.24	36.05	42.68								

TK03:00050

MMW 9-29-11



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Global Environmental Specialists

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MEMORANDUM

DATE: January 23, 2012

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington *MW*

TO: Linda Costello, START-3 Project Manager, Seattle, Washington

SUBJ: **Organic Data Summary Check,
Makah Reservation Warmhouse Beach Dump Site,
Makah Reservation, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data summary check of 7 tissue, 1 water, and 8 sediment/soil samples collected from the Makah Reservation Warmhouse Beach Dump site located in the Makah Reservation, Washington, has been completed. Analyses for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (EPA CLP SOW DLM02.2) were performed by Cape Fear Analytical, Wilmington, North Carolina.

The samples were numbered:

JE872	JE873	JE874	JE875	JE876	JE877	JE895
JE896	JE878	JE879	JE880	JE884	JE885	JE886
JE890	JE893					

No discrepancies were noted.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

January 23, 2012

Reply to: OEA-095
Attn of: tritt.maja@epa.gov

MEMORANDUM

Subject: Data Validation Report for Polychlorinated Dibenzo-*p*-Dioxin and Polychlorinated Dibenzofuran (PCDD/PCDF) Analyses of Soil, Sediment, Tissue, and Water Samples Collected for the Warmhouse Beach Dump Site Inspection

Case Number: 41693
Sample Delivery Groups: JE872, JE878

From: Maja Tritt, CLP Project Officer 
Office of Environmental Assessment, USEPA Region 10

To: Brandon Perkins, Site Assessment Manager
Office of Environmental Cleanup, USEPA Region 10

cc: Ginna Grepo-Grove, EPA R10 Regional QA Manager
Linda Costello, Ecology and Environment
Renee Nordeen, Ecology and Environment

This technical memorandum summarizes results of the quality assurance (QA) review of the laboratory data for 7 tissue samples, 1 water sample, and 8 sediment and soil samples collected from the above-referenced site. The samples were analyzed for PCDDs/PCDFs in accordance with *Statement of Work for Analysis of Chlorinated Dibenzo-*p*-dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs), Multi-Media, Multi Concentration (DLM02.2, December 2009)* by Cape Fear Analytical, located in Wilmington, NC.

The following samples were evaluated and are addressed in this data validation report:

SDG	Lab Sample ID	EPA Sample ID
JE872	2793001	JE872
	2793002	JE873
	2793003	JE874
	2793004	JE875
	2793005	JE876
	2793006	JE877
	2793007	JE895
	2793008	JE896

SDG	Lab Sample ID	EPA Sample ID
JE878	2730001	JE878
	2730002	JE879
	2730003	JE880
	2730004	JE884
	2730005	JE885
	2730006	JE886
	2730007	JE890
	2730008	JE893

DATA QUALIFICATIONS

The data were validated using procedures, technical acceptance criteria, and quality control specifications provided in the Contract Laboratory Program (CLP) Statement of Work DLM02.2, the CLP *National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review* (OSWER 9240.1-53, EPA-540-R-11-016; September 2011), and EPA's *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA-540-R08-005, January 2009). All sample analyses were evaluated to EPA's Stage 4 electronic/manual data validation process (S4VEM) as described in EPA (2009). In some cases, data quality elements were evaluated and data qualifiers were applied using the reviewer's professional judgment.

The conclusions presented herein are based on the information provided for review.

Summary of Validation Qualifiers Applied:

PCDD/PCDF values were qualified for the following reasons:

- The target compound was detected at a concentration that was less than the contract-required quantitation limit (CRQL). The results was qualified estimated, JQ.
- A peak was present with a signal-to-noise ratio >2.5 and within the established retention time window. However, the mass ion ratio criteria were not met and the value was flagged K by the laboratory to indicate an estimated maximum possible concentrations (EMPC). The result was qualified as a non-detect (U) at the reported concentration due to chromatographic interferences. Results for total homologs were qualified J when an EMPC value contributed to the total.
- The target compound was detected in both the sample and an associated laboratory blank. Sample results less than 5 times the concentration in the blank were qualified non-detects (U) at the reported concentration. Results greater than 5 times the blank were not qualified.

Overall Data Assessment

Samples were analyzed following the technical specifications of the analytical methods. The data, as qualified, are usable for all purposes.

Reason Codes for Validation Qualifiers

Data qualifier codes were added to the electronic data deliverable (EDD) during data validation to provide information about the reasons for qualification. The reason codes are included under the column header "Reasons". The following table provides definitions for the data qualification reason codes.

Data Qualifier Reason Codes and Definitions	
<CRQL	The value reported is <Contract Required Quantitation Limits (CRQLs)
CAL	Initial calibration criteria not met
CCV	Continuing calibration criteria not met
CLN-UP	Extract clean-up criteria not met
COELN	Initial identification erroneous due to co-elution with other detected target analytes
DPE	Polychlorinated diphenyl ether interferences present. Result is biased high (J qualifier applied) or represents a false positive (qualified as non-detect and reporting limit elevated to level of detection).
EMPC	Results reported are estimated maximum potential concentrations (EMPCs). Mass ion-ratios were not met due to interferences. Result is false positive and qualified as non-detect reported at the level of detection
EMPC<EDL	Estimated maximum potential concentration (EMPC) reported at concentration below the estimated detection limit (EDL). Result is qualified as non-detect at the EDL.
EXC	Result exceeds upper calibration range
HT	Holding time criteria not met
INT	Chromatographic interference
IS	Internal Standard recovery criteria not met
LCS	LCS/LCSD criteria not met
MB	Analyte was qualified as non-detect due to contamination in the associated blank. The value reported is <5x or <10x (if common lab contaminant) the value in the blank.
ND	The analyte was not detected in the sample, and is reported at the CRQL with the 'U' Qualifier.
OPR	On-going precision recovery check not met.
RESCHK	Instrument mass resolution and resolving power not met
RTs	Retention time criteria not met
SAT	Detector was saturated by high analyte response; result biased low and may be significantly underreported.
STORE	Sample Storage and preservation specified not met
TEMP	Cooler recommended temperature exceeded at the verified time of sample receipt at the lab (VTSR)
USE CONF	Use results from the confirmation run for 2,3,7,8-TCDF
USE DIL	Use results from the dilution run
USE R1	Use the results from the original full strength run

Data Qualifiers

The following is a list of validation and bias qualifiers applied to the sample result(s) when needed to indicate an associated out-of-control QA/QC results.

Validation Qualifiers	
U	The analyte was not detected at or above the reported result.
J	The analyte was positively identified. The associated numerical result is an estimate.
UJ	The analyte was not detected at or above the reported estimated result. The associated numerical value represents the estimated detection limit (EDL) or quantitation limit of the analyte in this sample.
R	The data are unusable for all purposes.
NJ	There is evidence that the analyte is present. The associated numerical result is an estimate.
Bias Qualifiers	
L	Low bias.
H	High bias.
Q	The result is estimated because the concentration is below the Contract Required Quantitation Limit (CRQL); unknown bias.
K	Unknown Bias.

II. DATA REVIEW CHECKLIST

The analytical data were evaluated following the recommended baseline checks used in the four stages of laboratory analytical data verification and validation for Superfund use listed as follows (EPA-540-R08-005, 2009):

Stage 1 – Data Validation					
Stage 1 validation of the laboratory analytical data package consists of verification and validation checks for the compliance of sample receipt conditions, sample characteristics (e.g., percent moisture), and analytical results (with associated information).					
	VERIFIED		QUAL		Calibration Procedure or Check
	YES	NO	YES	NO	
1	✓			✓	Documentation identifies the laboratory receiving and conducting analyses, and includes documentation for all samples submitted by the project or requester for analyses.
2	✓			✓	Requested analytical methods were performed and the analysis dates are present.
3	✓			✓	Requested target analyte results are reported along with the original laboratory data qualifiers and data qualifier definitions for each reported result.
4	✓			✓	Requested target analyte result units are reported.
5	✓			✓	Requested reporting limits for all samples are present and results at and below the requested (required) reporting limits are clearly identified (including sample detection limits if required).
6	✓			✓	Sampling dates (including times if needed), date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH and temperature) are documented.
7	✓			✓	Sample results are evaluated by comparing sample conditions upon receipt at the laboratory (e.g., preservation checks) and sample characteristics (e.g., percent moisture) to the requirements and guidelines present in national or regional data validation documents, analytical method(s) or contract.
Stage 2A – Data Validation					
Stage 2A validation of the laboratory analytical data package consists of the Stage 1 validation plus the verification and validation checks for the compliance of sample-related QC.					
	VERIFIED		QUAL		Calibration Procedure or Check
	YES	NO	YES	NO	
8	✓			✓	Requested methods (handling, preparation, cleanup, and analytical) are performed.
9	✓			✓	Method dates (including dates, times and duration of analysis for radiation counting measurements and other methods, if needed) for handling (e.g., Toxicity Characteristic Leaching Procedure), preparation, cleanup and analysis are present, as appropriate.
10	✓			✓	Requested spike analytes or compounds (e.g., surrogate, DMCs, LCS spikes, post digestion spikes) have been added, as appropriate.
11	✓			✓	Sample holding times (from sampling date to preparation and preparation to analysis) are evaluated.
12	✓			✓	Frequency of QC samples is checked for appropriateness (e.g., one LCS per twenty samples in a preparation batch).
13	✓			✓	Sample results are evaluated by comparing holding times and sample-related QC data to the requirements and guidelines present in national or regional data validation documents, analytical method(s) or contract.

Stage 2A – Data Validation QC Data					
14	✓		✓	Method blanks	
15	✓		✓	Internal Standard (IS) recoveries/clean-up recoveries	
16	✓		✓	Laboratory control sample (LCS)/Laboratory control sample duplicate (LCSD) recoveries	
17		✓		Matrix spike and matrix spike duplicate recoveries	
18		✓		Serial dilutions	
19		✓		Post digestion spikes	
20		✓		Standard reference materials	
21		✓		Equipment blanks	
22		✓		Trip blanks	
Stage 2B – Data Validation					
Stage 2B validation of the laboratory analytical data package consists of the Stage 2A validation plus the verification and validation checks for the compliance of instrument-related QC.					
	VERIFIED		QUAL		Calibration Procedure or Check
	YES	NO	YES	NO	
23	✓			✓	Initial calibration data (e.g., ICAL standards, ICV standards, ICBs) are provided for all requested analytes and linked to field samples reported. For each initial calibration, the calibration type used is present along with the initial calibration equation used including any weighting factor(s) applied and the associated correlation coefficients, as appropriate. Recalculations of the standard concentrations using the initial calibration curve are present, along with their associated percent recoveries, as appropriate (e.g., if required by the project, method, or contract). For the ICV standard, the associated percent recovery (or percent difference, as appropriate) is present.
24	✓			✓	Appropriate number and concentration of initial calibration standards are present.
25	✓			✓	Continuing calibration data (e.g. CCV standards and CCBs) are provided for all requested analytes and linked to field samples reported, as appropriate. For the CCV standard(s), the associated percent recoveries (or percent differences, as appropriate) are present.
26	✓			✓	Reported samples are bracketed by CCV standards and CCBs standards as appropriate.
27	✓			✓	Method specific instrument performance checks are present as appropriate (e.g., tunes for mass spectrometry methods, DDT/Endrin breakdown checks for pesticides and aroclors, instrument blanks and interference checks for ICP methods).
28	✓			✓	Frequency of instrument QC samples is checked for appropriateness (e.g., gas chromatography-mass spectroscopy [GC-MS] tunes/mass resolutions, window defining mix, %valley have been run every 12 hours).

Stage 3 – Data Validation					
Stage 3 validation of the laboratory analytical data package consists of the Stage 2B validation plus the recalculation of instrument and sample results from the laboratory instrument responses, and comparison of recalculated results to laboratory reported results.					
	VERIFIED		QUAL		QC Procedure or Check
	YES	NO	YES	NO	
29	✓			✓	Instrument response data (e.g., GC peak areas, ICP corrected intensities) are reported for requested analytes, surrogates, internal standards, and DMCs for all requested field samples, matrix spikes, matrix spike duplicates, LCS, and method blanks as well as calibration data and instrument QC checks (e.g., tunes, RT windows, resolutions, resolving power, and Florisil, alumina column checks).
30	✓			✓	Reported target analyte instrument responses are associated with appropriate internal standard analyte(s) for each (or selected) analyte(s) (for methods using internal standard for calibration).
31	✓			✓	Fit and appropriateness of the initial calibration curve used or required (e.g., mean calibration factor, regression analysis [linear or non-linear, with or without weighting factors, with or without forcing]) is checked with recalculation of the initial calibration curve for each (or selected) analyte(s) from the instrument response.
32	CCVs			✓	Comparison of instrument response to the minimum response requirements for each (or selected) analyte(s).
33	Algorithm checked			✓	Recalculation of each (or selected) opening and closing CCV (and CCB) response from the peak data reported for each (or selected) analyte(s) from the instrument response, as appropriate.
34	Algorithm checked			✓	Compliance check of recalculated opening and/or closing CCV (and CCB) response to recalculated initial calibration response for each (or selected) analyte(s).
35	Algorithm checked			✓	Recalculation of percent ratios for each (or selected) detected compound from the instrument response, as appropriate.
36	Algorithm checked			✓	Compliance check of recalculated percent ratio for each (or selected) detected target compound from the instrument response.
37	NA				Recalculation of each (or selected) instrument performance check (e.g., DDT/Endrin breakdown for pesticide analysis, instrument blanks, interference checks) from the instrument response.
38	Algorithm checked			✓	Recalculation and compliance check of retention time windows (for chromatographic methods) for each (or selected) analyte(s) from the laboratory reported retention times.
39	Algorithm checked			✓	Recalculation of reported results for each reported (or selected) target analyte(s) from the instrument response.
40	Algorithm checked			✓	Recalculation of each (or selected) reported spike recovery (surrogate recoveries, DMC recoveries, LCS recoveries, duplicate analyses, matrix spike and matrix spike duplicate recoveries, serial dilutions, post digestion spikes, standard reference materials etc.) from the instrument response.
41	Algorithm checked; add'l spot checks			✓	Each (or selected) sample result(s) and spike recovery(ies) are evaluated by comparing the recalculated numbers to the laboratory reported numbers according to the requirements and guidelines present in national or regional data validation documents, analytical method(s) or contract.

Note: Selection of analytes, spikes, and performance evaluation checks for the Stage 3 validation checks for a laboratory analytical data package being verified and validated generally will depend on many factors including (but not limited to) the type of verification and validation being performed (manual or electronic), requirements and guidelines present in national or regional data validation documents, analytical method(s) or contract, the number of laboratories reporting the data, the number and type of analytical methods reported, the number of analytes reported in each method, and the number of detected analytes. For this data package, a sample/analyte or standard/analyte combination was randomly selected for recalculation to verify lab's computer algorithm.

Stage 4 – Data Validation

Stage 4 validation of the laboratory analytical data package consists of the Stage 3 validation plus the evaluation of instrument outputs.

	VERIFIED		QUAL		QC Procedure or Check
	YES	NO	YES	NO	
42	✓			✓	All required instrument outputs (e.g., chromatograms, mass spectra, atomic emission spectra, instrument background corrections, and interference corrections) for evaluating sample and instrument performance are present.
43	✓		✓		Sample results are evaluated by checking each (or selected) instrument output (e.g., chromatograms, mass spectra, atomic emission spectra data, instrument background corrections, interference corrections) for correct identification and quantitation of analytes (e.g., peak integrations, use of appropriate internal standards for quantitation, elution order of analytes, and interferences).
44	Samples		✓		Each (or selected) instrument's output(s) is evaluated for confirmation of non-detected or tentatively identified analytes.

**IDFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution**

EPA Sample No.
JE872

Lab Name: Cape Fear Analytical, LLC (CFA)
Lab Code: NC001894 Case No. 41693

Contract: EP10W001070
TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793001

Sample wt/vol: 10.65 g

Lab File ID: A17OCT11B-5

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-SMS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units ng/kg

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322	31.6	.85	0.141	JG	
1,2,3,7,8-PeCDD	356/358				U	0.123
1,2,3,4,7,8-HxCDD	390/392				U	0.165
1,2,3,6,7,8-HxCDD	390/392				U	0.160
1,2,3,7,8,9-HxCDD	390/392				U	0.172
1,2,3,4,6,7,8-HpCDD	424/426				U	0.197
1,2,3,4,6,7,8,9-OCDD	458/460	44.84	.95	0.757	YU	
2,3,7,8-TCDF	304/306	31.01	.77	0.222	YU	
1,2,3,7,8-PeCDF	340/342				U	0.146
2,3,4,7,8-PeCDF	340/342				U	0.129
1,2,3,4,7,8-HxCDF	374/376				U	0.0851
1,2,3,6,7,8-HxCDF	374/376				U	0.0845
1,2,3,7,8,9-HxCDF	374/376				U	0.120
2,3,4,6,7,8-HxCDF	374/376				U	0.0845
1,2,3,4,6,7,8-HpCDF	408/410				U	0.090
1,2,3,4,7,8,9-HpCDF	408/410				U	0.153
1,2,3,4,6,7,8,9-OCDF	442/444				U	0.347

LC RQL
MB
MB

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	31.58	.82	0.65-0.89	80.7	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	34.36	1.62	1.32-1.78	106	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	37	1.28	1.05-1.43	68.0	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	37.09	1.26	1.05-1.43	76.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	40.45	1.03	0.88-1.20	74.5	(23%-140%)
13C-OCDD	470/472	44.78	.89	0.76-1.02	66.2	(17%-157%)
13C-2,3,7,8-TCDF	316/318	31	.81	0.65-0.89	86.6	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	33.55	1.52	1.32-1.78	96.7	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	34.18	1.57	1.32-1.78	107	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	36.27	.52	0.43-0.59	69.0	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	36.37	.53	0.43-0.59	69.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	36.87	.53	0.43-0.59	73.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	37.67	.51	0.43-0.59	76.6	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	39.17	.44	0.37-0.51	73.1	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	41.16	.43	0.37-0.51	74.8	(26%-138%)
13C1-2,3,7,8-TCDD	328/NA	31.59	NA	NA	87.8	(35%-197%)

* Column to be used to flag values outside QC limits.

MT

**1DFB - Form I-HR CDD-2
CDD/CDF Toxicity Equivalence Summary
High Resolution**

EPA Sample No.
JE872

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793001

Sample wt/vol: 10.65 g

Lab File ID: A17OCT11B-5

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Concentration	TEF*	TEF-Adjusted Concentration
2,3,7,8-TCDD	.141	x 1 =	.141
1,2,3,7,8-PeCDD	0	x 1 =	0
1,2,3,4,7,8-HxCDD	0	x 0.1 =	0
1,2,3,6,7,8-HxCDD	0	x 0.1 =	0
1,2,3,7,8,9-HxCDD	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDD	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDD	257 0	x 0.0003 =	.000277 0
2,3,7,8-TCDF	222 0	x 0.1 =	.0222 0
1,2,3,7,8-PeCDF	0	x 0.03 =	0
2,3,4,7,8-PeCDF	0	x 0.3 =	0
1,2,3,4,7,8-HxCDF	0	x 0.1 =	0
1,2,3,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,7,8,9-HxCDF	0	x 0.1 =	0
2,3,4,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDF	0	x 0.01 =	0
1,2,3,4,7,8,9-HpCDF	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDF	0	x 0.0003 =	0
		Total =	.1634277 0.141 JQ

* TEF - Toxicity Equivalent Factors from the World Health Organization (WHO), 2005.

NOT 1/13/12

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
 JE872

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793001

Sample wt/vol: 10.65 g

Lab File ID: A17OCT11B-5

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	0.141	1	.141	1	.141	1	.141
1,2,3,7,8-PeCDD	.123	1	.123	1	.123	1	.123
1,2,3,4,7,8-HxCDD	.165	0.1	.0165	0.5	.0825	0.05	.00825
1,2,3,6,7,8-HxCDD	.16	0.1	.016	0.01	.0016	0.01	.0016
1,2,3,7,8,9-HxCDD	.172	0.1	.0172	0.01	.00172	0.1	.0172
1,2,3,4,6,7,8-HpCDD	.197	0.01	.00197	0.001	.000197	0.001	.000197
1,2,3,4,6,7,8,9-OCDD	0.757	0.0003	.0002271	0.0001	.0000757	0.0001	.0000757
2,3,7,8-TCDF	0.222	0.1	.0222	0.05	.0111	1	.222
1,2,3,7,8-PeCDF	.146	0.03	.00438	0.05	.0073	0.1	.0146
2,3,4,7,8-PeCDF	.129	0.3	.0387	0.5	.0645	1	.129
1,2,3,4,7,8-HxCDF	.0851	0.1	.00851	0.1	.00851	0.1	.00851
1,2,3,6,7,8-HxCDF	.0845	0.1	.00845	0.1	.00845	0.1	.00845
1,2,3,7,8,9-HxCDF	.12	0.1	.012	0.1	.012	0.1	.012
2,3,4,6,7,8-HxCDF	.0845	0.1	.00845	0.1	.00845	0.1	.00845
1,2,3,4,6,7,8-HpCDF	.09	0.01	.0009	0.01	.0009	0.01	.0009
1,2,3,4,7,8,9-HpCDF	.153	0.01	.00153	0.01	.00153	0.01	.00153
1,2,3,4,6,7,8,9-OCDF	.347	0.0003	.0001041	0.0001	.0000347	0.0001	.0000347
		Total =	.4211212	Total =	.4728674	Total =	.6967974

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

NT

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE872

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793001

Sample wt/vol: 10.65 g

Lab File ID: A17OCT11B-5

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	2		JH	0.267
Total PeCDD	0		U	.123
Total HxCDD	0		U	.16
Total HpCDD	0		U	.197
Total TeCDF	1	0.222	YH	
Total PeCDF	0		U	.129
Total HxCDF	0		U	.0845
Total HpCDF	0		U	.09

MS

LOT

1DFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution

EPA Sample No.

JE873

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No. 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793002

Sample wt/vol: 10.14 g

Lab File ID: A17OCT11B-6

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units ng/kg

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	0.145
1,2,3,7,8-PeCDD	356/358				U	0.141
1,2,3,4,7,8-HxCDD	390/392				U	0.168
1,2,3,6,7,8-HxCDD	390/392				U	0.169
1,2,3,7,8,9-HxCDD	390/392				U	0.179
1,2,3,4,6,7,8-HpCDD	424/426				U	0.213
1,2,3,4,6,7,8,9-OCDD	458/460	44.78	.88	1.13	U <i>W</i>	
2,3,7,8-TCDF	304/306	31.04	.88	0.276	U <i>W</i>	
1,2,3,7,8-PeCDF	340/342				U	0.126
2,3,4,7,8-PeCDF	340/342				U	0.110
1,2,3,4,7,8-HxCDF	374/376				U	0.089
1,2,3,6,7,8-HxCDF	374/376				U	0.0901
1,2,3,7,8,9-HxCDF	374/376				U	0.135
2,3,4,6,7,8-HxCDF	374/376				U	0.0897
1,2,3,4,6,7,8-HpCDF	408/410				U	0.109
1,2,3,4,7,8,9-HpCDF	408/410				U	0.173
1,2,3,4,6,7,8,9-OCDF	442/444				U	0.335

MB
MB

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	31.58	.77	0.65-0.89	71.3	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	34.35	1.6	1.32-1.78	101	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	36.99	1.25	1.05-1.43	72.1	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	37.08	1.17	1.05-1.43	78.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	40.44	1.05	0.88-1.20	82.5	(23%-140%)
13C-OCDD	470/472	44.78	.91	0.76-1.02	74.0	(17%-157%)
13C-2,3,7,8-TCDF	316/318	31	.79	0.65-0.89	79.0	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	33.55	1.52	1.32-1.78	90.9	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	34.17	1.56	1.32-1.78	103	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	36.26	.5	0.43-0.59	73.2	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	36.36	.5	0.43-0.59	75.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	36.86	.52	0.43-0.59	81.5	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	37.66	.54	0.43-0.59	82.1	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	39.15	.46	0.37-0.51	78.0	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	41.14	.42	0.37-0.51	81.0	(26%-138%)
37Cl-2,3,7,8-TCDD	328/NA	31.59	NA	NA	76.5	(35%-197%)

Column to be used to flag values outside QC limits.

MT

**1DFB - Form I-HR CDD-2
CDD/CDF Toxicity Equivalence Summary
High Resolution**

EPA Sample No.
JE873

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793002

Sample wt/vol: 10.14 g

Lab File ID: A17OCT11B-6

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Concentration	TEF*	TEF-Adjusted Concentration
2,3,7,8-TCDD	0	x 1 =	0
1,2,3,7,8-PeCDD	0	x 1 =	0
1,2,3,4,7,8-HxCDD	0	x 0.1 =	0
1,2,3,6,7,8-HxCDD	0	x 0.1 =	0
1,2,3,7,8,9-HxCDD	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDD	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDD	<u>1130</u>	x 0.0003 =	<u>000339</u> 0
2,3,7,8-TCDF	<u>2760</u>	x 0.1 =	<u>0276</u> 0
1,2,3,7,8-PeCDF	0	x 0.03 =	0
2,3,4,7,8-PeCDF	0	x 0.3 =	0
1,2,3,4,7,8-HxCDF	0	x 0.1 =	0
1,2,3,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,7,8,9-HxCDF	0	x 0.1 =	0
2,3,4,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDF	0	x 0.01 =	0
1,2,3,4,7,8,9-HpCDF	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDF	0	x 0.0003 =	0
		Total =	<u>027939</u> 0

* TEF - Toxicity Equivalent Factors from the World Health Organization (WHO), 2005.

MT 1/13/12

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
 JE873

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793002

Sample wt/vol: 10.14 g

Lab File ID: A17OCT11B-6

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-SMS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.145	1	.145	1	.145	1	.145
1,2,3,7,8-PeCDD	.141	1	.141	1	.141	1	.141
1,2,3,4,7,8-HxCDD	.168	0.1	.0168	0.5	.084	0.05	.0084
1,2,3,6,7,8-HxCDD	.169	0.1	.0169	0.01	.00169	0.01	.00169
1,2,3,7,8,9-HxCDD	.179	0.1	.0179	0.01	.00179	0.1	.0179
1,2,3,4,6,7,8-HpCDD	.213	0.01	.00213	0.001	.000213	0.001	.000213
1,2,3,4,6,7,8,9-OCDD	1.13	0.0003	.000339	0.0001	.000113	0.0001	.000113
2,3,7,8-TCDF	0.276	0.1	.0276	0.05	.0138	1	.276
1,2,3,7,8-PeCDF	.126	0.03	.00378	0.05	.0063	0.1	.0126
2,3,4,7,8-PeCDF	.11	0.3	.033	0.5	.055	1	.11
1,2,3,4,7,8-HxCDF	.089	0.1	.0089	0.1	.0089	0.1	.0089
1,2,3,6,7,8-HxCDF	.0901	0.1	.00901	0.1	.00901	0.1	.00901
1,2,3,7,8,9-HxCDF	.135	0.1	.0135	0.1	.0135	0.1	.0135
2,3,4,6,7,8-HxCDF	.0897	0.1	.00897	0.1	.00897	0.1	.00897
1,2,3,4,6,7,8-HpCDF	.109	0.01	.00109	0.01	.00109	0.01	.00109
1,2,3,4,7,8,9-HpCDF	.173	0.01	.00173	0.01	.00173	0.01	.00173
1,2,3,4,6,7,8,9-OCDF	.335	0.0003	.0001005	0.0001	.0000335	0.0001	.0000335
		Total =	.4477495	Total =	.4921395	Total =	.7561495

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

MT

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE873

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793002

Sample wt/vol: 10.14 g

Lab File ID: A17OCT11B-6

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	1	0.444	JR	
Total PeCDD	0		U	.141
Total HxCDD	0		U	.168
Total HpCDD	0		U	.213
Total TeCDF	1	0.276	JR	
Total PeCDF	0		U	.11
Total HxCDF	0		U	.089
Total HpCDF	0		U	.109

MB

MT

**IDFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution**

EPA Sample No.
JE874

Lab Name: Cape Fear Analytical, LLC (CFA)
Lab Code: NC001894 Case No. 41693

Contract: EP10W001070
TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE
Sample wt/vol: 10.17 g
Water Sample Prep: N/A
Concentrated Extract Volume: 20 uL
Injection Volume: 1 uL % Solids/Lipids: N/A
GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um
Concentration Units: ng/kg

Lab Sample ID: 2793003
Lab File ID: A17OCT11B-7
Date Received: 22-SEP-11
Date Extracted: 13-OCT-11
Date Analyzed: 17-OCT-11
Dilution Factor: 1

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	0.113
1,2,3,7,8-PeCDD	356/358				U	0.145
1,2,3,4,7,8-HxCDD	390/392				U	0.224
1,2,3,6,7,8-HxCDD	390/392				U	0.226
1,2,3,7,8,9-HxCDD	390/392				U	0.238
1,2,3,4,6,7,8-HpCDD	424/426				U	0.256
1,2,3,4,6,7,8,9-OCDD	458/460	44.77	.99	0.907	✓ U	
2,3,7,8-TCDF	304/306	31	.81	0.252	✓ U	
1,2,3,7,8-PeCDF	340/342				U	0.124
2,3,4,7,8-PeCDF	340/342				U	0.119
1,2,3,4,7,8-HxCDF	374/376				U	0.0981
1,2,3,6,7,8-HxCDF	374/376				U	0.0989
1,2,3,7,8,9-HxCDF	374/376				U	0.149
2,3,4,6,7,8-HxCDF	374/376				U	0.0999
1,2,3,4,6,7,8-HpCDF	408/410				U	0.111
1,2,3,4,7,8,9-HpCDF	408/410				U	0.190
1,2,3,4,6,7,8,9-OCDF	442/444				U	0.356

MB
MB

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	31.58	.75	0.65-0.89	81.0	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	34.36	1.61	1.32-1.78	97.5	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	36.99	1.28	1.05-1.43	70.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	37.08	1.26	1.05-1.43	72.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	40.44	1.08	0.88-1.20	75.5	(23%-140%)
13C-OCDD	470/472	44.77	.91	0.76-1.02	61.6	(17%-157%)
13C-2,3,7,8-TCDF	316/318	31	.79	0.65-0.89	84.7	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	33.55	1.58	1.32-1.78	94.1	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	34.17	1.6	1.32-1.78	98.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	36.27	.52	0.43-0.59	71.9	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	36.37	.53	0.43-0.59	71.5	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	36.87	.53	0.43-0.59	76.5	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	37.67	.51	0.43-0.59	80.5	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	39.15	.44	0.37-0.51	74.2	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	41.14	.41	0.37-0.51	73.9	(26%-138%)
37Cl-2,3,7,8-TCDD	328/NA	31.59	NA	NA	85.8	(35%-197%)

Column to be used to flag values outside QC limits.

MB

**IDFB - Form I-HR CDD-2
CDD/CDF Toxicity Equivalence Summary
High Resolution**

EPA Sample No.
JE874

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793003

Sample wt/vol: 10.17 g

Lab File ID: A17OCT11B-7

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Concentration	TEF*	TEF-Adjusted Concentration
2,3,7,8-TCDD	0	x 1 =	0
1,2,3,7,8-PeCDD	0	x 1 =	0
1,2,3,4,7,8-HxCDD	0	x 0.1 =	0
1,2,3,6,7,8-HxCDD	0	x 0.1 =	0
1,2,3,7,8,9-HxCDD	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDD	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDD	987 0	x 0.0003 =	0002721 0
2,3,7,8-TCDF	252 0	x 0.1 =	0252 0
1,2,3,7,8-PeCDF	0	x 0.03 =	0
2,3,4,7,8-PeCDF	0	x 0.3 =	0
1,2,3,4,7,8-HxCDF	0	x 0.1 =	0
1,2,3,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,7,8,9-HxCDF	0	x 0.1 =	0
2,3,4,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDF	0	x 0.01 =	0
1,2,3,4,7,8,9-HpCDF	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDF	0	x 0.0003 =	0
		Total =	025472T 0

* TEF - Toxicity Equivalent Factors from the World Health Organization (WHO), 2005.

AM 1/13/12

IDFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
 JE874

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793003

Sample wt/vol: 10.17 g

Lab File ID: A17OCT11B-7

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.113	1	.113	1	.113	1	.113
1,2,3,7,8-PeCDD	.145	1	.145	1	.145	1	.145
1,2,3,4,7,8-HxCDD	.224	0.1	.0224	0.5	.112	0.05	.0112
1,2,3,6,7,8-HxCDD	.226	0.1	.0226	0.01	.00226	0.01	.00226
1,2,3,7,8,9-HxCDD	.238	0.1	.0238	0.01	.00238	0.1	.0238
1,2,3,4,6,7,8-HpCDD	.256	0.01	.00256	0.001	.000256	0.001	.000256
1,2,3,4,6,7,8,9-OCDD	0.907	0.0003	.0002721	0.0001	.0000907	0.0001	.0000907
2,3,7,8-TCDF	0.252	0.1	.0252	0.05	.0126	1	.252
1,2,3,7,8-PeCDF	.124	0.03	.00372	0.05	.0062	0.1	.0124
2,3,4,7,8-PeCDF	.119	0.3	.0357	0.5	.0595	1	.119
1,2,3,4,7,8-HxCDF	.0981	0.1	.00981	0.1	.00981	0.1	.00981
1,2,3,6,7,8-HxCDF	.0989	0.1	.00989	0.1	.00989	0.1	.00989
1,2,3,7,8,9-HxCDF	.149	0.1	.0149	0.1	.0149	0.1	.0149
2,3,4,6,7,8-HxCDF	.0999	0.1	.00999	0.1	.00999	0.1	.00999
1,2,3,4,6,7,8-HpCDF	.111	0.01	.00111	0.01	.00111	0.01	.00111
1,2,3,4,7,8,9-HpCDF	.19	0.01	.0019	0.01	.0019	0.01	.0019
1,2,3,4,6,7,8,9-OCDF	.356	0.0003	.0001068	0.0001	.0000356	0.0001	.0000356
		Total =	.4419589	Total =	.5009223	Total =	.7266423

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

MT

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE874

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793003

Sample wt/vol: 10.17 g

Lab File ID: A17OCT11B-7

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	2		JH	0.684
Total PeCDD	0		U	.145
Total HxCDD	0		U	.224
Total HpCDD	0		U	.256
Total TeCDF	1	0.252	YU	
Total PeCDF	0		U	.119
Total HxCDF	0		U	.0981
Total HpCDF	0		U	.111

EMPC; LCRDL

MB

NT

**1DFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution**

EPA Sample No.
JE875

Lab Name: Cape Fear Analytical, LLC (CFA)
Lab Code: NC001894 Case No. 41693

Contract: EP10W001070
TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE
Sample wt/vol: 10.84 g
Water Sample Prep: N/A
Concentrated Extract Volume: 20 uL
Injection Volume: 1 uL % Solids/Lipids: N/A
GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um
Concentration Units: ng/kg

Lab Sample ID: 2793004
Lab File ID: A17OCT11B-8
Date Received: 22-SEP-11
Date Extracted: 13-OCT-11
Date Analyzed: 17-OCT-11
Dilution Factor: 1

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	0.129
1,2,3,7,8-PeCDD	356/358				U	0.129
1,2,3,4,7,8-HxCDD	390/392				U	0.162
1,2,3,6,7,8-HxCDD	390/392				U	0.160
1,2,3,7,8,9-HxCDD	390/392				U	0.170
1,2,3,4,6,7,8-HpCDD	424/426				U	0.196
1,2,3,4,6,7,8,9-OCDD	458/460	44.82	.89	0.994	✓ U	
2,3,7,8-TCDF	304/306	31.01	.69	0.177	✓ U	
1,2,3,7,8-PeCDF	340/342				U	0.129
2,3,4,7,8-PeCDF	340/342				U	0.119
1,2,3,4,7,8-HxCDF	374/376				U	0.0928
1,2,3,6,7,8-HxCDF	374/376				U	0.0899
1,2,3,7,8,9-HxCDF	374/376				U	0.142
2,3,4,6,7,8-HxCDF	374/376				U	0.0978
1,2,3,4,6,7,8-HpCDF	408/410				U	0.106
1,2,3,4,7,8,9-HpCDF	408/410				U	0.182
1,2,3,4,6,7,8,9-OCDF	442/444				U	0.367

M/B
M/B

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	31.58	.82	0.65-0.89	72.0	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	34.36	1.53	1.32-1.78	90.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	36.99	1.28	1.05-1.43	65.5	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	37.08	1.26	1.05-1.43	72.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	40.44	1.06	0.88-1.20	70.8	(23%-140%)
13C-OCDD	470/472	44.78	.9	0.76-1.02	68.2	(17%-157%)
13C-2,3,7,8-TCDF	316/318	31	.78	0.65-0.89	79.7	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	33.55	1.62	1.32-1.78	86.9	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	34.17	1.56	1.32-1.78	94.4	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	36.27	.51	0.43-0.59	65.8	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	36.37	.5	0.43-0.59	65.9	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	36.87	.55	0.43-0.59	69.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	37.66	.53	0.43-0.59	72.4	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	39.15	.44	0.37-0.51	70.7	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	41.14	.44	0.37-0.51	73.1	(26%-138%)
37Cl-2,3,7,8-TCDD	328/NA	31.59	NA	NA	75.5	(35%-197%)

Column to be used to flag values outside QC limits.

M/T

**IDFB - Form 1-HR CDD-2
CDD/CDF Toxicity Equivalence Summary
High Resolution**

EPA Sample No.
JE875

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793004

Sample wt/vol: 10.84 g

Lab File ID: A17OCT11B-8

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm. 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Concentration	TEF*	TEF-Adjusted Concentration
2,3,7,8-TCDD	0	x 1 =	0
1,2,3,7,8-PeCDD	0	x 1 =	0
1,2,3,4,7,8-HxCDD	0	x 0.1 =	0
1,2,3,6,7,8-HxCDD	0	x 0.1 =	0
1,2,3,7,8,9-HxCDD	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDD	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDD	994 0	x 0.0003 =	0.002982 0
2,3,7,8-TCDF	177 0	x 0.1 =	0.177 0
1,2,3,7,8-PeCDF	0	x 0.03 =	0
2,3,4,7,8-PeCDF	0	x 0.3 =	0
1,2,3,4,7,8-HxCDF	0	x 0.1 =	0
1,2,3,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,7,8,9-HxCDF	0	x 0.1 =	0
2,3,4,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDF	0	x 0.01 =	0
1,2,3,4,7,8,9-HpCDF	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDF	0	x 0.0003 =	0
		Total =	0.179982 0

* TEF - Toxicity Equivalent Factors from the World Health Organization (WHO), 2005.

MT 1/13/12

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
JE875

Lab Name: Cape Fear Analytical, LLC (CFA)
 Lab Code: NC001894 Case No.: 41693

Contract: EP10W001070
 TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE
 Sample wt/vol: 10.84 g
 Water Sample Prep: N/A

Lab Sample ID: 2793004
 Lab File ID: A17OCT11B-8
 Date Received: 22-SEP-11
 Date Extracted: 13-OCT-11
 Date Analyzed: 17-OCT-11

Concentrated Extract Volume: 20 uL
 Injection Volume: 1 uL % Solids/Lipids: N/A
 GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um
 Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.129	1	.129	1	.129	1	.129
1,2,3,7,8-PeCDD	.129	1	.129	1	.129	1	.129
1,2,3,4,7,8-HxCDD	.162	0.1	.0162	0.5	.081	0.05	.0081
1,2,3,6,7,8-HxCDD	.16	0.1	.016	0.01	.0016	0.01	.0016
1,2,3,7,8,9-HxCDD	.17	0.1	.017	0.01	.0017	0.1	.017
1,2,3,4,6,7,8-HpCDD	.196	0.01	.00196	0.001	.000196	0.001	.000196
1,2,3,4,6,7,8,9-OCDD	0.994	0.0003	.0002982	0.0001	.0000994	0.0001	.0000994
2,3,7,8-TCDF	0.177	0.1	.0177	0.05	.00885	1	.177
1,2,3,7,8-PeCDF	.129	0.03	.00387	0.05	.00645	0.1	.0129
2,3,4,7,8-PeCDF	.119	0.3	.0357	0.5	.0595	1	.119
1,2,3,4,7,8-HxCDF	.0928	0.1	.00928	0.1	.00928	0.1	.00928
1,2,3,6,7,8-HxCDF	.0899	0.1	.00899	0.1	.00899	0.1	.00899
1,2,3,7,8,9-HxCDF	.142	0.1	.0142	0.1	.0142	0.1	.0142
2,3,4,6,7,8-HxCDF	.0978	0.1	.00978	0.1	.00978	0.1	.00978
1,2,3,4,6,7,8-HpCDF	.106	0.01	.00106	0.01	.00106	0.01	.00106
1,2,3,4,7,8,9-HpCDF	.182	0.01	.00182	0.01	.00182	0.01	.00182
1,2,3,4,6,7,8,9-OCDF	.367	0.0003	.0001101	0.0001	.0000367	0.0001	.0000367
		Total =	.4119683	Total =	.4625621	Total =	.6390621

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

MT

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE875

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793004

Sample wt/vol: 10.84 g

Lab File ID: A17OCT11B-8

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm. 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	0		U	.129
Total PeCDD	0		U	.129
Total HxCDD	0		U	.16
Total HpCDD	0		U	.196
Total TeCDF	1	0.177	U	
Total PeCDF	0		U	.119
Total HxCDF	0		U	.0899
Total HpCDF	0		U	.106

MB

NT

IDFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution

EPA Sample No.
JE876

Lab Name: Cape Fear Analytical, LLC (CFA)
 Lab Code: NC001894 Case No. 41693

Contract: EP10W001070
 TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE
 Sample wt/vol: 10.33 g
 Water Sample Prep: N/A
 Concentrated Extract Volume: 20 uL
 Injection Volume: 1 uL % Solids/Lipids: N/A
 GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um
 Concentration Units ng/kg

Lab Sample ID: 2793005
 Lab File ID: A17OCT11B-9
 Date Received: 22-SEP-11
 Date Extracted: 13-OCT-11
 Date Analyzed: 17-OCT-11
 Dilution Factor: 1

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	0.108
1,2,3,7,8-PeCDD	356/358				U	0.113
1,2,3,4,7,8-HxCDD	390/392				U	0.127
1,2,3,6,7,8-HxCDD	390/392				U	0.129
1,2,3,7,8,9-HxCDD	390/392				U	0.136
1,2,3,4,6,7,8-HpCDD	424/426				U	0.185
1,2,3,4,6,7,8,9-OCDD	458/460	44.78	1.01	1.01	Y U	
2,3,7,8-TCDF	304/306				U	0.131
1,2,3,7,8-PeCDF	340/342				U	0.0939
2,3,4,7,8-PeCDF	340/342				U	0.0877
1,2,3,4,7,8-HxCDF	374/376				U	0.0579
1,2,3,6,7,8-HxCDF	374/376				U	0.0691
1,2,3,7,8,9-HxCDF	374/376				U	0.105
2,3,4,6,7,8-HxCDF	374/376				U	0.0701
1,2,3,4,6,7,8-HpCDF	408/410				U	0.090
1,2,3,4,7,8,9-HpCDF	408/410				U	0.146
1,2,3,4,6,7,8,9-OCDF	442/444				U	0.350

MB

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	31.58	.77	0.65-0.89	79.2	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	34.36	1.57	1.32-1.78	103	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	37	1.27	1.05-1.43	74.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	37.09	1.27	1.05-1.43	75.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	40.44	1.08	0.88-1.20	78.0	(23%-140%)
13C-OCDD	470/472	44.78	.91	0.76-1.02	64.2	(17%-157%)
13C-2,3,7,8-TCDF	316/318	31	.79	0.65-0.89	84.4	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	33.55	1.59	1.32-1.78	99.7	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	34.18	1.56	1.32-1.78	103	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	36.27	.52	0.43-0.59	88.2	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	36.37	.55	0.43-0.59	76.5	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	36.87	.52	0.43-0.59	78.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	37.67	.53	0.43-0.59	83.9	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	39.17	.44	0.37-0.51	72.7	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	41.15	.44	0.37-0.51	75.9	(26%-138%)
37Cl-2,3,7,8-TCDD	328/NA	31.59	NA	NA	84.5	(35%-197%)

Column to be used to flag values outside QC limits.

MT

**1DFB - Form I-HR CDD-2
CDD/CDF Toxicity Equivalence Summary
High Resolution**

EPA Sample No.
JE876

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793005

Sample wt/vol: 10.33 g

Lab File ID: A17OCT11B-9

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Concentration	TEF*	TEF-Adjusted Concentration
2,3,7,8-TCDD	0	x 1 =	0
1,2,3,7,8-PeCDD	0	x 1 =	0
1,2,3,4,7,8-HxCDD	0	x 0.1 =	0
1,2,3,6,7,8-HxCDD	0	x 0.1 =	0
1,2,3,7,8,9-HxCDD	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDD	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDD	1.01 0	x 0.0003 =	0.00303 0
2,3,7,8-TCDF	0	x 0.1 =	0
1,2,3,7,8-PeCDF	0	x 0.03 =	0
2,3,4,7,8-PeCDF	0	x 0.3 =	0
1,2,3,4,7,8-HxCDF	0	x 0.1 =	0
1,2,3,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,7,8,9-HxCDF	0	x 0.1 =	0
2,3,4,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDF	0	x 0.01 =	0
1,2,3,4,7,8,9-HpCDF	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDF	0	x 0.0003 =	0
		Total =	0.00303 0

* TEF - Toxicity Equivalent Factors from the World Health Organization (WHO), 2005.

NT 1/13/12

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
JE876

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793005

Sample wt/vol: 10.33 g

Lab File ID: A17OCT11B-9

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.108	1	.108	1	.108	1	.108
1,2,3,7,8-PeCDD	.113	1	.113	1	.113	1	.113
1,2,3,4,7,8-HxCDD	.127	0.1	.0127	0.5	.0635	0.05	.00635
1,2,3,6,7,8-HxCDD	.129	0.1	.0129	0.01	.00129	0.01	.00129
1,2,3,7,8,9-HxCDD	.136	0.1	.0136	0.01	.00136	0.1	.0136
1,2,3,4,6,7,8-HpCDD	.185	0.01	.00185	0.001	.000185	0.001	.000185
1,2,3,4,6,7,8,9-OCDD	1.01	0.0003	.000303	0.0001	.000101	0.0001	.000101
2,3,7,8-TCDF	.131	0.1	.0131	0.05	.00655	1	.131
1,2,3,7,8-PeCDF	.0939	0.03	.002817	0.05	.004695	0.1	.00939
2,3,4,7,8-PeCDF	.0877	0.3	.02631	0.5	.04385	1	.0877
1,2,3,4,7,8-HxCDF	.0579	0.1	.00579	0.1	.00579	0.1	.00579
1,2,3,6,7,8-HxCDF	.0691	0.1	.00691	0.1	.00691	0.1	.00691
1,2,3,7,8,9-HxCDF	.105	0.1	.0105	0.1	.0105	0.1	.0105
2,3,4,6,7,8-HxCDF	.0701	0.1	.00701	0.1	.00701	0.1	.00701
1,2,3,4,6,7,8-HpCDF	.09	0.01	.0009	0.01	.0009	0.01	.0009
1,2,3,4,7,8,9-HpCDF	.146	0.01	.00146	0.01	.00146	0.01	.00146
1,2,3,4,6,7,8,9-OCDF	.35	0.0003	.000105	0.0001	.000035	0.0001	.000035
		Total =	.337255	Total =	.375136	Total =	.503221

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

MT

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE876

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793005

Sample wt/vol: 10.33 g

Lab File ID: A17OCT11B-9

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	0		U	.108
Total PeCDD	0		U	.113
Total HxCDD	0		-U	.127
Total HpCDD	0		U	.185
Total TeCDF	0		U	.131
Total PeCDF	0		U	.0705
Total HxCDF	0		U	.0579
Total HpCDF	0		U	.09

M/T

**1DFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution**

EPA Sample No.
JE877

Lab Name: Cape Fear Analytical, LLC (CFA)
Lab Code: NC001894 Case No. 41693

Contract: EP10W001070
TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE
Sample wt/vol: 10.37 g
Water Sample Prep: N/A
Concentrated Extract Volume: 20 uL
Injection Volume: 1 uL % Solids/Lipids: N/A
GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um
Concentration Units: ng/kg

Lab Sample ID: 2793006
Lab File ID: A17OCT11B-10
Date Received: 22-SEP-11
Date Extracted: 13-OCT-11
Date Analyzed: 17-OCT-11
Dilution Factor: 1

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	0.0879
1,2,3,7,8-PeCDD	356/358				U	0.0885
1,2,3,4,7,8-HxCDD	390/392				U	0.132
1,2,3,6,7,8-HxCDD	390/392				U	0.135
1,2,3,7,8,9-HxCDD	390/392				U	0.141
1,2,3,4,6,7,8-HpCDD	424/426				U	0.167
1,2,3,4,6,7,8,9-OCDD	458/460	44.81	.84	1.15	Y/M	
2,3,7,8-TCDF	304/306	31	.8	0.168	Y/M	
1,2,3,7,8-PeCDF	340/342				U	0.0754
2,3,4,7,8-PeCDF	340/342				U	0.0737
1,2,3,4,7,8-HxCDF	374/376				U	0.0598
1,2,3,6,7,8-HxCDF	374/376				U	0.0648
1,2,3,7,8,9-HxCDF	374/376				U	0.110
2,3,4,6,7,8-HxCDF	374/376				U	0.0712
1,2,3,4,6,7,8-HpCDF	408/410				U	0.0789
1,2,3,4,7,8,9-HpCDF	408/410				U	0.137
1,2,3,4,6,7,8,9-OCDF	442/444				U	0.268

MB
MB

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	31.58	.8	0.65-0.89	81.8	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	34.37	1.57	1.32-1.78	106	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	37	1.28	1.05-1.43	72.1	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	37.09	1.32	1.05-1.43	76.0	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	40.45	1.04	0.88-1.20	73.3	(23%-140%)
13C-OCDD	470/472	44.78	.89	0.76-1.02	60.7	(17%-157%)
13C-2,3,7,8-TCDF	316/318	31	.78	0.65-0.89	84.4	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	33.55	1.6	1.32-1.78	99.5	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	34.17	1.57	1.32-1.78	105	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	36.27	.53	0.43-0.59	85.3	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	36.37	.51	0.43-0.59	75.0	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	36.87	.55	0.43-0.59	76.4	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	37.67	.51	0.43-0.59	79.6	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	39.17	.44	0.37-0.51	69.0	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	41.15	.45	0.37-0.51	72.3	(26%-138%)
37Cl-2,3,7,8-TCDD	328/NA	31.59	NA	NA	90.0	(35%-197%)

Column to be used to flag values outside QC limits.

MT

**1DFB - Form I-HR CDD-2
CDD/CDF Toxicity Equivalence Summary
High Resolution**

EPA Sample No.
JE877

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793006

Sample wt/vol: 10.37 g

Lab File ID: A17OCT11B-10

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Concentration	TEF*	TEF-Adjusted Concentration
2,3,7,8-TCDD	0	x 1 =	0
1,2,3,7,8-PeCDD	0	x 1 =	0
1,2,3,4,7,8-HxCDD	0	x 0.1 =	0
1,2,3,6,7,8-HxCDD	0	x 0.1 =	0
1,2,3,7,8,9-HxCDD	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDD	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDD	1.15 0	x 0.0003 =	0.000345 0
2,3,7,8-TCDF	1.68 0	x 0.1 =	0.168 0
1,2,3,7,8-PeCDF	0	x 0.03 =	0
2,3,4,7,8-PeCDF	0	x 0.3 =	0
1,2,3,4,7,8-HxCDF	0	x 0.1 =	0
1,2,3,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,7,8,9-HxCDF	0	x 0.1 =	0
2,3,4,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDF	0	x 0.01 =	0
1,2,3,4,7,8,9-HpCDF	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDF	0	x 0.0003 =	0
		Total =	0.17145 0

* TEF - Toxicity Equivalent Factors from the World Health Organization (WHO), 2005.

NA 1/13/12

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
 JE877

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793006

Sample wt/vol: 10.37 g

Lab File ID: A17OCT11B-10

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.0879	1	.0879	1	.0879	1	.0879
1,2,3,7,8-PeCDD	.0885	1	.0885	1	.0885	1	.0885
1,2,3,4,7,8-HxCDD	.132	0.1	.0132	0.5	.066	0.05	.0066
1,2,3,6,7,8-HxCDD	.135	0.1	.0135	0.01	.00135	0.01	.00135
1,2,3,7,8,9-HxCDD	.141	0.1	.0141	0.01	.00141	0.1	.0141
1,2,3,4,6,7,8-HpCDD	.167	0.01	.00167	0.001	.000167	0.001	.000167
1,2,3,4,6,7,8,9-OCDD	1.15	0.0003	.000345	0.0001	.000115	0.0001	.000115
2,3,7,8-TCDF	0.168	0.1	.0168	0.05	.0084	1	.168
1,2,3,7,8-PeCDF	.0754	0.03	.002262	0.05	.00377	0.1	.00754
2,3,4,7,8-PeCDF	.0737	0.3	.02211	0.5	.03685	1	.0737
1,2,3,4,7,8-HxCDF	.0598	0.1	.00598	0.1	.00598	0.1	.00598
1,2,3,6,7,8-HxCDF	.0648	0.1	.00648	0.1	.00648	0.1	.00648
1,2,3,7,8,9-HxCDF	.11	0.1	.011	0.1	.011	0.1	.011
2,3,4,6,7,8-HxCDF	.0712	0.1	.00712	0.1	.00712	0.1	.00712
1,2,3,4,6,7,8-HpCDF	.0789	0.01	.000789	0.01	.000789	0.01	.000789
1,2,3,4,7,8,9-HpCDF	.137	0.01	.00137	0.01	.00137	0.01	.00137
1,2,3,4,6,7,8,9-OCDF	.268	0.0003	.0000804	0.0001	.0000268	0.0001	.0000268
		Total =	.2932064	Total =	.3272278	Total =	.4807378

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

MT

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No. JE877

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793006

Sample wt/vol: 10.37 g

Lab File ID: A17OCT11B-10

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	0		U	.0879
Total PeCDD	0		U	.0885
Total HxCDD	0		U	.132
Total HpCDD	0		U	.167
Total TeCDF	1	0.168	U u	
Total PeCDF	0		U	.0737
Total HxCDF	0		U	.0598
Total HpCDF	0		U	.0789

MB

NT

1DFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution

EPA Sample No. JE895

Lab Name: Cape Fear Analytical, LLC (CFA)
 Lab Code: NC001894 Case No. 41693

Contract: EP10W001070
 TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE
 Sample wt/vol: 10.85 g
 Water Sample Prep: N/A
 Concentrated Extract Volume: 20 uL
 Injection Volume: 1 uL % Solids/Lipids: N/A
 GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um
 Concentration Units: ng/kg

Lab Sample ID: 2793007
 Lab File ID: A17OCT11B-11
 Date Received: 22-SEP-11
 Date Extracted: 13-OCT-11
 Date Analyzed: 17-OCT-11
 Dilution Factor: 1

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	0.0811
1,2,3,7,8-PeCDD	356/358				U	0.0829
1,2,3,4,7,8-HxCDD	390/392				U	0.0903
1,2,3,6,7,8-HxCDD	390/392				U	0.0944
1,2,3,7,8,9-HxCDD	390/392				U	0.0979
1,2,3,4,6,7,8-HpCDD	424/426				U	0.161
1,2,3,4,6,7,8,9-OCDD	458/460	44.78	1.31*		Y	0.809
2,3,7,8-TCDF	304/306				U	0.110
1,2,3,7,8-PeCDF	340/342				U	0.0691
2,3,4,7,8-PeCDF	340/342				U	0.0656
1,2,3,4,7,8-HxCDF	374/376				U	0.0463
1,2,3,6,7,8-HxCDF	374/376				U	0.0516
1,2,3,7,8,9-HxCDF	374/376				U	0.0785
2,3,4,6,7,8-HxCDF	374/376				U	0.0536
1,2,3,4,6,7,8-HpCDF	408/410				U	0.0651
1,2,3,4,7,8,9-HpCDF	408/410				U	0.109
1,2,3,4,6,7,8,9-OCDF	442/444				U	0.232

EMPC

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	31.58	.79	0.65-0.89	83.4	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	34.36	1.62	1.32-1.78	111	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	37	1.28	1.05-1.43	76.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	37.09	1.29	1.05-1.43	78.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	40.45	1.04	0.88-1.20	79.4	(23%-140%)
13C-OCDD	470/472	44.78	.9	0.76-1.02	66.0	(17%-157%)
13C-2,3,7,8-TCDF	316/318	31	.81	0.65-0.89	88.8	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	33.56	1.54	1.32-1.78	106	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	34.18	1.57	1.32-1.78	108	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	36.27	.52	0.43-0.59	90.4	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	36.37	.53	0.43-0.59	81.1	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	36.87	.52	0.43-0.59	81.1	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	37.67	.54	0.43-0.59	85.8	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	39.17	.44	0.37-0.51	76.7	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	41.15	.44	0.37-0.51	76.1	(26%-138%)
37Cl-2,3,7,8-TCDD	328/NA	31.59	NA	NA	88.6	(35%-197%)

Column to be used to flag values outside QC limits.

MT

1DFB - Form 1-HR CDD-2
CDD/CDF Toxicity Equivalence Summary
High Resolution

EPA Sample No. JE895

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793007

Sample wt/vol: 10.85 g

Lab File ID: A17OCT11B-11

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-SMS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Concentration	TEF*	TEF-Adjusted Concentration
2,3,7,8-TCDD	0	x 1 =	0
1,2,3,7,8-PeCDD	0	x 1 =	0
1,2,3,4,7,8-HxCDD	0	x 0.1 =	0
1,2,3,6,7,8-HxCDD	0	x 0.1 =	0
1,2,3,7,8,9-HxCDD	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDD	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDD	0	x 0.0003 =	0
2,3,7,8-TCDF	0	x 0.1 =	0
1,2,3,7,8-PeCDF	0	x 0.03 =	0
2,3,4,7,8-PeCDF	0	x 0.3 =	0
1,2,3,4,7,8-HxCDF	0	x 0.1 =	0
1,2,3,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,7,8,9-HxCDF	0	x 0.1 =	0
2,3,4,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDF	0	x 0.01 =	0
1,2,3,4,7,8,9-HpCDF	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDF	0	x 0.0003 =	0
		Total =	0

* TEF - Toxicity Equivalent Factors from the World Health Organization (WHO), 2005.

MT

1DFD - Form 1-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
JE895

Lab Name: Cape Fear Analytical, LLC (CFA)
 Lab Code: NC001894 Case No.: 41693

Contract: EP10W001070
 TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE
 Sample wt/vol: 10.85 g
 Water Sample Prep: N/A
 Concentrated Extract Volume: 20 uL
 Injection Volume: 1 uL % Solids/Lipids: N/A
 GC Column: DB-5MS ID: 60m x 0.25mm. 0.25um
 Concentration Units: ng/kg

Lab Sample ID: 2793007
 Lab File ID: A17OCT11B-11
 Date Received: 22-SEP-11
 Date Extracted: 13-OCT-11
 Date Analyzed: 17-OCT-11
 Dilution Factor: 1

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.0811	1	.0811	1	.0811	1	.0811
1,2,3,7,8-PeCDD	.0829	1	.0829	1	.0829	1	.0829
1,2,3,4,7,8-HxCDD	.0903	0.1	.00903	0.5	.04515	0.05	.004515
1,2,3,6,7,8-HxCDD	.0944	0.1	.00944	0.01	.000944	0.01	.000944
1,2,3,7,8,9-HxCDD	.0979	0.1	.00979	0.01	.000979	0.1	.00979
1,2,3,4,6,7,8-HpCDD	.161	0.01	.00161	0.001	.000161	0.001	.000161
1,2,3,4,6,7,8,9-OCDD	0.809	0.0003	.0002427	0.0001	.0000809	0.0001	.0000809
2,3,7,8-TCDF	.11	0.1	.011	0.05	.0055	1	.11
1,2,3,7,8-PeCDF	.0691	0.03	.002073	0.05	.003455	0.1	.00691
2,3,4,7,8-PeCDF	.0656	0.3	.01968	0.5	.0328	1	.0656
1,2,3,4,7,8-HxCDF	.0463	0.1	.00463	0.1	.00463	0.1	.00463
1,2,3,6,7,8-HxCDF	.0516	0.1	.00516	0.1	.00516	0.1	.00516
1,2,3,7,8,9-HxCDF	.0785	0.1	.00785	0.1	.00785	0.1	.00785
2,3,4,6,7,8-HxCDF	.0536	0.1	.00536	0.1	.00536	0.1	.00536
1,2,3,4,6,7,8-HpCDF	.0651	0.01	.000651	0.01	.000651	0.01	.000651
1,2,3,4,7,8,9-HpCDF	.109	0.01	.00109	0.01	.00109	0.01	.00109
1,2,3,4,6,7,8,9-OCDF	.232	0.0003	.0000696	0.0001	.0000232	0.0001	.0000232
		Total =	.2516763	Total =	.2778341	Total =	.3867651

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

NT

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE895

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: TISSUE

Lab Sample ID: 2793007

Sample wt/vol: 10.85 g

Lab File ID: A17OCT11B-11

Water Sample Prep: N/A

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 13-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 17-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	0		U	.0811
Total PeCDD	0		U	.0829
Total HxCDD	0		U	.0903
Total HpCDD	0		U	.161
Total TeCDF	0		U	.11
Total PeCDF	0		U	.0656
Total HxCDF	0		U	.0463
Total HpCDF	0		U	.0651

MT

IDFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution

EPA Sample No.

JE896

Lab Name: Cape Fear Analytical, LLC (CFA)
 Lab Code: NC001894 Case No. 41693

Contract: EP10W001070
 TO No.: 1935.2

SDG No.: JE872

Matrix: WATER
 Sample wt/vol: 252.9 mL
 Water Sample Prep: CLLE
 Concentrated Extract Volume: 20 uL
 Injection Volume: 1 uL % Solids/Lipids: N/A
 GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um
 Concentration Units pg/L

Lab Sample ID: 2793008
 Lab File ID: A25OCT11X_2-5
 Date Received: 22-SEP-11
 Date Extracted: 20-OCT-11
 Date Analyzed: 25-OCT-11
 Dilution Factor: 1

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	2.29
1,2,3,7,8-PeCDD	356/358				U	2.67
1,2,3,4,7,8-HxCDD	390/392				U	3.46
1,2,3,6,7,8-HxCDD	390/392				U	3.71
1,2,3,7,8,9-HxCDD	390/392				U	3.80
1,2,3,4,6,7,8-HpCDD	424/426				U	4.46
1,2,3,4,6,7,8,9-OCDD	458/460				U	8.86
2,3,7,8-TCDF	304/306				U	2.36
1,2,3,7,8-PeCDF	340/342				U	2.00
2,3,4,7,8-PeCDF	340/342	33.98	1.33	2.14	JG	
1,2,3,4,7,8-HxCDF	374/376				U	2.14
1,2,3,6,7,8-HxCDF	374/376				U	2.24
1,2,3,7,8,9-HxCDF	374/376	37.41	2.27*		Yh	3.48
2,3,4,6,7,8-HxCDF	374/376				U	2.33
1,2,3,4,6,7,8-HpCDF	408/410				U	2.10
1,2,3,4,7,8,9-HpCDF	408/410				U	3.36
1,2,3,4,6,7,8,9-OCDF	442/444				U	5.92

← CORGL
 NT
 EMPC

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	31.34	.78	0.65-0.89	86.6	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	34.16	1.6	1.32-1.78	103	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	36.74	1.28	1.05-1.43	85.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	36.84	1.27	1.05-1.43	81.0	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	40.12	1.04	0.88-1.20	89.2	(23%-140%)
13C-OCDD	470/472	44.34	.91	0.76-1.02	80.2	(17%-157%)
13C-2,3,7,8-TCDF	316/318	30.67	.79	0.65-0.89	84.6	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	33.36	1.53	1.32-1.78	91.2	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	33.98	1.58	1.32-1.78	95.7	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	36.04	.51	0.43-0.59	85.8	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	36.14	.5	0.43-0.59	72.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	36.62	.52	0.43-0.59	78.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	37.39	.53	0.43-0.59	84.9	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	38.86	.45	0.37-0.51	77.8	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	40.8	.45	0.37-0.51	83.8	(26%-138%)
37Cl-2,3,7,8-TCDD	328/NA	31.35	NA	NA	89.4	(35%-197%)

* Column to be used to flag values outside QC limits.

NT

1DFB - Form I-HR CDD-2
CDD/CDF Toxicity Equivalence Summary
High Resolution

EPA Sample No.
 JE896

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: WATER

Lab Sample ID: 2793008

Sample wt/vol: 252.9 mL

Lab File ID: A25OCT11X 2-5

Water Sample Prep: CLLE

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 20-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 25-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: pg/L

Target Analyte	Concentration	TEF*	TEF-Adjusted Concentration
2,3,7,8-TCDD	0	x 1 =	0
1,2,3,7,8-PeCDD	0	x 1 =	0
1,2,3,4,7,8-HxCDD	0	x 0.1 =	0
1,2,3,6,7,8-HxCDD	0	x 0.1 =	0
1,2,3,7,8,9-HxCDD	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDD	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDD	0	x 0.0003 =	0
2,3,7,8-TCDF	0	x 0.1 =	0
1,2,3,7,8-PeCDF	0	x 0.03 =	0
2,3,4,7,8-PeCDF	2.14	x 0.3 =	.642
1,2,3,4,7,8-HxCDF	0	x 0.1 =	0
1,2,3,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,7,8,9-HxCDF	0	x 0.1 =	0
2,3,4,6,7,8-HxCDF	0	x 0.1 =	0
1,2,3,4,6,7,8-HpCDF	0	x 0.01 =	0
1,2,3,4,7,8,9-HpCDF	0	x 0.01 =	0
1,2,3,4,6,7,8,9-OCDF	0	x 0.0003 =	0
		Total =	.642 JR

* TEF - Toxicity Equivalent Factors from the World Health Organization (WHO), 2005.

NR

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.

JE896

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: WATER

Lab Sample ID: 2793008

Sample wt/vol: 252.9 mL

Lab File ID: A25OCT11X_2-5

Water Sample Prep: CLLE

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 20-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 25-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: pg/L

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	2.29	1	2.29	1	2.29	1	2.29
1,2,3,7,8-PeCDD	2.67	1	2.67	1	2.67	1	2.67
1,2,3,4,7,8-HxCDD	3.46	0.1	.346	0.5	1.73	0.05	.173
1,2,3,6,7,8-HxCDD	3.71	0.1	.371	0.01	.0371	0.01	.0371
1,2,3,7,8,9-HxCDD	3.8	0.1	.38	0.01	.038	0.1	.38
1,2,3,4,6,7,8-HpCDD	4.46	0.01	.0446	0.001	.00446	0.001	.00446
1,2,3,4,6,7,8,9-OCDD	8.86	0.0003	.002658	0.0001	.000886	0.0001	.000886
2,3,7,8-TCDF	2.36	0.1	.236	0.05	.118	1	2.36
1,2,3,7,8-PeCDF	2	0.03	.06	0.05	.1	0.1	.2
2,3,4,7,8-PeCDF	2.14	0.3	.642	0.5	1.07	1	2.14
1,2,3,4,7,8-HxCDF	2.14	0.1	.214	0.1	.214	0.1	.214
1,2,3,6,7,8-HxCDF	2.24	0.1	.224	0.1	.224	0.1	.224
1,2,3,7,8,9-HxCDF	3.48	0.1	.348	0.1	.348	0.1	.348
2,3,4,6,7,8-HxCDF	2.33	0.1	.233	0.1	.233	0.1	.233
1,2,3,4,6,7,8-HpCDF	2.1	0.01	.021	0.01	.021	0.01	.021
1,2,3,4,7,8,9-HpCDF	3.36	0.01	.0336	0.01	.0336	0.01	.0336
1,2,3,4,6,7,8,9-OCDF	5.92	0.0003	.001776	0.0001	.000592	0.0001	.000592
		Total =	8.117634	Total =	9.132638	Total =	11.329638

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

MT

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE896

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE872

Matrix: WATER

Lab Sample ID: 2793008

Sample wt/vol: 252.9 mL

Lab File ID: A25OCT11X 2-5

Water Sample Prep: CLLE

Date Received: 22-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 20-OCT-11

Injection Volume: 1 uL % Solids/Lipids: N/A

Date Analyzed: 25-OCT-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: pg/L

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	0		U	2.29
Total PeCDD	0		U	2.67
Total HxCDD	0		U	3.46
Total HpCDD	0		U	4.46
Total TeCDF	0		U	2.36
Total PeCDF	1	2.14	JQ	
Total HxCDF	2		JH	6.64
Total HpCDF	0		U	2.1

< CRQL
EMPC

NT

Modified 18-Form I-HR CDD-2

Client ID

CFA ID

TARGET

ANALYTE

CONCENTRATION
or EMPC or EDL

DV
Qualifier

Value
ND=0

TEF
Mammal

TEF-ADJUSTED
CONCENTRATION

TEF
Fish

TEF-ADJUSTED
CONCENTRATION

TEF
Bird

TEF-ADJUSTED
CONCENTRATION

JE878
2730001

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0	TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.126	U	0	1	0	1	0	1	0
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0712	U	0	1	0	1	0	1	0
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.118	U	0	0.1	0	0.5	0	0.05	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.119	U	0	0.1	0	0.01	0	0.01	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.127	U	0	0.1	0	0.01	0	0.1	0
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.261	U	0	0.01	0	0.001	0	0.001	0
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.772	U	0	0.0003	0	0.0001	0	0.0001	0
2,3,7,8-Tetrachlorodibenzofuran	0.241	J Q	0.241	0.1	0.0241	0.05	0.01205	1	0.241
1,2,3,7,8-Pentachlorodibenzofuran	0.0825	U	0	0.03	0	0.05	0	0.1	0
2,3,4,7,8-Pentachlorodibenzofuran	0.109	U	0	0.3	0	0.5	0	1	0
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0728	U	0	0.1	0	0.1	0	0.1	0
1,2,3,6,7,8-Hexachlorodibenzofuran	0.089	U	0	0.1	0	0.1	0	0.1	0
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0694	U	0	0.1	0	0.1	0	0.1	0
1,2,3,7,8,9-Hexachlorodibenzofuran	0.108	U	0	0.1	0	0.1	0	0.1	0
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0778	U	0	0.01	0	0.01	0	0.01	0
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.137	U	0	0.01	0	0.01	0	0.01	0
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.144	U	0	0.0003	0	0.0001	0	0.0001	0

TEQ (2005 Mammal/1998 Fish & Bird) ND = 0

Mammal 0.0241 Jk Fish 0.0121 Jk Bird 0.241 Jk

Client ID

CFA ID

TARGET

ANALYTE

CONCENTRATION
or EMPC or EDL

DV
Qualifier

Value
ND=0.5x

TEF
Mammal

TEF-ADJUSTED
CONCENTRATION

TEF
Fish

TEF-ADJUSTED
CONCENTRATION

TEF
Bird

TEF-ADJUSTED
CONCENTRATION

JE878
2730001

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0.5x	TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.126	U	0.063	1	0.063	1	0.063	1	0.063
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0712	U	0.0356	1	0.0356	1	0.0356	1	0.0356
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.118	U	0.059	0.1	0.0059	0.5	0.0295	0.05	0.00295
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.119	U	0.0595	0.1	0.00595	0.01	0.000595	0.01	0.000595
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.127	U	0.0635	0.1	0.00635	0.01	0.000635	0.1	0.00635
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.261	U	0.1305	0.01	0.001305	0.001	0.0001305	0.001	0.0001305
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.772	U	0.386	0.0003	0.0001158	0.0001	0.0000386	0.0001	0.0000386
2,3,7,8-Tetrachlorodibenzofuran	0.241	J	0.241	0.1	0.0241	0.05	0.01205	1	0.241
1,2,3,7,8-Pentachlorodibenzofuran	0.0825	U	0.04125	0.03	0.0012375	0.05	0.0020625	0.1	0.004125
2,3,4,7,8-Pentachlorodibenzofuran	0.109	U	0.0545	0.3	0.01635	0.5	0.02725	1	0.0545
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0728	U	0.0364	0.1	0.00364	0.1	0.00364	0.1	0.00364
1,2,3,6,7,8-Hexachlorodibenzofuran	0.089	U	0.0445	0.1	0.00445	0.1	0.00445	0.1	0.00445
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0694	U	0.0347	0.1	0.00347	0.1	0.00347	0.1	0.00347
1,2,3,7,8,9-Hexachlorodibenzofuran	0.108	U	0.054	0.1	0.0054	0.1	0.0054	0.1	0.0054
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0778	U	0.0389	0.01	0.000389	0.01	0.000389	0.01	0.000389
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.137	U	0.0685	0.01	0.000685	0.01	0.000685	0.01	0.000685
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.144	U	0.072	0.0003	0.0000216	0.0001	0.0000072	0.0001	0.0000072

TEQ (2005 Mammal/1998 Fish & Bird) ND = .5

Mammal 0.178 Jk Fish 0.189 Jk Bird 0.426 Jk

Client ID

CFA ID

TARGET

ANALYTE

CONCENTRATION
or EMPC or EDL

DV
Qualifier

Value
ND=1x

TEF
Mammal

TEF-ADJUSTED
CONCENTRATION

TEF
Fish

TEF-ADJUSTED
CONCENTRATION

TEF
Bird

TEF-ADJUSTED
CONCENTRATION

JE878
2730001

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=1x	TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.126	U	0.126	1	0.126	1	0.126	1	0.126
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0712	U	0.0712	1	0.0712	1	0.0712	1	0.0712
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.118	U	0.118	0.1	0.0118	0.5	0.059	0.05	0.0059
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.119	U	0.119	0.1	0.0119	0.01	0.00119	0.01	0.00119
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.127	U	0.127	0.1	0.0127	0.01	0.00127	0.1	0.0127
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.261	U	0.261	0.01	0.00261	0.001	0.000261	0.001	0.000261
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.772	U	0.772	0.0003	0.0002316	0.0001	0.0000772	0.0001	0.0000772
2,3,7,8-Tetrachlorodibenzofuran	0.241	J	0.241	0.1	0.0241	0.05	0.01205	1	0.241
1,2,3,7,8-Pentachlorodibenzofuran	0.0825	U	0.0825	0.03	0.002475	0.05	0.004125	0.1	0.00825
2,3,4,7,8-Pentachlorodibenzofuran	0.109	U	0.109	0.3	0.0327	0.5	0.0545	1	0.109
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0728	U	0.0728	0.1	0.00728	0.1	0.00728	0.1	0.00728
1,2,3,6,7,8-Hexachlorodibenzofuran	0.089	U	0.089	0.1	0.0089	0.1	0.0089	0.1	0.0089
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0694	U	0.0694	0.1	0.00694	0.1	0.00694	0.1	0.00694
1,2,3,7,8,9-Hexachlorodibenzofuran	0.108	U	0.108	0.1	0.0108	0.1	0.0108	0.1	0.0108
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0778	U	0.0778	0.01	0.000778	0.01	0.000778	0.01	0.000778
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.137	U	0.137	0.01	0.00137	0.01	0.00137	0.01	0.00137
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.144	U	0.144	0.0003	0.0000432	0.0001	0.0000144	0.0001	0.0000144

TEQ (2005 Mammal/1998 Fish & Bird) ND = 1

Mammal 0.332 Jk Fish 0.366 Jk Bird 0.612 Jk

< C R Q L

att 1/2/12

IDFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
JE878

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730001

Sample wt/vol: 12.05 g

Lab File ID: b19sep11b 4-4

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 83.9

Date Analyzed: 20-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.126	1	.126	1	.126	1	.126
1,2,3,7,8-PeCDD	0.0712	1	.0712	1	.0712	1	.0712
1,2,3,4,7,8-HxCDD	.118	0.1	.0118	0.5	.059	0.05	.0059
1,2,3,6,7,8-HxCDD	.119	0.1	.0119	0.01	.00119	0.01	.00119
1,2,3,7,8,9-HxCDD	.127	0.1	.0127	0.01	.00127	0.1	.0127
1,2,3,4,6,7,8-HpCDD	0.261	0.01	.00261	0.001	.000261	0.001	.000261
1,2,3,4,6,7,8,9-OCDD	0.772	0.0003	.0002316	0.0001	.0000772	0.0001	.0000772
2,3,7,8-TCDF	0.241	0.1	.0241	0.05	.01205	1	.241
1,2,3,7,8-PeCDF	.0825	0.03	.002475	0.05	.004125	0.1	.00825
2,3,4,7,8-PeCDF	0.109	0.3	.0327	0.5	.0545	1	.109
1,2,3,4,7,8-HxCDF	.0728	0.1	.00728	0.1	.00728	0.1	.00728
1,2,3,6,7,8-HxCDF	0.089	0.1	.0089	0.1	.0089	0.1	.0089
1,2,3,7,8,9-HxCDF	.108	0.1	.0108	0.1	.0108	0.1	.0108
2,3,4,6,7,8-HxCDF	.0694	0.1	.00694	0.1	.00694	0.1	.00694
1,2,3,4,6,7,8-HpCDF	.0778	0.01	.000778	0.01	.000778	0.01	.000778
1,2,3,4,7,8,9-HpCDF	.137	0.01	.00137	0.01	.00137	0.01	.00137
1,2,3,4,6,7,8,9-OCDF	0.144	0.0003	.000432	0.0001	.0000144	0.0001	.0000144
		Total =	.3318278	Total =	.3657556	Total =	.6116606

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

NT

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE878

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730001

Sample wt/vol: 12.05 g

Lab File ID: b19sep11b 4-4

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 83.9

Date Analyzed: 20-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	XZ	0.178 c.496	JQ	
Total PeCDD	2	0.140	YU	
Total HxCDD	1	0.127	YU	
Total HpCDD	2	0.439	YU	
Total TeCDF	3	0.542	JQ	
Total PeCDF	1		YU	0.109
Total HxCDF	1	0.089	YU	
Total HpCDF	0		U	.0778

WT 1/11/12 CCRQL
MB
MB
MB
CCRQL
WT 1/11/12 EMIZ MB
MB

WT

Modified 1B-Form I-HR CDD-2

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.155	U	0
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.139	U	0
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.145	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.181	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.211	U	0
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.228	U	0
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	4.09	JQ	4.09
2,3,7,8-Tetrachlorodibenzofuran	0.251	JQ	0.251
1,2,3,7,8-Pentachlorodibenzofuran	0.186	U	0
2,3,4,7,8-Pentachlorodibenzofuran	0.191	U	0
1,2,3,4,7,8-Hexachlorodibenzofuran	0.161	U	0
1,2,3,6,7,8-Hexachlorodibenzofuran	0.128	U	0
2,3,4,6,7,8-Hexachlorodibenzofuran	0.146	U	0
1,2,3,7,8,9-Hexachlorodibenzofuran	0.182	U	0
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.201	U	0
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.197	U	0
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.166	U	0

JE879
2730002

TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
1	0	1	0	1	0
1	0	1	0	1	0
0.1	0	0.5	0	0.05	0
0.1	0	0.01	0	0.01	0
0.1	0	0.01	0	0.1	0
0.01	0	0.001	0	0.001	0
0.0003	0.001227	0.0001	0.000409	0.0001	0.000409
0.1	0.0251	0.05	0.01255	1	0.251
0.03	0	0.05	0	0.1	0
0.3	0	0.5	0	1	0
0.1	0	0.1	0	0.1	0
0.1	0	0.1	0	0.1	0
0.1	0	0.1	0	0.1	0
0.1	0	0.1	0	0.1	0
0.01	0	0.01	0	0.01	0
0.01	0	0.01	0	0.01	0
0.0003	0	0.0001	0	0.0001	0

TEQ (2005 Mammal/1998 Fish & Bird) ND = 0

Mammal 0.0263 JQ Fish 0.0130 JQ Bird 0.251 JQ

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0.5x
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.155	U	0.0775
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.139	U	0.0695
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.145	U	0.0725
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.181	U	0.0905
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.211	U	0.1055
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.228	U	0.114
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	4.09	JQ	4.09
2,3,7,8-Tetrachlorodibenzofuran	0.251	JQ	0.251
1,2,3,7,8-Pentachlorodibenzofuran	0.186	U	0.093
2,3,4,7,8-Pentachlorodibenzofuran	0.191	U	0.0955
1,2,3,4,7,8-Hexachlorodibenzofuran	0.161	U	0.0805
1,2,3,6,7,8-Hexachlorodibenzofuran	0.128	U	0.064
2,3,4,6,7,8-Hexachlorodibenzofuran	0.146	U	0.073
1,2,3,7,8,9-Hexachlorodibenzofuran	0.182	U	0.091
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.201	U	0.1005
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.197	U	0.0985
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.166	U	0.083

JE879
2730002

TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
1	0.0775	1	0.0775	1	0.0775
1	0.0695	1	0.0695	1	0.0695
0.1	0.0725	0.5	0.03625	0.05	0.003625
0.1	0.0905	0.01	0.000905	0.01	0.000905
0.1	0.1055	0.01	0.001055	0.1	0.01055
0.01	0.00114	0.001	0.000114	0.001	0.000114
0.0003	0.001227	0.0001	0.000409	0.0001	0.000409
0.1	0.0251	0.05	0.01255	1	0.251
0.03	0.00279	0.05	0.00465	0.1	0.0093
0.3	0.02865	0.5	0.04775	1	0.0955
0.1	0.00805	0.1	0.00805	0.1	0.00805
0.1	0.0064	0.1	0.0064	0.1	0.0064
0.1	0.0073	0.1	0.0073	0.1	0.0073
0.1	0.0091	0.1	0.0091	0.1	0.0091
0.01	0.001005	0.01	0.001005	0.01	0.001005
0.01	0.000985	0.01	0.000985	0.01	0.000985
0.0003	0.0000249	0.0001	0.0000083	0.0001	0.0000083

TEQ (2005 Mammal/1998 Fish & Bird) ND = .5

Mammal 0.266 JQ Fish 0.284 JQ Bird 0.551 JQ

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=1x
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.155	U	0.155
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.139	U	0.139
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.145	U	0.145
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.181	U	0.181
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.211	U	0.211
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.228	U	0.228
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	4.09	JQ	4.09
2,3,7,8-Tetrachlorodibenzofuran	0.251	JQ	0.251
1,2,3,7,8-Pentachlorodibenzofuran	0.186	U	0.186
2,3,4,7,8-Pentachlorodibenzofuran	0.191	U	0.191
1,2,3,4,7,8-Hexachlorodibenzofuran	0.161	U	0.161
1,2,3,6,7,8-Hexachlorodibenzofuran	0.128	U	0.128
2,3,4,6,7,8-Hexachlorodibenzofuran	0.146	U	0.146
1,2,3,7,8,9-Hexachlorodibenzofuran	0.182	U	0.182
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.201	U	0.201
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.197	U	0.197
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.166	U	0.166

JE879
2730002

TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
1	0.155	1	0.155	1	0.155
1	0.139	1	0.139	1	0.139
0.1	0.0145	0.5	0.00725	0.05	0.000725
0.1	0.0181	0.01	0.00181	0.01	0.00181
0.1	0.0211	0.01	0.00211	0.1	0.0211
0.01	0.00228	0.001	0.000228	0.001	0.000228
0.0003	0.001227	0.0001	0.000409	0.0001	0.000409
0.1	0.0251	0.05	0.01255	1	0.251
0.03	0.00558	0.05	0.0093	0.1	0.0186
0.3	0.0573	0.5	0.0955	1	0.191
0.1	0.0161	0.1	0.0161	0.1	0.0161
0.1	0.0128	0.1	0.0128	0.1	0.0128
0.1	0.0146	0.1	0.0146	0.1	0.0146
0.1	0.0182	0.1	0.0182	0.1	0.0182
0.01	0.00201	0.01	0.00201	0.01	0.00201
0.01	0.00197	0.01	0.00197	0.01	0.00197
0.0003	0.0000498	0.0001	0.0000166	0.0001	0.0000166

TEQ (2005 Mammal/1998 Fish & Bird) ND = 1

Mammal 0.505 JQ Fish 0.554 JQ Bird 0.851 JQ

<CRQL

<CRQL

<CRQL

BT 1/12/12

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
JE879

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730002

Sample wt/vol: 12.48 g

Lab File ID: b19sep11b 4-7

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 88.7

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.155	1	.155	1	.155	1	.155
1,2,3,7,8-PeCDD	0.139	1	.139	1	.139	1	.139
1,2,3,4,7,8-HxCDD	0.145	0.1	.0145	0.5	.0725	0.05	.00725
1,2,3,6,7,8-HxCDD	0.181	0.1	.0181	0.01	.00181	0.01	.00181
1,2,3,7,8,9-HxCDD	0.211	0.1	.0211	0.01	.00211	0.1	.0211
1,2,3,4,6,7,8-HpCDD	0.228	0.01	.00228	0.001	.000228	0.001	.000228
1,2,3,4,6,7,8,9-OCDD	4.09	0.0003	.001227	0.0001	.000409	0.0001	.000409
2,3,7,8-TCDF	0.251	0.1	.0251	0.05	.01255	1	.251
1,2,3,7,8-PeCDF	0.186	0.03	.00558	0.05	.0093	0.1	.0186
2,3,4,7,8-PeCDF	0.191	0.3	.0573	0.5	.0955	1	.191
1,2,3,4,7,8-HxCDF	0.161	0.1	.0161	0.1	.0161	0.1	.0161
1,2,3,6,7,8-HxCDF	0.128	0.1	.0128	0.1	.0128	0.1	.0128
1,2,3,7,8,9-HxCDF	.182	0.1	.0182	0.1	.0182	0.1	.0182
2,3,4,6,7,8-HxCDF	0.146	0.1	.0146	0.1	.0146	0.1	.0146
1,2,3,4,6,7,8-HpCDF	0.201	0.01	.00201	0.01	.00201	0.01	.00201
1,2,3,4,7,8,9-HpCDF	0.197	0.01	.00197	0.01	.00197	0.01	.00197
1,2,3,4,6,7,8,9-OCDF	0.166	0.0003	.0000498	0.0001	.0000166	0.0001	.0000166
		Total =	.5049168	Total =	.5541036	Total =	.8510936

NT

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE879

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730002

Sample wt/vol: 12.48 g

Lab File ID: b19sep11b 4-7

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 88.7

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	1	0.0741	JQ	
Total PeCDD	1	0.139	JU	
Total HxCDD	3		JU	0.537
Total HpCDD	2	0.345	JU	
Total TeCDF	2	0.490	JQ	
Total PeCDF	2	0.378	JU	
Total HxCDF	4	0.549	JU	
Total HpCDF	2		JU	0.397

Handwritten notes:
 < CDFL
 MB
 MB, EMPC
 MB
 < CDFL
 MB
 MB
 MB EMPC

Handwritten signature: JAT

**IDFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution**

EPA Sample No.
JE880

Lab Name: Cape Fear Analytical, LLC (CFA)
Lab Code: NC001894 Case No. 41693

Contract: EP10W001070
TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID
Sample wt/vol: 12.31 g
Water Sample Prep: N/A
Concentrated Extract Volume: 20 uL
Injection Volume: 1 uL % Solids/Lipids: 81.7
GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um
Concentration Units: ng/kg

Lab Sample ID: 2730003
Lab File ID: b19sep11b_4-8
Date Received: 02-SEP-11
Date Extracted: 16-SEP-11
Date Analyzed: 21-SEP-11
Dilution Factor: 1

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	0.150
1,2,3,7,8-PeCDD	356/358	32.44	1.7	0.0736	<i>YU</i>	
1,2,3,4,7,8-HxCDD	390/392				U	0.109
1,2,3,6,7,8-HxCDD	390/392				U	0.108
1,2,3,7,8,9-HxCDD	390/392	34.89	1.13	0.0835	<i>YU</i>	
1,2,3,4,6,7,8-HpCDD	424/426	37.34	.82*		<i>YU</i>	0.213
1,2,3,4,6,7,8,9-OCDD	458/460	40.62	.76	0.613	<i>YU</i>	
2,3,7,8-TCDF	304/306	26.62	.8	0.245	<i>JU</i>	
1,2,3,7,8-PeCDF	340/342				U	0.0901
2,3,4,7,8-PeCDF	340/342	32.26	1.42	0.121	<i>YU</i>	
1,2,3,4,7,8-HxCDF	374/376	34.04	1.36	0.0835	<i>YU</i>	
1,2,3,6,7,8-HxCDF	374/376				U	0.0726
1,2,3,7,8,9-HxCDF	374/376				U	0.126
2,3,4,6,7,8-HxCDF	374/376				U	0.0797
1,2,3,4,6,7,8-HpCDF	408/410	36.36	1.14	0.169	<i>YU</i>	
1,2,3,4,7,8,9-HpCDF	408/410				U	0.175
1,2,3,4,6,7,8,9-OCDF	442/444	40.87	1.51*		<i>YU</i>	0.0895

MB

MB

EMPC

MB

MB

MB

EMPC

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	27.48	.82	0.65-0.89	65.9	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	32.42	1.56	1.32-1.78	81.8	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	34.63	1.3	1.05-1.43	73.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	34.69	1.26	1.05-1.43	77.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	37.34	1.05	0.88-1.20	81.5	(23%-140%)
13C-OCDD	470/472	40.63	.93	0.76-1.02	72.6	(17%-157%)
13C-2,3,7,8-TCDF	316/318	26.57	.79	0.65-0.89	67.3	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	31.58	1.56	1.32-1.78	74.3	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	32.24	1.57	1.32-1.78	71.8	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	34.01	.51	0.43-0.59	61.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	34.09	.51	0.43-0.59	70.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	34.51	.52	0.43-0.59	66.6	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	35.12	.52	0.43-0.59	60.3	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	36.34	.46	0.37-0.51	62.5	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	37.83	.45	0.37-0.51	57.7	(26%-138%)
37Cl-2,3,7,8-TCDD	328/NA	27.51	NA	NA	76.9	(35%-197%)

Column to be used to flag values outside QC limits.

MT

Modified 1B-Form I-HR CDD-2

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.15	U	0
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0736	U	0
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.109	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.108	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0835	U	0
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.213	U	0
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.613	U	0
2,3,7,8-Tetrachlorodibenzofuran	0.245	JR	0.245
1,2,3,7,8-Pentachlorodibenzofuran	0.0901	U	0
2,3,4,7,8-Pentachlorodibenzofuran	0.121	U	0
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0835	U	0
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0726	U	0
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0797	U	0
1,2,3,7,8,9-Hexachlorodibenzofuran	0.126	U	0
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.169	U	0
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.175	U	0
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.0895	U	0

JE880
2730003

TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
1	0	1	0	1	0
1	0	1	0	1	0
0.1	0	0.5	0	0.05	0
0.1	0	0.01	0	0.01	0
0.1	0	0.01	0	0.01	0
0.01	0	0.001	0	0.001	0
0.0003	0	0.0001	0	0.0001	0
0.1	0.0245	0.05	0.01225	1	0.245
0.03	0	0.05	0	0.1	0
0.3	0	0.5	0	1	0
0.1	0	0.1	0	0.1	0
0.1	0	0.1	0	0.1	0
0.1	0	0.1	0	0.1	0
0.01	0	0.01	0	0.01	0
0.01	0	0.01	0	0.01	0
0.0003	0	0.0001	0	0.0001	0

TEQ (2005 Mammal/1998 Fish & Bird) ND = 0

Mammal 0.0245 JR Fish 0.0123 JA Bird 0.245 JR

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0.5x
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.15	U	0.075
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0736	U	0.0368
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.109	U	0.0545
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.108	U	0.054
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0835	U	0.04175
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.213	U	0.1065
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.613	U	0.3065
2,3,7,8-Tetrachlorodibenzofuran	0.245	JR	0.245
1,2,3,7,8-Pentachlorodibenzofuran	0.0901	U	0.04505
2,3,4,7,8-Pentachlorodibenzofuran	0.121	U	0.0605
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0835	U	0.04175
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0726	U	0.0363
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0797	U	0.03985
1,2,3,7,8,9-Hexachlorodibenzofuran	0.126	U	0.063
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.169	U	0.0845
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.175	U	0.0875
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.0895	U	0.04475

JE880
2730003

TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
1	0.075	1	0.075	1	0.075
1	0.0368	1	0.0368	1	0.0368
0.1	0.00545	0.5	0.02725	0.05	0.002725
0.1	0.0054	0.01	0.00054	0.01	0.00054
0.1	0.004175	0.01	0.0004175	0.1	0.004175
0.01	0.001065	0.001	0.0001065	0.001	0.0001065
0.0003	0.00009195	0.0001	0.00003065	0.0001	0.00003065
0.1	0.245	0.05	0.01225	1	0.245
0.03	0.0013515	0.05	0.0022525	0.1	0.004505
0.3	0.01815	0.5	0.03025	1	0.0605
0.1	0.004175	0.1	0.004175	0.1	0.004175
0.1	0.00363	0.1	0.00363	0.1	0.00363
0.1	0.003985	0.1	0.003985	0.1	0.003985
0.1	0.0063	0.1	0.0063	0.1	0.0063
0.01	0.000845	0.01	0.000845	0.01	0.000845
0.01	0.000875	0.01	0.000875	0.01	0.000875
0.0003	0.000013425	0.0001	0.000004475	0.0001	0.000004475

TEQ (2005 Mammal/1998 Fish & Bird) ND = .5

Mammal 0.192 JA Fish 0.205 JA Bird 0.449 JA

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=1x
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.15	U	0.15
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0736	U	0.0736
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.109	U	0.109
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.108	U	0.108
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0835	U	0.0835
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.213	U	0.213
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.613	U	0.613
2,3,7,8-Tetrachlorodibenzofuran	0.245	JR	0.245
1,2,3,7,8-Pentachlorodibenzofuran	0.0901	U	0.0901
2,3,4,7,8-Pentachlorodibenzofuran	0.121	U	0.121
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0835	U	0.0835
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0726	U	0.0726
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0797	U	0.0797
1,2,3,7,8,9-Hexachlorodibenzofuran	0.126	U	0.126
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.169	U	0.169
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.175	U	0.175
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.0895	U	0.0895

JE880
2730003

TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
1	0.15	1	0.15	1	0.15
1	0.0736	1	0.0736	1	0.0736
0.1	0.0109	0.5	0.0545	0.05	0.00545
0.1	0.0108	0.01	0.00108	0.01	0.00108
0.1	0.00835	0.01	0.000835	0.1	0.00835
0.01	0.00213	0.001	0.000213	0.001	0.000213
0.0003	0.0001839	0.0001	0.0000613	0.0001	0.0000613
0.1	0.245	0.05	0.01225	1	0.245
0.03	0.002703	0.05	0.004505	0.1	0.00901
0.3	0.0363	0.5	0.0605	1	0.121
0.1	0.00835	0.1	0.00835	0.1	0.00835
0.1	0.00726	0.1	0.00726	0.1	0.00726
0.1	0.00797	0.1	0.00797	0.1	0.00797
0.1	0.0126	0.1	0.0126	0.1	0.0126
0.01	0.00169	0.01	0.00169	0.01	0.00169
0.01	0.00175	0.01	0.00175	0.01	0.00175
0.0003	0.00002685	0.0001	0.00000895	0.0001	0.00000895

TEQ (2005 Mammal/1998 Fish & Bird) ND = 1

Mammal 0.359 JA Fish 0.397 JA Bird 0.653 JA

CRQL
NA 4/12/12

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
JE880

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730003

Sample wt/vol: 12.31 g

Lab File ID: b19sep11b_4-8

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 81.7

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.15	1	.15	1	.15	1	.15
1,2,3,7,8-PeCDD	0.0736	1	.0736	1	.0736	1	.0736
1,2,3,4,7,8-HxCDD	.109	0.1	.0109	0.5	.0545	0.05	.00545
1,2,3,6,7,8-HxCDD	.108	0.1	.0108	0.01	.00108	0.01	.00108
1,2,3,7,8,9-HxCDD	0.0835	0.1	.00835	0.01	.000835	0.1	.00835
1,2,3,4,6,7,8-HpCDD	0.213	0.01	.00213	0.001	.000213	0.001	.000213
1,2,3,4,6,7,8,9-OCDD	0.613	0.0003	.0001839	0.0001	.0000613	0.0001	.0000613
2,3,7,8-TCDF	0.245	0.1	.0245	0.05	.01225	1	.245
1,2,3,7,8-PeCDF	.0901	0.03	.002703	0.05	.004505	0.1	.00901
2,3,4,7,8-PeCDF	0.121	0.3	.0363	0.5	.0605	1	.121
1,2,3,4,7,8-HxCDF	0.0835	0.1	.00835	0.1	.00835	0.1	.00835
1,2,3,6,7,8-HxCDF	.0726	0.1	.00726	0.1	.00726	0.1	.00726
1,2,3,7,8,9-HxCDF	.126	0.1	.0126	0.1	.0126	0.1	.0126
2,3,4,6,7,8-HxCDF	.0797	0.1	.00797	0.1	.00797	0.1	.00797
1,2,3,4,6,7,8-HpCDF	0.169	0.01	.00169	0.01	.00169	0.01	.00169
1,2,3,4,7,8,9-HpCDF	.175	0.01	.00175	0.01	.00175	0.01	.00175
1,2,3,4,6,7,8,9-OCDF	0.0895	0.0003	.00002685	0.0001	.00000895	0.0001	.00000895
		Total =	.35911375	Total =	.39717325	Total =	.65339325

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution

EPA Sample No.
 JE880

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730003

Sample wt/vol: 12.31 g

Lab File ID: b19sep11b 4-8

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 81.7

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	0		U	.15
Total PeCDD	1	0.0736	YU	
Total HxCDD	1	0.0835	YU	
Total HpCDD	2		YU	0.348
Total TeCDF	2	0.439	YQ	
Total PeCDF	1	0.121	YU	
Total HxCDF	1	0.0835	YU	
Total HpCDF	1	0.169	YU	

MB
 MB
 MB, EMPC
 < CRAL
 MB
 MB
 MB

W

Modified 1B-Form I-HR CDD-2

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0776	JR	0.0776
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0656	U	0
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0927	U	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0941	U	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0656	U	0
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.177	U	0
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.619	U	0
2,3,7,8-Tetrachlorodibenzofuran	0.257	JR	0.257
1,2,3,7,8-Pentachlorodibenzofuran	0.0637	U	0
2,3,4,7,8-Pentachlorodibenzofuran	0.0796	U	0
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0776	U	0
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0816	U	0
2,3,4,6,7,8-Hexachlorodibenzofuran	0.105	U	0
1,2,3,7,8,9-Hexachlorodibenzofuran	0.121	U	0
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0557	U	0
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.155	U	0
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.0696	U	0

JE884
2730004

TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
1	0.0776	1	0.0776	1	0.0776
1	0	1	0	1	0
0.1	0	0.5	0	0.05	0
0.1	0	0.01	0	0.01	0
0.1	0	0.01	0	0.1	0
0.001	0	0.001	0	0.001	0
0.0003	0	0.0001	0	0.0001	0
0.1	0.0257	0.05	0.01285	1	0.257
0.03	0	0.05	0	0.1	0
0.3	0	0.5	0	1	0
0.1	0	0.1	0	0.1	0
0.1	0	0.1	0	0.1	0
0.1	0	0.1	0	0.1	0
0.1	0	0.1	0	0.1	0
0.01	0	0.01	0	0.01	0
0.01	0	0.01	0	0.01	0
0.0003	0	0.0001	0	0.0001	0

TEQ (2005 Mammal/1998 Fish & Bird) ND = 0

Mammal 0.103 JR Fish 0.0905 JR Bird 0.335 JR

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0.5x
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0776	J	0.0776
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0656	U	0.0328
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0927	U	0.04635
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0941	U	0.04705
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0656	U	0.0328
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.177	U	0.0885
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.619	U	0.3095
2,3,7,8-Tetrachlorodibenzofuran	0.257	J	0.257
1,2,3,7,8-Pentachlorodibenzofuran	0.0637	U	0.03185
2,3,4,7,8-Pentachlorodibenzofuran	0.0796	U	0.0398
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0776	U	0.0388
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0816	U	0.0408
2,3,4,6,7,8-Hexachlorodibenzofuran	0.105	U	0.0525
1,2,3,7,8,9-Hexachlorodibenzofuran	0.121	U	0.0605
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0557	U	0.02785
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.155	U	0.0775
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.0696	U	0.0348

JE884
2730004

TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
1	0.0776	1	0.0776	1	0.0776
1	0.0328	1	0.0328	1	0.0328
0.1	0.004635	0.5	0.023175	0.05	0.0023175
0.1	0.004705	0.01	0.0004705	0.01	0.0004705
0.1	0.00328	0.01	0.000328	0.1	0.00328
0.01	0.000885	0.001	0.0000885	0.001	0.0000885
0.0003	0.00009285	0.0001	0.00003095	0.0001	0.00003095
0.1	0.0257	0.05	0.01285	1	0.257
0.03	0.0009555	0.05	0.0015925	0.1	0.003185
0.3	0.01194	0.5	0.0199	1	0.0398
0.1	0.00388	0.1	0.00388	0.1	0.00388
0.1	0.00408	0.1	0.00408	0.1	0.00408
0.1	0.00525	0.1	0.00525	0.1	0.00525
0.1	0.0605	0.1	0.0605	0.1	0.0605
0.01	0.0002785	0.01	0.0002785	0.01	0.0002785
0.01	0.000775	0.01	0.000775	0.01	0.000775
0.0003	0.00001044	0.0001	0.00000348	0.0001	0.00000348

TEQ (2005 Mammal/1998 Fish & Bird) ND = .5

Mammal 0.183 JR Fish 0.189 JR Bird 0.437 JR

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=1x
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0776	J	0.0776
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0656	U	0.0656
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0927	U	0.0927
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0941	U	0.0941
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0656	U	0.0656
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.177	U	0.177
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.619	U	0.619
2,3,7,8-Tetrachlorodibenzofuran	0.257	J	0.257
1,2,3,7,8-Pentachlorodibenzofuran	0.0637	U	0.0637
2,3,4,7,8-Pentachlorodibenzofuran	0.0796	U	0.0796
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0776	U	0.0776
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0816	U	0.0816
2,3,4,6,7,8-Hexachlorodibenzofuran	0.105	U	0.105
1,2,3,7,8,9-Hexachlorodibenzofuran	0.121	U	0.121
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0557	U	0.0557
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.155	U	0.155
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.0696	U	0.0696

JE884
2730004

TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
1	0.0776	1	0.0776	1	0.0776
1	0.0656	1	0.0656	1	0.0656
0.1	0.00927	0.5	0.04635	0.05	0.004635
0.1	0.00941	0.01	0.000941	0.01	0.000941
0.1	0.00656	0.01	0.000656	0.1	0.00656
0.01	0.00177	0.001	0.000177	0.001	0.000177
0.0003	0.0001857	0.0001	0.0000619	0.0001	0.0000619
0.1	0.0257	0.05	0.01285	1	0.257
0.03	0.001911	0.05	0.003185	0.1	0.00637
0.3	0.02388	0.5	0.0398	1	0.0796
0.1	0.00776	0.1	0.00776	0.1	0.00776
0.1	0.00816	0.1	0.00816	0.1	0.00816
0.1	0.0105	0.1	0.0105	0.1	0.0105
0.1	0.0121	0.1	0.0121	0.1	0.0121
0.01	0.000557	0.01	0.000557	0.01	0.000557
0.01	0.00155	0.01	0.00155	0.01	0.00155
0.0003	0.00002088	0.0001	0.00000596	0.0001	0.00000596

TEQ (2005 Mammal/1998 Fish & Bird) ND = 1

Mammal 0.263 JR Fish 0.288 JR Bird 0.539 JR

WT 1/12/12

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No. _____
 JE884

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730004

Sample wt/vol: 11.99 g

Lab File ID: b19sep11b 4-9

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 83.9

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	0.0776	1	.0776	1	.0776	1	.0776
1,2,3,7,8-PeCDD	0.0656	1	.0656	1	.0656	1	.0656
1,2,3,4,7,8-HxCDD	.0927	0.1	.00927	0.5	.04635	0.05	.004635
1,2,3,6,7,8-HxCDD	.0941	0.1	.00941	0.01	.000941	0.01	.000941
1,2,3,7,8,9-HxCDD	0.0656	0.1	.00656	0.01	.000656	0.1	.00656
1,2,3,4,6,7,8-HpCDD	0.177	0.01	.00177	0.001	.000177	0.001	.000177
1,2,3,4,6,7,8,9-OCDD	0.619	0.0003	.0001857	0.0001	.0000619	0.0001	.0000619
2,3,7,8-TCDF	0.257	0.1	.0257	0.05	.01285	1	.257
1,2,3,7,8-PeCDF	0.0637	0.03	.001911	0.05	.003185	0.1	.00637
2,3,4,7,8-PeCDF	0.0796	0.3	.02388	0.5	.0398	1	.0796
1,2,3,4,7,8-HxCDF	.0776	0.1	.00776	0.1	.00776	0.1	.00776
1,2,3,6,7,8-HxCDF	0.0816	0.1	.00816	0.1	.00816	0.1	.00816
1,2,3,7,8,9-HxCDF	.121	0.1	.0121	0.1	.0121	0.1	.0121
2,3,4,6,7,8-HxCDF	0.105	0.1	.0105	0.1	.0105	0.1	.0105
1,2,3,4,6,7,8-HpCDF	0.0557	0.01	.000557	0.01	.000557	0.01	.000557
1,2,3,4,7,8,9-HpCDF	.155	0.01	.00155	0.01	.00155	0.01	.00155
1,2,3,4,6,7,8,9-OCDF	0.0696	0.0003	.00002088	0.0001	.00000696	0.0001	.00000696
		Total =	.26253458	Total =	.28785486	Total =	.53917886

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

MT

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE884

Lab Name: Cape Fear Analytical, LLC (CFA)
 Lab Code: NC001894 Case No.: 41693
 Matrix: SOLID
 Sample wt/vol: 11.99 g
 Water Sample Prep: N/A
 Concentrated Extract Volume: 20 uL
 Injection Volume: 1 uL % Solids/Lipids: 83.9
 GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um
 Concentration Units: ng/kg

Contract: EP10W001070
 TO No.: 1935.2 SDG No.: JE878
 Lab Sample ID: 2730004
 Lab File ID: b19sep11b 4-9
 Date Received: 02-SEP-11
 Date Extracted: 16-SEP-11
 Date Analyzed: 21-SEP-11
 Dilution Factor: 1

Homologue	Peaks	Concentration	Q	EMPC/EDL	
Total TeCDD	1	0.0776	JQ		LCEQL
Total PeCDD	1	0.0656	YU		MB
Total HxCDD	2		YU	0.149	MB, EMPC
Total HpCDD	2	0.366	YU		MB
Total TeCDF	2	0.444	JQ		LCEQL
Total PeCDF	2	0.143	YU		MB
Total HxCDF	2		YU	0.187	MB, EMPC
Total HpCDF	2		YU	0.105	MB, EMPC

WAT

1DFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution

EPA Sample No.
JE885

Lab Name: **Cape Fear Analytical, LLC (CFA)**
 Lab Code: **NC001894** Case No. **41693**

Contract: **EP10W001070**
 TO No.: **1935.2**

SDG No.: **JE878**

Matrix: **SOLID**
 Sample wt/vol: **12.48 g**
 Water Sample Prep: **N/A**
 Concentrated Extract Volume: **20 uL**
 Injection Volume: **1 uL** % Solids/Lipids: **81**
 GC Column: **DB-5MS** ID: **60m x 0.25mm, 0.25um**
 Concentration Units **ng/kg**

Lab Sample ID: **2730005**
 Lab File ID: **b19sep11b 4-10**
 Date Received: **02-SEP-11**
 Date Extracted: **16-SEP-11**
 Date Analyzed: **21-SEP-11**
 Dilution Factor: **1**

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	0.131
1,2,3,7,8-PeCDD	356/358				U	0.0617
1,2,3,4,7,8-HxCDD	390/392				U	0.109
1,2,3,6,7,8-HxCDD	390/392	34.73	1.47*		XU	0.0811
1,2,3,7,8,9-HxCDD	390/392				U	0.113
1,2,3,4,6,7,8-HpCDD	424/426	37.35	1.17	0.277	XU	
1,2,3,4,6,7,8,9-OCDD	458/460	40.65	1	0.886	XU	
2,3,7,8-TCDF	304/306	26.61	.82	.0231	JQ	
1,2,3,7,8-PeCDF	340/342				U	0.0627
2,3,4,7,8-PeCDF	340/342	32.26	.81*		XU	0.085
1,2,3,4,7,8-HxCDF	374/376	34.05	1.63*		XU	0.0791
1,2,3,6,7,8-HxCDF	374/376	34.12	1.08	0.0554	XU	
1,2,3,7,8,9-HxCDF	374/376				U	0.0945
2,3,4,6,7,8-HxCDF	374/376	34.54	1.16	0.0415	XU	
1,2,3,4,6,7,8-HpCDF	408/410	36.37	1.12	0.166	XU	
1,2,3,4,7,8,9-HpCDF	408/410				U	0.135
1,2,3,4,6,7,8,9-OCDF	442/444				U	0.165

EMPC
 MB
 MB
 CCRQL
 EMPC
 EMPC
 MB
 MB
 MB

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	27.51	.8	0.65-0.89	72.1	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	32.43	1.55	1.32-1.78	83.5	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	34.64	1.26	1.05-1.43	73.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	34.71	1.26	1.05-1.43	73.2	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	37.36	1.06	0.88-1.20	80.1	(23%-140%)
13C-OCDD	470/472	40.64	.91	0.76-1.02	73.5	(17%-157%)
13C-2,3,7,8-TCDF	316/318	26.59	.81	0.65-0.89	73.3	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	31.6	1.56	1.32-1.78	77.5	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	32.26	1.56	1.32-1.78	75.2	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	34.03	.52	0.43-0.59	64.7	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	34.11	.53	0.43-0.59	67.3	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	34.53	.53	0.43-0.59	67.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	35.13	.52	0.43-0.59	62.0	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	36.35	.46	0.37-0.51	65.0	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	37.85	.45	0.37-0.51	61.8	(26%-138%)
37Cl-2,3,7,8-TCDD	328/NA	27.52	NA	NA	83.4	(35%-197%)

* Column to be used to flag values outside QC limits.

MB

Modified 18-Form I-HR CDD-2

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0	JE885 2730005		TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
				TEF Mammal	TEF-ADJUSTED CONCENTRATION				
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.131	U	0	1	0	1	0	1	0
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0617	U	0	1	0	1	0	1	0
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.109	U	0	0.1	0	0.5	0	0.05	0
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0811	U	0	0.1	0	0.01	0	0.01	0
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.113	U	0	0.1	0	0.01	0	0.1	0
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.277	U	0	0.0003	0	0.001	0	0.001	0
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.886	U	0	0.0003	0	0.0001	0	0.0001	0
2,3,7,8-Tetrachlorodibenzofuran	0.231	Q	0.231	0.1	0.0231	0.05	0.01155	1	0.231
1,2,3,7,8-Pentachlorodibenzofuran	0.0627	U	0	0.03	0	0.05	0	0.1	0
2,3,4,7,8-Pentachlorodibenzofuran	0.085	U	0	0.3	0	0.5	0	1	0
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0791	U	0	0.1	0	0.1	0	0.1	0
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0554	U	0	0.1	0	0.1	0	0.1	0
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0415	U	0	0.1	0	0.1	0	0.1	0
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0945	U	0	0.1	0	0.1	0	0.1	0
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.166	U	0	0.01	0	0.01	0	0.01	0
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.135	U	0	0.01	0	0.01	0	0.01	0
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.165	U	0	0.0003	0	0.0001	0	0.0001	0

TEQ (2005 Mammal/1998 Fish & Bird) ND = 0

Mammal

0.0231 JA

Fish

0.0116 JA

Bird

0.231 JA

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0.5x	JE885 2730005		TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
				TEF Mammal	TEF-ADJUSTED CONCENTRATION				
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.131	U	0.0655	1	0.0655	1	0.0655	1	0.0655
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0617	U	0.03085	1	0.03085	1	0.03085	1	0.03085
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.109	U	0.0545	0.1	0.00545	0.5	0.02725	0.05	0.002725
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0811	U	0.04055	0.1	0.004055	0.01	0.0004055	0.01	0.0004055
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.113	U	0.0565	0.1	0.00565	0.01	0.000565	0.1	0.00565
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.277	U	0.1385	0.01	0.001385	0.001	0.0001385	0.001	0.0001385
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.886	U	0.443	0.0003	0.0001329	0.0001	0.0000443	0.0001	0.0000443
2,3,7,8-Tetrachlorodibenzofuran	0.231	J	0.231	0.1	0.0231	0.05	0.01155	1	0.231
1,2,3,7,8-Pentachlorodibenzofuran	0.0627	U	0.03135	0.03	0.0009405	0.05	0.0015675	0.1	0.003135
2,3,4,7,8-Pentachlorodibenzofuran	0.085	U	0.0425	0.3	0.01275	0.5	0.02125	1	0.0425
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0791	U	0.03955	0.1	0.003955	0.1	0.003955	0.1	0.003955
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0554	U	0.0277	0.1	0.00277	0.1	0.00277	0.1	0.00277
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0415	U	0.02075	0.1	0.002075	0.1	0.002075	0.1	0.002075
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0945	U	0.04725	0.1	0.004725	0.1	0.004725	0.1	0.004725
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.166	U	0.083	0.01	0.00083	0.01	0.00083	0.01	0.00083
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.135	U	0.0675	0.01	0.000675	0.01	0.000675	0.01	0.000675
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.165	U	0.0825	0.0003	0.00002475	0.0001	0.00000825	0.0001	0.00000825

TEQ (2005 Mammal/1998 Fish & Bird) ND = .5

Mammal

0.165 JA

Fish

0.174 JA

Bird

0.397 JA

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=1x	JE885 2730005		TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION
				TEF Mammal	TEF-ADJUSTED CONCENTRATION				
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.131	U	0.131	1	0.131	1	0.131	1	0.131
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0617	U	0.0617	1	0.0617	1	0.0617	1	0.0617
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.109	U	0.109	0.1	0.0109	0.5	0.0545	0.05	0.00545
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0811	U	0.0811	0.1	0.00811	0.01	0.000811	0.01	0.000811
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.113	U	0.113	0.1	0.0113	0.01	0.00113	0.1	0.0113
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.277	U	0.277	0.01	0.00277	0.001	0.000277	0.001	0.000277
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.886	U	0.886	0.0003	0.0002658	0.0001	0.0000886	0.0001	0.0000886
2,3,7,8-Tetrachlorodibenzofuran	0.231	J	0.231	0.1	0.0231	0.05	0.01155	1	0.231
1,2,3,7,8-Pentachlorodibenzofuran	0.0627	U	0.0627	0.03	0.001881	0.05	0.003135	0.1	0.00627
2,3,4,7,8-Pentachlorodibenzofuran	0.085	U	0.085	0.3	0.0255	0.5	0.0425	1	0.085
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0791	U	0.0791	0.1	0.00791	0.1	0.00791	0.1	0.00791
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0554	U	0.0554	0.1	0.00554	0.1	0.00554	0.1	0.00554
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0415	U	0.0415	0.1	0.00415	0.1	0.00415	0.1	0.00415
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0945	U	0.0945	0.1	0.00945	0.1	0.00945	0.1	0.00945
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.166	U	0.166	0.01	0.00166	0.01	0.00166	0.01	0.00166
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.135	U	0.135	0.01	0.00135	0.01	0.00135	0.01	0.00135
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.165	U	0.165	0.0003	0.0000495	0.0001	0.0000165	0.0001	0.0000165

TEQ (2005 Mammal/1998 Fish & Bird) ND = 1

Mammal

0.307 JA

Fish

0.337 JA

Bird

0.563 JA

LCRQL

MT 1/12/12

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
 JE885

Lab Name: Cape Fear Analytical, LLC (CFA)
 Lab Code: NC001894 Case No.: 41693

Contract: EP10W001070
 TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730005

Sample wt/vol: 12.48 g

Lab File ID: b19sep11b 4-10

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 81

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.131	1	.131	1	.131	1	.131
1,2,3,7,8-PeCDD	.0617	1	.0617	1	.0617	1	.0617
1,2,3,4,7,8-HxCDD	.109	0.1	.0109	0.5	.0545	0.05	.00545
1,2,3,6,7,8-HxCDD	0.0811	0.1	.00811	0.01	.000811	0.01	.000811
1,2,3,7,8,9-HxCDD	.113	0.1	.0113	0.01	.00113	0.1	.0113
1,2,3,4,6,7,8-HpCDD	0.277	0.01	.00277	0.001	.000277	0.001	.000277
1,2,3,4,6,7,8,9-OCDD	0.886	0.0003	.0002658	0.0001	.0000886	0.0001	.0000886
2,3,7,8-TCDF	0.231	0.1	.0231	0.05	.01155	1	.231
1,2,3,7,8-PeCDF	.0627	0.03	.001881	0.05	.003135	0.1	.00627
2,3,4,7,8-PeCDF	0.085	0.3	.0255	0.5	.0425	1	.085
1,2,3,4,7,8-HxCDF	0.0791	0.1	.00791	0.1	.00791	0.1	.00791
1,2,3,6,7,8-HxCDF	0.0554	0.1	.00554	0.1	.00554	0.1	.00554
1,2,3,7,8,9-HxCDF	.0945	0.1	.00945	0.1	.00945	0.1	.00945
2,3,4,6,7,8-HxCDF	0.0415	0.1	.00415	0.1	.00415	0.1	.00415
1,2,3,4,6,7,8-HpCDF	0.166	0.01	.00166	0.01	.00166	0.01	.00166
1,2,3,4,7,8,9-HpCDF	.135	0.01	.00135	0.01	.00135	0.01	.00135
1,2,3,4,6,7,8,9-OCDF	.165	0.0003	.0000495	0.0001	.0000165	0.0001	.0000165
		Total =	.3066363 <i>JD</i>	Total =	.3367681 <i>JD</i>	Total =	.5629731 <i>JD</i>

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

W

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE885

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730005

Sample wt/vol: 12.48 g

Lab File ID: b19sep11b 4-10

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 81

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	0		U	.131
Total PeCDD	0		U	.0617
Total HxCDD	1		YU	0.0811
Total HpCDD	2	0.467	YU	
Total TeCDF	3		JH	0.475
Total PeCDF	1		YU	0.085
Total HxCDF	6		YU	0.344
Total HpCDF	1	0.166	YU	

MB, EMPC
MB
EMPC
MB, EMPC
MB, EMPC
MB

Handwritten signature

**1DFA - Form 1-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution**

EPA Sample No.

JE886

Lab Name: Cape Fear Analytical, LLC (CFA)
Lab Code: NC001894 Case No. 41693

Contract: EP10W001070
TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730006

Sample wt/vol: 12.45 g

Lab File ID: b19sep11b 4-11

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 83

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	0.148
1,2,3,7,8-PeCDD	356/358				U	0.0889
1,2,3,4,7,8-HxCDD	390/392				U	0.113
1,2,3,6,7,8-HxCDD	390/392				U	0.117
1,2,3,7,8,9-HxCDD	390/392				U	0.124
1,2,3,4,6,7,8-HpCDD	424/426	37.38	1.09	0.201	<i>Y</i> <i>U</i>	
1,2,3,4,6,7,8,9-OCDD	458/460	40.69	.83	0.680	<i>Y</i> <i>U</i>	
2,3,7,8-TCDF	304/306	26.59	.81	0.186	<i>J</i> <i>Q</i>	
1,2,3,7,8-PeCDF	340/342				U	0.0682
2,3,4,7,8-PeCDF	340/342	32.26	1.34	0.0658	<i>Y</i> <i>U</i>	
1,2,3,4,7,8-HxCDF	374/376				U	0.0689
1,2,3,6,7,8-HxCDF	374/376	34.11	.7*		<i>Y</i> <i>U</i>	
1,2,3,7,8,9-HxCDF	374/376				U	0.110
2,3,4,6,7,8-HxCDF	374/376				U	0.0693
1,2,3,4,6,7,8-HpCDF	408/410	36.33	1.11	0.122	<i>Y</i> <i>U</i>	
1,2,3,4,7,8,9-HpCDF	408/410				U	0.120
1,2,3,4,6,7,8,9-OCDF	442/444				U	0.138

MB
MB
CCPQ
MB
EMPC
MB

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	27.5	.82	0.65-0.89	70.1	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	32.42	1.55	1.32-1.78	89.3	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	34.63	1.26	1.05-1.43	70.7	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	34.7	1.28	1.05-1.43	70.9	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	37.35	1.07	0.88-1.20	84.3	(23%-140%)
13C-OCDD	470/472	40.64	.89	0.76-1.02	81.7	(17%-157%)
13C-2,3,7,8-TCDF	316/318	26.58	.8	0.65-0.89	70.2	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	31.59	1.56	1.32-1.78	81.4	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	32.25	1.57	1.32-1.78	74.0	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	34.02	.52	0.43-0.59	59.7	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	34.1	.53	0.43-0.59	62.4	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	34.52	.53	0.43-0.59	62.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	35.12	.54	0.43-0.59	57.4	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	36.34	.44	0.37-0.51	62.7	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	37.84	.45	0.37-0.51	61.7	(26%-138%)
13C1-2,3,7,8-TCDD	328/NA	27.51	NA	NA	83.1	(35%-197%)

* Columns to be used to flag values outside QC limits.

KAT

Modified 18-Form I-HR CDD-2

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0	TEF		TEF-ADJUSTED		TEF		TEF-ADJUSTED	
				Mammal	Fish	CONCENTRATION	Fish	CONCENTRATION	Bird	CONCENTRATION	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.148	U	0	1	0	0	1	0	1	0	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0889	U	0	1	0	0	1	0	1	0	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.113	U	0	0.1	0	0.5	0	0.05	0	0	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.117	U	0	0.1	0	0.01	0	0.01	0	0	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.124	U	0	0.1	0	0.01	0	0.1	0	0	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.201	U	0	0.01	0	0.001	0	0.001	0	0	
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.68	U	0	0.0003	0	0.0001	0	0.0001	0	0	
2,3,7,8-Tetrachlorodibenzofuran	0.186	JQ	0.186	0.1	0.0186	0.05	0.0093	1	0.186	0.186	
1,2,3,7,8-Pentachlorodibenzofuran	0.0682	U	0	0.03	0	0.05	0	0.1	0	0	
2,3,4,7,8-Pentachlorodibenzofuran	0.0658	U	0	0.3	0	0.5	0	1	0	0	
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0689	U	0	0.1	0	0.1	0	0.1	0	0	
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0755	U	0	0.1	0	0.1	0	0.1	0	0	
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0693	U	0	0.1	0	0.1	0	0.1	0	0	
1,2,3,7,8,9-Hexachlorodibenzofuran	0.11	U	0	0.1	0	0.1	0	0.1	0	0	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.122	U	0	0.01	0	0.01	0	0.01	0	0	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.12	U	0	0.01	0	0.01	0	0.01	0	0	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.138	U	0	0.0003	0	0.0001	0	0.0001	0	0	

TEQ (2005 Mammal/1998 Fish & Bird) ND = 0

Mammal 0.0186 JQ Fish 0.0093 JQ Bird 0.186 JQ

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0.5x	TEF		TEF-ADJUSTED		TEF		TEF-ADJUSTED	
				Mammal	Fish	CONCENTRATION	Fish	CONCENTRATION	Bird	CONCENTRATION	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.148	U	0.074	1	0.074	1	0.074	1	0.074	0.074	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0889	U	0.04445	1	0.04445	1	0.04445	1	0.04445	0.04445	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.113	U	0.0565	0.1	0.00565	0.5	0.02825	0.05	0.02825	0.02825	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.117	U	0.0585	0.1	0.00585	0.01	0.000585	0.01	0.000585	0.000585	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.124	U	0.062	0.1	0.0062	0.01	0.00062	0.1	0.0062	0.0062	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.201	U	0.1005	0.01	0.001005	0.001	0.0001005	0.001	0.0001005	0.0001005	
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.68	U	0.34	0.0003	0.000102	0.0001	0.000034	0.0001	0.000034	0.000034	
2,3,7,8-Tetrachlorodibenzofuran	0.186	JQ	0.186	0.1	0.0186	0.05	0.0093	1	0.186	0.186	
1,2,3,7,8-Pentachlorodibenzofuran	0.0682	U	0.0341	0.03	0.001023	0.05	0.001705	0.1	0.00341	0.00341	
2,3,4,7,8-Pentachlorodibenzofuran	0.0658	U	0.0329	0.3	0.00987	0.5	0.01645	1	0.0329	0.0329	
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0689	U	0.03445	0.1	0.003445	0.1	0.003445	0.1	0.003445	0.003445	
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0755	U	0.03775	0.1	0.003775	0.1	0.003775	0.1	0.003775	0.003775	
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0693	U	0.03465	0.1	0.003465	0.1	0.003465	0.1	0.003465	0.003465	
1,2,3,7,8,9-Hexachlorodibenzofuran	0.11	U	0.055	0.1	0.0055	0.1	0.0055	0.1	0.0055	0.0055	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.122	U	0.061	0.01	0.00061	0.01	0.00061	0.01	0.00061	0.00061	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.12	U	0.06	0.01	0.0006	0.01	0.0006	0.01	0.0006	0.0006	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.138	U	0.069	0.0003	0.0000207	0.0001	0.0000069	0.0001	0.0000069	0.0000069	

TEQ (2005 Mammal/1998 Fish & Bird) ND = .5

Mammal 0.184 JQ Fish 0.193 JQ Bird 0.368 JQ

Client ID

CFA ID

TARGET

ANALYTE

ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=1x	TEF		TEF-ADJUSTED		TEF		TEF-ADJUSTED	
				Mammal	Fish	CONCENTRATION	Fish	CONCENTRATION	Bird	CONCENTRATION	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.148	U	0.148	1	0.148	1	0.148	1	0.148	0.148	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0889	U	0.0889	1	0.0889	1	0.0889	1	0.0889	0.0889	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.113	U	0.113	0.1	0.0113	0.5	0.0565	0.05	0.0565	0.0565	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.117	U	0.117	0.1	0.0117	0.01	0.00117	0.01	0.00117	0.00117	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.124	U	0.124	0.1	0.0124	0.01	0.00124	0.1	0.0124	0.0124	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.201	U	0.201	0.01	0.00201	0.001	0.000201	0.001	0.000201	0.000201	
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.68	U	0.68	0.0003	0.000204	0.0001	0.000068	0.0001	0.000068	0.000068	
2,3,7,8-Tetrachlorodibenzofuran	0.186	JQ	0.186	0.1	0.0186	0.05	0.0093	1	0.186	0.186	
1,2,3,7,8-Pentachlorodibenzofuran	0.0682	U	0.0682	0.03	0.002046	0.05	0.00341	0.1	0.00682	0.00682	
2,3,4,7,8-Pentachlorodibenzofuran	0.0658	U	0.0658	0.3	0.01974	0.5	0.0329	1	0.0658	0.0658	
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0689	U	0.0689	0.1	0.00689	0.1	0.00689	0.1	0.00689	0.00689	
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0755	U	0.0755	0.1	0.00755	0.1	0.00755	0.1	0.00755	0.00755	
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0693	U	0.0693	0.1	0.00693	0.1	0.00693	0.1	0.00693	0.00693	
1,2,3,7,8,9-Hexachlorodibenzofuran	0.11	U	0.11	0.1	0.011	0.1	0.011	0.1	0.011	0.011	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.122	U	0.122	0.01	0.00122	0.01	0.00122	0.01	0.00122	0.00122	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.12	U	0.12	0.01	0.0012	0.01	0.0012	0.01	0.0012	0.0012	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.138	U	0.138	0.0003	0.0000414	0.0001	0.0000138	0.0001	0.0000138	0.0000138	

TEQ (2005 Mammal/1998 Fish & Bird) ND = 1

Mammal 0.350 JQ Fish 0.376 JQ Bird 0.550 JQ

LIT 1/12/12

1DDFD - Form 1-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
JE886

Lab Name: Cape Fear Analytical, LLC (CFA)
 Lab Code: NC001894 Case No.: 41693

Contract: EP10W001070
 TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID
 Sample wt/vol: 12.45 g
 Water Sample Prep: N/A
 Concentrated Extract Volume: 20 uL

Lab Sample ID: 2730006
 Lab File ID: b19sep11b 4-11
 Date Received: 02-SEP-11
 Date Extracted: 16-SEP-11
 Date Analyzed: 21-SEP-11
 Dilution Factor: 1

Injection Volume: 1 uL % Solids/Lipids: 83
 GC Column: DB-5MS ID: 60m x 0.25mm. 0.25um
 Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.148	1	.148	1	.148	1	.148
1,2,3,7,8-PeCDD	.0889	1	.0889	1	.0889	1	.0889
1,2,3,4,7,8-HxCDD	.113	0.1	.0113	0.5	.0565	0.05	.00565
1,2,3,6,7,8-HxCDD	.117	0.1	.0117	0.01	.00117	0.01	.00117
1,2,3,7,8,9-HxCDD	.124	0.1	.0124	0.01	.00124	0.1	.0124
1,2,3,4,6,7,8-HpCDD	0.201	0.01	.00201	0.001	.000201	0.001	.000201
1,2,3,4,6,7,8,9-OCDD	0.680	0.0003	.000204	0.0001	.000068	0.0001	.000068
2,3,7,8-TCDF	0.186	0.1	.0186	0.05	.0093	1	.186
1,2,3,7,8-PeCDF	.0682	0.03	.002046	0.05	.00341	0.1	.00682
2,3,4,7,8-PeCDF	0.0658	0.3	.01974	0.5	.0329	1	.0658
1,2,3,4,7,8-HxCDF	.0689	0.1	.00689	0.1	.00689	0.1	.00689
1,2,3,6,7,8-HxCDF	0.0755	0.1	.00755	0.1	.00755	0.1	.00755
1,2,3,7,8,9-HxCDF	.11	0.1	.011	0.1	.011	0.1	.011
2,3,4,6,7,8-HxCDF	.0693	0.1	.00693	0.1	.00693	0.1	.00693
1,2,3,4,6,7,8-HpCDF	0.122	0.01	.00122	0.01	.00122	0.01	.00122
1,2,3,4,7,8,9-HpCDF	.12	0.01	.0012	0.01	.0012	0.01	.0012
1,2,3,4,6,7,8,9-OCDF	.138	0.0003	.0000414	0.0001	.0000138	0.0001	.0000138
		Total =	.3497314	Total =	.3764928	Total =	.5498128

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

MT

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No.
JE886

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894

Case No.: 41693

TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730006

Sample wt/vol: 12.45 g

Lab File ID: b19sep11b_4-11

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 83

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	0		U	.148
Total PeCDD	0		U	.0889
Total HxCDD	0		U	.113
Total HpCDD	2	0.350	<i>Yh</i>	
Total TeCDF	2	0.325	<i>JQ</i>	
Total PeCDF	1	0.0658	<i>Yh</i>	
Total HxCDF	2		<i>Yh</i>	0.137
Total HpCDF	1	0.122	<i>Yh</i>	

*MB
LCRRL
MB
MB, EMPC
MB*

WNT

**1DFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution**

EPA Sample No.
JE890

Lab Name: Cape Fear Analytical, LLC (CFA)
Lab Code: NC001894 Case No. 41693

Contract: EP10W001070
TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730007

Sample wt/vol: 15.94 g

Lab File ID: b19sep11b 4-12

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 63

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ug/kg

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	0.189
1,2,3,7,8-PeCDD	356/358				U	0.0997
1,2,3,4,7,8-HxCDD	390/392				U	0.135
1,2,3,6,7,8-HxCDD	390/392	34.69	2.88*		X U	0.0956
1,2,3,7,8,9-HxCDD	390/392	34.89	2.35*		X U	0.163
1,2,3,4,6,7,8-HpCDD	424/426	37.36	1.02	1.48	J Q	
1,2,3,4,6,7,8,9-OCDD	458/460	40.64	.94	11.6		
2,3,7,8-TCDF	304/306	26.63	.8	0.281	J Q	
1,2,3,7,8-PeCDF	340/342				U	0.0968
2,3,4,7,8-PeCDF	340/342				U	0.0745
1,2,3,4,7,8-HxCDF	374/376				U	0.0844
1,2,3,6,7,8-HxCDF	374/376	34.1	1.32	0.0796	X U	
1,2,3,7,8,9-HxCDF	374/376				U	0.126
2,3,4,6,7,8-HxCDF	374/376	34.52	1.18	0.0896	X U	
1,2,3,4,6,7,8-HpCDF	408/410	36.35	.8*		X U	0.506
1,2,3,4,7,8,9-HpCDF	408/410				U	0.144
1,2,3,4,6,7,8,9-OCDF	442/444	40.87	.84	1.44	X U	

EMPC
EMPC
LCRQL
LCRQL
MB
MB
EMPC
MB

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	27.48	.79	0.65-0.89	67.8	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	32.42	1.56	1.32-1.78	83.6	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	34.63	1.28	1.05-1.43	67.7	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	34.7	1.28	1.05-1.43	72.6	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	37.34	1.07	0.88-1.20	79.0	(23%-140%)
13C-OCDD	470/472	40.63	.91	0.76-1.02	73.4	(17%-157%)
13C-2,3,7,8-TCDF	316/318	26.57	.8	0.65-0.89	68.5	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	31.59	1.52	1.32-1.78	72.2	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	32.25	1.55	1.32-1.78	74.0	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	34.02	.52	0.43-0.59	63.3	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	34.1	.52	0.43-0.59	61.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	34.51	.53	0.43-0.59	63.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	35.12	.53	0.43-0.59	58.5	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	36.34	.45	0.37-0.51	64.3	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	37.83	.45	0.37-0.51	60.3	(26%-138%)
37Cl-2,3,7,8-TCDD	328/NA	27.51	NA	NA	76.7	(35%-197%)

Column to be used to flag values outside QC limits.

MT

Modified 1B-Form I-HR CDD-2

Client ID	JE890									
CFA ID	2730007									
TARGET ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0	TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.189	U	0	1	0	1	0	1	0	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0997	U	0	1	0	1	0	1	0	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.135	U	0	0.1	0	0.5	0	0.05	0	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0956	U	0	0.1	0	0.01	0	0.01	0	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.163	U	0	0.1	0	0.01	0	0.1	0	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1.48	J	1.48	0.01	0.0148	0.001	0.00148	0.001	0.00148	
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	11.6	J	11.6	0.0003	0.00348	0.0001	0.00116	0.0001	0.00116	
2,3,7,8-Tetrachlorodibenzofuran	0.281	J	0.281	0.1	0.0281	0.05	0.01405	1	0.281	
1,2,3,7,8-Pentachlorodibenzofuran	0.0968	U	0	0.03	0	0.05	0	0.1	0	
2,3,4,7,8-Pentachlorodibenzofuran	0.0745	U	0	0.3	0	0.5	0	1	0	
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0844	U	0	0.1	0	0.1	0	0.1	0	
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0796	U	0	0.1	0	0.1	0	0.1	0	
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0896	U	0	0.1	0	0.1	0	0.1	0	
1,2,3,7,8,9-Hexachlorodibenzofuran	0.126	U	0	0.1	0	0.1	0	0.1	0	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.506	U	0	0.01	0	0.01	0	0.01	0	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.144	U	0	0.01	0	0.01	0	0.01	0	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	1.44	U	0	0.0003	0	0.0001	0	0.0001	0	

TEQ (2005 Mammal/1998 Fish & Bird) ND = 0.

Mammal 0.0464 *JQ* Fish 0.0167 *JQ* Bird 0.284 *JQ*

Client ID	JE890									
CFA ID	2730007									
TARGET ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0.5x	TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.189	U	0.0945	1	0.0945	1	0.0945	1	0.0945	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0997	U	0.04985	1	0.04985	1	0.04985	1	0.04985	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.135	U	0.0675	0.1	0.00675	0.5	0.03375	0.05	0.003375	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0956	U	0.0478	0.1	0.00478	0.01	0.000478	0.01	0.000478	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.163	U	0.0815	0.1	0.00815	0.01	0.000815	0.1	0.00815	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1.48	J	1.48	0.01	0.0148	0.001	0.00148	0.001	0.00148	
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	11.6	J	11.6	0.0003	0.00348	0.0001	0.00116	0.0001	0.00116	
2,3,7,8-Tetrachlorodibenzofuran	0.281	J	0.281	0.1	0.0281	0.05	0.01405	1	0.281	
1,2,3,7,8-Pentachlorodibenzofuran	0.0968	U	0.0484	0.03	0.001452	0.05	0.00242	0.1	0.00484	
2,3,4,7,8-Pentachlorodibenzofuran	0.0745	U	0.03725	0.3	0.011175	0.5	0.018625	1	0.03725	
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0844	U	0.0422	0.1	0.00422	0.1	0.00422	0.1	0.00422	
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0796	U	0.0398	0.1	0.00398	0.1	0.00398	0.1	0.00398	
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0896	U	0.0448	0.1	0.00448	0.1	0.00448	0.1	0.00448	
1,2,3,7,8,9-Hexachlorodibenzofuran	0.126	U	0.063	0.1	0.0063	0.1	0.0063	0.1	0.0063	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.506	U	0.253	0.01	0.00253	0.01	0.00253	0.01	0.00253	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.144	U	0.072	0.01	0.00072	0.01	0.00072	0.01	0.00072	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	1.44	U	0.72	0.0003	0.000216	0.0001	0.000072	0.0001	0.000072	

TEQ (2005 Mammal/1996 Fish & Bird) ND = 5

Mammal 0.245 *JQ* Fish 0.239 *JQ* Bird 0.504 *JQ*

Client ID	JE890									
CFA ID	2730007									
TARGET ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=1x	TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.189	U	0.189	1	0.189	1	0.189	1	0.189	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0997	U	0.0997	1	0.0997	1	0.0997	1	0.0997	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.135	U	0.135	0.1	0.0135	0.5	0.0675	0.05	0.00675	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0956	U	0.0956	0.1	0.00956	0.01	0.000956	0.01	0.000956	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.163	U	0.163	0.1	0.0163	0.01	0.00163	0.1	0.0163	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1.48	J	1.48	0.01	0.0148	0.001	0.00148	0.001	0.00148	
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	11.6	J	11.6	0.0003	0.00348	0.0001	0.00116	0.0001	0.00116	
2,3,7,8-Tetrachlorodibenzofuran	0.281	J	0.281	0.1	0.0281	0.05	0.01405	1	0.281	
1,2,3,7,8-Pentachlorodibenzofuran	0.0968	U	0.0968	0.03	0.002904	0.05	0.00484	0.1	0.00968	
2,3,4,7,8-Pentachlorodibenzofuran	0.0745	U	0.0745	0.3	0.02235	0.5	0.03725	1	0.0745	
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0844	U	0.0844	0.1	0.00844	0.1	0.00844	0.1	0.00844	
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0796	U	0.0796	0.1	0.00796	0.1	0.00796	0.1	0.00796	
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0896	U	0.0896	0.1	0.00896	0.1	0.00896	0.1	0.00896	
1,2,3,7,8,9-Hexachlorodibenzofuran	0.126	U	0.126	0.1	0.0126	0.1	0.0126	0.1	0.0126	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.506	U	0.506	0.01	0.00506	0.01	0.00506	0.01	0.00506	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.144	U	0.144	0.01	0.00144	0.01	0.00144	0.01	0.00144	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	1.44	U	1.44	0.0003	0.000432	0.0001	0.000144	0.0001	0.000144	

TEQ (2005 Mammal/1998 Fish & Bird) ND = 1

Mammal 0.445 *JQ* Fish 0.462 *JQ* Bird 0.725 *JQ*

← CRQL

ANT 1/2/12

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
JE890

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730007

Sample wt/vol: 15.94 g

Lab File ID: b19sep11b_4-12

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 63

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.189	1	.189	1	.189	1	.189
1,2,3,7,8-PeCDD	.0997	1	.0997	1	.0997	1	.0997
1,2,3,4,7,8-HxCDD	.135	0.1	.0135	0.5	.0675	0.05	.00675
1,2,3,6,7,8-HxCDD	0.0956	0.1	.00956	0.01	.000956	0.01	.000956
1,2,3,7,8,9-HxCDD	0.163	0.1	.0163	0.01	.00163	0.1	.0163
1,2,3,4,6,7,8-HpCDD	1.48	0.01	.0148	0.001	.00148	0.001	.00148
1,2,3,4,6,7,8,9-OCDD	11.6	0.0003	.00348	0.0001	.00116	0.0001	.00116
2,3,7,8-TCDF	0.281	0.1	.0281	0.05	.01405	1	.281
1,2,3,7,8-PeCDF	.0968	0.03	.002904	0.05	.00484	0.1	.00968
2,3,4,7,8-PeCDF	.0745	0.3	.02235	0.5	.03725	1	.0745
1,2,3,4,7,8-HxCDF	.0844	0.1	.00844	0.1	.00844	0.1	.00844
1,2,3,6,7,8-HxCDF	0.0796	0.1	.00796	0.1	.00796	0.1	.00796
1,2,3,7,8,9-HxCDF	.126	0.1	.0126	0.1	.0126	0.1	.0126
2,3,4,6,7,8-HxCDF	0.0896	0.1	.00896	0.1	.00896	0.1	.00896
1,2,3,4,6,7,8-HpCDF	0.506	0.01	.00506	0.01	.00506	0.01	.00506
1,2,3,4,7,8,9-HpCDF	.144	0.01	.00144	0.01	.00144	0.01	.00144
1,2,3,4,6,7,8,9-OCDF	1.44	0.0003	.000432	0.0001	.000144	0.0001	.000144
		Total =	.444586	Total =	.46217	Total =	.72513

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

MT

2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution

EPA Sample No.
 JE890

Lab Name: Cape Fear Analytical, LLC (CFA)
 Lab Code: NC001894 Case No.: 41693

Contract: EP10W001070
 TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730007

Sample wt/vol: 15.94 g

Lab File ID: b19sep11b 4-12

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 63

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Homologue	Peaks	Concentration	Q	EMPC/EDL	
Total TeCDD	1	0.494	J Q		LCRQL
Total PeCDD	3	0.641	J Q		LCRQL
Total HxCDD	6		J H	1.73	EMPC
Total HpCDD	2	2.99	J Q		LCRQL
Total TeCDF	6	3.34			
Total PeCDF	3		J H	0.338	MS, EMPC
Total HxCDF	6		J H	0.894	MS, EMPC
Total HpCDF	2		J H	1.37	EMPC

WJ

IDFA - Form I-HR CDD-1
CDD/CDF Sample Data Summary
High Resolution

EPA Sample No. _____
JE893

Lab Name: Cape Fear Analytical, LLC (CFA)
 Lab Code: NC001894 Case No. 41693

Contract: EP10W001070
 TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730008

Sample wt/vol: 11.9 g

Lab File ID: b19sep11b 4-13

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 90.9

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units ng/kg

Target Analyte	Selected Ions	Peak RT	Ion Ratio #	Concentration	Q	EMPC/EDL
2,3,7,8-TCDD	320/322				U	0.119
1,2,3,7,8-PeCDD	356/358				U	0.0575
1,2,3,4,7,8-HxCDD	390/392				U	0.0821
1,2,3,6,7,8-HxCDD	390/392				U	0.083
1,2,3,7,8,9-HxCDD	390/392				U	0.0888
1,2,3,4,6,7,8-HpCDD	424/426	37.39	.96	0.190	X U	
1,2,3,4,6,7,8,9-OCDD	458/460	40.65	.92	0.534	X U	
2,3,7,8-TCDF	304/306	26.59	.72	0.196	J U	
1,2,3,7,8-PeCDF	340/342				U	0.0599
2,3,4,7,8-PeCDF	340/342	32.28	1.59	0.0814	X U	
1,2,3,4,7,8-HxCDF	374/376	34.02	.98*		X U	0.0869
1,2,3,6,7,8-HxCDF	374/376	34.12	.92*		X U	0.0462
1,2,3,7,8,9-HxCDF	374/376				U	0.0958
2,3,4,6,7,8-HxCDF	374/376	34.51	.94*		X U	0.0518
1,2,3,4,6,7,8-HpCDF	408/410	36.35	1.04	0.0943	X U	
1,2,3,4,7,8,9-HpCDF	408/410				U	0.118
1,2,3,4,6,7,8,9-OCDF	442/444				U	0.146

MB
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 EMPC
 EMPC
 MB

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

Labeled Compounds	Selected Ions	Peak RT	Ion Ratio #	Ion Ratio Limits	% Rec #	Recovery Limits
13C-2,3,7,8-TCDD	332/334	27.5	.8	0.65-0.89	68.0	(25%-164%)
13C-1,2,3,7,8-PeCDD	368/370	32.43	1.56	1.32-1.78	82.0	(25%-181%)
13C-1,2,3,4,7,8-HxCDD	402/404	34.64	1.27	1.05-1.43	72.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD	402/404	34.7	1.28	1.05-1.43	72.9	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD	436/438	37.35	1.07	0.88-1.20	82.7	(23%-140%)
13C-OCDD	470/472	40.64	.9	0.76-1.02	76.2	(17%-157%)
13C-2,3,7,8-TCDF	316/318	26.58	.78	0.65-0.89	68.5	(24%-169%)
13C-1,2,3,7,8-PeCDF	352/354	31.59	1.56	1.32-1.78	74.5	(24%-185%)
13C-2,3,4,7,8-PeCDF	352/354	32.25	1.58	1.32-1.78	71.4	(21%-178%)
13C-1,2,3,4,7,8-HxCDF	384/386	34.02	.51	0.43-0.59	64.0	(26%-152%)
13C-1,2,3,6,7,8-HxCDF	384/386	34.11	.51	0.43-0.59	68.7	(26%-123%)
13C-2,3,4,6,7,8-HxCDF	384/386	34.52	.52	0.43-0.59	67.5	(28%-136%)
13C-1,2,3,7,8,9-HxCDF	384/386	35.13	.53	0.43-0.59	60.8	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF	418/420	36.35	.45	0.37-0.51	66.1	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF	418/420	37.84	.44	0.37-0.51	62.5	(26%-138%)
37Cl-2,3,7,8-TCDD	328/NA	27.52	NA	NA	78.7	(35%-197%)

* Column to be used to flag values outside QC limits.

Handwritten signature/initials

Modified 1B-Form I-HR CDD-2

Client ID	JE893									
CFA ID	2730008									
TARGET ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0	TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.119	U	0	1	0	1	0	1	0	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0575	U	0	1	0	1	0	1	0	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0821	U	0	0.1	0	0.5	0	0.05	0	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.083	U	0	0.1	0	0.01	0	0.01	0	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0888	U	0	0.1	0	0.01	0	0.1	0	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.19	U	0	0.01	0	0.001	0	0.001	0	
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.534	U	0	0.0003	0	0.0001	0	0.0001	0	
2,3,7,8-Tetrachlorodibenzofuran	0.196	U	0	0.1	0	0.05	0	1	0	
1,2,3,7,8-Pentachlorodibenzofuran	0.0599	U	0	0.03	0	0.05	0	0.1	0	
2,3,4,7,8-Pentachlorodibenzofuran	0.0814	U	0	0.3	0	0.5	0	1	0	
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0869	U	0	0.1	0	0.1	0	0.1	0	
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0462	U	0	0.1	0	0.1	0	0.1	0	
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0518	U	0	0.1	0	0.1	0	0.1	0	
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0958	U	0	0.1	0	0.1	0	0.1	0	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0943	U	0	0.01	0	0.01	0	0.01	0	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.118	U	0	0.01	0	0.01	0	0.01	0	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.146	U	0	0.0003	0	0.0001	0	0.0001	0	
TEQ (2005 Mammal/1998 Fish & Bird) ND = 0				Mammal	0 U	Fish	0 U	Bird	0 U	

Client ID	JE893									
CFA ID	2730008									
TARGET ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=0.5x	TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.119	U	0.0595	1	0.0595	1	0.0595	1	0.0595	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0575	U	0.02875	1	0.02875	1	0.02875	1	0.02875	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0821	U	0.04105	0.1	0.004105	0.5	0.020525	0.05	0.0020525	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.083	U	0.0415	0.1	0.00415	0.01	0.000415	0.01	0.000415	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0888	U	0.0444	0.1	0.00444	0.01	0.000444	0.1	0.00444	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.19	U	0.095	0.01	0.00095	0.001	0.000095	0.001	0.000095	
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.534	U	0.267	0.0003	0.0000801	0.0001	0.0000267	0.0001	0.0000267	
2,3,7,8-Tetrachlorodibenzofuran	0.196	U	0.098	0.1	0.0098	0.05	0.0049	1	0.098	
1,2,3,7,8-Pentachlorodibenzofuran	0.0599	U	0.02995	0.03	0.0008985	0.05	0.0014975	0.1	0.002995	
2,3,4,7,8-Pentachlorodibenzofuran	0.0814	U	0.0407	0.3	0.01221	0.5	0.02035	1	0.0407	
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0869	U	0.04345	0.1	0.004345	0.1	0.004345	0.1	0.004345	
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0462	U	0.0231	0.1	0.00231	0.1	0.00231	0.1	0.00231	
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0518	U	0.0259	0.1	0.00259	0.1	0.00259	0.1	0.00259	
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0958	U	0.0479	0.1	0.00479	0.1	0.00479	0.1	0.00479	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0943	U	0.04715	0.01	0.0004715	0.01	0.0004715	0.01	0.0004715	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.118	U	0.059	0.01	0.00059	0.01	0.00059	0.01	0.00059	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.146	U	0.073	0.0003	0.0000219	0.0001	0.0000073	0.0001	0.0000073	
TEQ (2005 Mammal/1998 Fish & Bird) ND = .5				Mammal	0.140 U	Fish	0.152 U	Bird	0.252 U	

Client ID	JE893									
CFA ID	2730008									
TARGET ANALYTE	CONCENTRATION or EMPC or EDL	DV Qualifier	Value ND=1x	TEF Mammal	TEF-ADJUSTED CONCENTRATION	TEF Fish	TEF-ADJUSTED CONCENTRATION	TEF Bird	TEF-ADJUSTED CONCENTRATION	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.119	U	0.119	1	0.119	1	0.119	1	0.119	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0575	U	0.0575	1	0.0575	1	0.0575	1	0.0575	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0821	U	0.0821	0.1	0.00821	0.5	0.04105	0.05	0.004105	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.083	U	0.083	0.1	0.0083	0.01	0.00083	0.01	0.00083	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0888	U	0.0888	0.1	0.00888	0.01	0.000888	0.1	0.00888	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.19	U	0.19	0.01	0.0019	0.001	0.00019	0.001	0.00019	
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.534	U	0.534	0.0003	0.0001602	0.0001	0.0000534	0.0001	0.0000534	
2,3,7,8-Tetrachlorodibenzofuran	0.196	U	0.196	0.1	0.0196	0.05	0.0098	1	0.196	
1,2,3,7,8-Pentachlorodibenzofuran	0.0599	U	0.0599	0.03	0.001797	0.05	0.002995	0.1	0.00599	
2,3,4,7,8-Pentachlorodibenzofuran	0.0814	U	0.0814	0.3	0.02442	0.5	0.0407	1	0.0814	
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0869	U	0.0869	0.1	0.00869	0.1	0.00869	0.1	0.00869	
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0462	U	0.0462	0.1	0.00462	0.1	0.00462	0.1	0.00462	
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0518	U	0.0518	0.1	0.00518	0.1	0.00518	0.1	0.00518	
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0958	U	0.0958	0.1	0.00958	0.1	0.00958	0.1	0.00958	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0943	U	0.0943	0.01	0.000943	0.01	0.000943	0.01	0.000943	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.118	U	0.118	0.01	0.00118	0.01	0.00118	0.01	0.00118	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.146	U	0.146	0.0003	0.0000438	0.0001	0.0000146	0.0001	0.0000146	
TEQ (2005 Mammal/1998 Fish & Bird) ND = 1				Mammal	0.280 U	Fish	0.303 U	Bird	0.504 U	

WTS 11/2/12

1DFD - Form I-HR CDD-4
TEF Adjusted Concentration Mammal/Fish/Bird

EPA Sample No.
JE893

Lab Name: Cape Fear Analytical, LLC (CFA)

Contract: EP10W001070

Lab Code: NC001894 Case No.: 41693

TO No.: 1935.2

SDG No.: JE878

Matrix: SOLID

Lab Sample ID: 2730008

Sample wt/vol: 11.9 g

Lab File ID: b19sep11b 4-13

Water Sample Prep: N/A

Date Received: 02-SEP-11

Concentrated Extract Volume: 20 uL

Date Extracted: 16-SEP-11

Injection Volume: 1 uL % Solids/Lipids: 90.9

Date Analyzed: 21-SEP-11

GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um

Dilution Factor: 1

Concentration Units: ng/kg

Target Analyte	Conc.	TEF Mammal	TEF-Adj. Conc.	TEF Fish	TEF-Adj. Conc.	TEF Bird	TEF-Adj. Conc.
2,3,7,8-TCDD	.119	1	.119	1	.119	1	.119
1,2,3,7,8-PeCDD	.0575	1	.0575	1	.0575	1	.0575
1,2,3,4,7,8-HxCDD	.0821	0.1	.00821	0.5	.04105	0.05	.004105
1,2,3,6,7,8-HxCDD	.083	0.1	.0083	0.01	.00083	0.01	.00083
1,2,3,7,8,9-HxCDD	.0888	0.1	.00888	0.01	.000888	0.1	.00888
1,2,3,4,6,7,8-HpCDD	0.190	0.01	.0019	0.001	.00019	0.001	.00019
1,2,3,4,6,7,8,9-OCDD	0.534	0.0003	.0001602	0.0001	.0000534	0.0001	.0000534
2,3,7,8-TCDF	0.196	0.1	.0196	0.05	.0098	1	.196
1,2,3,7,8-PeCDF	.0599	0.03	.001797	0.05	.002995	0.1	.00599
2,3,4,7,8-PeCDF	0.0814	0.3	.02442	0.5	.0407	1	.0814
1,2,3,4,7,8-HxCDF	0.0869	0.1	.00869	0.1	.00869	0.1	.00869
1,2,3,6,7,8-HxCDF	0.0462	0.1	.00462	0.1	.00462	0.1	.00462
1,2,3,7,8,9-HxCDF	.0958	0.1	.00958	0.1	.00958	0.1	.00958
2,3,4,6,7,8-HxCDF	0.0518	0.1	.00518	0.1	.00518	0.1	.00518
1,2,3,4,6,7,8-HpCDF	0.0943	0.01	.000943	0.01	.000943	0.01	.000943
1,2,3,4,7,8,9-HpCDF	.118	0.01	.00118	0.01	.00118	0.01	.00118
1,2,3,4,6,7,8,9-OCDF	.146	0.0003	.0000438	0.0001	.0000146	0.0001	.0000146
		Total =	.280004 <i>u</i>	Total =	.303214 <i>u</i>	Total =	.504156 <i>u</i>

TEF - Toxicity Equivalent Factors from the World Health Organization (WHO) (Mammal 2005, Fish and Bird 1998).

**2DF - Form II-HR CDD
CDD/CDF Total Homologue Concentration Summary
High Resolution**

EPA Sample No. JE893

Lab Name: Cape Fear Analytical, LLC (CFA)
 Lab Code: NC001894 Case No.: 41693
 Matrix: SOLID
 Sample wt/vol: 11.9 g
 Water Sample Prep: N/A
 Concentrated Extract Volume: 20 uL
 Injection Volume: 1 uL % Solids/Lipids: 90.9
 GC Column: DB-5MS ID: 60m x 0.25mm, 0.25um
 Concentration Units: ng/kg

Contract: EP10W001070
 TO No.: 1935.2 SDG No.: JE878
 Lab Sample ID: 2730008
 Lab File ID: b19sep11b 4-13
 Date Received: 02-SEP-11
 Date Extracted: 16-SEP-11
 Date Analyzed: 21-SEP-11
 Dilution Factor: 1

Homologue	Peaks	Concentration	Q	EMPC/EDL
Total TeCDD	0		U	.119
Total PeCDD	0		U	.0575
Total HxCDD	1		X U	0.0592
Total HpCDD	2	0.355	X U	
Total TeCDF	5		X U	0.455
Total PeCDF	1	0.0814	X U	
Total HxCDF	4		X U	0.287
Total HpCDF	1	0.0943	X U	

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ANT



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: February 9, 2012

TO: Linda Ader, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Inorganic Data Summary Check,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data summary check of 7 tissue samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Analysis for metals (EPA SW-846 Methods 6010B and 6020) was performed at the Manchester Environmental Laboratory, Port Orchard, Washington.

The samples were numbered:

11354208 11354209 11354210 11354211 11354212 11354213 11354231

No discrepancies were noted.

The secondary reviewer added the following bias qualifiers to applicable estimated results based on information provided in the Quality Assurance Memorandum:

All estimated calcium, cobalt, and iron results were qualified as estimated quantities with an unknown bias (JK).

All estimated sodium results were qualified as estimated quantities with a high bias (JH).

All estimated silver sample quantitation limits were qualified as estimated quantities with a low bias (UJL).



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

MEMORANDUM

SUBJECT: Data Release for Metals Results from the USEPA Region 10
Laboratory

PROJECT NAME: Makah Reservation Warmhouse Beach Dump SI

PROJECT CODE: TEC-971B

FROM: Gerald Dodo, Chemistry Supervisor
Office of Environmental Assessment
USEPA Region 10 Laboratory

TO: Brandon Perkins, RPM
Office of Environmental Cleanup, Unit #4 Site Clean up,
USEPA Region 10

CC: Renee Nordeen, Ecology and Environment

I have authorized release of this data package. Attached you will find the metals results for the Makah Reservation Warmhouse Beach Dump SI project for the samples collected on 08/30/2011 and 08/31/2011. For further information regarding the attached data, contact Stephanie Le at (360) 871-8715.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

QUALITY ASSURANCE MEMORANDUM
FOR INORGANIC CHEMICAL ANALYSES

DATE: February 8, 2012

TO: Brandon Perkins, Project Manager
Office of Environmental Cleanup, Assessment and Brownfields Unit 1, US EPA Region 10 Laboratory

FROM: Katie Adams, Chemist
Office of Environmental Assessment, US EPA Region 10 Laboratory

SUBJECT: Quality Assurance Review of Makah Reservation Warmhouse Beach Dump SI Project
Tissues for Metals

Project Code: TEC-971B
Account Code: 2011TI0P302DD2C10HVLA00

CC: Renee Nordeen, Ecology and Environment

The following is a quality assurance review of the results of the analysis of 7 tissue samples for metals. These samples were submitted for the Makah Reservation Warmhouse Beach Dump SI project. The analysis was performed by ESAT chemists at the US EPA Region 10 Laboratory in Port Orchard, WA, following US EPA and Laboratory guidelines.

This review was conducted for the following samples:

Tissue

11354208 11354209 11354210 11354211 11354212 11354213 11354231

Data Qualifications

Comments below refer to the quality control specifications outlined in the Laboratory's current Quality Assurance Manual, Standard Operating Procedures (SOPs) and the Quality Assurance Project Plan (QAPP). No excursions were required from the method Standard Operating Procedure.

The quality control measures which did not meet Laboratory /QAPP criteria are annotated in the title of each affected subsection with "Laboratory/QAPP criteria not met".

For those tests for which the USEPA Region 10 Laboratory has been accredited by the National Environmental Laboratory Accreditation Conference (NELAC), all requirements of the current NELAC Standard have been met. The Region 10 Laboratory's Quality System has been accredited to the standards of the National Environmental Laboratory Accreditation Conference (NELAC).

1. Sample Transport and Receipt

Upon sample receipt, all conditions met Laboratory/QAPP requirements for this project.

2. Sample Holding Times

The concentration of an analyte in a sample or sample extract may increase or decrease over time depending on the nature of the analyte. For this reason, holding time limits are recommended for samples. The samples covered by this review met method holding time recommendations, where applicable.

3. Sample Preparation

Samples were prepared according to the method outlined in the SOP for these analytes for this type of matrix. No qualification of the data was required based on sample preparation.

4. Initial Calibration and Calibration Verification – Laboratory/QAPP Criteria not met

The linear regression generated for the initial calibrations met method criteria. The low point of the calibration curve is usually the Minimum Reporting Level (MRL) of the method.

All low-level, mid-range, and high-level calibration verification checks met the frequency and recovery criteria on the day of analysis.

In addition to these checks, a blank calibration check standard is analyzed to demonstrate that the instrument baseline has not drifted during analysis. The blank calibration check standard for cobalt drifted slightly out of acceptance limits on the day of analysis. All cobalt results are qualified (J), estimated, based on this baseline drift.

5. Laboratory Control Samples

All laboratory control sample results met the recovery acceptance criteria for the methods reported. No qualification was required based on laboratory control sample analysis.

6. Blank Analysis

The method blanks did not contain detectable levels of analytes which would require data qualification.

7. Duplicate Analysis – Laboratory/QAPP Criteria not met

Duplicate analysis was performed on sample 11354231. Sample results which were greater than 5 times of the MRL level were within the +/- 35% QAPP RPD requirement, with the exceptions of calcium and iron. All calcium and iron results were qualified (J), estimated, on this basis. No other qualification was required based on duplicate analysis.

8. Matrix Spike/Matrix Spike Duplicate Analysis– Laboratory/QAPP Criteria not met

Matrix spike analyses were performed on sample 11354231. Sample results were within the \pm 75-125% recovery and relative percent difference (RPD) requirements, with the following exceptions: calcium (73%/288%), iron (178%/92%), sodium (105%/132%) and silver (12%/15%). All results for calcium, iron, sodium, and silver were qualified (J), estimated, based on these recoveries. No other qualification was required based on matrix spike analyses.

9. Reference Materials

A reference material was prepared and analyzed with these samples. Analytical values for this sample were within the range of acceptable results. No qualification was necessary based on analysis of the reference material.

10. Interferences

A serial dilution check was analyzed at a 5X dilution to demonstrate that interferences were under control.

11. Reporting Limits

Results are reported on a wet weight basis.

All sample results that fall below the MRL are assigned the value of the MRL and the 'U' qualifier is attached.

12. Data Qualifiers

All cobalt results were qualified (J), estimated, due to instrument drift on the day of analysis. All calcium and iron results were qualified (J), estimated, due to duplicate precision. All calcium, iron, sodium, and silver results were qualified (J), estimated, based on matrix spike recoveries. No other qualification was required.

Below are the definitions for the codes used for qualifying data from these analyses. When more than one quality issue was involved, the most restrictive qualifier has been attached to the data.

U - The analyte was not detected at or above the reported value.

J - The identification of the analyte is acceptable; however, the reported value is an estimate.

The usefulness of qualified data should be treated according to the severity of the qualifier in light of the project's data quality objectives. Should questions arise regarding the data, contact Stephanie Le at the Region 10 Laboratory, phone number (360) 871- 8715.

13. Definitions

Accuracy - the degree of conformity of a measured or calculated quantity to its actual value.

Duplicate Analysis - when a duplicate of a sample (DS), a matrix spike (MSD), or a laboratory control sample (LCSD) is analyzed, it is possible to use the comparison of the results in terms of relative percent difference (RPD) to calculate precision.

Internal standards - Compounds used to help evaluate instrument analytical performance for individual samples. Internal standards provide an instrument response for reference to accurately quantify the analytes for all associated instrumental analyses.

Laboratory Control Sample (LCS) - a clean matrix spiked with known quantities of analytes. The LCS is processed with samples through every step of preparation and analysis. Measuring percent recovery of each analyte in the LCS provides a measurement of accuracy for the analyte in the project samples. A laboratory control sample is prepared and analyzed at a frequency no less than one for every 20 project samples.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) - Sample analyses performed to provide information about the effect of the sample matrix on analyte recovery and measurement within the project samples. To create the MS/MSD, a project sample is spiked with known quantities of analytes and the percent recoveries of the analytes are determined.

Method Blank- An analytical control that is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background and reagent contamination. A method blank is prepared and analyzed for every batch of samples at a minimum frequency of one per every 20 samples. To produce unqualified data, the result of the method blank analysis is required to be less than the MRL and less than 10 times the amount of analyte found in any project sample.

Minimum Reporting Level (MRL) - the smallest measured concentration of a substance that can be reliably measured using a given analytical method.

Peak Integrations - The output of many analytical instruments is a peak which represents the quantity of analyte in the sample. The instrument automatically integrates the peak area to provide the concentration of the analyte; however, sometimes these peaks need to be manually integrated by the analyst.

Precision – the degree of mutual agreement or repeatability among a series of individual results.

Reference materials – Samples with analyte values that are homogeneous and well established. This allows the reference material to be used to assess the accuracy of the measurement method.

Relative Percent Difference – The difference between two sample results divided by their mean and expressed as a percentage.

US EPA Region 10 Laboratory

Multi-Analyte Final Report



Project Code : TEC-971B

Site : MAKAH RESERVATION WARMHOUSE BEACH DUMP SI

Contact : Brandon Perkins

Account : 11T10P302DD2C10HVLA00

Sample : 11354208

Description : EB01TS

Matrix : Tissue

Weight Basis : Dry

Collected : 8/30/2011 10:40:00AM

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7440360	Antimony	0.10	mg/Kg	U	2/2/12	5
7440382	Arsenic	2.1	mg/Kg		2/2/12	5
7440417	Beryllium	0.013	mg/Kg	U	2/2/12	5
7440439	Cadmium	0.85	mg/Kg		2/2/12	5
7440473	Chromium	1.4	mg/Kg		2/2/12	5
7440484	Cobalt	0.097	mg/Kg	J Km	2/2/12	5
7440508	Copper	1.7	mg/Kg		2/2/12	5
7439921	Lead	0.59	mg/Kg		2/2/12	5
7439965	Manganese	3.17	mg/Kg		2/2/12	5
7439987	Molybdenum	0.091	mg/Kg		2/2/12	5
7440020	Nickel	0.91	mg/Kg		2/2/12	5
7782492	Selenium	0.37	mg/Kg		2/2/12	5
7440224	Silver	0.013	mg/Kg	UJ L	2/2/12	5
7440280	Thallium	0.0607	mg/Kg	M	2/2/12	5
7440622	Vanadium	0.56	mg/Kg		2/2/12	5

Sample : 11354209

Description : EB02TS

Matrix : Tissue

Weight Basis : Dry

Collected : 8/30/2011 10:45:00AM

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7440360	Antimony	0.098	mg/Kg	U	2/2/12	5
7440382	Arsenic	2.1	mg/Kg		2/2/12	5
7440417	Beryllium	0.012	mg/Kg	U	2/2/12	5
7440439	Cadmium	0.67	mg/Kg		2/2/12	5
7440473	Chromium	0.28	mg/Kg		2/2/12	5
7440484	Cobalt	0.048	mg/Kg	J K _{mu}	2/2/12	5
7440508	Copper	1.8	mg/Kg		2/2/12	5
7439921	Lead	0.25	mg/Kg	U	2/2/12	5
7439965	Manganese	0.60	mg/Kg		2/2/12	5
7439987	Molybdenum	0.073	mg/Kg		2/2/12	5
7440020	Nickel	0.38	mg/Kg		2/2/12	5
7782492	Selenium	0.35	mg/Kg		2/2/12	5
7440224	Silver	0.012	mg/Kg	UJ L _{mu}	2/2/12	5
7440280	Thallium	0.0246	mg/Kg	U	2/2/12	5
7440622	Vanadium	0.12	mg/Kg		2/2/12	5

Sample : 11354210

Description : EB03TS

Matrix : Tissue

Weight Basis : Dry

Collected : 8/30/2011 10:55:00AM

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7440360	Antimony	0.099	mg/Kg	U	2/2/12	5
7440382	Arsenic	2.3	mg/Kg		2/2/12	5
7440417	Beryllium	0.012	mg/Kg	U	2/2/12	5
7440439	Cadmium	0.86	mg/Kg		2/2/12	5
7440473	Chromium	0.68	mg/Kg		2/2/12	5
7440484	Cobalt	0.074	mg/Kg	JKaw	2/2/12	5
7440508	Copper	1.6	mg/Kg		2/2/12	5
7439921	Lead	0.25	mg/Kg	U	2/2/12	5
7439965	Manganese	0.96	mg/Kg		2/2/12	5
7439987	Molybdenum	0.097	mg/Kg		2/2/12	5
7440020	Nickel	0.53	mg/Kg		2/2/12	5
7782492	Selenium	0.32	mg/Kg		2/2/12	5
7440224	Silver	0.012	mg/Kg	UJLm	2/2/12	5
7440280	Thallium	0.0691	mg/Kg		2/2/12	5
7440622	Vanadium	0.24	mg/Kg		2/2/12	5

Sample : 11354211

Description : WB01TS

Matrix : Tissue

Weight Basis : Dry

Collected : 8/31/2011 9:20:00AM

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7440360	Antimony	0.087	mg/Kg	U	2/2/12	5
7440382	Arsenic	3.19	mg/Kg		2/2/12	5
7440417	Beryllium	0.011	mg/Kg	U	2/2/12	5
7440439	Cadmium	0.64	mg/Kg		2/2/12	5
7440473	Chromium	2.53	mg/Kg		2/2/12	5
7440484	Cobalt	0.10	mg/Kg	J Km	2/2/12	5
7440508	Copper	4.03	mg/Kg		2/2/12	5
7439921	Lead	0.22	mg/Kg		2/2/12	5
7439965	Manganese	2.37	mg/Kg		2/2/12	5
7439987	Molybdenum	0.099	mg/Kg		2/2/12	5
7440020	Nickel	1.6	mg/Kg		2/2/12	5
7782492	Selenium	0.48	mg/Kg		2/2/12	5
7440224	Silver	0.011	mg/Kg	UJ Lpw	2/2/12	5
7440280	Thallium	0.0996	mg/Kg		2/2/12	5
7440622	Vanadium	0.37	mg/Kg		2/2/12	5

Sample : 11354212

Description : WB02TS

Matrix : Tissue

Weight Basis : Dry

Collected : 8/31/2011 9:10:00AM

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7440360	Antimony	0.098	mg/Kg	U	2/2/12	5
7440382	Arsenic	2.95	mg/Kg		2/2/12	5
7440417	Beryllium	0.012	mg/Kg	U	2/2/12	5
7440439	Cadmium	0.62	mg/Kg		2/2/12	5
7440473	Chromium	0.90	mg/Kg		2/2/12	5
7440484	Cobalt	0.085	mg/Kg	JKR	2/2/12	5
7440508	Copper	2.1	mg/Kg		2/2/12	5
7439921	Lead	0.50	mg/Kg		2/2/12	5
7439965	Manganese	1.3	mg/Kg		2/2/12	5
7439987	Molybdenum	0.11	mg/Kg		2/2/12	5
7440020	Nickel	0.91	mg/Kg		2/2/12	5
7782492	Selenium	0.48	mg/Kg		2/2/12	5
7440224	Silver	0.012	mg/Kg	UJLW	2/2/12	5
7440280	Thallium	0.124	mg/Kg		2/2/12	5
7440622	Vanadium	0.21	mg/Kg		2/2/12	5

Sample : 11354213

Description : WB03TS

Matrix : Tissue

Weight Basis : Dry

Collected : 8/31/2011 9:25:00AM

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7440360	Antimony	0.093	mg/Kg	U	2/2/12	5
7440382	Arsenic	3.55	mg/Kg		2/2/12	5
7440417	Beryllium	0.012	mg/Kg	U	2/2/12	5
7440439	Cadmium	0.76	mg/Kg		2/2/12	5
7440473	Chromium	1.9	mg/Kg		2/2/12	5
7440484	Cobalt	0.11	mg/Kg	JK No	2/2/12	5
7440508	Copper	3.40	mg/Kg		2/2/12	5
7439921	Lead	0.67	mg/Kg		2/2/12	5
7439965	Manganese	3.37	mg/Kg		2/2/12	5
7439987	Molybdenum	0.11	mg/Kg		2/2/12	5
7440020	Nickel	1.4	mg/Kg		2/2/12	5
7782492	Selenium	0.56	mg/Kg		2/2/12	5
7440224	Silver	0.012	mg/Kg	UJLW	2/2/12	5
7440280	Thallium	0.0897	mg/Kg		2/2/12	5
7440622	Vanadium	0.38	mg/Kg		2/2/12	5

Sample : 11354231

Description : BK01TS

Matrix : Tissue

Weight Basis : Dry

Collected : 8/31/2011 10:05:00AM

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis	
					Date	Dilution
Target Analyte Results:						
7440360	Antimony	0.096	mg/Kg	U	2/2/12	5
7440382	Arsenic	2.1	mg/Kg		2/2/12	5
7440417	Beryllium	0.012	mg/Kg	U	2/2/12	5
7440439	Cadmium	0.99	mg/Kg		2/2/12	5
7440473	Chromium	0.51	mg/Kg		2/2/12	5
7440484	Cobalt	0.11	mg/Kg	J Km	2/2/12	5
7440508	Copper	1.6	mg/Kg		2/2/12	5
7439921	Lead	0.24	mg/Kg	U	2/2/12	5
7439965	Manganese	1.2	mg/Kg		2/2/12	5
7439987	Molybdenum	0.11	mg/Kg		2/2/12	5
7440020	Nickel	0.57	mg/Kg		2/2/12	5
7782492	Selenium	0.38	mg/Kg		2/2/12	5
7440224	Silver	0.012	mg/Kg	UJ Lm	2/2/12	5
7440280	Thallium	0.0522	mg/Kg		2/2/12	5
7440622	Vanadium	0.22	mg/Kg		2/2/12	5

Sample : 11354231 Sample Duplicate

Description : BK01TS

Matrix : Tissue

Weight Basis : Dry

Collected : 8/31/2011 10:05:00AM

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result Unit	Qual.	Analysis	
				Date	Dilution
Target Analyte Results:					
7440360	Antimony	0.093 mg/Kg	U	2/2/12	5
7440382	Arsenic	2.1 mg/Kg		2/2/12	5
7440417	Beryllium	0.012 mg/Kg	U	2/2/12	5
7440439	Cadmium	0.93 mg/Kg		2/2/12	5
7440473	Chromium	0.50 mg/Kg		2/2/12	5
7440484	Cobalt	0.095 mg/Kg	J K _{mu}	2/2/12	5
7440508	Copper	1.6 mg/Kg		2/2/12	5
7439921	Lead	0.23 mg/Kg	U	2/2/12	5
7439965	Manganese	0.78 mg/Kg		2/2/12	5
7439987	Molybdenum	0.093 mg/Kg		2/2/12	5
7440020	Nickel	0.56 mg/Kg		2/2/12	5
7782492	Selenium	0.38 mg/Kg		2/2/12	5
7440224	Silver	0.012 mg/Kg	U	2/2/12	5
7440280	Thallium	0.0863 mg/Kg		2/2/12	5
7440622	Vanadium	0.19 mg/Kg		2/2/12	5

Sample : 11354231 Matrix Spike

Description : BK01TS

Matrix : Tissue

Weight Basis : Dry

Collected : 8/31/2011 10:05:00AM

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Spiked Compounds:						
7440360	Antimony	96 %			2/2/12	5
7440382	Arsenic	98 %			2/2/12	5
7440417	Beryllium	90 %			2/2/12	5
7440439	Cadmium	93 %			2/2/12	5
7440473	Chromium	96 %			2/2/12	5
7440484	Cobalt	95 %			2/2/12	5
7440508	Copper	93 %			2/2/12	5
7439921	Lead	97 %			2/2/12	5
7439965	Manganese	99 %			2/2/12	5
7439987	Molybdenum	97 %			2/2/12	5
7440020	Nickel	97 %			2/2/12	5
7782492	Selenium	95 %			2/2/12	5
7440224	Silver	12 %			2/2/12	5
7440280	Thallium	98 %			2/2/12	5
7440622	Vanadium	97 %			2/2/12	5

Sample : 11354231 Matrix Spike#2

Description : BK01TS

Matrix : Tissue

Collected : 8/31/2011 10:05:00AM

Weight Basis : Dry

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Spiked Compounds:						
7440360	Antimony	97 %			2/2/12	5
7440382	Arsenic	97 %			2/2/12	5
7440417	Beryllium	88 %			2/2/12	5
7440439	Cadmium	93 %			2/2/12	5
7440473	Chromium	97 %			2/2/12	5
7440484	Cobalt	96 %			2/2/12	5
7440508	Copper	94 %			2/2/12	5
7439921	Lead	98 %			2/2/12	5
7439965	Manganese	96 %			2/2/12	5
7439987	Molybdenum	96 %			2/2/12	5
7440020	Nickel	98 %			2/2/12	5
7782492	Selenium	94 %			2/2/12	5
7440224	Silver	15 %			2/2/12	5
7440280	Thallium	97 %			2/2/12	5
7440622	Vanadium	98 %			2/2/12	5

Sample : IT012112ABL Blank

Description : Blank

Matrix : Tissue

Weight Basis : Dry

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7440360	Antimony	0.10	mg/Kg	U	2/1/12	5
7440382	Arsenic	0.010	mg/Kg	U	2/1/12	5
7440417	Beryllium	0.013	mg/Kg	U	2/1/12	5
7440439	Cadmium	0.010	mg/Kg	U	2/1/12	5
7440473	Chromium	0.10	mg/Kg	U	2/1/12	5
7440484	Cobalt	0.010	mg/Kg	U	2/1/12	5
7440508	Copper	0.25	mg/Kg	U	2/1/12	5
7439921	Lead	0.25	mg/Kg	U	2/1/12	5
7439965	Manganese	0.050	mg/Kg	U	2/1/12	5
7439987	Molybdenum	0.025	mg/Kg	U	2/1/12	5
7440020	Nickel	0.10	mg/Kg	U	2/1/12	5
7782492	Selenium	0.025	mg/Kg	U	2/1/12	5
7440224	Silver	0.013	mg/Kg	U	2/1/12	5
7440280	Thallium	0.0250	mg/Kg	U	2/1/12	5
7440622	Vanadium	0.015	mg/Kg	U	2/1/12	5

Sample : IT012112AL1 Lab Control Std

Description : Lab Control Standard

Matrix : Tissue

Weight Basis : Dry

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Spiked Compounds:						
7440360	Antimony	98	%		2/1/12	5
7440382	Arsenic	101	%		2/1/12	5
7440417	Beryllium	93	%		2/1/12	5
7440439	Cadmium	98	%		2/1/12	5
7440473	Chromium	101	%		2/1/12	5
7440484	Cobalt	98	%		2/1/12	5
7440508	Copper	98	%		2/1/12	5
7439921	Lead	99	%		2/1/12	5
7439965	Manganese	101	%		2/1/12	5
7439987	Molybdenum	99	%		2/1/12	5
7440020	Nickel	102	%		2/1/12	5
7782492	Selenium	99	%		2/1/12	5
7440224	Silver	101	%		2/1/12	5
7440280	Thallium	100	%		2/1/12	5
7440622	Vanadium	100	%		2/1/12	5

Sample : IT012112AL2 Lab Control Std#2

Description : Lab Control Standard Dup.

Matrix : Tissue

Weight Basis : Dry

Parameter : ICP/MS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6020 - ICPMS (15 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Spiked Compounds:						
7440360	Antimony	97 %			2/1/12	5
7440382	Arsenic	98 %			2/1/12	5
7440417	Beryllium	90 %			2/1/12	5
7440439	Cadmium	94 %			2/1/12	5
7440473	Chromium	98 %			2/1/12	5
7440484	Cobalt	96 %			2/1/12	5
7440508	Copper	96 %			2/1/12	5
7439921	Lead	97 %			2/1/12	5
7439965	Manganese	99 %			2/1/12	5
7439987	Molybdenum	97 %			2/1/12	5
7440020	Nickel	99 %			2/1/12	5
7782492	Selenium	97 %			2/1/12	5
7440224	Silver	98 %			2/1/12	5
7440280	Thallium	98 %			2/1/12	5
7440622	Vanadium	97 %			2/1/12	5

US EPA Region 10 Laboratory

Multi-Analyte Final Report



Project Code : TEC-971B

Site : MAKAH RESERVATION WARMHOUSE BEACH DUMP SI

Contact : Brandon Perkins

Account : 11T10P302DD2C10HVLA00

Sample : 11354208

Description : EB01TS

Matrix : Tissue

Collected : 8/30/2011 10:40:00AM

Weight Basis : Wet

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:					
7429905	Aluminum	156 mg/Kg		1/25/12	4
7440393	Barium	0.96 mg/Kg		1/25/12	4
7440702	Calcium	1000 mg/Kg	J K _{HW}	1/25/12	4
7439896	Iron	170 mg/Kg	J K _{HW}	1/25/12	4
7439954	Magnesium	823 mg/Kg		1/25/12	4
7440097	Potassium	1400 mg/Kg		1/25/12	4
7440235	Sodium	5200 mg/Kg	J H _{HW}	1/25/12	4
7440666	Zinc	22.0 mg/Kg		1/25/12	4

Sample : 11354209

Description : EB02TS

Matrix : Tissue

Collected : 8/30/2011 10:45:00AM

Weight Basis : Wet

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:					
7429905	Aluminum	12 mg/Kg	U	1/25/12	4
7440393	Barium	0.39 mg/Kg	U	1/25/12	4
7440702	Calcium	710 mg/Kg	J K _{HW}	1/25/12	4
7439896	Iron	26 mg/Kg	J K _{HW}	1/25/12	4
7439954	Magnesium	804 mg/Kg		1/25/12	4
7440097	Potassium	1520 mg/Kg		1/25/12	4
7440235	Sodium	5900 mg/Kg	J H _{HW}	1/25/12	4
7440666	Zinc	19.9 mg/Kg		1/25/12	4

Sample : 11354210

Description : EB03TS

Matrix : Tissue

Collected : 8/30/2011 10:55:00AM

Weight Basis : Wet

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7429905	Aluminum	27	mg/Kg		1/25/12	4
7440393	Barium	0.40	mg/Kg	U	1/25/12	4
7440702	Calcium	2100	mg/Kg	J <i>Kmu</i>	1/25/12	4
7439896	Iron	58	mg/Kg	J <i>Kmu</i>	1/25/12	4
7439954	Magnesium	849	mg/Kg		1/25/12	4
7440097	Potassium	1200	mg/Kg		1/25/12	4
7440235	Sodium	6100	mg/Kg	J <i>Hmu</i>	1/25/12	4
7440666	Zinc	18.4	mg/Kg		1/25/12	4

Sample : 11354211

Description : WB01TS

Matrix : Tissue

Collected : 8/31/2011 9:20:00AM

Weight Basis : Wet

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7429905	Aluminum	77.9	mg/Kg		1/25/12	4
7440393	Barium	0.35	mg/Kg		1/25/12	4
7440702	Calcium	940	mg/Kg	J <i>Kmu</i>	1/25/12	4
7439896	Iron	130	mg/Kg	J <i>Kmu</i>	1/25/12	4
7439954	Magnesium	852	mg/Kg		1/25/12	4
7440097	Potassium	2070	mg/Kg		1/25/12	4
7440235	Sodium	5500	mg/Kg	J <i>Hmu</i>	1/25/12	4
7440666	Zinc	30.5	mg/Kg		1/25/12	4

Sample : 11354212

Description : WB02TS

Matrix : Tissue

Collected : 8/31/2011 9:10:00AM

Weight Basis : Wet

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7429905	Aluminum	23	mg/Kg		1/25/12	4
7440393	Barium	0.39	mg/Kg	U	1/25/12	4
7440702	Calcium	3600	mg/Kg	J	1/25/12	4
7439896	Iron	58	mg/Kg	J	1/25/12	4
7439954	Magnesium	921	mg/Kg		1/25/12	4
7440097	Potassium	1910	mg/Kg		1/25/12	4
7440235	Sodium	6600	mg/Kg	J	1/25/12	4
7440666	Zinc	29.2	mg/Kg		1/25/12	4

Sample : 11354213

Description : WB03TS

Matrix : Tissue

Collected : 8/31/2011 9:25:00AM

Weight Basis : Wet

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7429905	Aluminum	82.7	mg/Kg		1/25/12	4
7440393	Barium	0.37	mg/Kg		1/25/12	4
7440702	Calcium	2600	mg/Kg	J	1/25/12	4
7439896	Iron	180	mg/Kg	J	1/25/12	4
7439954	Magnesium	911	mg/Kg		1/25/12	4
7440097	Potassium	2220	mg/Kg		1/25/12	4
7440235	Sodium	6100	mg/Kg	J	1/25/12	4
7440666	Zinc	34.8	mg/Kg		1/25/12	4

Sample : 11354231

Description : BK01TS

Matrix : Tissue

Weight Basis : Wet

Collected : 8/31/2011 10:05:00AM

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result Unit	Qual.	Analysis	
				Date	Dilution
Target Analyte Results:					
7429905	Aluminum	32 mg/Kg		1/25/12	4
7440393	Barium	0.38 mg/Kg	U	1/25/12	4
7440702	Calcium	1500 mg/Kg	J <i>K</i>	1/25/12	4
7439896	Iron	62 mg/Kg	J <i>K</i>	1/25/12	4
7439954	Magnesium	955 mg/Kg		1/25/12	4
7440097	Potassium	1480 mg/Kg		1/25/12	4
7440235	Sodium	6800 mg/Kg	J <i>H</i>	1/25/12	4
7440666	Zinc	21.6 mg/Kg		1/25/12	4

Sample : 11354231 Sample Duplicate

Description : BK01TS

Matrix : Tissue

Weight Basis : Wet

Collected : 8/31/2011 10:05:00AM

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result Unit	Qual.	Analysis	
				Date	Dilution
Target Analyte Results:					
7429905	Aluminum	23 mg/Kg		1/25/12	4
7440393	Barium	0.37 mg/Kg	U	1/25/12	4
7440702	Calcium	920 mg/Kg	J <i>K</i>	1/25/12	4
7439896	Iron	43 mg/Kg	J <i>K</i>	1/25/12	4
7439954	Magnesium	928 mg/Kg		1/25/12	4
7440097	Potassium	1480 mg/Kg		1/25/12	4
7440235	Sodium	6800 mg/Kg	J <i>H</i>	1/25/12	4
7440666	Zinc	21.2 mg/Kg		1/25/12	4

Sample : 11354231 Matrix Spike

Description : BK01TS

Matrix : Tissue

Collected : 8/31/2011 10:05:00AM

Weight Basis : Wet

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Spiked Compounds:						
7429905	Aluminum	110	%Rec		1/25/12	4
7440393	Barium	104	%Rec		1/25/12	4
7440702	Calcium	73	%Rec		1/25/12	4
7439896	Iron	178	%Rec		1/25/12	4
7439954	Magnesium	100	%Rec		1/25/12	4
7440097	Potassium	101	%Rec		1/25/12	4
7440235	Sodium	105	%Rec		1/25/12	4
7440666	Zinc	105	%Rec		1/25/12	4

Sample : 11354231 Matrix Spike#2

Description : BK01TS

Matrix : Tissue

Collected : 8/31/2011 10:05:00AM

Weight Basis : Wet

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Spiked Compounds:						
7429905	Aluminum	94	%Rec		1/25/12	4
7440393	Barium	107	%Rec		1/25/12	4
7440702	Calcium	288	%Rec		1/25/12	4
7439896	Iron	92	%Rec		1/25/12	4
7439954	Magnesium	99	%Rec		1/25/12	4
7440097	Potassium	110	%Rec		1/25/12	4
7440235	Sodium	132	%Rec		1/25/12	4
7440666	Zinc	99	%Rec		1/25/12	4

Sample : IT012112ABL Blank

Description : Blank

Matrix : Tissue

Weight Basis : Wet

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
7429905	Aluminum	12	mg/Kg	U	1/25/12	4
7440393	Barium	0.40	mg/Kg	U	1/25/12	4
7440702	Calcium	12	mg/Kg	U	1/25/12	4
7439896	Iron	8.0	mg/Kg	U	1/25/12	4
7439954	Magnesium	20	mg/Kg	U	1/25/12	4
7440097	Potassium	280	mg/Kg	U	1/25/12	4
7440235	Sodium	40	mg/Kg	U	1/25/12	4
7440666	Zinc	2.0	mg/Kg	U	1/25/12	4

Sample : IT012112AL1 Lab Control Std

Description : Lab Control Standard

Matrix : Tissue

Weight Basis : Wet

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Spiked Compounds:						
7429905	Aluminum	95	%Rec		1/25/12	4
7440393	Barium	105	%Rec		1/25/12	4
7440702	Calcium	101	%Rec		1/25/12	4
7439896	Iron	102	%Rec		1/25/12	4
7439954	Magnesium	100	%Rec		1/25/12	4
7440097	Potassium	99	%Rec		1/25/12	4
7440235	Sodium	105	%Rec		1/25/12	4
7440666	Zinc	104	%Rec		1/25/12	4

Sample : IT012112AL2 Lab Control Std#2

Description : Lab Control Standard Dup.

Matrix : Tissue

Weight Basis : Dry

Parameter : ICP-SAS

Fraction : Total

Prep Method: 3052-M - (MOD) Microwave Assisted Acid Digestion of Siliceous and Organic Matrices

Analysis Method: 6010B - Inductively Coupled Plasma-Atomic Emission Spectrometry, SW-846 (22 elements)

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Spiked Compounds:						
7429905	Aluminum	95	%Rec		1/25/12	4
7440393	Barium	104	%Rec		1/25/12	4
7440702	Calcium	109	%Rec		1/25/12	4
7439896	Iron	103	%Rec		1/25/12	4
7439954	Magnesium	101	%Rec		1/25/12	4
7440097	Potassium	97	%Rec		1/25/12	4
7440235	Sodium	103	%Rec		1/25/12	4
7440666	Zinc	107	%Rec		1/25/12	4



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720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 19, 2011

TO: Linda Costello, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Summary Check,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data summary check of two soil samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Analysis for Aroclors (EPA CLP SOW SOM01.2) was performed by ALS Laboratory Group, Salt Lake City, Utah.

The samples were numbered: JE868 JE870

No discrepancies were noted.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

October 19, 2011

Reply to: Donald M. Brown
Attn of: OEA-095

MEMORANDUM

Subject: Data Validation Report for the Aroclor Analysis of the Soil Samples Collected from the Makah Reservation Warmhouse Beach Dump Site - Case Number 41693, SDG JE868

From: Donald M. Brown, QA Chemist^{Dmb}
USEPA Region 10, Office of Environmental Assessment, Environmental Services Unit

To: Brandon Perkins, Site Assessment Manager
USEPA Region 10, Office of Environmental Cleanup

CC: Renee Nordeen, Ecology & Environment, Inc.

The quality assurance (QA) review of the analytical data generated from the analysis of two (2) soil samples collected from the above referenced site has been completed. These samples were analyzed for Aroclors by ALS Laboratory Group (DATAC) located in Salt Lake City, Utah.

All sample analyses were evaluated following EPA's Stage 4 Data Validation Electronic/Manual Process (S4VEM). The validation was conducted and appropriate qualifiers were applied according to the Quality Control Specifications outlined in the Sampling & Quality Assurance Plan for Makah Reservation Warmhouse Beach Dump (August 2011); the technical specifications of the EPA Contract Laboratory Program's (CLP) Statement of Work (SOW) for Multi-Media, Multi-Concentration Organic Analyses (SOM01.2); the Contract Laboratory Program's National Functional Guidelines for Organic Data Review; and the Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (EPA-540-R08-005). Some of the data quality elements were qualified using the reviewer's professional judgment. The conclusions presented herein are based on the information provided for the review.

Samples JE868 and JE870 exceeded the percent moisture requirement (i.e. greater than 70% moisture). The results associated with these samples were considered estimates and qualified "UJK".

A summary of samples evaluated in this validation report and the pertinent dates for sample collection, sample receipt at the laboratory, extraction, and analyses is attached along with the validated data.

I. QUALITY CONTROL RESULTS SUMMARY

Aroclor Analysis		
Quality Control Test	Outliers?	Evaluation Criteria
Blanks	N	Non-detect or < 10X Blank
Initial Calibration	N	< 20% RSD
Continuing Calibration Verification	N	Open: ≤ 15% D. Close: ≤ 50% D
Surrogate Spikes	N	30 – 150%
Laboratory Control Samples	N	50 – 150%
Target Compound Identification	N	≤ 30% D

(Note: RSD = Relative Standard Deviation, D = Difference)

II. DATA QUALIFICATIONS

Summary of Validation Qualifiers Applied:

Data qualifications applied after the manual and electronic data review can be found in the attached “Manual/Electronic Data Review Results” section of this report.

Data Qualifiers

The following is a list of validation qualifiers applied to the sample result(s) when needed to indicate associated out-of-control QA/QC results.

Data Qualifiers	
U	The analyte was not detected at or above the reported result.
J	The analyte was positively identified. The associated numerical result is an estimate.
UJ	The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
R	The data are unusable for all purposes.
N	There is evidence the analyte is present in this sample.
JN	There is evidence that the analyte is present. The associated numerical result is an estimate.

For site assessment and investigations, the following bias qualifiers are applied to the data in addition to the above data qualifiers when necessary to allow for data analysis and interpretation using Pre-Score software calculations for National Priority Listing Hazard Ranking Scoring (NPL-HRS).

Bias Qualifiers	
L	Low bias.
H	High bias.
Q	The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).
K	Unknown bias.

Attachments:

Sample Summary Report
Manual/Electronic Data Review Results
Analytical Sample Listing (Report #6)

Sample Summary Report

Case No: 41693	Contract: EPW11037	SDG No: JE868	Lab Code: DATAC
Sample Number: JE868	Method: Aroclor	Matrix: Soil	MA Number: DEFAULT
Sample Location: EC01SD	pH: 7.0	Sample Date: 08302011	Sample Time: 17:00:00
% Moisture: 88.2165	% Solids:		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	34	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1221	34	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1232	34	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1242	34	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1248	34	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1254	34	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1260	34	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1262	34	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1268	34	ug/kg	1.0	U	UJK	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE868	Lab Code:	DATA
Sample Number:	JE868MS	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	EC01SD	pH:	7.0	Sample Date:	08302011	Sample Time:	17:00:00
% Moisture:	88.2165			% Solids:			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	190	ug/kg	1.0		J	Yes	S4VEM
Aroclor-1221	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1260	160	ug/kg	1.0	P	J	Yes	S4VEM
Aroclor-1232	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1242	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1248	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1254	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1262	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1268	46	ug/kg	1.0	U	UJ	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE868	Lab Code:	DATA
Sample Number:	JE868MSD	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	EC01SD	pH:	7.0	Sample Date:	08302011	Sample Time:	17:00:00
% Moisture :	88.2165			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	230	ug/kg	1.0		J	Yes	S4VEM
Aroclor-1260	210	ug/kg	1.0	P	J	Yes	S4VEM
Aroclor-1221	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1232	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1242	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1248	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1254	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1262	46	ug/kg	1.0	U	UJ	Yes	S4VEM
Aroclor-1268	46	ug/kg	1.0	U	UJ	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE868	Lab Code:	DATA
Sample Number:	JE870	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	WC01SD	pH:	7.4	Sample Date:	08302011	Sample Time:	16:20:00
% Moisture :	85.1666			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	27	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1221	27	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1232	27	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1242	27	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1248	27	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1254	27	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1260	27	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1262	27	ug/kg	1.0	U	UJK	Yes	S4VEM
Aroclor-1268	27	ug/kg	1.0	U	UJK	Yes	S4VEM

Manual/Electronic Data Review Results

AROCLOR ANALYSIS
Percent Moisture Qualification Summary
Percent moisture content of the following soil samples exceeds criteria (i.e. >70% moisture). Detected compounds are qualified JK. Non-detected compounds are qualified UJK.
JE868, JE870

National Functional Guidelines Report #06

Lab DATA(ALS Environmental) SDG JE868 Case 41693 Contract EPW11037 Region 10 DDTID 133047 SOW SOM01.2

Analytical Sample Listing

Aroclor

Sample Number	Sample Type	Matrix	Level	Sampling Date	Date Received	Extraction		Analysis		
						Type	Date/Time	Date/Time	GC Column	Instrument
JE868	Field_Sample	Soil		08302011 17:00:00	09092011 10:11:00	Sonication	09182011 18:26:00	09232011 03:48:00	RTXCLP	GCE20
JE868	Field_Sample	Soil		08302011 17:00:00	09092011 10:11:00	Sonication	09182011 18:26:00	09232011 04:08:00	RTXCLP2	GCE20
JE868MS	Matrix_Spike	Soil		08302011 17:00:00	09092011 10:11:00	Sonication	09182011 18:26:00	09232011 04:28:00	RTXCLP	GCE20
JE868MS	Matrix_Spike	Soil		08302011 17:00:00	09092011 10:11:00	Sonication	09182011 18:26:00	09232011 04:47:00	RTXCLP2	GCE20
JE868MSD	Matrix_Spike_Duplicate	Soil		08302011 17:00:00	09092011 10:11:00	Sonication	09182011 18:26:00	09232011 04:47:00	RTXCLP	GCE20
JE868MSD	Matrix_Spike_Duplicate	Soil		08302011 17:00:00	09092011 10:11:00	Sonication	09182011 18:26:00	09232011 05:07:00	RTXCLP2	GCE20
JE870	Field_Sample	Soil		08302011 16:20:00	09092011 10:11:00	Sonication	09182011 18:26:00	09232011 04:08:00	RTXCLP	GCE20
JE870	Field_Sample	Soil		08302011 16:20:00	09092011 10:11:00	Sonication	09182011 18:26:00	09232011 04:28:00	RTXCLP2	GCE20



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MEMORANDUM

DATE: September 21, 2011

TO: Linda Costello, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Inorganic Data Summary Check,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data summary check of 7 sediment samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Analysis for Target Analyte List metals (EPA CLP SOW ISM01.2) was performed by Sentinel, Inc., Huntsville, Alabama.

The samples were numbered:

MJE878 MJE879 MJE880 MJE884 MJE885 MJE886 MJE893

No discrepancies were noted.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

September 20, 2011

Reply To: OEA-095

MEMORANDUM

SUBJECT: Data Validation Report for Metals Analysis of Sediment Samples Collected for the Makah Reservation Warmhouse Beach Dump Site Inspection - Case 41693, SDG: MJE878

FROM: Donald Matheny, Chemist 
Office of Environmental Assessment, Environmental Services Unit

TO: Brandon Perkins, Site Assessment Manager
Office of Environmental Clean-up

CC: Renee Nordeen, Ecology & Environment, Inc.

The quality assurance (QA) review of the analytical data generated from the analysis of seven (7) sediments, collected from the above referenced site, has been completed. These samples were analyzed for total metals by the Sentinel, Inc., located in Huntsville, AL.

All sample analyses were evaluated following EPA's Stage 4 Data Validation Electronic/Manual Process (S4VEM). The validation was conducted according to the Quality Control Specifications outlined in the Sampling & Quality Assurance Project Plan for the *Makah Reservation Warmhouse Beach Dump* (August, 2011), the EPA Contract Laboratory Program's (CLP) Statement of Work (SOW) for Multi-Media, Multi-Concentration Inorganic Analyses (ISM01.2), the National Functional Guidelines for Inorganic Data Review, and the Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. Some data may be qualified using the reviewer's professional judgment. The conclusions presented herein are based on the information provided for the review.

A summary of samples evaluated in this validation report and the pertinent dates for sample collection, sample receipt at the laboratory, extraction and analyses is attached along with the validated data.

I. QUALITY CONTROL RESULTS SUMMARY

Quality Control Test	Result Ranges	Outliers?	Evaluation Criteria
Blanks	Within criteria	Y*	Non-detect or <10% of Sample
Matrix Spike (MJE893)	76 - 107%	N	75 - 125%
Sample Duplicate (MJE893)	≤ 14%	Y*	≤ 20% RPD or ± CRQL
LCS (blank spike)	86 - 112%	N	70 - 130%; (Ag, Sb 50 - 150%)
Serial Dilution (MJE893)	≤ 8%	Y*	≤ 10% Difference

*See the "Data Qualifications" section below for excursions and qualification of affected data.

II. DATA QUALIFICATIONS

Summary of Validation Qualifiers Applied

After the manual and electronic data review, the following data qualifications were applied:

Blanks
The following samples have analyte results greater than or equal to MDLs but less than CRQLs. The associated calibration and/or preparation blank analyte results are greater than or equal to MDLs but less than or equal to CRQLs. Detected analytes are qualified U. Non-detected analytes are not qualified. Sample results are elevated at CRQLs.
Arsenic - MJE886, MJE878, MJE879, MJE880, MJE884 Cadmium - All samples Lead - MJE886, MJE879, MJE880, MJE884, JE885 Mercury - MJE886, MJE893, MJE878, MJE879, MJE880, MJE884, MJE885 Potassium - All samples Selenium - All samples
Detection Limit
The following samples have results greater than or equal to MDLs but less than CRQLs. Detected analytes are qualified IQ.
Barium - All samples Nickel - MJE893, MJE893D Silver - All samples Sodium - All samples
Duplicates
The following Duplicate or original sample results are less than or equal to 5xCRQL and the absolute difference between duplicate and original samples are greater than CRQL or sample results are greater than 5xCRQL and RPD is greater than 20%. The original sample results are greater than or equal to MDLs. Detected analytes are qualified JK. Non-detected analytes are qualified UJK.
Arsenic - All samples Copper - All samples
Serial Dilution
The following ICP Serial Dilution (SD) samples have percent difference (%D) greater than 10% and initial sample results are greater than 50xMDLs. The detected analytes in samples with results greater than or equal to MDLs are qualified JL.
Aluminum - All samples Cobalt - All samples Iron - All samples

Data Qualifiers

The following is a list of validation qualifiers applied to the sample result(s) when needed to indicate associated out-of-control QA/QC results.

Data Qualifiers	
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
J	The associated value is an estimated quantity.
UJ	The analyte was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The data are unusable. The analyte may or may not be present in the sample.
Project Specific Data Qualifiers	
L	Low bias.
H	High bias.
K	Unknown Bias.
Q	Detected concentration is below the method reporting limit / Contract Required Quantitation Limit, but is above the method detection limit.

III. SAMPLE INDEX

Sample Number	Matrix	Sampling Date	Date Received	ICP Analysis		Mercury Analysis	
				Prep. Date	Analysis Date	Prep. Date	Analysis Date
MJE878	Water	8/30/2011	9/2/2011	9/07/2011	9/09/2011	9/07/2011	9/07/2011
MJE879	Water	8/30/2011	9/2/2011	9/07/2011	9/09/2011	9/07/2011	9/07/2011
MJE880	Water	8/30/2011	9/2/2011	9/07/2011	9/09/2011	9/07/2011	9/07/2011
MJE884	Water	8/30/2011	9/2/2011	9/07/2011	9/09/2011	9/07/2011	9/07/2011
MJE885	Water	8/30/2011	9/2/2011	9/07/2011	9/09/2011	9/07/2011	9/07/2011
MJE886	Water	8/30/2011	9/2/2011	9/07/2011	9/09/2011	9/07/2011	9/07/2011
MJE893	Water	8/31/2011	9/2/2011	9/07/2011	9/09/2011	9/07/2011	9/07/2011

Sample Summary Report

Case No:	41693	Contract:	EPW09040	SDG No:	MJE878	Lab Code:	SENTIN
Sample Number:	MJE878	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	EB01SD	pH:		Sample Date:	08302011	Sample Time:	09:45:00
% Moisture :		% Solids :			87		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.11	mg/kg	1.0	J	U	Yes	S4VEM

Case No: 41693	Contract: EPW09040	SDG No: MJE878	Lab Code: SENTIN
Sample Number: MJE878	Method: ICP_AES	Matrix: Soil	MA Number: DEFAULT
Sample Location: EB01SD	pH:	Sample Date: 08302011	Sample Time: 09:45:00
% Moisture :		% Solids : 87	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	8250	mg/kg	1.0		JL	Yes	S4VEM
Antimony	6.9	mg/kg	1.0	U	U	Yes	S4VEM
Arsenic	1.1	mg/kg	1.0	J	UJK	Yes	S4VEM
Barium	10.6	mg/kg	1.0	J	JQ	Yes	S4VEM
Beryllium	0.57	mg/kg	1.0	U	U	Yes	S4VEM
Cadmium	0.57	mg/kg	1.0	J	U	Yes	S4VEM
Calcium	4570	mg/kg	1.0			Yes	S4VEM
Chromium	15.7	mg/kg	1.0			Yes	S4VEM
Cobalt	5.7	mg/kg	1.0	J	JL	Yes	S4VEM
Copper	6.4	mg/kg	1.0		JK	Yes	S4VEM
Iron	15000	mg/kg	1.0		JL	Yes	S4VEM
Lead	1.1	mg/kg	1.0	U	U	Yes	S4VEM
Magnesium	5680	mg/kg	1.0			Yes	S4VEM
Manganese	258	mg/kg	1.0			Yes	S4VEM
Nickel	11.1	mg/kg	1.0			Yes	S4VEM
Potassium	570	mg/kg	1.0	J	U	Yes	S4VEM
Selenium	4.0	mg/kg	1.0	J	U	Yes	S4VEM
Silver	1.1	mg/kg	1.0	J	JQ	Yes	S4VEM
Sodium	216	mg/kg	1.0	J	JQ	Yes	S4VEM
Thallium	2.9	mg/kg	1.0	U	U	Yes	S4VEM
Vanadium	34.4	mg/kg	1.0			Yes	S4VEM
Zinc	30.7	mg/kg	1.0			Yes	S4VEM

Case No:	41693	Contract:	EPW09040	SDG No:	MJE878	Lab Code:	SENTIN
Sample Number:	MJE879	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	EB02SD	pH:		Sample Date:	08302011	Sample Time:	09:50:00
% Moisture :		% Solids :			83		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.12	mg/kg	1.0	J	U	Yes	S4VEM

Case No:	41693	Contract:	EPW09040	SDG No:	MJE878	Lab Code:	SENTIN
Sample Number:	MJE879	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	EB02SD	pH:		Sample Date:	08302011	Sample Time:	09:50:00
% Moisture :		% Solids :		83			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	7670	mg/kg	1.0		JL	Yes	S4VEM
Antimony	7.2	mg/kg	1.0	U	U	Yes	S4VEM
Arsenic	1.2	mg/kg	1.0	J	UJK	Yes	S4VEM
Barium	10.5	mg/kg	1.0	J	JQ	Yes	S4VEM
Beryllium	0.60	mg/kg	1.0	U	U	Yes	S4VEM
Cadmium	0.60	mg/kg	1.0	J	U	Yes	S4VEM
Calcium	6340	mg/kg	1.0			Yes	S4VEM
Chromium	12.5	mg/kg	1.0			Yes	S4VEM
Cobalt	5.4	mg/kg	1.0	J	JL	Yes	S4VEM
Copper	6.0	mg/kg	1.0		JK	Yes	S4VEM
Iron	14200	mg/kg	1.0		JL	Yes	S4VEM
Lead	1.2	mg/kg	1.0	J	U	Yes	S4VEM
Magnesium	5310	mg/kg	1.0			Yes	S4VEM
Manganese	239	mg/kg	1.0			Yes	S4VEM
Nickel	10.4	mg/kg	1.0			Yes	S4VEM
Potassium	600	mg/kg	1.0	J	U	Yes	S4VEM
Selenium	4.2	mg/kg	1.0	J	U	Yes	S4VEM
Silver	1.1	mg/kg	1.0	J	JQ	Yes	S4VEM
Sodium	257	mg/kg	1.0	J	JQ	Yes	S4VEM
Thallium	3.0	mg/kg	1.0	U	U	Yes	S4VEM
Vanadium	32.0	mg/kg	1.0			Yes	S4VEM
Zinc	29.3	mg/kg	1.0			Yes	S4VEM

Case No: 41693	Contract: EPW09040	SDG No: MJE878	Lab Code: SENTIN
Sample Number: MJE880	Method: ICP_AES	Matrix: Soil	MA Number: DEFAULT
Sample Location: EB03SD	pH:	Sample Date: 08302011	Sample Time: 10:05:00
% Moisture :		% Solids : 81	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	8450	mg/kg	1.0		JL	Yes	S4VEM
Antimony	7.4	mg/kg	1.0	U	U	Yes	S4VEM
Arsenic	1.2	mg/kg	1.0	J	UJK	Yes	S4VEM
Barium	9.7	mg/kg	1.0	J	JQ	Yes	S4VEM
Beryllium	0.62	mg/kg	1.0	U	U	Yes	S4VEM
Cadmium	0.62	mg/kg	1.0	J	U	Yes	S4VEM
Calcium	4720	mg/kg	1.0			Yes	S4VEM
Chromium	12.2	mg/kg	1.0			Yes	S4VEM
Cobalt	5.1	mg/kg	1.0	J	JL	Yes	S4VEM
Copper	6.7	mg/kg	1.0		JK	Yes	S4VEM
Iron	16100	mg/kg	1.0		JL	Yes	S4VEM
Lead	1.2	mg/kg	1.0	J	U	Yes	S4VEM
Magnesium	5980	mg/kg	1.0			Yes	S4VEM
Manganese	251	mg/kg	1.0			Yes	S4VEM
Nickel	9.9	mg/kg	1.0			Yes	S4VEM
Potassium	620	mg/kg	1.0	J	U	Yes	S4VEM
Selenium	4.3	mg/kg	1.0	J	U	Yes	S4VEM
Silver	1.1	mg/kg	1.0	J	JQ	Yes	S4VEM
Sodium	290	mg/kg	1.0	J	JQ	Yes	S4VEM
Thallium	3.1	mg/kg	1.0	U	U	Yes	S4VEM
Vanadium	31.4	mg/kg	1.0			Yes	S4VEM
Zinc	29.4	mg/kg	1.0			Yes	S4VEM

Case No:	41693	Contract:	EPW09040	SDG No:	MJE878	Lab Code:	SENTIN
Sample Number:	MJE880	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	EB03SD	pH:		Sample Date:	08302011	Sample Time:	10:05:00
% Moisture :		% Solids :			81		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.12	mg/kg	1.0	J	U	Yes	S4VEM

Case No: 41693	Contract: EPW09040	SDG No: MJE878	Lab Code: SENTIN
Sample Number: MJE884	Method: ICP_AES	Matrix: Soil	MA Number: DEFAULT
Sample Location: WB01SD	pH:	Sample Date: 08302011	Sample Time: 12:15:00
% Moisture :		% Solids: 83	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	7140	mg/kg	1.0		JL	Yes	S4VEM
Antimony	7.2	mg/kg	1.0	U	U	Yes	S4VEM
Arsenic	1.2	mg/kg	1.0	J	UJK	Yes	S4VEM
Barium	14.7	mg/kg	1.0	J	JQ	Yes	S4VEM
Beryllium	0.60	mg/kg	1.0	U	U	Yes	S4VEM
Cadmium	0.60	mg/kg	1.0	J	U	Yes	S4VEM
Calcium	3350	mg/kg	1.0			Yes	S4VEM
Chromium	10.4	mg/kg	1.0			Yes	S4VEM
Cobalt	4.8	mg/kg	1.0	J	JL	Yes	S4VEM
Copper	5.7	mg/kg	1.0		JK	Yes	S4VEM
Iron	12200	mg/kg	1.0		JL	Yes	S4VEM
Lead	1.2	mg/kg	1.0	J	U	Yes	S4VEM
Magnesium	4640	mg/kg	1.0			Yes	S4VEM
Manganese	236	mg/kg	1.0			Yes	S4VEM
Nickel	8.4	mg/kg	1.0			Yes	S4VEM
Potassium	600	mg/kg	1.0	J	U	Yes	S4VEM
Selenium	4.2	mg/kg	1.0	J	U	Yes	S4VEM
Silver	0.84	mg/kg	1.0	J	JQ	Yes	S4VEM
Sodium	193	mg/kg	1.0	J	JQ	Yes	S4VEM
Thallium	3.0	mg/kg	1.0	U	U	Yes	S4VEM
Vanadium	31.5	mg/kg	1.0			Yes	S4VEM
Zinc	27.8	mg/kg	1.0			Yes	S4VEM

Case No:	41693	Contract:	EPW09040	SDG No:	MJE878	Lab Code:	SENTIN
Sample Number:	MJE884	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	WB01SD	pH:		Sample Date:	08302011	Sample Time:	12:15:00
% Moisture :		% Solids :			83		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.12	mg/kg	1.0	J	U	Yes	S4VEM

Case No:	41693	Contract:	EPW09040	SDG No:	MJE878	Lab Code:	SENTIN
Sample Number:	MJE885	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	WB02SD	pH:		Sample Date:	08302011	Sample Time:	12:20:00
% Moisture :		% Solids :	82				

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.12	mg/kg	1.0	J	U	Yes	S4VEM

Case No.: 41693	Contract: EPW09040	SDG No: MJE878	Lab Code: SENTIN
Sample Number: MJE885	Method: ICP_AES	Matrix: Soil	MA Number: DEFAULT
Sample Location: WB02SD	pH:	Sample Date: 08302011	Sample Time: 12:20:00
% Moisture :		% Solids: 82	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	7000	mg/kg	1.0		JL	Yes	S4VEM
Antimony	7.3	mg/kg	1.0	U	U	Yes	S4VEM
Arsenic	1.2	mg/kg	1.0	U	UJK	Yes	S4VEM
Barium	10	mg/kg	1.0	J	JQ	Yes	S4VEM
Beryllium	0.61	mg/kg	1.0	U	U	Yes	S4VEM
Cadmium	0.61	mg/kg	1.0	J	U	Yes	S4VEM
Calcium	3150	mg/kg	1.0			Yes	S4VEM
Chromium	8.9	mg/kg	1.0			Yes	S4VEM
Cobalt	4.4	mg/kg	1.0	J	JL	Yes	S4VEM
Copper	5.0	mg/kg	1.0		JK	Yes	S4VEM
Iron	12000	mg/kg	1.0		JL	Yes	S4VEM
Lead	1.2	mg/kg	1.0	J	U	Yes	S4VEM
Magnesium	4450	mg/kg	1.0			Yes	S4VEM
Manganese	226	mg/kg	1.0			Yes	S4VEM
Nickel	7.5	mg/kg	1.0			Yes	S4VEM
Potassium	610	mg/kg	1.0	J	U	Yes	S4VEM
Selenium	4.2	mg/kg	1.0	J	U	Yes	S4VEM
Silver	0.81	mg/kg	1.0	J	JQ	Yes	S4VEM
Sodium	173	mg/kg	1.0	J	JQ	Yes	S4VEM
Thallium	3.0	mg/kg	1.0	U	U	Yes	S4VEM
Vanadium	29.8	mg/kg	1.0			Yes	S4VEM
Zinc	26.5	mg/kg	1.0			Yes	S4VEM

Case No:	41693	Contract:	EPW09040	SDG No:	MJE878	Lab Code:	SENTIN
Sample Number:	MJE886	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	WB03SD	pH:		Sample Date:	08302011	Sample Time:	12:25:00
% Moisture :		% Solids :	84				

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.12	mg/kg	1.0	J	U	Yes	S4VEM

Case No: 41693	Contract: EPW09040	SDG No: MJE878	Lab Code: SENTIN
Sample Number: MJE886	Method: ICP_AES	Matrix: Soil	MA Number: DEFAULT
Sample Location: WB03SD	pH:	Sample Date: 08302011	Sample Time: 12:25:00
% Moisture :		% Solids : 84	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	7320	mg/kg	1.0		JL	Yes	S4VEM
Antimony	7.2	mg/kg	1.0	U	U	Yes	S4VEM
Arsenic	1.2	mg/kg	1.0	J	UJK	Yes	S4VEM
Barium	13.2	mg/kg	1.0	J	JQ	Yes	S4VEM
Beryllium	0.60	mg/kg	1.0	U	U	Yes	S4VEM
Cadmium	0.60	mg/kg	1.0	J	U	Yes	S4VEM
Calcium	3330	mg/kg	1.0			Yes	S4VEM
Chromium	10.4	mg/kg	1.0			Yes	S4VEM
Cobalt	4.8	mg/kg	1.0	J	JL	Yes	S4VEM
Copper	6.5	mg/kg	1.0		JK	Yes	S4VEM
Iron	12800	mg/kg	1.0		JL	Yes	S4VEM
Lead	1.2	mg/kg	1.0	J	U	Yes	S4VEM
Magnesium	4650	mg/kg	1.0			Yes	S4VEM
Manganese	220	mg/kg	1.0			Yes	S4VEM
Nickel	9.2	mg/kg	1.0			Yes	S4VEM
Potassium	600	mg/kg	1.0	J	U	Yes	S4VEM
Selenium	4.2	mg/kg	1.0	J	U	Yes	S4VEM
Silver	0.91	mg/kg	1.0	J	JQ	Yes	S4VEM
Sodium	176	mg/kg	1.0	J	JQ	Yes	S4VEM
Thallium	3.0	mg/kg	1.0	U	U	Yes	S4VEM
Vanadium	29.5	mg/kg	1.0			Yes	S4VEM
Zinc	26.9	mg/kg	1.0			Yes	S4VEM

Case No:	41693	Contract:	EPW09040	SDG No:	MJE878	Lab Code:	SENTIN
Sample Number:	MJE893	Method:	Hg	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	BK03SD	pH:		Sample Date:	08312011	Sample Time:	10:00:00
% Moisture :				% Solids :	94		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Mercury	0.11	mg/kg	1.0	J	U	Yes	S4VEM

Case No	41693	Contract:	EPW09040	SDG No:	MJE878	Lab Code:	SENTIN
Sample Number:	MJE893	Method:	ICP_AES	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	BK03SD	pH:		Sample Date:	08312011	Sample Time:	10:00:00
% Moisture :		% Solids :	94				

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aluminum	2380	mg/kg	1.0		JL	Yes	S4VEM
Antimony	6.4	mg/kg	1.0	U	U	Yes	S4VEM
Arsenic	1.1	mg/kg	1.0	U	UJK	Yes	S4VEM
Barium	2.4	mg/kg	1.0	J	JQ	Yes	S4VEM
Beryllium	0.53	mg/kg	1.0	U	U	Yes	S4VEM
Cadmium	0.53	mg/kg	1.0	J	U	Yes	S4VEM
Calcium	799	mg/kg	1.0			Yes	S4VEM
Chromium	1.5	mg/kg	1.0			Yes	S4VEM
Cobalt	1.6	mg/kg	1.0	J	JL	Yes	S4VEM
Copper	2.1	mg/kg	1.0	J	JK	Yes	S4VEM
Iron	4630	mg/kg	1.0		JL	Yes	S4VEM
Lead	1.1	mg/kg	1.0	U	U	Yes	S4VEM
Magnesium	1560	mg/kg	1.0			Yes	S4VEM
Manganese	91.5	mg/kg	1.0			Yes	S4VEM
Nickel	2.3	mg/kg	1.0	J	JQ	Yes	S4VEM
Potassium	530	mg/kg	1.0	J	U	Yes	S4VEM
Selenium	3.7	mg/kg	1.0	J	U	Yes	S4VEM
Silver	0.34	mg/kg	1.0	J	JQ	Yes	S4VEM
Sodium	129	mg/kg	1.0	J	JQ	Yes	S4VEM
Thallium	2.7	mg/kg	1.0	U	U	Yes	S4VEM
Vanadium	6.5	mg/kg	1.0			Yes	S4VEM
Zinc	11.1	mg/kg	1.0			Yes	S4VEM



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: February 6, 2012

TO: Linda Ader, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Percent Lipids Data Memorandum,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The Form-I pages originally provided by the laboratory did not include the percent lipids values for the tissue samples. An Ecology and Environment, Inc. (E & E) START chemist created the attached table from the original laboratory electronic data deliverable (EDD) and additional information provided by the EPA chemist to the START chemist on February 2, 2012. The table allows data users to match the percent lipids values for each tissue sample with the CLP sample number.

Analysis for percent lipids on 7 tissue samples was performed by Cape Fear Analytical, LLC., Wilmington, North Carolina. The percent lipids analyses were performed in conjunction with EPA CLP SOW DLM02.2 analyses and the data were validated using procedures, technical acceptance criteria, and quality control specifications provided in the Contract Laboratory Program (CLP) Statement of Work DLM02.2, the CLP National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review (OSWER 9240.1-53, EPA-540-R-11-016; September 2011), and EPA's Guidance for Labeling Externally Validated Analytical Data for Superfund Use (EPA-540-R08-005, January 2009). The samples were numbered:

JE872 JE873 JE874 JE875 JE876 JE877 JE895

Lab Name: Cape Fear Analytical, LLC

ClientID	Collected	Received	Prepped	Analyzed	Method	Component	CAS	Matrix	Result	Units	Lab_Qual	Val_Qual	Reasons	Val_Label
JE872	08/30/2011	09/22/2011		10/25/2011		Lipid		TISSUE	0.65	percent				S4VEM
JE873	08/30/2011	09/22/2011		10/25/2011		Lipid		TISSUE	0.21	percent				S4VEM
JE874	08/30/2011	09/22/2011		10/25/2011		Lipid		TISSUE	0.76	percent				S4VEM
JE875	08/31/2011	09/22/2011		10/25/2011		Lipid		TISSUE	1.6	percent				S4VEM
JE876	08/31/2011	09/22/2011		10/25/2011		Lipid		TISSUE	2.63	percent				S4VEM
JE877	08/31/2011	09/22/2011		10/25/2011		Lipid		TISSUE	2.39	percent				S4VEM
JE895	08/31/2011	09/22/2011		10/25/2011		Lipid		TISSUE	1.14	percent				S4VEM
<p>Note: the Form-I pages provided by the laboratory did not include the percent lipids values for the tissue samples. An Ecology and Environment, Inc. (E & E) START chemist created this table from the original laboratory electronic data deliverable (EDD) and additional informaton provided by the EPA chemist to the START chemist on February 2, 2012, to present the percent lipid value associated with each CLP sample number.</p>														

MMW 2-6-12



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: December 8, 2011

TO: Linda Costello, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington *mw*

SUBJ: **Organic Data Summary Check,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data summary check of 11 soil samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Analysis for Total Organic Carbon (Puget Sound Estuarine Protocols Method PSEP -TOC) was performed at the Manchester Environmental Laboratory, Port Orchard, Washington.

The samples were numbered:

11354205	11354207	11354214	11354215	11354216	11354220
11354221	11354222	11354227	11354228	11354229	

No discrepancies were noted.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

MEMORANDUM

SUBJECT: Data Release for Inorganics Results from the USEPA
Region 10 Laboratory

PROJECT NAME: Makah Reservation Warmhouse Beach Dump SI

PROJECT CODE: TEC-971B

FROM: Gerald Dodo, Chemistry Supervisor
Office of Environmental Assessment
USEPA Region 10 Laboratory

TO: Brandon Perkins, RPM
Office of Environmental Cleanup, Unit #4 Site Clean up,
USEPA Region 10

CC: Renee Nordeen, Ecology and Environment

I have authorized release of this data package. Attached you will find the Total Organic Carbon results for the Makah Reservation Warmhouse Beach Dump SI project for the samples collected on 08/30/2011 and 08/31/2011. For further information regarding the attached data, contact Stephanie Le at (360) 871-8715.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

QUALITY ASSURANCE MEMORANDUM
FOR INORGANIC CHEMICAL ANALYSES

DATE: November 30, 2011

TO: Brandon Perkins, Project Manager
Office of Environmental Cleanup, Assessment and Brownfields Unit 1, US EPA Region 10

FROM: Stephanie Le, Chemist
Office of Environmental Assessment, US EPA Region 10 Laboratory

SUBJECT: Quality Assurance Review of Makah Reservation Warmhouse Beach Dump SI Project Results
For Total Organic Carbon

Project Code: TEC-971B
Account Code: 2011T10P302DD2C10HVLA00

CC: Renee Nordeen, Ecology and Environment

The following is a quality assurance review of the results of the analysis of 11 soil samples for Total Organic Carbon (TOC). These samples were submitted for the Makah Reservation Warmhouse Beach Dump SI Project. The analyses were performed by ESAT chemists at the US EPA Region 10 Laboratory in Port Orchard, WA, following US EPA and Laboratory guidelines.

This review was conducted for the following samples:

11354205	11354207	11354214	11354215	11354216	11354220	11354221
11354222	11354227	11354228	11354229			

Data Qualifications

Comments below refer to the quality control specifications outlined in the Laboratory's current Quality Assurance Manual, Standard Operating Procedures (SOPs) and the Quality Assurance Project Plan (QAPP). No excursions were required from the method Standard Operating Procedure.

All quality control measures met Laboratory/QAPP criteria.

For those tests for which the USEPA Region 10 Laboratory has been accredited by the National Environmental Laboratory Accreditation Conference (NELAC), all requirements of the current NELAC Standard have been met. The Region 10 Laboratory's Quality System has also been accredited to the standards of the National Environmental Laboratory Accreditation Conference (NELAC).

1. Sample Transport and Receipt

Upon sample receipt, all conditions met Laboratory/QAPP requirements for this project.

2. Sample Holding Times

The concentration of an analyte in a sample or sample extract may increase or decrease over time depending on the nature of the analyte. For this reason, holding time limits are recommended for samples. The samples covered by this review met method holding time recommendations.

3. Sample Preparation

Samples were prepared according to the method outlined in the SOP for these analytes for this type of matrix. No qualification of the data was required based on sample preparation.

4. Initial Calibration and Calibration Verification

The initial calibration met method criteria. All calibration verification checks met the frequency and recovery criteria on the day of analysis. No qualification was required based on calibration or calibration verification.

5. Laboratory Control Samples

All laboratory control sample results met the recovery acceptance criteria for the method. No qualification was required based on laboratory control sample analysis.

6. Blank Analysis

The method blanks did not contain detectable levels of analyte which would require data qualification.

7. Duplicate Analysis

Duplicate analysis was performed on samples 11354207, 11354227, and 11354229. Sample results which were greater than five times the MRL level were within the $\pm 25\%$ RPD requirement. No qualification was required based on duplicate analysis.

8. Matrix Spike/Matrix Spike Duplicate Analysis

Matrix spike analyses were performed on samples 11354207, 11354227, and 11354229. Sample results were within the $\pm 25\%$ recovery and relative percent difference (RPD) requirements. No qualification was required based on matrix spike analyses.

9. Instrument Peak Integrations

No manual integrations were performed for this method.

10. Reporting Limits

All sample results that fall below the Minimum Reporting Limit (MRL) are assigned the value of the MRL and the 'U' qualifier is attached.

11. Data Qualifiers

The (U) qualifier was attached to the sample results that were below the MRL. No other qualification was required. The definition for the data qualifier is as follows:

U - The analyte was not detected at or above the reported value.

The usefulness of qualified data should be treated according to the severity of the qualifier in light of the project's data quality objectives. Should questions arise regarding the data, contact Stephanie Le at the Region 10 Laboratory, phone number (360) 871- 8715.

12. Definitions

Accuracy - the degree of conformity of a measured or calculated quantity to its actual value.

Duplicate Analysis – when a duplicate of a sample (DS), a matrix spike (MSD), or a laboratory control sample (LCS) is analyzed, it is possible to use the comparison of the results in terms of relative percent difference (RPD) to calculate precision.

Laboratory Control Sample (LCS) - a clean matrix spiked with known quantities of analytes. The LCS is processed with samples through every step of preparation and analysis. Measuring percent recovery of each analyte in the LCS provides a measurement of accuracy for the analyte in the project samples. A laboratory control sample is prepared and analyzed at a frequency no less than one for every 20 project samples.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) - Sample analyses performed to provide information about the effect of the sample matrix on analyte recovery and measurement within the project samples. To create the MS/MSD, a project sample is spiked with known quantities of analyte(s) and the percent recovery of the analyte(s) is (are) determined.

Method Blank- An analytical control that is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background and reagent contamination. A method blank is prepared and analyzed for every batch of samples at a minimum frequency of one per every 20 samples. To produce unqualified data, the result of the method blank analysis is required to be less than the MRL and less than 10 times the amount of analyte found in any project sample.

Minimum Reporting Level (MRL) - the smallest measured concentration of a substance that can be reliably measured using a given analytical method.

Peak Integrations - The output of many analytical instruments is a peak which represents the quantity of analyte in the sample. The instrument automatically integrates the peak area to provide the concentration of the analyte; however, sometimes these peaks need to be manually integrated by the analyst.

Precision – the degree of mutual agreement or repeatability among a series of individual results.

Relative Percent Difference – The difference between two sample results divided by their mean and expressed as a percentage.

US EPA Region 10 Laboratory

Multi-Sample Final Report



Project Code : TEC-971B

Site : MAKAH RESERVATION WARMHOUSE BEACH DUMP SI

Contact : Brandon Perkins

Account : 11T10P302DD2C10HVLA00

Parameter(s): TOC

Analyte: *90064 - Total Organic Carbon

Weight Basis : Dry

Prep Method(s): PSEP-TOC - TOC in sediments by Puget Sound Estuarine Protocols

Analytical Method: PSEP-TOC - TOC in sediments by Puget Sound Estuarine Protocols

Target Analyte Results:

Sample	COC Description	Lab Matrix	Result	Unit	Qual.	Analysis Date	Dilution
11354205 sam	EC02SD	Sediment	9620	mg/Kg		11/1/11	1
11354207 sam	WC02SD	Sediment	970	mg/Kg		11/1/11	1
11354214 sam	EB01SD	Sediment	794	mg/Kg		11/1/11	1
11354215 sam	EB02SD	Sediment	821	mg/Kg		11/1/11	1
11354216 sam	EB03SD	Sediment	814	mg/Kg		11/2/11	1
11354220 sam	WB01SD	Sediment	806	mg/Kg		11/2/11	1
11354221 sam	WB02SD	Sediment	985	mg/Kg		11/2/11	1
11354222 sam	WB03SD	Sediment	715	mg/Kg		11/2/11	1
11354227 sam	BK01SD	Sediment	64400	mg/Kg		11/2/11	1
11354228 sam	BK02SD	Sediment	3420	mg/Kg		11/2/11	1
11354229 sam	BK03SD	Sediment	396	mg/Kg		11/2/11	1
11354207 du	WC02SD	Sediment	845	mg/Kg		11/1/11	1
11354227 du	BK01SD	Sediment	61500	mg/Kg		11/2/11	1
11354229 du	BK03SD	Sediment	327	mg/Kg		11/2/11	1
IS110111ABL blk	Blank	Solid	500	mg/Kg	U	11/1/11	1
IS110211ABL blk	Blank	Solid	500	mg/Kg	U	11/2/11	1

Spiked Compounds:

Sample	COC Description	Lab Matrix	Result	Unit	Qual.	Analysis Date	Dilution
11354207 ms	WC02SD	Sediment	98	%Rec		11/1/11	1
11354227 ms	BK01SD	Sediment	94	%Rec		11/2/11	1
11354229 ms	BK03SD	Sediment	116	%Rec		11/2/11	1
11354207 msd	WC02SD	Sediment	97	%Rec		11/1/11	1
11354227 msd	BK01SD	Sediment	115	%Rec		11/2/11	1
11354229 msd	BK03SD	Sediment	106	%Rec		11/2/11	1
IS110111ACO std	Control	Solid	108	%Rec		11/1/11	1
IS110211ACO std	Control	Solid	116	%Rec		11/2/11	1
IS110111AL1 lcs	Lab Control Standard	Solid	100	%Rec		11/1/11	1
IS110211AL1 lcs	Lab Control Standard	Solid	101	%Rec		11/2/11	1
IS110111AL2 lc2	Lab Control Standard Dup.	Solid	101	%Rec		11/1/11	1
IS110211AL2 lc2	Lab Control Standard Dup.	Solid	101	%Rec		11/2/11	1



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: December 30, 2011

TO: Linda Costello, Project Manager, E & E, Seattle, Washington *MW*

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington

SUBJ: **Mercury Data Summary Check,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data summary check of 7 tissue samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Mercury analysis (EPA Method 245.6) was performed at the Manchester Environmental Laboratory, Port Orchard, Washington.

The samples were numbered:

EB01TS	EB02TS	EB03TS	WB01TS	WB02TS
WB03TS	BK01TS			

No discrepancies were noted.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

MEMORANDUM

SUBJECT: Data Release for Inorganics Results from the USEPA
Region 10 Laboratory

PROJECT NAME: Makah Reservation Warmhouse Beach Dump SI

PROJECT CODE: TEC-971B

FROM: Gerald Dodo, Chemistry Supervisor
Office of Environmental Assessment
USEPA Region 10 Laboratory

TO: Brandon Perkins, RPM
Office of Environmental Cleanup, Unit #4 Site Clean up,
USEPA Region 10

CC: Renee Nordeen, Ecology and Environment

I have authorized release of this data package. Attached you will find the mercury results for the Makah Reservation Warmhouse Beach Dump SI project for the samples collected on 08/30/2011 and 08/31/2011. For further information regarding the attached data, contact Stephanie Le at (360) 871-8715.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

QUALITY ASSURANCE MEMORANDUM
FOR INORGANIC CHEMICAL ANALYSES

DATE: December 22, 2011

TO: Brandon Perkins, Project Manager
Office of Environmental Cleanup, Assessment and Brownfields Unit 1, US EPA Region 10 Laboratory

FROM: Stephanie Le, Chemist
Office of Environmental Assessment, US EPA Region 10 Laboratory

SUBJECT: Quality Assurance Review of Makah Reservation Warmhouse Beach Dump SI Tissue
For Mercury

Project Code: TEC-971B
Account Code: 2011T10P302DD2C10HVLA00

CC: Renee Nordeen, Ecology and Environment

The following is a quality assurance review of the results of the analysis of 7 tissue samples for mercury. These samples were submitted for the Makah Reservation Warmhouse Beach Dump SI project. The analysis was performed by ESAT chemists at the US EPA Region 10 Laboratory in Port Orchard, WA, following US EPA and Laboratory guidelines.

This review was conducted for the following samples:

Tissue

11354208 11354209 11354210 11354211 11354212 11354213 11354231

Data Qualifications

Comments below refer to the quality control specifications outlined in the Laboratory's current Quality Assurance Manual, Standard Operating Procedures (SOPs) and the Quality Assurance Project Plan (QAPP). No excursions were required from the method Standard Operating Procedure.

All quality control measures met Laboratory/QAPP criteria.

For those tests for which the USEPA Region 10 Laboratory has been accredited by the National Environmental Laboratory Accreditation Conference (NELAC), all requirements of the current NELAC Standard have been met. The Region 10 Laboratory's Quality System has been accredited to the standards of the National Environmental Laboratory Accreditation Conference (NELAC).

1. Sample Transport and Receipt

Upon sample receipt, all conditions met Laboratory/QAPP requirements for this project.

2. Sample Holding Times

The concentration of an analyte in a sample or sample extract may increase or decrease over time depending on the nature of the analyte. For this reason, holding time limits are recommended for samples. The samples covered by this review met method holding time recommendations, where applicable.

3. Sample Preparation

Samples were prepared according to the method outlined in the SOP for these analytes for this type of matrix. No qualification of the data was required based on sample preparation.

4. Initial Calibration and Calibration Verification

The linear regression generated for the initial calibrations met method criteria. The low point of the calibration curve is usually the Minimum Reporting Level (MRL) of the method. All calibration verification checks met the frequency and recovery criteria on the day of analysis. No qualification was required based on calibration or calibration verification.

5. Laboratory Control Samples

All laboratory control sample results met the recovery acceptance criteria for the methods reported. No qualification was required based on laboratory control sample analysis.

6. Blank Analysis

The method blanks did not contain detectable levels of mercury which would require data qualification.

7. Duplicate Analysis

Duplicate analysis was performed on sample 11354231. Sample results which were greater than 5 times of the MRL level were within the +/- 20% RPD requirement. No qualification was required based on duplicate analysis.

8. Matrix Spike/Matrix Spike Duplicate Analysis

Matrix spike analyses were performed on sample 11354231. Sample results were within the \pm 75-125% recovery and relative percent difference (RPD) requirements. No qualification was required based on matrix spike analyses.

9. Reference Materials

A reference material was prepared and analyzed with these samples. Analytical values for this sample were within the range of acceptable results. No qualification was necessary based on analysis of the reference material.

10. Instrument Peak Integrations

No manual integrations were performed for these methods.

11. Reporting Limits

Results are reported on a wet weight basis.

All sample results that fall below the MRL are assigned the value of the MRL and the 'U' qualifier is attached.

12. Data Qualifiers

No data qualification was required for this analysis.

Below are the definitions for the codes used for qualifying data from these analyses. When more than one quality issue was involved, the most restrictive qualifier has been attached to the data.

U - The analyte was not detected at or above the reported value.

The usefulness of qualified data should be treated according to the severity of the qualifier in light of the project's data quality objectives. Should questions arise regarding the data, contact Stephanie Le at the Region 10 Laboratory, phone number (360) 871- 8715.

13. Definitions

Accuracy - the degree of conformity of a measured or calculated quantity to its actual value.

Duplicate Analysis – when a duplicate of a sample (DS), a matrix spike (MSD), or a laboratory control sample (LCSD) is analyzed, it is possible to use the comparison of the results in terms of relative percent difference (RPD) to calculate precision.

Internal standards - Compounds used to help evaluate instrument analytical performance for individual samples. Internal standards provide an instrument response for reference to accurately quantify the analytes for all associated instrumental analyses.

Laboratory Control Sample (LCS) - a clean matrix spiked with known quantities of analytes. The LCS is processed with samples through every step of preparation and analysis. Measuring percent recovery of each analyte in the LCS provides a measurement of accuracy for the analyte in the project samples. A laboratory control sample is prepared and analyzed at a frequency no less than one for every 20 project samples.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) - Sample analyses performed to provide information about the effect of the sample matrix on analyte recovery and measurement within the project samples. To create the MS/MSD, a project sample is spiked with known quantities of analytes and the percent recoveries of the analytes are determined.

Method Blank- An analytical control that is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background and reagent contamination. A method blank is prepared and analyzed for every batch of samples at a minimum frequency of one per every 20 samples. To produce unqualified data, the result of the method blank analysis is required to be less than the MRL and less than 10 times the amount of analyte found in any project sample.

Minimum Reporting Level (MRL) - the smallest measured concentration of a substance that can be reliably measured using a given analytical method.

Peak Integrations - The output of many analytical instruments is a peak which represents the quantity of analyte in the sample. The instrument automatically integrates the peak area to provide the concentration of the analyte; however, sometimes these peaks need to be manually integrated by the analyst.

Precision – the degree of mutual agreement or repeatability among a series of individual results.

Reference materials – Samples with analyte values that are homogeneous and well established. This allows the reference material to be used to assess the accuracy of the measurement method.

Relative Percent Difference – The difference between two sample results divided by their mean and expressed as a percentage.

US EPA Region 10 Laboratory



Multi-Sample Final Report

Project Code : TEC-971B

Site : MAKAH RESERVATION WARMHOUSE BEACH DUMP SI

Contact : Brandon Perkins

Account : 11T10P302DD2C10HVLA00

Parameter(s): Hg

Analyte: 7439976 - Mercury

Weight Basis : Wet

Prep Method(s): 245.6 - Mercury, Cold Vapor, Manual, Tissues, MCAWW

Analytical Method: 245.6 - Mercury, Cold Vapor, Manual, Tissues, MCAWW

Target Analyte Results:

Sample	COC Description	Lab Matrix	Result	Unit	Qual.	Analysis Date	Dilution
11354208 sam	EB01TS	Tissue	0.0276	mg/Kg		11/16/11	1
11354209 sam	EB02TS	Tissue	0.0244	mg/Kg		11/16/11	1
11354210 sam	EB03TS	Tissue	0.0282	mg/Kg		11/16/11	1
11354211 sam	WB01TS	Tissue	0.0243	mg/Kg		11/16/11	1
11354212 sam	WB02TS	Tissue	0.0263	mg/Kg		11/16/11	1
11354213 sam	WB03TS	Tissue	0.0267	mg/Kg		11/16/11	1
11354231 sam	BK01TS	Tissue	0.0360	mg/Kg		11/16/11	1
11354231 du	BK01TS	Tissue	0.0326	mg/Kg		11/16/11	1
IT111511ABL blk	Blank	Tissue	0.013	mg/Kg	U	11/16/11	1

Spiked Compounds:

Sample	COC Description	Lab Matrix	Result	Unit	Qual.	Analysis Date	Dilution
11354231 ms	BK01TS	Tissue	83	%Rec		11/16/11	1
11354231 msd	BK01TS	Tissue	87	%Rec		11/16/11	1
IT111511ACO std	Control	Tissue	85	%Rec		11/16/11	10
IT111511AL1 lcs	Lab Control Standard	Tissue	85	%Rec		11/16/11	1
IT111511AL2 lc2	Lab Control Standard Dup.	Tissue	87	%Rec		11/16/11	1



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MEMORANDUM

DATE: November 21, 2011

TO: Linda Costello, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Summary Check,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data summary check of 7 tissue samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Analysis for PBDE (EPA SW-846 Method 8270-SIM) was performed at the Manchester Environmental Laboratory, Port Orchard, Washington.

The samples were numbered:

11354208 11354209 11354210 11354211 11354212 11354213 11354231

No discrepancies were noted.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

MEMORANDUM

Subject: Data Release for PBDE tissue Results from the Region 10 USEPA Laboratory

Project Name: Makah Reservation Warmhouse Beach Dump SI

Project Code: TEC-971B

From: Gerald Dodo, Supervisory Chemist
Office of Environmental Assessment, USEPA Region 10 Laboratory

To: Brandon Perkins
Office of Environmental Cleanup, USEPA Region 10

CC: Renee Nordeen – E&E

I have authorized release of this data package. Attached you will find the PBDE tissue analysis results for the Makah Reservation Warmhouse Beach Dump SI project collected 08/30/11 to 08/31/11. For further information regarding the attached data, contact Chris Pace at 360-871-8703.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

QUALITY ASSURANCE MEMORANDUM
FOR ORGANIC CHEMICAL ANALYSES

Date: November 17, 2011

To: Brandon Perkins
Office of Environmental Cleanup, USEPA Region 10

From: Chris Pace, Chemist
Office of Environmental Assessment, USEPA Region 10 Laboratory

Subject: Quality Assurance Review for the PBDE Analysis of Samples from the Makah Reservation
Warmhouse Beach Dump SI

Project Code: TEC-971B
Account Code: 2011T10P302DD2C10HVLA00

CC: Renee Nordeen – E&E

The following is a quality assurance review of the data for PBDE analysis of tissue samples from the above referenced site. The analyses were performed by the EPA Region 10 Laboratory using EPA SW846 method 8270-SIM.

This review was conducted for the following samples:

11354208 11354209 11354210 11354211 11354212 11354213
11354231

Data Qualifications

Comments below refer to the quality control specifications outlined in the Laboratory's current Quality Assurance Manual, Standard Operating Procedures (SOPs) and the Quality Assurance Project Plan (QAPP). No excursions were required from the method Standard Operating Procedure.

The quality control measures which did not meet Laboratory/QAPP criteria are annotated in the title of each affected subsection with "*Laboratory/QAPP Criteria Could Not be Met*".

For those tests for which the EPA Region 10 Laboratory has been accredited by the National Environmental Laboratory Accreditation Conference (NELAC), all requirements of the current NELAC Standard have been met.

1. Sample Receipt

Upon sample receipt, no conditions were noted that would impact data quality.

2. Sample Holding Times

The concentration of an analyte in a sample or extract of a sample may increase or decrease over time depending on the nature of the analyte. For this reason, holding time limits are recommended for samples and extracts. Samples were frozen prior to extraction. Extracts were analyzed within 40 days of preparation.

3. Sample Preparation

Samples were prepared according to the method.

4. Initial Calibration/Continuing Calibration Verification (CCV)

Initial calibration was performed on 11/07/11. Percent relative standard deviations (%RSDs) of the relative response factors (RRFs) met the criteria of $\leq 15\%$ or correlation coefficients met the criteria of ≥ 0.990 .

The CCV for reported samples met the criteria for frequency of analysis. The percent accuracies met the criteria of 80-120% of the true value.

5. Blank Analysis

Method blanks were analyzed with each sample batch to evaluate the potential for laboratory contamination and effects on the sample results. Target analytes were not detected in method blanks.

6. Surrogate Spikes

Surrogate recoveries are used to help in the evaluation of laboratory performance on individual samples. The surrogate analyte used for these analyses was 5,5'-difluoro-PBDE-47. All surrogate recoveries were within the criteria of 50-150%.

7. Matrix Spike/Matrix Spike Duplicate Analysis (MS/MSD)

MS/MSD analyses are performed to provide information on the effects of sample matrices toward the analytical method. An MS/MSD analyses were performed using sample 11354231. The MS/MSD recoveries were within the criteria of 50-150% with a relative percent difference $\leq 30\%$.

8. LCS/LCSD

Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) are generated to provide information on the accuracy and precision of the analytical method and the laboratory performance. The LCS/LCSD recoveries were within the criteria of 70-130% with a relative percent difference $\leq 30\%$.

9. Internal Standard Performance

Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. The retention time variations of all internal standards were within 30 seconds of the continuing calibration standard. The percent areas of all the internal standards were within the specified 50% to 200% of the continuing calibration standard for all reported results.

10. Compound Quantitation

The initial calibration functions were used for calculations. Reported quantitation limits were based on the initial calibration standards and sample size used for the analysis.

All manual integrations have been reviewed and found to comply with acceptable integration practices.

11. Identification

All of the compounds detected in the analyses were within the RRT windows, met the USEPA spectral matching criteria and/or were judged to be acceptable.

12. Compound Quantitation

The initial calibration functions were used for calculations. Reported quantitation limits were based on the initial calibration standards and sample size used for the analysis.

All manual integrations have been reviewed and found to comply with acceptable integration practices.

13. Data Qualifiers

All requirements for data qualifiers from the preceding sections were accumulated. Each sample data summary sheet and each compound was checked for positive or negative results. From this, the overall need for data qualifiers for each analysis was determined. In cases where more than one of the preceding sections required data qualifiers, the most restrictive qualifier has been added to the data.

The usefulness of qualified data should be treated according to the severity of the qualifier in light of the project's data quality objectives. Should questions arise regarding the data, contact Chris Pace at the Region 10 Laboratory, phone number (360) 871 - 8703.

Qualifier	Definition
U	The analyte was not detected at or above the reported value.
J	The identification of the analyte is acceptable; the reported value is an estimate.
UJ	The analyte was not detected at or above the reported value. The reported value is an estimate.
R	The presence or absence of the analyte can not be determined from the data due to severe quality control problems. The data are rejected and considered unusable. <u>No value is reported with this qualification.</u>
NA	Not Applicable, the parameter was not analyzed for, or there is no analytical result for this parameter. <u>No value is reported with this qualification.</u>

US EPA Region 10 Laboratory

Multi-Analyte Final Report



Project Code : TEC-971B

Site : MAKAH RESERVATION WARMHOUSE BEACH DUMP SI

Contact : Brandon Perkins

Account : 11T10P302DD2C10HVLA00

Sample : 11354208

COC Description : EB01TS

Matrix : Tissue

Weight Basis : Wet

Collected : 8/30/11 10:40

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.62	ug/kg	U	11/7/11	1
5436431	BDE# 47	0.62	ug/kg	U	11/7/11	1
60348609	BDE# 99	0.62	ug/kg	U	11/7/11	1
189084648	BDE#100	0.62	ug/kg	U	11/7/11	1
68631492	BDE#153	0.62	ug/kg	U	11/7/11	1
207122154	BDE#154	0.62	ug/kg	U	11/7/11	1
207122165	BDE#183	0.62	ug/kg	U	11/7/11	1
1163195	BDE#209	6.2	ug/kg	U	11/7/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	82	%Rec		11/7/11	1

Sample : 11354209

COC Description : EB02TS

Matrix : Tissue

Collected : 8/30/11 10:45

Weight Basis : Wet

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.63	ug/kg	U	11/7/11	1
5436431	BDE# 47	0.63	ug/kg	U	11/7/11	1
60348609	BDE# 99	0.63	ug/kg	U	11/7/11	1
189084648	BDE#100	0.63	ug/kg	U	11/7/11	1
68631492	BDE#153	0.63	ug/kg	U	11/7/11	1
207122154	BDE#154	0.63	ug/kg	U	11/7/11	1
207122165	BDE#183	0.63	ug/kg	U	11/7/11	1
1163195	BDE#209	6.3	ug/kg	U	11/7/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	79	%Rec		11/7/11	1

Sample : 11354210

COC Description : EB03TS

Matrix : Tissue

Collected : 8/30/11 10:55

Weight Basis : Wet

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.62	ug/kg	U	11/7/11	1
5436431	BDE# 47	0.62	ug/kg	U	11/7/11	1
60348609	BDE# 99	0.62	ug/kg	U	11/7/11	1
189084648	BDE#100	0.62	ug/kg	U	11/7/11	1
68631492	BDE#153	0.62	ug/kg	U	11/7/11	1
207122154	BDE#154	0.62	ug/kg	U	11/7/11	1
207122165	BDE#183	0.62	ug/kg	U	11/7/11	1
1163195	BDE#209	6.2	ug/kg	U	11/7/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	81	%Rec		11/7/11	1

Sample : 11354211

COC Description : WB01TS

Matrix : Tissue

Collected : 8/31/11 9:20

Weight Basis : Wet

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.93	ug/kg	U	11/7/11	1
5436431	BDE# 47	0.93	ug/kg	U	11/7/11	1
60348609	BDE# 99	0.93	ug/kg	U	11/7/11	1
189084648	BDE#100	0.93	ug/kg	U	11/7/11	1
68631492	BDE#153	0.93	ug/kg	U	11/7/11	1
207122154	BDE#154	0.93	ug/kg	U	11/7/11	1
207122165	BDE#183	0.93	ug/kg	U	11/7/11	1
1163195	BDE#209	9.3	ug/kg	U	11/7/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	82	%Rec		11/7/11	1

Sample : 11354212

COC Description : WB02TS

Matrix : Tissue

Collected : 8/31/11 9:10

Weight Basis : Wet

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.84	ug/kg	U	11/7/11	1
5436431	BDE# 47	0.84	ug/kg	U	11/7/11	1
60348609	BDE# 99	0.84	ug/kg	U	11/7/11	1
189084648	BDE#100	0.84	ug/kg	U	11/7/11	1
68631492	BDE#153	0.84	ug/kg	U	11/7/11	1
207122154	BDE#154	0.84	ug/kg	U	11/7/11	1
207122165	BDE#183	0.84	ug/kg	U	11/7/11	1
1163195	BDE#209	8.4	ug/kg	U	11/7/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	81	%Rec		11/7/11	1

Sample : 11354213

COC Description : WB03TS

Matrix : Tissue

Collected : 8/31/11 9:25

Weight Basis : Wet

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.93	ug/kg	U	11/7/11	1
5436431	BDE# 47	0.93	ug/kg	U	11/7/11	1
60348609	BDE# 99	0.93	ug/kg	U	11/7/11	1
189084648	BDE#100	0.93	ug/kg	U	11/7/11	1
68631492	BDE#153	0.93	ug/kg	U	11/7/11	1
207122154	BDE#154	0.93	ug/kg	U	11/7/11	1
207122165	BDE#183	0.93	ug/kg	U	11/7/11	1
1163195	BDE#209	9.3	ug/kg	U	11/7/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	81	%Rec		11/7/11	1

Sample : 11354231

COC Description : BK01TS

Matrix : Tissue

Collected : 8/31/11 10:05

Weight Basis : Wet

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	0.69	ug/kg	U	11/7/11	1
5436431	BDE# 47	0.69	ug/kg	U	11/7/11	1
60348609	BDE# 99	0.69	ug/kg	U	11/7/11	1
189084648	BDE#100	0.69	ug/kg	U	11/7/11	1
68631492	BDE#153	0.69	ug/kg	U	11/7/11	1
207122154	BDE#154	0.69	ug/kg	U	11/7/11	1
207122165	BDE#183	0.69	ug/kg	U	11/7/11	1
1163195	BDE#209	6.9	ug/kg	U	11/7/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	79	%Rec		11/7/11	1

Sample : 11354231 Matrix Spike

COC Description : BK01TS

Matrix : Tissue

Collected : 8/31/11 10:05

Weight Basis : Wet

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	79	%Rec		11/7/11	1
5436431	BDE# 47	82	%Rec		11/7/11	1
60348609	BDE# 99	86	%Rec		11/7/11	1
189084648	BDE#100	86	%Rec		11/7/11	1
68631492	BDE#153	86	%Rec		11/7/11	1
207122154	BDE#154	85	%Rec		11/7/11	1
207122165	BDE#183	90	%Rec		11/7/11	1
1163195	BDE#209	84	%Rec		11/7/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	80	%Rec		11/7/11	1

Sample : 11354231 Matrix Spike#2

COC Description : BK01TS

Matrix : Tissue

Collected : 8/31/11 10:05

Weight Basis : Wet

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	76	%Rec		11/7/11	1
5436431	BDE# 47	80	%Rec		11/7/11	1
60348609	BDE# 99	80	%Rec		11/7/11	1
189084648	BDE#100	84	%Rec		11/7/11	1
68631492	BDE#153	85	%Rec		11/7/11	1
207122154	BDE#154	83	%Rec		11/7/11	1
207122165	BDE#183	89	%Rec		11/7/11	1
1163195	BDE#209	81	%Rec		11/7/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	79	%Rec		11/7/11	1

Sample : OBT11300B1 Blank

COC Description : Blank

Matrix : Tissue

Weight Basis : Wet

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	1.0	ug/kg	U	11/7/11	1
5436431	BDE# 47	1.0	ug/kg	U	11/7/11	1
60348609	BDE# 99	1.0	ug/kg	U	11/7/11	1
189084648	BDE#100	1.0	ug/kg	U	11/7/11	1
68631492	BDE#153	1.0	ug/kg	U	11/7/11	1
207122154	BDE#154	1.0	ug/kg	U	11/7/11	1
207122165	BDE#183	1.0	ug/kg	U	11/7/11	1
1163195	BDE#209	10	ug/kg	U	11/7/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	81	%Rec		11/7/11	1

Sample : OBT11300F1 Lab Control Std

Sample : OBT1

COC Description : Lab Control Standard

Matrix : Tissue

Weight Basis : Wet

Parameter : PBDE

Prep Method: 3570 - Method 3570 Micro-extraction, SW-846

Analysis Method: 8270D - Semivolatiles by GC/MS

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
41318756	BDE# 28	81	%Rec		11/7/11	1
5436431	BDE# 47	79	%Rec		11/7/11	1
60348609	BDE# 99	79	%Rec		11/7/11	1
189084648	BDE#100	83	%Rec		11/7/11	1
68631492	BDE#153	89	%Rec		11/7/11	1
207122154	BDE#154	82	%Rec		11/7/11	1
207122165	BDE#183	90	%Rec		11/7/11	1
1163195	BDE#209	72	%Rec		11/7/11	1
Surrogate Compounds:						
*201161	5,5'-Difluoro-PBDE-47	79	%Rec		11/7/11	1



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MEMORANDUM

DATE: November 21, 2011

TO: Linda Costello, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Summary Check,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data summary check of 7 tissue samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Analysis for Aroclors (EPA SW-846 Method 8082) was performed at the Manchester Environmental Laboratory, Port Orchard, Washington.

The samples were numbered:

11354208 11354209 11354210 11354211 11354212 11354213 11354231

No discrepancies were noted.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

MEMORANDUM

Subject: Data Release for PCB Aroclor Results from the Region 10 USEPA Laboratory

Project Name: Makah Reservation Warmhouse Beach Dump SI

Project Code: TEC-971B

From: Gerald Dodo, Supervisory Chemist
Office of Environmental Assessment, USEPA Region 10 Laboratory

To: Brandon Perkins
Office of Environmental Cleanup, USEPA Region 10

CC: Renee Nordeen – E&E

I have authorized release of this data package. Attached you will find the PCB Aroclor analysis results for the Makah Reservation Warmhouse Beach Dump SI project collected 08/30/11 to 08/31/11. For further information regarding the attached data, contact Chris Pace at 360-871-8703.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

QUALITY ASSURANCE MEMORANDUM
FOR ORGANIC CHEMICAL ANALYSES

Date: November 14, 2011

To: Brandon Perkins
Office of Environmental Cleanup, USEPA Region 10

From: Chris Pace, Chemist
Office of Environmental Assessment, USEPA Region 10 Laboratory

Subject: Quality Assurance Review for the PCB Analysis of Samples from the Makah Reservation
Warmhouse Beach Dump SI

Project Code: TEC-971B
Account Code: 2011T10P302DD2C10HVLA00

CC: Renee Nordeen – E&E

The following is a quality assurance review of the data for PCB Aroclor analysis samples from the above referenced site. The analyses were performed by the EPA Region 10 Laboratory using EPA SW846 method 8082.

This review was conducted for the following samples:

11354208 11354209 11354210 11354211 11354212 11354213
11354231

Data Qualifications

Comments below refer to the quality control specifications outlined in the Laboratory's current Quality Assurance Manual, Standard Operating Procedures (SOPs) and the Quality Assurance Project Plan (QAPP). No excursions were required from the method Standard Operating Procedure.

The quality control measures which did not meet Laboratory/QAPP criteria are annotated in the title of each affected subsection with "*Laboratory/QAPP Criteria Could Not be Met*".

For those tests for which the EPA Region 10 Laboratory has been accredited by the National Environmental Laboratory Accreditation Conference (NELAC), all requirements of the current NELAC Standard have been met.

1. Sample Receipt

Upon sample receipt, no conditions were noted that would impact data quality.

2. Sample Holding Times

The concentration of an analyte in a sample or extract of a sample may increase or decrease over time depending on the nature of the analyte. For this reason, holding time limits are recommended for samples and extracts. Samples were frozen prior to extraction. Extracts were analyzed within 40 days of preparation.

3. Sample Preparation

Samples were prepared according to the method.

4. Initial Calibration/Continuing Calibration Verification (CCV)

Initial calibration was performed on 09/16/11. Calibration curves met the coefficient of determination criteria.

The CCV for reported samples met the criteria for frequency of analysis. The percent accuracies met the criteria of 80-120% of the true value.

5. Blank Analysis

Method blanks were analyzed with each sample batch to evaluate the potential for laboratory contamination and effects on the sample results. Target analytes were not detected in method blanks.

6. Surrogate Spikes

Surrogate recoveries are used to help in the evaluation of laboratory performance on individual samples. The surrogate analyte used for these analyses was decachlorobiphenyl (PCB congener 209). All surrogate recoveries were within the criteria of 50-150%.

7. Matrix Spike/Matrix Spike Duplicate Analysis (MS/MSD)

MS/MSD analyses are performed to provide information on the effects of sample matrices toward the analytical method. An MS/MSD analyses were performed using sample 11354231. The MS/MSD recoveries were within the criteria of 50-150% with a relative percent difference $\leq 50\%$.

8. LCS/LCSD

Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) are generated to provide information on the accuracy and precision of the analytical method and the laboratory performance. The LCS/LCSD recoveries were within the criteria of 70-130% with a relative percent difference $\leq 50\%$.

9. Compound Quantitation

The initial calibration functions were used for calculations. Reported quantitation limits were based on the initial calibration standards and sample size used for the analysis.

All manual integrations have been reviewed and found to comply with acceptable integration practices.

10. Identification

PCBs and the surrogate were identified based on chromatographic retention times of two dissimilar gas chromatography columns as determined from the initial calibration and pattern matching with standards.

11. Data Qualifiers

All requirements for data qualifiers from the preceding sections were accumulated. Each sample data summary sheet and each compound was checked for positive or negative results. From this, the overall need for data qualifiers for each analysis was determined. In cases where more than one of the preceding sections required data qualifiers, the most restrictive qualifier has been added to the data.

The usefulness of qualified data should be treated according to the severity of the qualifier in light of the project's data quality objectives. Should questions arise regarding the data, contact Chris Pace at the Region 10 Laboratory, phone number (360) 871 - 8703.

Qualifier	Definition
U	The analyte was not detected at or above the reported value.
J	The identification of the analyte is acceptable; the reported value is an estimate.
UJ	The analyte was not detected at or above the reported value. The reported value is an estimate.
R	The presence or absence of the analyte can not be determined from the data due to severe quality control problems. The data are rejected and considered unusable. <u>No value is reported with this qualification.</u>
NA	Not Applicable, the parameter was not analyzed for, or there is no analytical result for this parameter. <u>No value is reported with this qualification.</u>

US EPA Region 10 Laboratory

Multi-Analyte Final Report



Project Code : TEC-971B

Site : MAKAH RESERVATION WARMHOUSE BEACH DUMP SI

Contact : Brandon Perkins

Account : 11T10P302DD2C10HVLA00

Sample : 11354208

COC Description : EB01TS

Matrix : Tissue

Collected : 8/30/11 10:40

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
2051243	PCB Congener 209	97	%Rec		11/1/11	1
12674112	PCB-1016	18	ug/kg	U	11/1/11	1
11104282	PCB-1221	18	ug/kg	U	11/1/11	1
11141165	PCB-1232	18	ug/kg	U	11/1/11	1
53469219	PCB-1242	18	ug/kg	U	11/1/11	1
12672296	PCB-1248	18	ug/kg	U	11/1/11	1
11097691	PCB-1254	18	ug/kg	U	11/1/11	1
11096825	PCB-1260	18	ug/kg	U	11/1/11	1

Sample : 11354209

COC Description : EB02TS

Matrix : Tissue

Collected : 8/30/11 10:45

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
2051243	PCB Congener 209	92	%Rec		11/1/11	1
12674112	PCB-1016	19	ug/kg	U	11/1/11	1
11104282	PCB-1221	19	ug/kg	U	11/1/11	1
11141165	PCB-1232	19	ug/kg	U	11/1/11	1
53469219	PCB-1242	19	ug/kg	U	11/1/11	1
12672296	PCB-1248	19	ug/kg	U	11/1/11	1
11097691	PCB-1254	19	ug/kg	U	11/1/11	1
11096825	PCB-1260	19	ug/kg	U	11/1/11	1

Sample : 11354210

COC Description : EB03TS

Matrix : Tissue

Collected : 8/30/11 10:55

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
2051243	PCB Congener 209	92	%Rec		11/1/11	1
12674112	PCB-1016	18	ug/kg	U	11/1/11	1
11104282	PCB-1221	18	ug/kg	U	11/1/11	1
11141165	PCB-1232	18	ug/kg	U	11/1/11	1
53469219	PCB-1242	18	ug/kg	U	11/1/11	1
12672296	PCB-1248	18	ug/kg	U	11/1/11	1
11097691	PCB-1254	18	ug/kg	U	11/1/11	1
11096825	PCB-1260	18	ug/kg	U	11/1/11	1

Sample : 11354211

COC Description : WB01TS

Matrix : Tissue

Collected : 8/31/11 9:20

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
2051243	PCB Congener 209	88	%Rec		11/1/11	1
12674112	PCB-1016	19	ug/kg	U	11/1/11	1
11104282	PCB-1221	19	ug/kg	U	11/1/11	1
11141165	PCB-1232	19	ug/kg	U	11/1/11	1
53469219	PCB-1242	19	ug/kg	U	11/1/11	1
12672296	PCB-1248	19	ug/kg	U	11/1/11	1
11097691	PCB-1254	19	ug/kg	U	11/1/11	1
11096825	PCB-1260	19	ug/kg	U	11/1/11	1

Sample : 11354212

COC Description : WB02TS

Matrix : Tissue

Collected : 8/31/11 9:10

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
2051243	PCB Congener 209	83	%Rec		11/1/11	1
12674112	PCB-1016	19	ug/kg	U	11/1/11	1
11104282	PCB-1221	19	ug/kg	U	11/1/11	1
11141165	PCB-1232	19	ug/kg	U	11/1/11	1
53469219	PCB-1242	19	ug/kg	U	11/1/11	1
12672296	PCB-1248	19	ug/kg	U	11/1/11	1
11097691	PCB-1254	19	ug/kg	U	11/1/11	1
11096825	PCB-1260	19	ug/kg	U	11/1/11	1

Sample : 11354213

COC Description : WB03TS

Matrix : Tissue

Collected : 8/31/11 9:25

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
2051243	PCB Congener 209	85	%Rec		11/1/11	1
12674112	PCB-1016	19	ug/kg	U	11/1/11	1
11104282	PCB-1221	19	ug/kg	U	11/1/11	1
11141165	PCB-1232	19	ug/kg	U	11/1/11	1
53469219	PCB-1242	19	ug/kg	U	11/1/11	1
12672296	PCB-1248	19	ug/kg	U	11/1/11	1
11097691	PCB-1254	19	ug/kg	U	11/1/11	1
11096825	PCB-1260	19	ug/kg	U	11/1/11	1

Sample : 11354231

COC Description : BK01TS

Matrix : Tissue

Collected : 8/31/11 10:05

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
2051243	PCB Congener 209	93	%Rec		11/1/11	1
12674112	PCB-1016	19	ug/kg	U	11/1/11	1
11104282	PCB-1221	19	ug/kg	U	11/1/11	1
11141165	PCB-1232	19	ug/kg	U	11/1/11	1
53469219	PCB-1242	19	ug/kg	U	11/1/11	1
12672296	PCB-1248	19	ug/kg	U	11/1/11	1
11097691	PCB-1254	19	ug/kg	U	11/1/11	1
11096825	PCB-1260	19	ug/kg	U	11/1/11	1

Sample : 11354231 Matrix Spike

COC Description : BK01TS

Matrix : Tissue

Collected : 8/31/11 10:05

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:					
2051243	PCB Congener 209	86 %Rec		11/1/11	1
12674112	PCB-1016	80 %Rec		11/1/11	1
11096825	PCB-1260	90 %Rec		11/1/11	1

Sample : 11354231 Matrix Spike#2

COC Description : BK01TS

Matrix : Tissue

Collected : 8/31/11 10:05

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:					
2051243	PCB Congener 209	87 %Rec		11/1/11	1
12674112	PCB-1016	81 %Rec		11/1/11	1
11096825	PCB-1260	94 %Rec		11/1/11	1

Sample : OBT11301A1 Blank

COC Description : Blank

Matrix : Tissue

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
2051243	PCB Congener 209	92	%Rec		11/1/11	1
12674112	PCB-1016	18	ug/kg	U	11/1/11	1
11104282	PCB-1221	18	ug/kg	U	11/1/11	1
11141165	PCB-1232	18	ug/kg	U	11/1/11	1
53469219	PCB-1242	18	ug/kg	U	11/1/11	1
12672296	PCB-1248	18	ug/kg	U	11/1/11	1
11097691	PCB-1254	18	ug/kg	U	11/1/11	1
11096825	PCB-1260	18	ug/kg	U	11/1/11	1

Sample : OBT11301F1 Lab Control Std

COC Description : Lab Control Standard

Matrix : Tissue

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
2051243	PCB Congener 209	89	%Rec		11/1/11	1
12674112	PCB-1016	84	%Rec		11/1/11	1
11096825	PCB-1260	88	%Rec		11/1/11	1

Sample : OBT11301F2 Lab Control Std

COC Description : Lab Control Standard

Matrix : Tissue

Parameter : PCB

Prep Method: 3545 - ASE Extraction

Analysis Method: 8082 - Polychlorinated Biphenyls (PCBs/congeners) by GC

Analyte Code	Analyte Name	Result	Unit	Qual.	Analysis Date	Dilution
Target Analyte Results:						
2051243	PCB Congener 209	94	%Rec		11/1/11	1
12674112	PCB-1016	85	%Rec		11/1/11	1
11096825	PCB-1260	91	%Rec		11/1/11	1



ecology and environment, inc.

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MEMORANDUM

DATE: September 30, 2011

TO: Linda Costello, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington 

SUBJ: **Inorganic Data Quality Assurance Review,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data quality assurance review of 12 soil/sediment samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Analysis for Perchlorate (EPA Method 6860) and total solids (EPA Method 160.3) was performed by Columbia Analytical Services, Rochester, New York. All sample analyses were evaluated following EPA's Stage 2 and 4 Data Validation Electronic/Manual Process (S4VEM).

The samples were numbered:

BK01SS	BK03SD	EB01SD	EB02SD	EB03SD	LF01SS
LF02SS	LF03SS	LF04SS	WB01SD	WB02SD	WB03SD

Data Qualifications:

1. Sample Holding Times: Satisfactory.

The temperature blank was received at $< 6^{\circ}\text{C}$ but the sample temperatures were measured at 8.7°C to 13.2°C due to insulation from ice by the packing materials; associated positive sample results and sample quantitation limits were qualified as estimated quantities with a low bias (JL or UJL). The samples were collected on August 30, 2011, were extracted on September 11, 2011, and were analyzed by September 11, 2011, therefore meeting QC criteria of less than 28 days between extraction and analysis for soil samples.

2. Initial and Continuing Calibration: Acceptable.

All initial calibration results were within QC limits of 20% RPD and all ICV and CCV recoveries were within QC limits of 85% to 115%.

3. Blanks: Acceptable.

A preparation blank was analyzed for each 20 samples or per matrix per concentration level. Blanks were analyzed after each Initial or Continuing Calibration Verification. There were no detections in any blanks.

4. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

5. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

6. Blank and Matrix Spike Analysis: Acceptable.

Blank and matrix spike analyses was performed per SDG or per matrix per concentration level, whichever was more frequent. Spike and spike duplicate recoveries were within the QC limits of 80% to 120% recovery.

7. Duplicate Analysis: Acceptable.

A laboratory spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate results were within QC limits.

8. Internal Standards: Acceptable.

All internal standard results were within QC limits of 50% to 150% of the average ICV area counts and within 0.98 to 1.02 RRT units of the perchlorate ion.

9. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical methods, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

- 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.

- JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.

- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).

- N - The analysis indicates the present 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 its 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.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 1755
Date Received: 9/ 2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 18:10

Sample Name: BK01SS
Lab Code: R1104933-001

Units: µg/Kg
Basis: Dry
Percent Solids: 60.7

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQUDATA\HPLC02\DATA\091111\B0022404.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	3.3 UJL	3.3	0.66	

MW
930-11

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 1000
Date Received: 9/2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 18:32

Sample Name: BK03SD
Lab Code: R1104933-002

Units: µg/Kg
Basis: Dry
Percent Solids: 93.2

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\091111\B0022405.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	2.1 UJL	2.1	0.43	



COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 0945
Date Received: 9/2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 18:53

Sample Name: EB01SD
Lab Code: R1104933-003

Units: µg/Kg
Basis: Dry
Percent Solids: 83.5

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\091111\B0022406.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	2.4 U JL	2.4	0.48	

MW
R21

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 0950
Date Received: 9/2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 19:15

Sample Name: EB02SD
Lab Code: R1104933-004

Units: µg/Kg
Basis: Dry
Percent Solids: 84.8

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\091111\B0022407.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	2.4 UJL	2.4	0.48	



COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 1005
Date Received: 9/2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 19:37

Sample Name: EB03SD
Lab Code: R1104933-005

Units: µg/Kg
Basis: Dry
Percent Solids: 81.6

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\091111\B0022408.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	2.5 UJL	2.5	0.50	



COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 1510
Date Received: 9/ 2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 20:20

Sample Name: LF01SS
Lab Code: R1104933-006

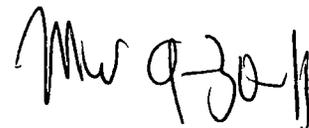
Units: µg/Kg
Basis: Dry
Percent Solids: 79.4

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\091111\B0022410.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	0.76 JQ	2.5	0.51	



COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 1525
Date Received: 9/2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 20:41

Sample Name: LF02SS
Lab Code: R1104933-007

Units: µg/Kg
Basis: Dry
Percent Solids: 79.0

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\091111\B0022411.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	24 JL	2.5	0.51	



COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 1540
Date Received: 9/2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 21:03

Sample Name: LF03SS
Lab Code: R1104933-008

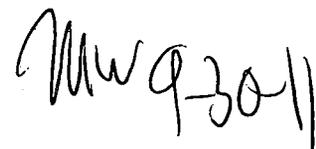
Units: µg/Kg
Basis: Dry
Percent Solids: 91.2

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\091111\B0022412.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	5.2 JL	2.2	0.44	



COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 1550
Date Received: 9/2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 21:25

Sample Name: LF04SS
Lab Code: R1104933-009

Units: µg/Kg
Basis: Dry
Percent Solids: 77.8

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\091111\B0022413.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	1.9 JQ	2.6	0.52	



COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 1215
Date Received: 9/2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 21:46

Sample Name: WB01SD
Lab Code: R1104933-010

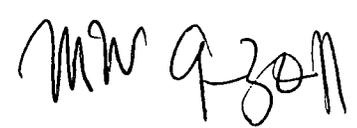
Units: µg/Kg
Basis: Dry
Percent Solids: 85.5

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\091111\B0022414.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	0.70 J Q	2.3	0.47	



COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 1220
Date Received: 9/ 2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 22:08

Sample Name: WB02SD
Lab Code: R1104933-011

Units: µg/Kg
Basis: Dry
Percent Solids: 85.5

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\091111\B0022415.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	2.3 U JL	2.3	0.47	

MW 9-30-11

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Soil and Clam Tissue/Project #: 002233.0660.01SI TDD #: 1
Sample Matrix: Soil

Service Request: R1104933
Date Collected: 8/30/11 1225
Date Received: 9/2/11
Date Extracted: 9/11/11
Date Analyzed: 9/11/11 22:29

Sample Name: WB03SD
Lab Code: R1104933-012

Units: µg/Kg
Basis: Dry
Percent Solids: 85.8

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\091111\B0022416.D\

Analysis Lot: 261031
Extraction Lot: 141686
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	2.3 U <i>JL</i>	2.3	0.47	

AMW
9/30/11



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: January 26, 2012

TO: Linda Costello, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington 

SUBJ: **Organic Data Validation Memorandum,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data validation of 1 rinsate blank and 7 tissue samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Analysis for perchlorate (EPA SW-846 Method 6850) was performed at Columbia Analytical Services, Inc., Rochester, New York.

The samples were numbered:

BK01TS EB01TS EB02TS EB03TS WB01TS WB02TS WB03TS
TS01RS

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at $< 6^{\circ}\text{C}$. The samples were collected between August 30 and September 2, 2011, were extracted by September 26, 2011, and were analyzed by September 29, 2011, therefore within QC criteria of less than 28 days between collection and analysis for water samples and less than 28 days between collection and extraction and less than 28 days between extraction and analysis for soil samples. Soil criteria were applied to the tissue samples in the absence of tissue criteria.

2. Initial and Continuing Calibration: Acceptable.

All calibration results were within QC limits.

3. Blanks: Acceptable.

A preparation blank was analyzed for each 20 samples or per matrix per concentration level. Blanks were analyzed after each Initial or Continuing Calibration Verification. There were no detections in any blanks.

4. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

5. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

6. LODV: Acceptable.

The LODV results were acceptable.

7. Blank and Matrix Spike Analysis: Satisfactory.

Blank and matrix spike analyses was performed per SDG or per matrix per concentration level, whichever was more frequent. Spike and spike duplicate recoveries were within the QC limits except one low tissue blank spike recovery; associated sample results were qualified as estimated quantities with a low bias (JL or UJL).

8. Duplicate Analysis: Satisfactory.

A laboratory spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate results were within QC limits except the tissue blank spike duplicate result; no additional actions were taken based on this outlier.

9. Internal Standards: Acceptable.

All internal standard results were within QC limits.

10. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present 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 its 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.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Clam Tissue/Project #: 002233.0660.01SI TDD #: 11-01-001
Sample Matrix: Animal Tissue

Service Request: R1105265
Date Collected: 8/31/11 1005
Date Received: 9/22/11
Date Extracted: 9/26/11
Date Analyzed: 9/29/11 12:31

Sample Name: BK01TS
Lab Code: R1105265-001

Units: µg/Kg
Basis: As Received

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\092911\B0022536.D\

Analysis Lot: 263452
Extraction Lot: 142754
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result	Q	MRL	Note
14797-73-0	Perchlorate	2.0	UJL	2.0	MU

MW 126/12

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Clam Tissue/Project #: 002233.0660.01SI TDD #: 11-01-001
Sample Matrix: Animal Tissue

Service Request: R1105265
Date Collected: 8/30/11 1040
Date Received: 9/22/11
Date Extracted: 9/26/11
Date Analyzed: 9/29/11 13:36

Sample Name: EBOITS
Lab Code: R1105265-002

Units: µg/Kg
Basis: As Received

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQUDATA\HPLC02\DATA\092911\B0022539.D\

Analysis Lot: 263452
Extraction Lot: 142754
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result	Q	MRL	Note
14797-73-0	Perchlorate	2.0	U <i>JL</i>	2.0	<i>Ma</i>

Ma 12612

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Clam Tissue/Project #: 002233.0660.01SI TDD #: 11-01-001
Sample Matrix: Animal Tissue

Service Request: R1105265
Date Collected: 8/30/11 1045
Date Received: 9/22/11
Date Extracted: 9/26/11
Date Analyzed: 9/29/11 13:58

Sample Name: EB02TS
Lab Code: R1105265-003

Units: µg/Kg
Basis: As Received

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\092911\B0022540.D\

Analysis Lot: 263452
Extraction Lot: 142754
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result	Q	MRL	Note
14797-73-0	Perchlorate	2.0	U JL	2.0	JML

MW 1-2612

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Clam Tissue/Project #: 002233.0660.01SI TDD #: 11-01-001
Sample Matrix: Animal Tissue

Service Request: R1105265
Date Collected: 8/30/11 1055
Date Received: 9/22/11
Date Extracted: 9/26/11
Date Analyzed: 9/29/11 14:41

Sample Name: EB03TS
Lab Code: R1105265-004

Units: µg/Kg
Basis: As Received

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\092911\B0022542.D\

Analysis Lot: 263452
Extraction Lot: 142754
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result	Q	MRL	Note
14797-73-0	Perchlorate	2.0	U <i>JL</i>	2.0	<i>AMW</i>

AMW 1-26-12

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Clam Tissue/Project #: 002233.0660.01SI TDD #: 11-01-001
Sample Matrix: Animal Tissue

Service Request: R1105265
Date Collected: 8/31/11 0920
Date Received: 9/22/11
Date Extracted: 9/26/11
Date Analyzed: 9/29/11 15:03

Sample Name: WB01TS
Lab Code: R1105265-005

Units: µg/Kg
Basis: As Received

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQUDATA\HPLC02\DATA\092911\B0022543.D\

Analysis Lot: 263452
Extraction Lot: 142754
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result	Q	MRL	Note
14797-73-0	Perchlorate	2.0	U <i>JL</i>	2.0	<i>Me</i>

MW 12/12

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Clam Tissue/Project #: 002233.0660.01SI TDD #: 11-01-001
Sample Matrix: Animal Tissue

Service Request: R1105265
Date Collected: 8/31/11 0910
Date Received: 9/22/11
Date Extracted: 9/26/11
Date Analyzed: 9/29/11 15:24

Sample Name: WB02TS
Lab Code: R1105265-006

Units: µg/Kg
Basis: As Received

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQUATA\HPLC02\DATA\092911\B0022544.D\

Analysis Lot: 263452
Extraction Lot: 142754
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result	Q	MRL	Note
14797-73-0	Perchlorate	2.0	U JL	2.0	MLU

MLU F-2612

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Clam Tissue/Project #: 002233.0660.01SI TDD #: 11-01-001
Sample Matrix: Animal Tissue

Service Request: R1105265
Date Collected: 8/31/11 0925
Date Received: 9/22/11
Date Extracted: 9/26/11
Date Analyzed: 9/29/11 15:46

Sample Name: WB03TS
Lab Code: RI105265-007

Units: µg/Kg
Basis: As Received

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQU\DATA\HPLC02\DATA\092911\B0022545.D\

Analysis Lot: 263452
Extraction Lot: 142754
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	Note
14797-73-0	Perchlorate	2.0 UJL	2.0	FM

MW 1-26-12

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Ecology And Environment, Incorporated
Project: Perchlorate in Clam Tissue/Project #: 002233.0660.01SI TDD #: 11-01-001
Sample Matrix: Water

Service Request: R1105265
Date Collected: 9/21/11 1105
Date Received: 9/22/11
Date Extracted: 9/26/11
Date Analyzed: 9/26/11 23:33

Sample Name: TS01RS
Lab Code: R1105265-008

Units: µg/L
Basis: NA

Perchlorates in Water, Soils, Solid Wastes Using High Performance LC/Electrospray/Mass Spectrometry

Analytical Method: 6850
Prep Method: Method
Data File Name: J:\ACQUDATA\HPLC02\DATA\092611\B0022451.D\

Analysis Lot: 262951
Extraction Lot: 142758
Instrument Name: R-HPLC-02
Dilution Factor: 1

CAS No.	Analyte Name	Result Q	MRL	MDL	Note
14797-73-0	Perchlorate	0.20 U	0.20	0.026	

MW 1-26-12



ecology and environment, inc.

International Specialists in the Environment

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: September 21, 2011

TO: Linda Costello, Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-3 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Inorganic Data Summary Check,
Makah Reservation Warmhouse Beach Dump, Neah Bay, Washington**

REF: TDD: 11-01-0013 PAN: 002233.0660.01SI

The data summary check of 16 soil samples collected from the Makah Reservation Warmhouse Beach Dump site located in Neah Bay, Washington, has been completed. Analysis for Aroclors (EPA CLP SOW SOM01.2) was performed by ALS Laboratory Group, Salt Lake City, Utah.

The samples were numbered:

JE864	JE865	JE866	JE867	JE869	JE871	JE878	JE879
JE880	JE884	JE885	JE886	JE890	JE891	JE892	JE893

No discrepancies were noted.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

September 21, 2011

Reply to: Donald M. Brown
Attn of: OEA-095

MEMORANDUM

Subject: Data Validation Report for the Aroclor Analysis of the Soil Samples Collected from the Makah Reservation Warmhouse Beach Dump Site - Case Number 41693, SDG JE864

From: Donald M. Brown, QA Chemist^{DMB}
USEPA Region 10, Office of Environmental Assessment, Environmental Services Unit

To: Brandon Perkins, Site Assessment Manager
USEPA Region 10, Office of Environmental Cleanup

CC: Renee Nordeen, Ecology & Environment, Inc.

The quality assurance (QA) review of the analytical data generated from the analysis of sixteen (16) soil samples collected from the above referenced site has been completed. These samples were analyzed for Aroclors by ALS Laboratory Group (DATAC) located in Salt Lake City, Utah.

All sample analyses were evaluated following EPA's Stage 4 Data Validation Electronic/Manual Process (S4VEM). The validation was conducted and appropriate qualifiers were applied according to the Quality Control Specifications outlined in the Sampling & Quality Assurance Plan for Makah Reservation Warmhouse Beach Dump (August 2011); the technical specifications of the EPA Contract Laboratory Program's (CLP) Statement of Work (SOW) for Multi-Media, Multi-Concentration Organic Analyses (SOM01.2); the Contract Laboratory Program's National Functional Guidelines for Organic Data Review; and the Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (EPA-540-R08-005). Some of the data quality elements were qualified using the reviewer's professional judgment. The conclusions presented herein are based on the information provided for the review.

A summary of samples evaluated in this validation report and the pertinent dates for sample collection, sample receipt at the laboratory, extraction, and analyses is attached along with the validated data.

I. QUALITY CONTROL RESULTS SUMMARY

Aroclor Analysis		
Quality Control Test	Outliers?	Evaluation Criteria
Blanks	N	Non-detect or < 10X Blank
Initial Calibration	N	≤ 20% RSD
Continuing Calibration Verification	N	Open: ≤ 15% D, Close: ≤ 50% D
Surrogate Spikes	N	30 – 150%
Laboratory Control Samples	N	50 – 150%
Target Compound Identification	N	≤ 30% D

(Note: RSD = Relative Standard Deviation, D = Difference)

II. DATA QUALIFICATIONS

Summary of Validation Qualifiers Applied:

Data qualifications applied after the manual and electronic data review can be found in the attached “Manual Data Review Results” section of this report. No data were qualified for this review.

Data Qualifiers

The following is a list of validation qualifiers applied to the sample result(s) when needed to indicate associated out-of-control QA/QC results.

Data Qualifiers	
U	The analyte was not detected at or above the reported result.
J	The analyte was positively identified. The associated numerical result is an estimate.
UJ	The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
R	The data are unusable for all purposes.
N	There is evidence the analyte is present in this sample.
JN	There is evidence that the analyte is present. The associated numerical result is an estimate.

For site assessment and investigations, the following bias qualifiers are applied to the data in addition to the above data qualifiers when necessary to allow for data analysis and interpretation using Pre-Score software calculations for National Priority Listing Hazard Ranking Scoring (NPL-HRS).

Bias Qualifiers	
L	Low bias.
H	High bias.
Q	The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).
K	Unknown bias.

Attachments:

Sample Summary Report
Manual Data Review Results
Analytical Sample Listing (Report #6)

Sample Summary Report

Case No: 41693	Contract: EPW11037	SDG No: JE864	Lab Code: DATA
Sample Number: JE864	Method: Aroclor	Matrix: Soil	MA Number: DEFAULT
Sample Location: LF01SS	pH: 6.8	Sample Date: 08302011	Sample Time: 15:10:00
% Moisture : 16.8942		% Solids :	

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	24	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE865	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	LF02SS	pH:	6.9	Sample Date:	08302011	Sample Time:	15:25:00
% Moisture :	22.1032			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	25	ug/kg	1.0	U	U	Yes	S4VEM

Case No: 41693	Contract: EPW11037	SDG No: JE864	Lab Code: DATAC
Sample Number: JE866	Method: Aroclor	Matrix: Soil	MA Number: DEFAULT
Sample Location: LF03SS	pH: 8.0	Sample Date: 08302011	Sample Time: 15:40:00
% Moisture: 7.9522	% Solids:		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	150	ug/kg	1.0			Yes	S4VEM
Aroclor-1221	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	21	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE867	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	LF04SS	pH:	5.3	Sample Date:	08302011	Sample Time:	15:50:00
% Moisture :	21.1668			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	25	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE869	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	EC02SD	pH:	7.1	Sample Date:	08302011	Sample Time:	09:20:00
% Moisture :	25.039			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	26	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	26	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	26	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	26	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	26	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	26	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	26	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	26	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	26	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA C
Sample Number:	JE871	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	WC02SD	pH:	7.7	Sample Date:	08302011	Sample Time:	12:05:00
% Moisture :	17.5539			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	24	ug/kg	1.0	U	U	Yes	S4VEM

Case No: 41693	Contract: EPW11037	SDG No: JE864	Lab Code: DATAC
Sample Number: JE878	Method: Aroclor	Matrix: Soil	MA Number: DEFAULT
Sample Location: EB01SD	pH: 8.2	Sample Date: 08302011	Sample Time: 09:45:00
% Moisture: 15.4325	% Solids:		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	23	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE879	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	EB02SD	pH:	8.9	Sample Date:	08302011	Sample Time:	09:50:00
% Moisture :	15.4652			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	23	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE880	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	EB03SD	pH:	9.2	Sample Date:	08302011	Sample Time:	10:05:00
% Moisture:	18.891			% Solids:			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	24	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE884	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	WB01SD	pH:	7.9	Sample Date:	08302011	Sample Time:	12:15:00
% Moisture :	17.6492			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	24	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE885	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	WB02SD	pH:	7.7	Sample Date:	08302011	Sample Time:	12:20:00
% Moisture :	17.3232			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	24	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	24	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE886	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	WB03SD	pH:	7.8	Sample Date:	08302011	Sample Time:	12:25:00
% Moisture :	15.4723			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	23	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	23	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE890	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	BK01SS	pH:	6.1	Sample Date:	08302011	Sample Time:	17:55:00
% Moisture:	34.3021			% Solids:			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	30	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	30	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	30	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	30	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	30	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	30	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	30	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	30	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	30	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE891	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	BK01SD	pH:	6.3	Sample Date:	08302011	Sample Time:	18:10:00
% Moisture :	6.5255			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	21	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE892	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	BK02SD	pH:	6.4	Sample Date:	08312011	Sample Time:	10:00:00
% Moisture :	8.9512			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	21	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	21	ug/kg	1.0	U	U	Yes	S4VEM

Case No: 41693	Contract: EPW11037	SDG No: JE864	Lab Code: DATA
Sample Number: JE893	Method: Aroclor	Matrix: Soil	MA Number: DEFAULT
Sample Location: BK03SD	pH: 6.8	Sample Date: 08312011	Sample Time: 10:00:00
% Moisture: 22.0232	% Solids:		

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1221	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	25	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract:	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE893MS	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	BK03SD	pH:	6.8	Sample Date:	08312011	Sample Time:	10:00:00
% Moisture :	22.0232			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	82	ug/kg	1.0		J	Yes	S4VEM
Aroclor-1260	86	ug/kg	1.0		J	Yes	S4VEM
Aroclor-1221	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1232	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	25	ug/kg	1.0	U	U	Yes	S4VEM

Case No:	41693	Contract	EPW11037	SDG No:	JE864	Lab Code:	DATA
Sample Number:	JE893MSD	Method:	Aroclor	Matrix:	Soil	MA Number:	DEFAULT
Sample Location:	BK03SD	pH:	6.8	Sample Date:	08312011	Sample Time:	10:00:00
% Moisture :	22.0232			% Solids :			

Analyte Name	Result	Units	Dilution Factor	Lab Flag	Validation	Reportable	Validation Level
Aroclor-1016	93	ug/kg	1.0		J	Yes	S4VEM
Aroclor-1221	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1260	96	ug/kg	1.0		J	Yes	S4VEM
Aroclor-1232	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1242	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1248	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1254	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1262	25	ug/kg	1.0	U	U	Yes	S4VEM
Aroclor-1268	25	ug/kg	1.0	U	U	Yes	S4VEM

Manual Data Review Results

AROCLOR ANALYSIS
Sample Qualification Summary
No qualification was applied.

National Functional Guidelines Report #06

Lab DATAC(ALS Environmental) SDG JE864 Case 41693 Contract EPW11037 Region 10 DDTID 131546 SOW SOM01.2

Analytical Sample Listing

Aroclor

Sample Number	Sample Type	Matrix	Level	Sampling Date	Date Received	Extraction		Analysis		
						Type	Date/Time	Date/Time	GC Column	Instrument
JE864	Field_Sample	Soil		08302011 15:10:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 01:42:00	RTXCLP	GCE19
JE864	Field_Sample	Soil		08302011 15:10:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 02:03:00	RTXCLP2	GCE19
JE865	Field_Sample	Soil		08302011 15:25:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 02:03:00	RTXCLP	GCE19
JE865	Field_Sample	Soil		08302011 15:25:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 02:23:00	RTXCLP2	GCE19
JE866	Field_Sample	Soil		08302011 15:40:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 02:23:00	RTXCLP	GCE19
JE866	Field_Sample	Soil		08302011 15:40:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 02:43:00	RTXCLP2	GCE19
JE867	Field_Sample	Soil		08302011 15:50:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 02:43:00	RTXCLP	GCE19
JE867	Field_Sample	Soil		08302011 15:50:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 03:03:00	RTXCLP2	GCE19
JE869	Field_Sample	Soil		08302011 09:20:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 03:03:00	RTXCLP	GCE19
JE869	Field_Sample	Soil		08302011 09:20:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 03:24:00	RTXCLP2	GCE19
JE871	Field_Sample	Soil		08302011 12:05:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 03:24:00	RTXCLP	GCE19
JE871	Field_Sample	Soil		08302011 12:05:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 03:44:00	RTXCLP2	GCE19
JE878	Field_Sample	Soil		08302011 09:45:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 03:44:00	RTXCLP	GCE19
JE878	Field_Sample	Soil		08302011 09:45:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 04:04:00	RTXCLP2	GCE19
JE879	Field_Sample	Soil		08302011 09:50:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 04:04:00	RTXCLP	GCE19
JE879	Field_Sample	Soil		08302011 09:50:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 04:24:00	RTXCLP2	GCE19
JE880	Field_Sample	Soil		08302011 10:05:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 04:24:00	RTXCLP	GCE19
JE880	Field_Sample	Soil		08302011 10:05:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 04:44:00	RTXCLP2	GCE19
JE884	Field_Sample	Soil		08302011 12:15:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 04:44:00	RTXCLP	GCE19
JE884	Field_Sample	Soil		08302011 12:15:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 05:05:00	RTXCLP2	GCE19
JE885	Field_Sample	Soil		08302011 12:20:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 05:05:00	RTXCLP	GCE19
JE885	Field_Sample	Soil		08302011 12:20:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 05:25:00	RTXCLP2	GCE19
JE886	Field_Sample	Soil		08302011 12:25:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 05:25:00	RTXCLP	GCE19
JE886	Field_Sample	Soil		08302011 12:25:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 05:45:00	RTXCLP2	GCE19
JE890	Field_Sample	Soil		08302011 17:55:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 05:45:00	RTXCLP	GCE19
JE890	Field_Sample	Soil		08302011 17:55:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 06:05:00	RTXCLP2	GCE19

National Functional Guidelines Report #06

Lab DATAC(ALS Environmental) SDG JE864 Case 41693 Contract EPW11037 Region 10 DDTID 131546 SOW SOM01.2

Analytical Sample Listing

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Sample Number	Sample Type	Matrix	Level	Sampling Date	Date Received	Extraction		Analysis		
						Type	Date/Time	Date/Time	GC Column	Instrument
JE891	Field_Sample	Soil		08302011 18:10:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 06:05:00	RTXCLP	GCE19
JE891	Field_Sample	Soil		08302011 18:10:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 06:26:00	RTXCLP2	GCE19
JE892	Field_Sample	Soil		08312011 10:00:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 06:26:00	RTXCLP	GCE19
JE892	Field_Sample	Soil		08312011 10:00:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 06:46:00	RTXCLP2	GCE19
JE893	Field_Sample	Soil		08312011 10:00:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 06:46:00	RTXCLP	GCE19
JE893	Field_Sample	Soil		08312011 10:00:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 07:06:00	RTXCLP2	GCE19
JE893MS	Matrix_Spike	Soil		08312011 10:00:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 07:06:00	RTXCLP	GCE19
JE893MS	Matrix_Spike	Soil		08312011 10:00:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 07:26:00	RTXCLP2	GCE19
JE893MSD	Matrix_Spike_Duplicate	Soil		08312011 10:00:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 07:26:00	RTXCLP	GCE19
JE893MSD	Matrix_Spike_Duplicate	Soil		08312011 10:00:00	09022011 09:58:00	Sonication	09022011 15:00:00	09132011 07:47:00	RTXCLP2	GCE19