

# OFF-PROPERTY PORTION REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT

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FORMER PACIFIC WOOD TREATING CO. SITE  
FACILITY ID 1019, CLEANUP SITE ID 3020



*Prepared for*  
**PORT OF RIDGEFIELD**  
*February 13, 2025*  
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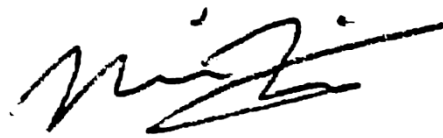
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*The material and data in this report were prepared  
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## ACRONYMS AND ABBREVIATIONS

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bgs	below ground surface
CAP	cleanup action plan
the City	City of Ridgefield
COC	chain of custody
CSM	conceptual site model
CUL	cleanup level
DCA	disproportionate-cost analysis
dioxins	chlorinated dibenzo-p-dioxins and dibenzofurans
Ecology	Washington State Department of Ecology
EF	exposure frequency
EPA	U.S. Environmental Protection Agency
FS	feasibility study
GIS	Geographic Information Systems
IAWP	interim action work plan
ISM	incremental sampling methodology
LRIS	Lake River Industrial Site
MFA	Maul Foster & Alongi, Inc.
MTCA	Model Toxics Control Act
ng/kg	nanograms per kilogram
NGVD	National Geodetic Vertical Datum of 1927/1947
OPP	off-property portion
the Order	Agreed Order No. DE 11057 between the Port and Ecology
PAH	polycyclic aromatic hydrocarbon
PCP	Pentachlorophenol
POC	point of compliance
the Port	Port of Ridgefield
PSEP	Puget Sound Estuary Protocol
PWT	Pacific Wood Treating Co.
QA/QC	quality assurance and quality control
RCRA	Resource Conservation and Recovery Act
REL	remediation level
RI	remedial investigation
ROW	right-of-way
RSD	relative standard deviation
SAP	sampling and analysis plan
site	former PWT site
SM	Standard Methods for the Examination of Water and Wastewater
SSAP	site-specific sampling and analysis plan
TCDD	2,3,7,8-tetrachloro dibenzo-p-dioxin

## ACRONYMS AND ABBREVIATIONS (CONTINUED)

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TEC	toxicity equivalent concentration
TEE	terrestrial ecological evaluation
TEF	toxic equivalency factor
TEQ	toxicity equivalent
TOC	total organic carbon
WAC	Washington Administrative Code

# 1 INTRODUCTION

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On behalf of the Port of Ridgefield (the Port), Maul Foster & Alongi, Inc. (MFA) has prepared this remedial investigation and feasibility study (RI/FS) for the off-property portion (OPP) of the former Pacific Wood Treating Co. (PWT) site (the site) in Ridgefield, Washington (see Figure 1-1). The OPP is adjacent to the Port's waterfront property, formerly known as the Lake River Industrial Site (LRIS). This RI/FS was prepared under the authority of Agreed Order No. DE 11057 (the Order) between the Port and the Washington State Department of Ecology (Ecology).

PWT operated a wood-treating facility at the LRIS from 1964 to 1993. These operations resulted in the release of hazardous chemicals, including chlorinated dibenzo-p-dioxins and dibenzofurans (dioxins). Previous soil investigations indicated that dioxins are present on public rights-of-way (ROWs) in the OPP at levels exceeding the Model Toxics Control Act (MTCA) Method B cleanup level (CUL) for the dioxin toxicity equivalent (TEQ) of 13 nanograms per kilogram (ng/kg) (MFA, 2013b). RI activities were conducted to determine the extent of former PWT-related (i.e., associated with the former wood-treating operations) dioxin contamination in the OPP. The work was completed consistent with the Ecology-approved RI work plan (MFA, 2015).

This report first describes the RI activities completed for the Phase 1, Phase 2, and Phase 3 OPP investigation areas (see Figure 1-2). Environmental sampling design and procedures, sample handling and analysis, quality assurance protocols, and laboratory analytical results and interpretation are presented. Soil investigation was conducted consistent with a sampling and analysis plan (SAP) developed pursuant to Washington Administrative Code (WAC) 173-340-810 and WAC 173-340-830 (MFA, 2015). Site-specific SAPs (SSAPs) that identify sample locations were developed and approved by Ecology before the start of sampling activities. The sampling results are evaluated in the context of potential exposure pathways and applicable CULs to determine areas with potential for unacceptable risk. The RI results provide the basis for the FS. The FS evaluates cleanup alternatives to identify a preferred cleanup action for the OPP that mitigates unacceptable risk.

Interim action (removal of contaminated soil and restoration) was conducted in 2016 and 2017 to remedy OPP areas (subsequently identified as the Phase 1 OPP) known at the time to exceed the CUL. The interim action was completed consistent with the Ecology-approved Interim Action Work Plan (IAWP, MFA, 2016a). The interim action was technically necessary to immediately reduce threats to human health and achieved final cleanup for the Phase 1 OPP. Cleanup has not been conducted for the Phase 2 and Phase 3 OPP (see Figure 1-2). The need for cleanup in these areas will be informed by the results of this RI/FS.

## 1.1 Definition of Site and Off-Property Portion

The site is located at and near 111 West Division Street in Ridgefield, Washington (see Figure 1-1). The site is defined by the extent of contamination caused by the release of hazardous substances from the former PWT operations. The site constitutes a "Facility" under Revised Code of Washington

70.105D.020(4). The site includes those portions of the LRIS, Port-owned properties, Carty Lake, Lake River, and OPP that were impacted by former PWT operations.

The OPP area of Ridgefield consist of residential with some commercial properties. The OPP RI work was done in three phases, Phase 1, Phase 2, and Phase 3 (see Figure 1-2). The Phase 1 OPP is the area where ROWs and properties are identified in the Order as requiring remedial investigation. The Phase 2 and Phase 3 OPP are areas where remedial investigation of ROWs and properties was required by Ecology, based on the results of Phase 1 and 2 RI activities. The OPP boundary therefore defines the investigation area in which both ROWs and properties were evaluated to determine whether PWT-related contamination is present. For purposes of this RI/FS, a “property” is defined to include residential properties (which most of the OPP comprises) as well as several mixed-use and park/open-space properties.

## 1.2 Purpose and Objectives

This data provided in this report meets the requirements of MTCA (WAC 173-340) for performing an RI and a risk assessment. The scope of work for the OPP was completed consistent with the Order. The purpose of the RI was to generate data sufficient to characterize the nature and extent of soil contamination in ROWs and properties in order to complete a risk assessment. The specific RI objectives are as follows:

- Determine the nature and extent of PWT-related dioxins in soils, focusing on the lateral and vertical extent of contamination in ROWs and properties.
- Identify any significant localized dioxin source areas in or near properties in the OPP. Source areas are characterized through a review of historical information, questionnaires/interviews, and property surveys.
- Identify all current and reasonably likely future human receptors at the OPP. This analysis considers all relevant contaminant migration pathways and the nature and extent of dioxins in soil.
- Evaluate the risk to human health from releases from former PWT operations.

Information gathered from the RI supports the FS. The FS evaluates cleanup action alternatives that protect human health by eliminating, reducing, or otherwise controlling risks, consistent with WAC 173-340-350(8) and WAC 173-340-355. The FS considers cleanup actions that meet requirements specified in WAC 173-340-360 and provide the basis for a cleanup action plan (CAP).

## 1.3 Regulatory Framework

The 2013 Consent Decree required certain cleanup actions, which have been substantively completed, for the following portions of the site: the LRIS, Port-owned properties, Carty Lake, and Lake River. The cleanup actions for these areas are described in the Ecology-issued CAP (Ecology, 2013b). The 2013 Consent Decree required additional remedial characterization for the OPP and mandated that the work be conducted under a separate Agreed Order (the Order; Ecology, 2013c).

Ecology and the Port entered into the Order in December 2014. The Order requirements include preparing an RI work plan and conducting an RI to determine the nature and extent of hazardous substances at the OPP (defined in the Order as the Phase 1 OPP portion shown in Figure 1-2) to identify potential threats to human health and the environment. The Order also requires preparing an RI/FS and a draft CAP pursuant to MTCA. The Ecology-approved RI work plan was prepared in April 2015 (MFA, 2015). Results of the Phase 1 RI activities in 2015–2016 showed contamination extended beyond the Phase 1 portion and Ecology required additional remedial characterization to the east of the Phase 1 portion. Phase 2 RI activities were conducted in 2016–2017 consistent with the approach provided in MFA memorandums (MFA, 2016c,e). Based on the results of the 2016–2017 RI activities, where it was found contamination extended beyond the Phase 2 portion, Ecology required additional remedial characterization. The Phase 3 activities were conducted in 2019–2020 in coordination with Ecology (Ecology, 2018). Phase 3 defined the lateral contamination extent and no more lateral extent characterization work is needed. In 2023, vertical contamination extent was investigated in the Phase 2 and Phase 3 areas. This report describes the RI activities and an FS that has been prepared to satisfy these requirements of the Order.

Property cleanups were conducted as an interim action in 2016 and 2017 to remedy the Phase 1 OPP, as described in the IAWP (MFA, 2016a). The interim action meets the requirements set forth in WAC 173-340-430, including the requirement that the interim action is consistent with, and does not exclude, any reasonable cleanup alternatives for a cleanup action for the entire OPP, which are identified in the FS.

## 2 BACKGROUND

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### 2.1 Former Pacific Wood Treating Co. Site History

The Port of Ridgefield leased the approximately 40-acre LRIS to PWT from approximately 1964 to 1993. PWT's operations involved pressure-treating wood products with oil-based treatment solutions containing creosote; pentachlorophenol (PCP); and water-based mixtures of copper, chromium, arsenic, and/or zinc. Potential release and transport mechanisms for these hazardous substances are described in the 2013 site RI/FS report (MFA, 2013b). PWT filed for bankruptcy in 1993 and abandoned the LRIS. The Port established office spaces on the LRIS and manages the waterfront property. Multiple upland and in-water cleanup actions have been substantively completed, as shown in Figure 2-1.

### 2.2 Off-Property Setting

The OPP is located in section 24, township 4 north, range 1 west, Willamette Meridian. The Phase 1 OPP includes 49 tax lots and associated ROWs. The Phase 2 OPP includes 59 tax lots and associated ROWs. The Phase 3 OPP includes 15 tax lots and associated ROWs. The OPP is zoned mostly low-density residential, and a few tax lots are zoned parks/open space or central mixed use. The land use is not expected to change. In the OPP vicinity, nonresidential zoning designations (waterfront-mixed use) apply to the Burlington Northern Santa Fe railroad tracks, the Port-owned Railroad Avenue



properties, and the waterfront property to the west (see Figure 2-2). There is substantial development in the OPP, with minimal viable ecological habitat.

## 2.2.1 Topography

The OPP is relatively flat in the eastern part of the Phase 1 area and all of the Phase 2 area. Otherwise, the ground surface has a downward slope from east to west from North 1<sup>st</sup> Avenue to the terrace where the LRIS is located. The elevation ranges from approximately 90 feet National Geodetic Vertical Datum of 1927/1947 (NGVD) in the east to approximately 50 feet NGVD at the western extent.

## 2.2.2 Area Geology

Four principal geologic units have been identified at the nearby waterfront property (MFA, 2013b): fill, younger alluvium, older alluvium, and the upper Troutdale Formation. The younger alluvium (clayey silts, sandy silts, and sands) appears to be thicker to the west near Lake River, and the older alluvium (sandy gravel) appears to be thicker to the east. A silty gravel unit observed beneath the alluvium forms an aquitard and may represent the top of the Troutdale Formation. Note that the waterfront property is west of the OPP and is approximately 10 to 70 feet lower in elevation.

OPP soils are classified as Hillsboro silt loam and are well-drained. Soil samples collected at properties during the course of RI activities generally indicate a sand with silt layer from approximately 0 to 1 foot below ground surface (bgs). In ROWs, sand with silt or gravel with sand/silt is present from approximately 0 to 2 feet bgs. Six soil borings, from 0 to 10 feet bgs, were drilled in ROWs in September 2012. The borings generally indicate gravel with sand fill layer or gravel with silt from approximately 0 to 1 foot bgs, sand and/or silts from approximately 1 to 8 feet bgs, and sand from approximately 8 to 10 feet bgs (MFA, 2013a).

The drinking water supply in the OPP neighborhood is provided by the City of Ridgefield (the City). That water source is from a well field located approximately 2,000 feet (0.4 mile) east of the OPP in Abrams Park. Based on the Clark County Maps Online database, no domestic drinking water wells were identified in the OPP. Mr. Steven Wall, PE, the City's former public works director, stated that, in the future, water wells will not be installed west of Abrams Park, in the direction of the OPP (Wall, 2006). If additional water needs arise, beyond the installation of additional wells at Abrams Park and/or the I-5 junction, the City will install wells east of I-5.

## 2.2.3 Potential Hazardous Substances

Multiple investigations have been conducted since 1985 to characterize contamination associated with former PWT operations; these investigations are summarized in the site RI/FS (MFA, 2013b). Previous investigations conducted on the OPP demonstrated that the only potential hazardous substances in the OPP were dioxins, and that the presence of dioxins required evaluation of potential risk to human health. No unacceptable risk to ecological receptors is expected. These investigations are described below.

In 2010, surface soil samples from 0-0.5 feet depth were collected at 6 locations to the north of and in the Phase 1 OPP ROWs. Analyses were conducted for chemicals known to have impacted LRIS soils, including polycyclic aromatic hydrocarbons (PAHs), PCP, arsenic, chromium, copper, zinc, and dioxins (MFA, 2010). In 2011, ten additional surface soil samples were collected in the Phase 1 OPP (MFA, 2011). In September 2012, deeper composite soil sampling (0 to 6 feet bgs) was conducted at six Phase 1 ROW locations to support evaluation of potential risks to terrestrial ecological receptors (MFA, 2013a). These 2012 sample locations duplicated the 2010 and 2011 sampling locations where elevated dioxin levels were discovered. The surface soil data obtained from these investigations were used to inform the Phase 1 OPP extent and are provided in Table 2-1. Surface soil sample locations and results are shown in Figure 2-3.

Based on the results of the 2010 investigation, an initial terrestrial ecological evaluation (TEE) showed that PAHs, PCP, and metals should not be expected to result in adverse effects to ecological receptors in the OPP; however additional evaluation was needed for dioxins (MFA, 2012). Using the data collected during the 2011 and 2012 investigations, a supplementary TEE demonstrated that dioxins in soil samples representative of potential exposure are below ecological indicator concentrations (MFA, 2013a). In February 2013, Ecology approved the supplementary TEE showing no unacceptable risk to ecological receptors in the OPP (Ecology, 2013a).

The supplementary TEE prepared in 2013 informed the 2015 OPP RI work plan. The OPP RI work plan included identification and evaluation of potential hazardous substances that may pose a threat to human health or the environment (MFA, 2015). Data from the RI work were compared with MTCA Method A and B CULs protective of human health (WAC 173-340-705), and no chemicals, except dioxins, exceeded the applicable CULs. Dioxins (measured as the TEQ) were detected above the CUL of 13 ng/kg (see Figure 2-3). Dioxins were therefore identified as the only substances potentially hazardous to human health that required further investigation.

## 2.2.4 Regional and Local Climate Vulnerabilities

Consistent with WAC 173-340-350, climate information is provided to help inform characteristics which could affect the migration of hazardous substances or the resilience of cleanup action alternatives. According to the Fourth National Climate Assessment (May, et al. 2018), climate trends for the northwest region of the U.S. include: increased temperatures during all seasons under all future scenarios; decreased snowpack; increased wildfires and insect infestations; decreased rainfall and water availability during the dry season; increased flooding during the wet season; a rising sea level; increased storm surge events; more frequent heat waves; and increased risk of landslide and erosion. The most applicable climate related vulnerabilities to the OPP are decreased rainfall during the dry season and more frequent heat waves.

According to the University of Washington Climate Mapping tool for Clark County (<https://data.cig.uw.edu/climatemapping>), the OPP is located in an area with predicted increased drought, higher extreme heat, increased frequent heavy magnitude precipitation events resulting in increased streamflow volumes, and increased high fire danger days. Other climate change impacts are not as likely to significantly affect the OPP.

## 2.3 Phase 1 OPP Interim Action Summary

An interim action was completed in 2016 and 2017 in the Phase 1 OPP. Soil on properties and adjacent ROWs that exceeded the dioxin CUL were remedied consistent with the IAWP (MFA, 2016a). The interim action objectives were to remove soil from residential properties and adjacent ROWs that exceeded the Model Toxics Control Act (MTCA) Method B cleanup level (CUL) for the dioxin toxicity equivalent of 13 nanograms per kilogram. The completed interim action removed contaminated soil and was technically necessary to reduce threats to human health and the environment (MFA, 2018).

Prior to interim action implementation, all required agency approvals and permits were acquired. A robust, project-specific construction quality assurance program was implemented during construction to verify that the work was constructed to the performance standards detailed in the construction drawings and described in the technical specifications, which, in turn, fulfilled the requirements of the interim action prescribed. This included: construction submittals, meetings, daily reports, construction surveying, and import material testing. Public communications included pre-cleanup outreach with affected homeowners, restoration design outreach with homeowners, and general public outreach in coordination with Ecology including signage and flyers with general information about the remedial actions being conducted, with Ecology and MFA contact information for interest or questions about the program. A cultural resource contractor (WillametteCRA) conducted shovel probes and determined that no archaeological resources were present in properties surveyed prior to ground-disturbing construction activities. WillametteCRA prepared an inadvertent discovery plan, which was implemented during the construction. No discoveries of archeological or historical resources were made during interim action construction.

The construction was divided into two phases: remediation and restoration. Remediation activities consisted of site preparation including topographical survey to document existing topographic conditions and site features; an site walk-through; structural survey to document the building conditions; and targeted removal of fences and stumps for access. The construction contractor submitted a temporary erosion control plan and provided a certified erosion and sediment control lead for the duration of the project. This included a minimum of weekly inspections and submittal of monthly discharge monitoring reports to Ecology to comply with the reporting requirements of the permit.

The excavation of contaminated soil began on July 20, 2016, and continued through September 30, 2016. Excavation continued at the remaining properties and ROWs in June 2017 and was completed by September 2017. The base of each excavation was surveyed to verify that the required excavation depth had been met. To the extent possible, excavated soil was loaded directly into trucks and trailers (truck and pup) and hauled off site for disposal. Plastic sheeting was placed under trucks and trailers during loading activities to minimize the tracking of contaminated material onto roadway surfaces. In accordance with an Ecology-approved waste determination memorandum, excavated soil was transported to Wasco County Landfill in The Dalles, Oregon (a Subtitle D landfill facility) for disposal. Trucks hauling excavated soil were tarped to minimize loss of material during transport. A total of 7,728 tons (5,038 in 2016 and 2,690 in 2017) of contaminated soil and associated debris (i.e., vegetation and demolition debris) was hauled off site and disposed of at the landfill.

Restoration activities included clean fill (soil) placement and landscaping to a condition equal to or better than prior to disturbance. Clean backfill materials included clean topsoil and driveway gravel (crushed surface base course). The backfill material was placed to the design grade, using front-end loaders, skid steers, and hand tools. Survey measurements, provided in electronic format to MFA, ensured adequate backfill quantity and appropriate drainage. In some cases, field alterations were made to accommodate a homeowner's request or conditions that had changed since the design was finalized.

MFA provided restoration design to the properties on an individual basis. Restoration plans were completed by a landscape architect and approved by the homeowner prior to construction. Homeowners were provided with two options for landscape restoration: (1) restore with lawn and mulched bed(s), or (2) restore with the same or in-kind landscaping that was to be removed. Ground covers, shrubs, and trees were installed in accordance with the contract drawings to the extent possible. During construction, when daytime temperatures were too hot for effective transplanting, shrubs and trees originally identified for transplant in the contract drawings were either protected in place or replaced in kind. Lawn warranties were extended until either September 30 or for 30 days after installation (whichever would come later). Lawn maintenance included watering and mowing as needed. Owners were instructed to keep people and pets off the lawns during the maintenance period or risk voiding the lawn warranty. Lawn maintenance became the responsibility of the homeowner after the 30-day maintenance period. After restoration, a final walkthrough was conducted with each homeowner to clarify that lawn and plant care was the responsibility of the homeowner following the end of the 30-day maintenance period. In some cases, it was determined that additional work (e.g., patching sod) was necessary; the work was subsequently completed by the contractor. Homeowners were given yard maintenance flyers listing lawn and plant care tips and suggesting fertilizing and maintenance activities. Homeowners signed a close-out agreement documenting that all work and maintenance on the property had been completed (or would be completed) and that the homeowner was responsible for yard maintenance.

Post-construction inspection of all existing building foundations and structures assessed during the pre-construction survey at each property was conducted to ensure that foundations and structures had not been damaged during remediation and restoration activities.

Restoration of ROWs was designed to match pre-remediation conditions. In most cases, hydroseed was placed in locations where the ROW had been remediated. At driveways and other areas where gravel had been present before remediation, coarse gravel was placed between the street and the property to provide access and parking. No catch basins, utilities, or appurtenances were installed in the ROW during restoration; existing utility features were preserved.

In total, 29 properties and associated ROWs were remedied. Additional construction completion details are provided in the OPP interim action completion report (MFA, 2018).

# 3 REMEDIAL INVESTIGATION APPROACH

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This section describes the RI approach used to characterize the nature and extent of soil contamination that may be associated with former PWT operations. A phased evaluation was conducted generally consistent with the RI work plan (MFA, 2015) and subsequent procedures identified (MFA, 2016c,e; Ecology, 2018) to identify and then sample ROWs and properties.

## 3.1 Determine Property Investigation Area

The Phase 1, Phase 2, and Phase 3 OPP boundaries define the investigation area in which properties were evaluated to determine whether PWT-related contamination may be present (see Figure 3-1). ROW samples were first collected throughout the Ridgefield residential neighborhood east of the BNSF rail tracks and generally west of North 4<sup>th</sup> Avenue to define the investigation area. There were several reasons for this “ROW-first” approach. The approach supported the preliminary conceptual site model (CSM, i.e., aerial and vehicle tracking deposition), initial RI data results, and the subsequent RI results provided in this report (also see MFA, 2015; 2016a, c).

ROW samples provide a conservative measure of dioxin concentrations when compared to property sample results; concentrations in ROWs are typically higher—in many cases much higher—than in nearby properties. This pattern reflects the CSM dioxin deposition by vehicle tracking as a potential transport mechanism resulting in higher concentrations in ROWs (directly adjacent to streets) than at properties. Logistical reasons were also considered. Property sampling is time-intensive, requiring property-specific evaluations, public outreach and communications, and access agreements. The ROW-first approach expedited the RI and minimized unnecessary activities by first refining the spatial extent of the property investigation area.

**Phase 1 OPP.** The Phase 1 OPP was defined based on ROW data collected as part of prior investigations, as shown in the Order (see Section 1.3). The Phase 1 OPP represents the area in which 2010–2011 ROW soil samples exceed the CUL and property soils are accessible (see Section 2.2.3).

Additional ROW data collected during Phase 1 RI activities indicated that the dioxin extent had not been fully delineated. Concentrations of dioxins that exceeded the CUL were identified near the Phase 1 boundary at Main Street, Mill Street, and Maple Avenue. Additional investigation (i.e., Phase 2) was therefore required.

**Phase 2 OPP.** The Phase 2 ROW sampling approach was informed by the Phase 1 results and the preliminary CSM, and was determined in coordination with Ecology (MFA, 2016c). The Phase 2 OPP represents the area in which Phase 2 ROW samples exceed the CUL and property soils are accessible.

Phase 2 ROW samples were collected to the east, north, and south of the Phase 1 OPP boundary in 2016. Samples were analyzed using a tiered approach. Tier 1 samples were collected adjacent to the Phase 1 boundary and along the historical and current truck route (Division Street and North 3<sup>rd</sup> Avenue). Tier 1 samples were analyzed immediately upon collection. Tier 2 and 3 samples were

collected farther from the Phase 1 area and initially were archived. These samples were released for analysis or remained archived, based on the Tier 1 or 2 results, as determined in coordination with Ecology (MFA, 2016b,d,e). For example, Tier 2 samples were released for analysis if nearby Tier 1 results exceeded the CUL. A few opportunistic samples located in the Phase 2 OPP (ROW-002N, ROW-010E, ROW-022E, ROW-038S, and ROW-029BS) were collected as part of Phase 1 RI activities.

Additional data were collected during 2023 to determine the vertical extent of dioxin concentrations at Phase 2 properties with surface impacts.

**Phase 3 OPP.** The Phase 3 OPP was defined based on 2010–2011 ROW data collected north of Hall Street and east of North 1<sup>st</sup> Avenue, as well as data collected in 2017 near the intersection of Elm Street and Railroad Avenue. The Phase 3 OPP represents the final area in which additional property investigation was required (Ecology, 2018; 2020).

Additional data were collected during 2023 to determine the vertical extent of dioxin concentrations at Phase 3 properties with surface impacts. In addition, a composite surface soil sample was collected from the basement of one property (AOI 081) to verify surface soil concentrations have not impacted soil in the basement.<sup>1</sup>

## 3.2 Identify Sample Properties

Multiple analyses to determine general property characteristics and land uses and practices were conducted to identify properties for sampling. A property was selected for sampling if it was determined that former PWT operations may be a source of dioxins. It was assumed that former PWT operations are the most likely potential source of dioxins (if present); however, other potential sources were also evaluated. PWT last operated in 1993, and dioxins are ubiquitous in the environment because of anthropogenic and natural sources that are unrelated to the former PWT operations. The analyses also informed the sample areas at selected properties. Sample areas are those portions of a property that represent potential exposure areas and that would be most representative of PWT-related dioxins, if present.

All 123 OPP tax lots (49, 59, and 15 for the Phase 1, 2, and 3 OPP areas, respectively) were evaluated initially (see Figure 3-1). The tax lots comprise 102 total “properties” (42, 45, and 15 for the Phase 1, 2, and 3 OPP areas, respectively) considered for sampling. Multiple tax lots were considered as part of one “property” in several cases where houses span more than one tax lot (e.g., property 002). A single tax lot was split into two “properties” in two cases. For example, properties 028A and B were established because two homes are present on one tax lot. A database summarizing information for each tax lot is provided as Appendix A.

Properties were evaluated for sampling based on the analyses described further below.

**Property Surveys.** An initial survey was conducted for each property. General yard characteristics were identified, including potential exposure areas, presence of burn areas and spills or staining, and

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<sup>1</sup> The composite soil sample was collected in coordination with Ecology (Ecology 2024).

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other factors that may indicate potential localized point sources of dioxins (e.g., wood-burning stoves, treated wood landscaping). Yards with limited exposure area (e.g., primarily impervious surface), access issues, and other features were also identified. Property descriptions are provided in Appendix A.

**Questionnaires and Interviews.** Questionnaires developed in coordination with Ecology were provided to property tenants and owners (see Appendix B). The questionnaire addresses potential point sources of dioxins (e.g., whether burn barrels were used in the past, use of chlorinated pesticides), significant land/structural changes since 1993, typical yard use(s) and high-use areas, and potential safety hazards. Multiple attempts were made to obtain completed questionnaires. Properties for which questionnaires were obtained are noted in Appendix A. Ecology and MFA also conducted opportunistic interviews. House visits, phone calls, and/or e-mails were placed to tenants/owners when a questionnaire had not been remitted or when additional information was needed. In many cases, persons verbally shared information, such as home construction date, significant landscaping changes, and yard uses. This information is incorporated into the property descriptions provided in Appendix A.

**Historical Analyses.** Consistent with the RI work plan, tax lot information was queried (see Appendix A), Geographic Information Systems (GIS) aerial analysis was conducted (MFA, 2015), and /or questionnaires and interviews with owners were conducted (see Appendix A) to determine which properties had been built since approximately 1993. These post-1993 properties may not reflect PWT-related dioxin contamination, since home construction includes significant soil disturbance, excavation, and/or import of soil fill. As determined in coordination with Ecology during the RI, the post-1993 properties were however further considered for sampling. Additional GIS aerial analysis to assess significant structural (e.g., removal of small structures) and landscaping (e.g., installation of lawns) changes since 1993 was also considered as part of the RI work plan. It was later determined that satellite imagery with sufficient resolution from 1990 to 2000 was unavailable, and no additional GIS analysis was conducted.

**Property Sample Results.** Properties were sampled during the RI on a rolling basis as sampling access agreements (see Appendix C) were obtained and SSAPs were finalized (see Appendix D). During the Phase 2 and 3 activities it was determined, in coordination with Ecology, that several properties did not require sampling. This determination was based on results from nearby areas consistently showing concentrations below the CUL and based on their location in areas further from former PWT operations (i.e., further east than nearby sampled properties) or the historical treated wood haul routes. (i.e., further north or east than nearby sampled properties).

Based on the above analyses, the following properties and tax lots shown on Figure 3-1 were not further considered for sampling:

- **020A.** 020A is a backyard lot with an approximately 6-to-8-foot-diameter former burn area in the center. Former activities included burning of plastics, a potential localized source of dioxins. It was determined that results for 020B (owned by the same person) would act as a surrogate for 020A. That is, if soil concentrations above the CUL were observed at 020B, it would be assumed that soil concentrations exceeded the CUL at 020A.

- **033.** The property is covered by a triplex structure and is paved, and no soil is exposed. A narrow strip of grass is present adjacent to the north side of the property; however, this area is part of the adjacent property 031.
- **Three tax lots at Division Street and North Third Avenue Intersection.** As demonstrated by multiple lines of evidence, no PWT-related impacts are expected. The properties were constructed in the mid-2000s, likely resulting in significant disturbance/removal/import of soils after PWT operations ceased. A sample (ROW-P2-007) collected from the adjacent Division Street ROW showed concentrations below the CUL; the area sampled is contiguous with the yards and was reconstructed at the same time as the homes were built. Phase 1 sampling at nearby properties that are closer to former PWT operations and that were also constructed in the mid-2000s (properties 009 and 010) demonstrated concentrations below the CUL.
- **Two tax lots at Northeast corner of Mill Street and North 3<sup>rd</sup> Avenue Intersection.** These two tax lots are comprised by a paved apartment complex. No soil is exposed.
- **Davis Park North.** Davis Park consists of a southern portion (Davis Park South, identified as property 062) four tax lots and a northern portion (Davis Park North) comprised by one tax lot. A surface soil sample, representing surface soil conditions in this area, was collected at Davis Park North as part of previous activities (SS-55; see Figure 2-3).
- **040 and 042.** These Phase 2 properties located south of Mill Street were removed from sampling consideration, based on nearby property sample and ROW results below the CUL. Property 041A (located directly west) and a ROW sample (collected at the intersection of North 1<sup>st</sup> Avenue and Mill Street) are closer to the LRIS and are below the CUL. Property 041B is located southwest and is above the CUL, however it was determined in coordination with Ecology that impacts at this property are not PWT site-related. These properties are therefore located to the south of the Phase 2 OPP extent. Sample results are further discussed in Section 5.
- **047, 050, 053, 055, 069, 070, and 074.** These Phase 2 properties were removed from sampling consideration, based on nearby property sample and ROW results below the CUL. For example, properties to the west of 074 are closer to potential PWT-related sources and are below the CUL; therefore sampling is not needed at 074. These properties are all located along the far northern, eastern, and southern extents of the Phase 2 OPP, areas farthest from former PWT operations and the historical truck route. The nearby sample results are further discussed in Section 5.
- **090 and 091.** These Phase 3 properties were removed from sampling consideration, based on nearby property sample and ROW results below the CUL. Properties to the west of 092 and 093 are closer to potential PWT-related sources and are below the CUL. The nearby sample results are further discussed in Section 5.



### 3.3 Property Sampling Procedures

This section describes procedures implemented at the properties identified for sampling. Sample procedures followed the methodology provided in the RI work plan. A public participation plan was implemented prior to and during the property-specific outreach and sampling efforts described below.

#### 3.3.1 Access Agreements

Access agreements were provided via mail and hand delivery to property owners and tenants (see Appendix C). Multiple follow-up attempts, including additional letters, phone calls, e-mails, and home visits, were made if access agreements were not received after approximately two weeks. Access agreements were received for all properties identified for sampling, with the exception of properties 058, 060, 065, 082, and 090/091. All properties for which access agreements had been obtained were sampled (see Figure 3-2).

#### 3.3.2 Sampling Visits

Sampling visits were conducted with property owners and tenants prior to SSAP development and sampling:

- Information about the scope of the assessment was provided to the owner or tenant and an acceptable sampling time frame was determined or confirmed.
- A property walk was conducted to identify or verify sampling obstructions, sampling hazards (e.g., dogs, unsound structures), areas of soil disturbance, and other features of interest.
- Property features were recorded in real time (e.g., using GIS software) and photos were taken to provide the basis for developing sample areas identified in an SSAP.

Sampling visit observations are incorporated into the property descriptions provided in Appendix A.

#### 3.3.3 Characterization

Sampling was conducted generally consistent with the Ecology-approved SAP (MFA, 2015). SSAPs were generated on a rolling basis as access agreements were obtained, to optimize efficiency and accelerate sampling and analytical receipt timelines. An SSAP was typically issued when enough access agreements to conduct one or more days of sampling had been obtained. All SSAPs were approved by Ecology prior to sampling. The final SSAPs for all sampling conducted as part of the RI is provided as Appendix D.

The SSAPs provide a description of property characteristics, sample type(s), and laboratory analyses to be conducted. A figure showing the sample area(s), locations, and photos of relevant features was developed for each property. The sample area is based on the portion of the property that is accessible and at which dioxin contamination, if present, may be associated with former PWT operations. Areas covered with structures/significant vegetation or areas with significant soil disturbance were not

included in the sampling area. These include soil or gravel fill areas (e.g., garden beds), burn areas, areas near large trees with shallow roots, and areas covered with yard debris or equipment. In some cases, based on information gathered and property size, more than one sample area per property was selected.

The sample locations included modified surface incremental sampling methodology (ISM), surface composite, and/or subsurface discrete locations. ISM locations were selected based on a stratified random approach using a triangular grid (developed using ArcGIS 10 and Visual Sample Plan 6). This approach reduces the probability of missing areas with significantly elevated concentrations. Composite samples were collected in a few cases where access to the property was limited and a systematic random grid ISM approach was not feasible. Discrete sampling was used in ROWs, where concentrations were expected to be highest. Sample types are further described in the following sections and descriptions are provided in Appendix E.

### 3.3.3.1 Surface Sampling

A modified ISM approach was applied to the top 6 inches of soil (zero to 0.5 foot bgs) at each property. ISM is a structured composite sampling and processing protocol that reduces data variability and increases the probability of identifying areas of elevated concentrations, thereby increasing data representativeness. ISM provides a single sample for analysis, with a concentration representative of the mean concentration in a predefined sample area termed by literature a “decision unit” (ADEC, 2009; HDOH, 2009; ITRC, 2012). For this RI, ten ISM increments per sample area were collected. Typically, 30 or more increments are recommended. This modified approach accounts for the relatively small size of the sample areas, and previous ISM investigations in the region showed minimal variability among replicates when applying this approach. Triplicate ISM samples were collected at several properties to further assess sample variability.

Two sample areas (front- and backyard) were selected for properties 013 and 018. The property 013 front yard is located directly at the intersection of Division Street and Railroad Avenue, an area that was suspected to be more significantly impacted. The house and fencing divide the front yard from the backyard, and it was hypothesized that these structures could reduce contaminant deposition in the backyard. Property 018 is a large lot and two sampling areas were selected.

Ten continuous soil cores (with surface vegetation removed) were retrieved from zero to 0.5 foot bgs in each sampling area, using a 1.5-inch-diameter soil coring sampler. In a few cases, the sample locations shown in the SSAP were field-adjusted several feet to accommodate obstructions. The ten cores, each weighing approximately 200 grams, were composited into one sample weighing approximately 2 kilograms. The sample was then processed by the laboratory and analyzed to obtain a representative average contaminant concentration for each sampling area. To assess sample variability, field triplicates (three sets of ten increment samples from different locations in the sampling area) were collected at four properties, and an opportunistic field duplicate (two sets of ten increment samples from the same locations in the sampling area) was collected (see Appendix E for triplicate and duplicate sampling locations).

A composite sampling approach was implemented at property 001, which is heavily landscaped. Several feet of soil, mulch and/or pea gravel were placed on top of geosynthetic fabric that separates

a former lawn from the current landscaping. Due to the limited access, the surface materials (e.g., mulching and geosynthetic layer) were removed in five locations and a composite sample was collected from the top 6 inches. For property 004, which was undeveloped and was covered with up to approximately 8-foot-tall blackberry bushes when sampling was first conducted in 2015, a four-point composite sample was collected from accessible locations. The property was cleared in 2017 and an ISM sample was collected at that time.

A composite sampling approach was also implemented in the basement of property 081. The building on the property was originally a post and pier construction and the basement was not enclosed until the 1990s. Evidence of surface water entering the basement was noted during a site visit. A five-point composite sample was collected from accessible surface soil in the basement to verify soil conditions.

In total, 89 ISM and three composite property samples were analyzed. Figure 3-2 shows the ISM sampling areas. Appendix E provides sample descriptions and representative photographs.

### 3.3.3.2 Subsurface Sampling

Subsurface soil samples were collected to evaluate the vertical extent of dioxin contamination at properties. To inform soil excavation depths, samples were collected from multiple properties where surface soil exceeded the CUL. A stainless-steel hand auger was used to collect discrete samples from up to 3 feet bgs. Samples were collected throughout the OPP to achieve good spatial distribution.

Subsurface sample locations are shown in Figure 3-2. Sample descriptions and representative photographs are provided in Appendix E.

## 3.4 ROW Sampling Procedures

Soil samples were collected to determine the lateral and vertical extent of dioxin contamination in ROWs. The ROW samples also informed the property investigation area (see Section 3.1). Discrete surface (zero to 0.5 foot bgs) and subsurface samples from multiple 0.5 foot length intervals (0 to 2.0 feet bgs) were collected using a stainless steel hand auger. Locations were (1) placed to achieve good spatial distribution across the OPP, and (2) selected so that typically one or more locations on each side of a city block were sampled. In some cases, ROW samples collected previously (in 2010–2011) were available, and these areas were not recharacterized. Surface samples were analyzed upon collection. The subsurface samples at ROW locations were typically archived and subsequently analyzed if dioxin concentrations exceeded the CUL in the corresponding surface or shallower subsurface sample. Subsurface samples were collected primarily in the Phase 1 OPP to support delineation of interim action soil excavation depths.

Sample names correspond with the nearest lot number and were collected at the locations shown in Figure 3-2. Sample coordinates, sample descriptions, and representative photographs are presented in Appendix E.

### 3.5 Sample Collection, Handling, and Transport

Procedures for collecting, handling, and transporting soil samples followed the RI work plan (MFA, 2015). Sampling personnel wore clean, disposable gloves while collecting samples. Gloves were changed before sample collection. Sampling equipment and reusable materials that contacted soil were decontaminated consistent with the SAP provided in the RI work plan (MFA, 2015). ISM sample increments were removed from the coring device with stainless steel utensils and placed into a sampling-area-dedicated, 1-gallon glass jar. The composite, discrete subsurface, and ROW samples were homogenized in a stainless-steel bowl before being placed into laboratory-provided, 8-ounce glass jars. Samples were labeled, stored in iced shipping containers with chain-of-custody (COC) documentation, and transported to the contract laboratory. Copies of the COC are included in the laboratory reports (see Appendix F).

### 3.6 Field Quality Assurance and Quality Control Samples

Quality assurance and quality control (QA/QC) samples were collected to ensure that field samples and quantitative field measurements were representative of the media collected. Field QA/QC samples and collection frequency were as follows:

- **Equipment Rinsate Blanks**—Equipment rinsate blanks were collected by passing laboratory-provided deionized/distilled water through or over nondedicated sampling equipment to ensure that decontamination procedures were sufficient. The rinsate blank results are evaluated in the data quality memoranda (see Appendix F).
- **Field Replicates**—Field replicates are collected to measure sampling and laboratory precision. Triplicates (three sets of ten increment samples from different locations) were collected for four sampling areas, and an opportunistic field duplicate (two sets of ten increment samples from the same locations in the sampling area) was collected for one sampling area. One field duplicate was collected for the discrete subsurface (0.5 to 1 foot bgs) property sample analysis.

The relative standard deviation (RSD) of the analytical results for triplicate ISM samples was calculated to measure data precision, using the following equation:

$$\text{RSD (\%)} = \frac{100\% * \text{Standard Deviation}}{\text{Average}}$$

Lower RSD values are desirable, as the lower the RSD, the greater the confidence that the average approximates a normal distribution and that the average contaminant concentrations are representative of the sampling areas (HDOH, 2009). RSDs are evaluated in the data quality memoranda in Appendix F.

### 3.7 Laboratory Procedures

Each soil sample was analyzed for dioxins and total organic carbon (TOC), using U.S. Environmental Protection Agency (EPA) Method 1613B (prior to 2023), Method 8290A (starting in 2023), and Puget

Sound Estuary Protocol (PSEP)/Standard Methods for the Examination of Water and Wastewater (SM) Method 5310B, respectively. Analysis of TOC was performed as an indicator to assess potential variabilities among evaluated properties. If there was a significant variation in the TOC at a property relative to surrounding properties, it could indicate a property-specific condition (e.g., history of significant on-site refuse burning).

ISM sample processing and TOC analysis were conducted at the Ecology-accredited Apex Laboratories of Tigard, Oregon. Apex Laboratories provided ISM-processed sample aliquots (for ISM samples) and unaltered sample mass (for composite and discrete samples) to the Ecology-accredited laboratories Maxaam Analytics of Mississauga, Ontario, Cape Fear Analytical, LLC of Wilmington, North Carolina, or Enthalpy Analytical of El Dorado Hills, California for dioxin analysis.

ISM sample processing was closely coordinated with Apex to ensure representative sample aliquots. This included a laboratory visit by an MFA chemist to observe and review ISM processing procedures. As discussed above, samples were field consolidated to generate a sample of approximately 2 kilograms (wet weight) representative of each sampling area. Samples were then processed consistent with an ISM standard operating procedure provided in the RI work plan (MFA, 2015). The laboratory air-dried each sample at room temperature, and visible organic matter was removed. The entire volume of each sample was chopped and sieved to obtain a representative subsample. The laboratory performed the “1-dimensional slabcake” subsampling procedure on sub-aliquot sample volume. The slabcake procedure involves spreading the sample at a consistent depth in a line, using 20 or more passes and using a square scoop to cut across the line as needed to create an aliquot for each analysis. Samples for TOC were ground prior to analysis. Each sub-aliquot sample mass was sufficient to run the requested analyses and attain the requested reporting limits.

### 3.8 Data Usability

Data were reviewed for usability and were qualified consistent with EPA procedures and appropriate laboratory and method-specific guidelines. Data quality review memoranda are provided in Appendix F. All validated analytical data have been uploaded to Ecology’s Environmental Information System database. All data obtained are considered usable for this RI/FS.

Consistent with WAC 173-340-708(8), mixtures of dioxins are considered a single hazardous substance in the evaluation of compliance with CULs. Dioxin toxicity is assessed using a toxic equivalency approach. Each congener in the group is assigned a toxic equivalency factor (TEF).<sup>2</sup> The TEF describes the toxicity of a congener relative to the most toxic compound, 2,3,7,8-tetrachloro dibenzo-p-dioxin (TCDD). For example, a congener that is half as toxic as TCDD would have a TEF of 0.5. Multiplying the concentration of a congener by the TEF produces the concentration of TCDD that is equivalent in toxicity to the congener concentration of concern, known as the toxicity equivalent concentration (TEC). Computing the TEC for each congener ( $C_i$  in the equation below) in a sample, followed by summing all TEC values, permits expression of all congener concentrations in terms of a total TCDD TEQ (i.e., dioxin TEQ):

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<sup>2</sup> The most recent effort to develop TCDD TEFs used multiple lines of evidence to develop a consensus-based list of TEFs for mammal receptors (Van den Berg et al., 2006).

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

Dioxin results are qualified as follows (data treatment is consistent with Ecology [2019]):

- Congeners qualified as non-detect and flagged with a “U” are used in the TEQ calculation at one-half the associated value.
- Congeners qualified as estimated and flagged with a “J” are used without modification in the TEQ calculation.
- Congeners qualified as non-detect with an estimated limit (i.e., flagged with a “UJ”) are used in the TEQ calculation at one-half the associated value.
- If all congeners in a chemical group are undetected, the group sum is reported as undetected.

### 3.9 Cultural Resources

State and federal laws and regulations protecting cultural resources apply to the cleanup of contaminated sites under the MTCA WAC 173-340-710. Executive Order 21-02 (formerly 05-05) also applies when the cleanup project receives state funds, including remedial action grants and loans.

Cultural resources have been considered throughout the RI and interim action activities (see Appendix L). In 2015, Ecology consulted with the Washington State Department of Archaeology and Historic Preservation (DAHP) prior to Phase 1 interim action work in 2016. Systematic archaeological surveys were conducted to determine if archaeological resources are present at the OPP. Results of those surveys are documented in the Cultural Resources Survey for the Port of Ridgefield’s Ridgefield Upland Cleanup Project, Clark County dated April 7, 2016. This report indicates “No previously recorded archaeological sites are in the project area, but a relatively large number of precontact and historic sites are in the vicinity” and that “[i]t is our professional opinion that the proposed project is unlikely to affect any archaeological resources.” The cultural resource contractor (WillametteCRA) subsequently prepared an inadvertent discovery plan, which was implemented during the interim action construction. No discoveries of archeological or historical resources were made during interim action construction.

In 2023, Ecology again consulted with DAHP prior to additional Phase 2 and 3 sampling activities. WillametteCRA conducted additional archaeological survey for the Phase 2 and 3 areas. The investigation conducted consisted of a pedestrian survey and excavation of 35 shovel probes on 10 privately owned parcels in a residential neighborhood. Archaeologists identified one new archaeological resource and recommended that the resource is not eligible for listing. It was recommended cleanup can proceed in the surveyed area as planned, and that no additional archaeological investigations are necessary prior to the start of project activities; that an inadvertent discovery plan be developed and kept on site at all times during ground-disturbing work and that the contractor receive inadvertent discovery plan training; and that should unanticipated archaeological or historical resources be encountered during project activities, all ground-disturbing activity in the vicinity of the find should be halted and DAHP should be notified immediately (see Appendix L for full report). DAHP was notified of the results and provided with a copy of WillametteCRA’s cultural

resource survey. DAHP did not comment on the results which is typical for isolates which are non-tribal.

### 3.10 Public Participation

A public participation plan was prepared by Ecology and implemented in coordination with the Port (Ecology, 2014). The plan describes the tools Ecology has used and will continue to use to inform the public during project activities. The plan is intended to address concerns from individuals, community groups, local governments, tribes, federal and state agencies, and any other organization that may have an interest in or knowledge of the OPP. Ecology and the Port will continue coordination to ensure that future project activities account for community input.

In coordination with the Port, Ecology held a public community meeting, provided public notice, distributed fact sheets, and solicited comments prior to and during the project. Multiple visits with property owners and tenants were conducted. Letters were provided to property owners and tenants prior to and after sampling activities. An example results letter showing sample locations, sample results, and description of next steps is provided as Appendix G. These efforts ensured that owners and tenants were aware of overall project activities as well as property-specific activities, and were provided multiple opportunities for input. Solicitation of comments continued at important stages of the project, such as the submission of the draft CAP and will continue during any future cleanup activities. Common community concerns include noise and traffic, short- and long-term risks, socioeconomic impacts, cleanup and restoration procedures, and the time frame of project activities.

## 4 CONCEPTUAL SITE MODEL

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The CSM describes the physical and chemical conditions on the OPP. The primary purpose of the CSM is to describe pathways by which human and ecological receptors may be exposed to PWT-related chemicals (specifically, dioxins) in the environment. According to the EPA (1989), a complete exposure pathway consists of four necessary elements: (1) a source and mechanism of chemical release to the environment; (2) an environmental transport medium for a released chemical; (3) a point of potential contact with the impacted medium (referred to as the exposure point); and (4) an exposure route at the exposure point.

### 4.1 Sources

Suspected historical sources of soil impacts include wood-treating chemicals and other substances that were used as part of wood-treating operations during PWT activities from 1964 to 1993. The specific operational activities leading to dioxin formation and the proximate source(s) have not been established. Note that dioxins can also result from anthropogenic combustion sources, which include vehicle/railway emissions, backyard trash burning, structure fires, and burning vegetation treated with chlorinated pesticides (EPA, 2006).

## 4.2 Fate and Transport

Dioxins are stable compounds and are highly resistant to most environmental degradation processes. Because of their low vapor pressure and low solubility, dioxins will typically be bound to organic matter found in surface soil. Particulates deposited on soils may be re-entrained by soil erosion (wind or water) or tracked by vehicles and transported to other areas. Because of their lack of mobility, dioxins are most often found in the upper several centimeters of soil, and the higher the organic carbon content in soil, the less mobile the compounds will be. Dioxins may deposit on vegetation; however, dioxins in soil are not likely to be taken up by plant roots and translocated to the plant shoots because they are hydrophobic and bind strongly to soil. The hydrophobicity of dioxins, combined with low vapor pressure and low water solubility, further indicates that leaching to subsurface soil and groundwater is typically insignificant in the absence of mechanical disturbance or organic solvents. Similarly, dioxins have little potential for volatilizing from soil (ATSDR, 1998; EPA, 2003).

Primary suspected transport mechanisms that may have impacted the OPP include vehicle tracking, wind transport and deposition, and secondary dispersion (e.g., stormwater) to soils. Historically, trucks transporting treated lumber left the LRIS driving in a southeast direction through the OPP, using primarily Division Street, 3rd Avenue (and possibly Main Street), and finally Pioneer Street (see Figure 2-2 for street locations). Reportedly, while completing a Vietnam-era contract with the U.S. Department of Defense, trucks left the LRIS with wood still dripping treatment chemicals. Soil vehicle tracking also likely occurred at that time. The area near Pioneer Street includes commercial buildings is predominantly paved, such that soil impacts are not expected in this neighborhood.

Wind transport of particulates from the LRIS toward the OPP is another suspected transport mechanism. Wind transport likely would have occurred primarily in the driest months of the year (June through September). Available wind data (from 1978 to 2016) were obtained from the National Oceanic and Atmospheric Administration National Climatic Data Center for the Scappoose Airport, 6 miles west of the site. Approximately 49 percent of the time, wind direction was classified as “calm” or “variable.” During the time when a significant wind speed was observed, wind with a north/northwest/west component was predominant (43 percent of the time). The wind direction provided in the database is the direction from which the wind originates. Therefore, wind blows predominantly from the northwest toward the south to southeast to east (i.e., from the LRIS toward the OPP). Near the eastern Phase 2 boundary (between 4th Avenue and 5th Avenue), surface elevations increase by approximately 20 to 30 feet. Any surface deposition that potentially affected this area (e.g., via vehicle tracking or wind) would migrate back to the west if soil particulates were transported in stormwater. Based on the above fate and transport considerations, PWT-related impacts associated with this secondary transport mechanism are expected to decrease with distance from the LRIS and are not expected outside the OPP.

## 4.3 Exposure Scenarios

Human health exposure scenarios are shown in Figure 4-1. Potential human receptors include residents/park users (adults and children) and workers (e.g., construction). Potential soil exposure pathways include direct contact (incidental soil ingestion [soil and dust particles], dermal contact, or dust inhalation) and secondary ingestion (consumption of chemicals in or on produce, inhalation from



volatilization, exposure to impacted groundwater). Incidental ingestion of soils may occur during activities (e.g., playing in yards, gardening, yard improvement projects [digging]) followed by hand-to-mouth contact. Children may ingest significantly more soils than adults because of more frequent hand-to-mouth contact and/or more time spent in close proximity to soils (EPA, 2011). Dermal contact with dioxins in soil is considered an insignificant exposure pathway relative to incidental soil ingestion, and the vapor inhalation pathway for dioxins in soil is insignificant relative to the ingestion/dermal-contact pathways (Paustenbach et al., 2006). Transfer of dioxins in soil to homegrown vegetables and other plants is also considered an insignificant exposure pathway. The low vapor pressure of dioxins prevents any substantial vapor flux from contaminated (and often long-weathered) soils, and suspension of local soils, with subsequent deposition on plants, is expected to be nominal for dioxins because of normal washing, processing, and/or cooking of vegetables (Paustenbach et al., 2006). These findings support limited potential exposure to dioxins in soil from the dermal-contact, vapor inhalation, and produce-consumption pathways. Direct contact (via incidental soil ingestion and dust inhalation) is considered a potentially complete exposure pathway.

Human receptors are unlikely to have direct exposure to groundwater. Groundwater is not used for drinking and, given the availability, reliability, and relatively low cost of municipal water, it is unlikely that water-supply wells will be developed at or near the OPP in the foreseeable future (see Section 2.2). Furthermore, dioxins do not readily leach to groundwater, and the associated exposure pathway is considered incomplete. Similarly, dioxins do not readily migrate to subsurface soils or volatilize to air, and the associated exposure pathways are considered insignificant.

Per WAC 173-340-350 remedial investigation activities must also consider potential exposure of likely vulnerable populations and overburdened communities. Ridgefield is not considered an “economically disadvantaged,” city, town, or unincorporated portion of the county as defined in WAC 173-322A-100(15) and (16). According to the Washington State Department of Health Disparities mapping application (<https://fortress.wa.gov/doh/wtnibl/WTNIBL/>), Ridgefield ranks low to moderate for all assessed environmental health disparity categories, where a rank of 1 corresponds to low (minimal impacts) and 10 to high (significant impacts): environmental exposures (rank of 5); environmental effects (rank of 4); socioeconomic factors (rank of 1); and sensitive populations (rank of 1)(see Table 4-1). As a result, and based on the project goal of eliminating potential for human contaminated soil exposure, disproportionate impacts to vulnerable populations and overburdened communities are not anticipated.

The potential for adverse effects to ecological receptors was assessed in the RI work plan (based on the TEE completed in 2012), and no unacceptable risks to ecological receptors are expected (MFA, 2015). The ecological receptor pathways are therefore incomplete.

## 5 NATURE AND EXTENT

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Hazardous substances are those chemicals that are evaluated in an RI/FS because of their frequency, mobility, persistence in the environment, or toxicity. Dioxins are identified as a potential hazardous

substance for the OPP. This section evaluates nature and extent of dioxins at OPP properties and ROWs.

## 5.1 Property Results

Table 5-1 presents dioxin results for the property samples. Surface soils in multiple properties are above the CUL (see Figure 5-1). Concentrations are highest along Division Street near Railroad Avenue. The steep grade of Division Street (west of North First Avenue), along with frequent historical truck traffic, may have led to greater drippage and re-entrainment in this area. Some moderately elevated concentrations (greater than 10 ng/kg dioxin TEQ above the CUL) are observed farther east on Division Street and along North 3rd Avenue, also likely reflecting historical truck traffic. In many cases, concentrations marginally exceed the CUL (i.e., by no more than 10 ng/kg dioxin TEQ). Aerial deposition, vehicle tracking, and/or common ubiquitous sources likely account for these marginally elevated concentrations.

The lateral extent of dioxin contamination is bounded. Soils to the west of the OPP have been remediated as part of previous LRIS cleanup actions. Soil concentrations decrease to below the CUL near the eastern OPP boundary. To the south, concentrations are also below the CUL. The exception is property 041B (see Figures 3-2 and 5-1). The soil concentration is well above the CUL and this result is inconsistent with the CSM: no roads access this area (which is strongly sloped toward the railway) and decreasing concentrations to the south of the LRIS are expected. The CSM is supported by the results for property 041A (below the CUL), which is located north of 041B and is closer to the LRIS. Property 041B is therefore not considered part of the site, as determined in coordination with Ecology (MFA, 2016e). Soil concentrations to the north and east of the OPP boundary are below the CUL.

The vertical extent of dioxin contamination is bounded and is generally limited to less than 1.5 feet bgs. The exception is property 043 which shows elevated concentrations from 1.5 to 2 feet bgs; additional sampling as part of pre-design activities will be conducted to bound vertical extent at this property. The subsurface concentrations are typically much lower than corresponding surface concentrations, reflecting the limited mobility of dioxins. Sampling at ROWs (see Section 5.2) adjacent to properties shows that concentrations from 1.5 to 2 feet bgs are below the CUL in all cases. ROWs are typically more impacted than properties and the ROW subsurface data therefore provide a conservative surrogate for property vertical extent. With the exception of property 043, based on the fate and transport considerations and the data results, vertical extent does not exceed 1.5 feet bgs at properties.

## 5.2 ROW Results

Table 5-2 presents dioxin results for surface and subsurface ROW samples collected from 2015 through 2017. The results for ROW samples collected during previous investigations are provided in Table 2-1. The ROW results were used to determine the property investigation areas (see Section 3.1). The surface and subsurface ROW results demonstrate that dioxin concentrations in OPP ROWs routinely exceed the CUL, as shown in Figures 5-2 and 5-3, respectively. ROW concentrations are typically higher than the property results and exhibit a similar spatial distribution. Concentrations are highest along the western portion of Division Street near Railroad Avenue and on North 3rd Street,

likely reflecting historical traffic along the truck route. Concentrations in other areas exceed the CUL by less than one order of magnitude or are below the CUL.

The lateral extent of ROW dioxin contamination is bounded. Soils to the west of the OPP have been remediated as part of previous cleanup actions (LRIS, Railroad Avenue and Overpass Property). East of the OPP boundary, concentrations decrease to below the CUL. Concentrations are also below the CUL to the south, with the exceptions of ROW-029BS, ROW-P2-033, and ROW-P2-034. ROW impacts farther south are not expected: no ROWs are present south of ROW-029BS and a nearby property sample (041A) is below the CUL, and no ROWs with accessible soils are present in the primarily commercial area south of ROW-P2-033 and ROW-P2-034. Concentrations are below the CUL north of the OPP boundary. ROW impacts do not appear to extend past the area north of Hall Street and east of North 1st Avenue.

The vertical extent of ROW dioxin contamination is bounded and does not exceed 1.5 feet bgs. Concentrations in the subsurface decrease relative to surface concentrations, reflecting limited dioxin mobility. At all locations, shallow subsurface samples (e.g., 1 to 1.5 feet bgs) or deeper subsurface (1.5 to 2 feet bgs) samples are below the CUL. This includes two locations (ROW-013 and -014) where the observed surface concentrations were significantly higher than at all other locations. Subsurface samples were not collected in the Phase 2 or 3 OPP; however, surface concentrations are lower than those observed in the Phase 1 OPP. Based on the fate and transport considerations and the data results, vertical extent also does not exceed 1.5 feet bgs at the Phase 2 and 3 ROWs.

### 5.3 Quality Assurance and Quality Control Results

Field QA/QC samples demonstrate that all sample results are representative and appropriate for decision-making. The ISM triplicate concentrations are generally consistent and show that the modified ISM approach adequately characterized average soil concentrations in properties (see Appendix F). A field duplicate taken at one property was within 2 ng/kg dioxin TEQ of the primary sample. These results indicate that ISM processing and field sampling errors were minimized. The subsurface discrete sample primary and duplicate results also showed minimal variability. Rinsate blank samples verified that nondisposable sampling equipment did not contaminate samples.

### 5.4 Data Gaps

The RI sampling approach first delineated the investigation area in which properties were further evaluated to determine whether PWT-related contamination may be present. Sample areas in properties that are most likely to reflect PWT releases were characterized using the ISM approach. ISM increases the probability of capturing elevated surface concentrations while providing a representative average concentration for larger areas. A few properties initially selected for sampling were removed from sampling consideration, based on nearby sample results below the CUL. Data gaps are limited to five properties (properties 058, 060, 065, and 090/091) identified for sampling. Access agreements were not obtained for these properties following repeated requests, and it is not anticipated that sampling will be conducted at these properties.

Samples sufficient to bound the lateral and vertical extent were collected. Soil data indicates vertical extent typically does not exceed 1.5 feet bgs and is often no more than 1 foot bgs. Additional

subsurface samples can be collected during cleanup design activities to refine excavation depths for property 043 and ROWs that exceed the CUL.

## 6 CLEANUP LEVELS AND POINTS OF COMPLIANCE

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A soil CUL is the concentration of a hazardous substance in soil that is determined to be protective of human health and the environment under specified exposure conditions. CULs, in combination with points of compliance (POCs), typically define a site's area or volume of media that must be addressed by a cleanup action (WAC 173-340-700 through 173-340-760). A cleanup standard takes into account the CUL and the POC and incorporates other state and federal regulatory requirements applicable to the cleanup action and its location.

MTCA includes procedures for developing standard and modified Method B CULs for different media (WAC 173-340-700). Default conservative assumptions are used in calculating the unrestricted land use standard Method B CUL. The Method B CUL of 13 ng/kg for TCDD is protective of persons ingesting dioxins in soil and dust particles and is selected as the soil CUL for comparison with dioxin TEQs (see Section 3.8). The CUL is based on exposure assumptions protective of children and include, but are not limited to, an exposure duration of six years, a soil ingestion/dust inhalation rate of 200 milligrams per day, and an average body weight of 16 kilograms over the exposure duration (WAC 173-340-740). The CUL integrates an acceptable excess cancer risk level of 1 in 1 million for carcinogenic chemicals such as dioxins. This means that exposure to dioxins at 13 ng/kg dioxin TEQ is predicted to increase the chance of cancer by no more than 0.0001 percent (the acceptable level), whereas exposure to a higher concentration such as 130 ng/kg dioxin TEQ would increase cancer risk by 0.001 percent (an unacceptable level). The dioxin TEQ is calculated and compared with the CUL to determine whether soil concentrations may result in unacceptable risk (see Section 7).

The POC is where in the affected medium (soil) the CUL must be attained. The POC for human exposure via direct contact is 0 to 15 feet bgs for soil (WAC 173-340-740 (6)(d)). Fifteen feet is the assumed depth of soil that could be excavated and distributed at the soil surface during typical site development work.

## 7 RISK ASSESSMENT

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Human health risk assessment procedures are set forth in WAC 173-340-708. Potential exposure scenarios were evaluated and the incidental-ingestion pathway (soil and dust particles) is considered potentially complete for residents, park users, and construction workers (see Section 4.3). The CUL described in Section 6 was developed based on incidental-ingestion reasonable maximum exposure assumptions for residents and is protective of all potential receptor groups. The CUL accounts for both the current and the potential future OPP use conditions (residential, mixed-use, and parks/open space).

The dioxin TEQ incorporates toxicity associated with the 17 dioxin congeners and is compared with the CUL to assess whether soil concentrations may result in unacceptable risk. As summarized in Figure 7-1, dioxin TEQs in multiple areas exceed the CUL. The highest property dioxin TEQ (183 ng/kg) is approximately 14 times higher than the CUL and is estimated to result in an excess cancer risk level of approximately 14 in 1 million. Exposure in ROWs may be lower (e.g., persons are more likely to be active in yards than near roads); however, dioxin TEQs significantly exceed the CUL.

A remediation level (REL) was developed to assess potential for unacceptable risks at park and recreational areas (the City-owned Davis Park). RELs help inform appropriate cleanup action alternatives, since they are used to identify hazardous substance concentrations at which different cleanup action components can be used at a site (WAC 173-340-200). RELs, by definition, exceed CULs. The park REL (46 ng/kg dioxin TEQ) incorporates reasonable maximum exposure assumptions for park users and was developed because soil exposure scenarios at parks differ from those at residential areas. The REL relies on the default MTCA residential soil CUL parameters (as provided in equation WAC 740-2), with the exception of exposure frequency (EF). In the default equation, EF is equal to one, corresponding to 365 days of soil exposure per year. Two days of exposure per week (104 days per year) is assumed to represent a reasonable maximum EF for a park user, consistent with Ecology (2005) and EPA (2011) park activity factors. This resulting EF of 0.28 leads to the calculated REL of 46 ng/kg dioxin TEQ (MFA, 2017).

The dioxin TEQ concentration at Davis Park south (property 062) (13.6 ng/kg) marginally exceeds the CUL of 13 ng/kg. However, this corresponds with an estimated excess cancer risk level that does not exceed 1 in 1 million to one significant figure ( $1 \times 10^{-6}$ ), based on the residential-use exposure assumptions. In addition, the cancer risk level ( $1 \times 10^{-6}$ ) is less than the acceptable level for total cumulative risk of 1 in 100,000 ( $1 \times 10^{-5}$ ), based on presence of the single chemical (dioxins). Dioxin concentrations at Davis Park therefore do not exceed acceptable risk levels based on protection of both residential and park uses. Unacceptable risks to park users based on the existing conditions are therefore not expected.

For informational purposes an REL was also developed for ROWs since soil exposure scenarios within the ROWs differ from those at residential areas. The REL protective of ROW users was developed to assess potential for unacceptable risks, consistent with MTCA procedures. The ROW REL relies on the default residential soil CUL parameters (as provided in equation WAC 740-2), with the exception of EF equal to 0.167 derived for a ROW scenario. Based on multiple lines of evidence the ROW REL of 77 ng/kg dioxin TEQ is expected to be protective of all ROW users. Dioxin concentrations at some ROWs are below the REL, whereas others are above the REL. Therefore, unacceptable risks to users at ROWs exceeding 77 ng/kg dioxin TEQ are anticipated (MFA, 2024).

In summary, an FS evaluating cleanup alternatives is necessary based on the potential for unacceptable risks to human health at the residential properties and ROW areas of the OPP. No further evaluation is necessary for Davis Park.

# 8 FEASIBILITY STUDY

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This section presents the results of the feasibility analyses conducted for the OPP. Cleanup alternatives were previously evaluated for the Phase 1 OPP interim action consistent with FS procedures provided in WAC 173-340-350 and WAC 173-340-355 (MFA, 2016a). The selected cleanup alternative for the Phase 1 OPP interim action is consistent with the selected alternative identified in this FS. Final cleanup of the Phase 1 OPP was conducted in 2016–2017 (see Section 2.3) consistent with WAC 173-340-360 requirements (MFA, 2018). Cleanup has not been completed at other areas of the OPP (see Figure 8-1). This FS summarizes the cleanup alternative analyses for the OPP areas that still require cleanup and has been prepared to satisfy the requirements of the Order.

Feasible cleanup alternatives that protect human health by eliminating, reducing, or otherwise controlling risks are evaluated consistent with WAC 173-340-350, -351, and -355. The FS also considers cleanup actions that meet requirements specified in WAC 173-340-360. Per WAC 173-340-351 the FS study should remain flexible to avoid collecting unnecessary information or conducting unnecessary evaluations.

Current or potential future residential area soils with hazardous substances must be treated, removed, or contained. The following qualify as a residential area per WAC 173-340-360:

- A property that is currently used for residential purposes
- A property that has the potential to serve as a future residential area, based on the consideration of zoning, statutory and regulatory restrictions, comprehensive plans, historical use, adjacent land uses, and other relevant factors

Based on current zoning designations of residential and mixed use and likely future land use, the OPP properties and nearby ROWs are considered residential areas. For these areas the FS therefore considers only cleanup actions that specify treatment, removal, or containment of that soil.

## 8.1 Technology Screen and Cleanup Alternatives Considerations

Consistent with WAC 173-340-351, individual cleanup action components (technologies) were reviewed and screened to identify applicable methods for remediating the soils. A preliminary screening of applicable, commonly used remediation methods was completed (including technologies discussed in the Federal Remediation Technologies Roundtable screening matrix [FRTR, 2008]). Effectiveness and implementability of the technologies were assessed for the dioxin contamination exceeding the CUL in soil on residential properties and ROWs (residential areas), resulting in a single appropriate technology—removal and restoration (MFA, 2016a). This was discussed with and agreed to by Ecology at a meeting on July 29, 2015. Technology screening results are provided in Appendix H.

Consistent with WAC 173-340-351 cleanup alternatives were identified for evaluation and comply with the requirements in WAC 173-340-360. This includes, but is not limited to, identifying a reasonable number and type of alternatives, taking into account the characteristics and complexity of the site, including current site conditions and physical constraints; and the threats posed by the site to human health and the environment, including likely vulnerable populations and overburdened communities. As discussed in section 4.3, the project goals are to reduce potential for human contaminated soil exposure and therefore disproportionate impacts to likely vulnerable populations and overburdened communities would not occur. The alternatives analysis is provided below.

## 8.2 Alternatives

The cleanup alternative for residential areas was developed using the individual cleanup technologies identified from the technology screening process (see Appendix H), taking into consideration the CUL presented in Section 6. The development of cleanup alternatives involves combining various remedial technologies into a comprehensive approach that accomplishes the cleanup action goals. A single appropriate technology—removal and restoration—was identified as agreed to with Ecology. A No Action alternative was not evaluated because the soil CUL exceedances would remain and clearly does not meet the requirements for a cleanup action in WAC 173-340-360.

### 8.2.1 Alternative 1: Soil Removal and Restoration

The primary components of the alternative are:

- Predesign sampling to refine vertical cleanup extent
- Removal of soil to the CUL in properties and ROWs
- Restoration of property and ROW landscaping

An SSAP for Ecology review was prepared that defines sampling locations and depth of samples to supplement existing sampling data for all residential properties (see Appendix D). Sampling has defined the vertical extent at all properties except one, where additional sampling is ongoing. Additional sampling will be necessary to determine vertical extent at ROWs that are not adjacent to residential cleanup properties. The sample results will inform the vertical extent of the proposed soil removal and will be included in the forthcoming engineering design report.

Removed soil would be replaced with clean soil or, in the case of ROWs, soil or clean gravel consistent with existing conditions. Excavated soil would be transported by truck and disposed of as nonhazardous material at a Subtitle D landfill facility. Landscaping would be restored.

## 8.3 Alternative Analysis

This section describes the MTCA process by which the preferred cleanup alternative for OPP residential areas is selected. The MTCA requirements are used as the criteria for evaluating cleanup alternatives. While only one feasible alternative was identified and no formal alternative analysis was conducted, the selected cleanup action must meet requirements pursuant to WAC 173-340-360

described below. The following sections describe how the selected alternative meets these MTCA requirements.

### 8.3.1 General Requirements

The cleanup action must meet the MTCA requirements (WAC 173-340-360(3)(a)), which include the following ten requirements:

- Protection of human health and the environment, including likely vulnerable populations and overburdened communities
- Compliance with cleanup standards
- Compliance with applicable state and federal laws
- Prevent or minimize present and future releases and migration of hazardous substances
- Provide resilience to climate change impacts that have a high likelihood of occurring
- Provisions for compliance monitoring
- Not rely primarily on institutional controls and monitoring at a site
- Not rely primarily on dilution and dispersion
- Provide for a reasonable restoration time frame
- Use permanent solutions to the maximum extent practicable
- Requirements one through eight above are discussed in this section and requirements nine and ten are discussed in the sections that follow.

#### 8.3.1.1 Protection of Human Health and the Environment

The single appropriate technology (removal and restoration) is protective of human health and the environment, including likely vulnerable populations and overburdened communities. This alternative involves removal of impacted soil in areas with dioxin concentrations above the CUL and replacing it with clean soil. Through excavation, direct or indirect contact and exposure would be prevented for the long term.

#### 8.3.1.2 Compliance with Cleanup Standards

The cleanup will be conducted consistent with MTCA (WAC 173-340).

#### 8.3.1.3 Compliance with Applicable State and Federal Laws

The cleanup will be conducted consistent with applicable state and federal laws, as discussed in Appendix I.

#### 8.3.1.4 Hazardous Substance Release

This alternative involves removal of impacted soil in areas with dioxin concentrations above the CUL and replacing it with clean soil. Therefore, the cleanup will minimize present and future releases and migration of hazardous substances in the environment.



### 8.3.1.5 Climate Change

This alternative involves removal of impacted soil in areas with dioxin concentrations above the CUL and replacing it with clean soil. Therefore, the cleanup is resilient to climate change impacts that have a high likelihood of occurring including increased drought, higher extreme heat, increased frequent heavy magnitude precipitation events resulting in increased streamflow volumes, and increased high fire danger days. Greater risk would remain if contaminated soil was not removed.

### 8.3.1.6 Provision for Compliance Monitoring

Compliance monitoring, as required by WAC 173-340-410 and 173-340-740 through 173-340-750, consists of protection monitoring, performance monitoring, and confirmation monitoring to determine short- and long-term safety and effectiveness of the implemented alternative.

Protection monitoring is conducted to confirm that human health and the environment are adequately protected during construction, operation, and maintenance periods. Performance monitoring confirms that the cleanup has attained cleanup standards or other performance standards, including those outlined in any permits. Confirmation monitoring may be included to verify the long-term effectiveness of the interim action and/or final cleanup action.

Protection monitoring would consist of engineering oversight to verify safe material-handling procedures, effective health and safety measures, effective erosion- and sediment-control measures, and dust monitoring. Engineering controls would be applied as necessary to protect residents from exposure and unsafe conditions. Performance monitoring, in the form of confirmation sampling, includes samples collected as part of the RI sampling effort. These analytical data are used to set the vertical extents of the excavations prior to construction; a topographic survey of each property will be conducted following excavation and prior to backfill to verify that the soil above the CUL has been removed. Additional monitoring may be conducted consistent with sampling procedures provided in the SAP (MFA, 2015) to refine vertical extent or, at properties where it is infeasible to remove portions of soil (e.g., along steep slopes), to verify that the CUL has been met. The combination of this performance monitoring sampling and the post-soil-excavation/preconstruction topographic survey data will serve as confirmation monitoring.

### 8.3.1.7 Institutional Controls

This alternative does not rely primarily on institutional controls.

### 8.3.1.8 Dilution and Dispersion

This alternative involves removal of impacted soil in areas with dioxin concentrations above the CUL and replacing it with clean soil. Therefore, the cleanup does not rely primarily on dilution and dispersion.

### 8.3.2 Disproportionate-Cost Analysis

Disproportionate-cost analysis (DCA) is conducted to determine whether a cleanup action uses permanent solutions to the maximum extent practicable. Costs are determined to be disproportionate to benefits if the incremental cost of a more expensive alternative over that of a lower-cost alternative exceeds the incremental degree of benefits achieved by the more expensive alternative. As outlined in WAC 173-340-360(4) and (5), DCA includes evaluation criteria that are a mix of qualitative and quantitative factors.

As there is only one feasible alternative that was identified in coordination with Ecology, a full DCA was not performed. This is consistent with WAC 173-340-351 which specifies an FS should remain flexible to avoid unnecessary evaluations. However, the sections below illustrate how this alternative meets criteria established by the DCA process, including protectiveness, permanence, long-term effectiveness, management of implementation risks, technical and administrative implementability, consideration of public concerns, and cost.

#### **Protectiveness**

Overall protectiveness of human health and the environment, including likely vulnerable populations and overburdened communities, includes the degree to which existing risks are reduced, the time required to reduce risk at a site and attain cleanup standards, on-site and off-site risks resulting from implementing the selected alternative, and improvement of the overall quality of the environment. The selected alternative is protective to the acceptable excess cancer risk level of 1 in 1 million standard for residential use, as soil above the CUL will be removed from the site.

#### **Permanence**

Permanence is a factor by which the cleanup action permanently reduces the toxicity, mobility, or volume of hazardous substances. The adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous-substance releases and sources of releases, the degree of irreversibility of the waste-treatment process, and the characteristics and quantity of treatment residuals generated are all considered under this criterion.

MTCA states that, when selecting an alternative, preference shall be given to “permanent solutions to the maximum extent practicable.” A permanent solution is defined in WAC 173-340-200 as a cleanup action in which the cleanup standards of WAC 173-340-700 through 760 are met without further action being required at the site being cleaned up, or at any other site involved with the cleanup action, other than the approved disposal of any residue from the treatment of hazardous substances.

The selected alternative has a very high level of permanence. Soil exceeding the CUL is removed.

#### **Effectiveness over the Long Term**

Long-term effectiveness includes the degree of certainty that the alternative will be successful; the reliability of the alternative for the period of time during which hazardous substances are expected to remain on site at concentrations that exceed CULs; the resilience of the alternative to climate change

impacts; the magnitude of residual risk with the alternative in place; and the effectiveness of controls required to manage treatment residues or remaining wastes.

The selected alternative (removal and restoration) provides excellent long-term effectiveness because soil will be permanently removed, eliminating the area and volume of soils exceeding the CUL.

### **Management of Implementation Risks**

Management of implementation risks addresses the risk to human health, including likely vulnerable populations and overburdened communities, and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks. Short-term risks to remediation workers, the general public, and the environment are assessed under this criterion. Generally, short-term risks are expected to be linearly related to the amount of material handled, treated, and/or transported/disposed of (e.g., worker injury/cubic yards excavated [equipment failure], public exposure/cubic yards per mile transported [highway accident], release to environment/gallons treated [treatment system upset]).

As an invasive remedial technology, the selected alternative (removal and restoration) rates low for implementation risk. This alternative involves construction to remove impacted soil. This construction will disturb soil, increasing the potential for improper handling during the removal process, and may result in the generation of dust that could transport contamination and lead to inhalation exposure. Most of the construction associated with this alternative will take place in a location immediately adjacent to private homes. Construction equipment can be dangerous if operated improperly or if the public enters work areas. This alternative increases the likelihood of conflicts between the general public and construction activities.

Management of implementation risks for the selected cleanup alternative are achievable through active coordination between construction oversight personnel, construction contractor(s), property owners and tenants. Risks are also mitigated using construction methods to reduce or eliminate dust or spread of contaminated media.

### **Technical and Administrative Implementability**

Technical and administrative implementability addresses the ability to implement the alternative and includes consideration of whether the alternative is technically possible; the availability of necessary off-site facilities, services, and materials; administrative and regulatory requirements; scheduling; size; complexity; monitoring requirements; access for construction operations and monitoring; and integration with existing facility (or locally applicable) operations and other current or potential cleanup actions.

The selected alternative is implementable from a technical and administrative standpoint. However, compared with less invasive technologies, the selected alternative (removal and restoration) will require more coordination with area property owners.

## Consideration of Public Concerns

Consideration of public concerns addresses concerns from individuals, community groups, local governments, tribes, federal and state agencies, and any other organization that may have an interest in or knowledge of the site and that may have a preferred alternative.

Ecology and the Port have addressed community concerns throughout project activities (see Section 3.9). Additional issues or concerns were considered by Ecology as part of the draft CAP public comment period, as stipulated in WAC 173-340-600 and consistent with requirements set forth in WAC 173-340-380(2). The public comment period for the project was open between January 9 and February 10, 2025. No comments were received and no changes to the documents were requested. Community concerns will also be factored into local permit processes, including responding to any City permitting concerns.

The selected alternative likely will include concerns related to required construction activities, noise, disturbances to property owners, and actions related to the disturbance of contaminated soil. These and similar concerns were raised during the 2016–2017 interim action construction activities. Management of such concerns will continue throughout the project as part of public outreach activities (see Section 3.9), including Ecology and Port-contractor site visits and communications with property owners and tenants.

## Cost

Appendix J provides cost estimates for residential properties and ROWs for the selected alternative. The Phase 1 interim action costs are not included in these estimates since that cleanup work is already completed as shown in Figure 8-1. Primary cost assumptions are included in these tables and are informed by the Phase 1 OPP 2016–2017 interim action costs.

### 8.3.3 Reasonable Restoration Time Frame

WAC 173-340-360(4) contains guidance for determining reasonable restoration time frames. The following must be taken into consideration: potential risks posed by the site to human health and the environment; the practicability of achieving a shorter restoration time frame; current use of the site, surrounding areas, and associated resources that are, or that may be, affected by releases from the site; likely effectiveness and reliability of institutional controls; ability to control and monitor migration of hazardous substances from the site; toxicity of the hazardous substances at the site; and the natural processes that reduce concentrations of hazardous substances and that have been documented to occur at the site or under similar conditions.

The selected alternative can be executed within a reasonable time frame of one year.

### 8.3.4 Expectations for Alternatives

WAC 173-340-370 outlines Ecology's expectations for the development of alternatives and the selection of cleanup actions. Based on the above evaluations, the single feasible alternative is likely to ensure compliance with the expectations. Each of the expectation criteria is summarized below:

### **Treatment of Waste and Hazardous Substances**

Ecology generally expects that treatment technologies will be emphasized at sites containing liquid wastes, high concentrations of hazardous substances, highly mobile hazardous materials, and discrete areas of hazardous materials that lend themselves to treatment. The site contains no liquid wastes; the hazardous-substance concentrations are not especially high and, in fact, generally correspond with less than a 1 in 100,000 excess cancer risk level; and dioxins are not highly mobile.

The selected alternative complies with Ecology's expectation.

### **Minimization of Long-Term Management at Small Sites**

Ecology also favors the minimization of long-term management for small sites through the use of destruction, detoxification, and/or removal to bring concentrations on site to below CULs.

The selected alternative requires no long-term management at the site to bring concentrations below CULs; the selected alternative complies with Ecology's expectation.

### **Use of Engineering Controls at Large Sites**

Ecology recognizes the need to use engineering controls, such as containment, for sites where there are large volumes of low-level contamination and where treatment is impractical.

The selected alternative does not include long-term engineering controls; this criterion is not applicable.

### **Minimize Stormwater Contamination and Off-Site Migration; Control Runoff to Avoid Surface Water Contamination**

Ecology also expects that measures will be taken to avoid stormwater contamination and its subsequent migration off site. In addition, contamination of surface water near the OPP should be avoided through the control of runoff and groundwater discharge or migration.

The selected alternative will remove soils exceeding the CUL. The project will employ stormwater best management practices during construction. Because the contaminants have limited mobility, standard construction practices to limit turbid discharges from the site will avoid contamination of surface water.

### **Minimize Direct Contact and Migration by Consolidating Hazardous Substances**

Ecology expects that when hazardous substances remain on site at concentrations that exceed CULs, those hazardous substances will be consolidated to the maximum extent practicable where needed to minimize the potential for direct contact and migration of hazardous substances.

Under the selected alternative, no hazardous substances at concentrations that exceed CULs will remain at residential areas; this criterion is not applicable.

## **Control Groundwater Discharge or Migration to Avoid Surface Water Contamination**

Groundwater is not a consideration for the OPP, as the contamination is surficial, the water table is greatly removed from the contaminated layer and dioxins are not very mobile or water-soluble. This criterion is not applicable.

## **Allow Natural Attenuation**

Ecology acknowledges that natural attenuation may be appropriate where criteria are met.

The selected alternative does not rely on natural attenuation or degradation of dioxins; this criterion is not applicable.

## **No Significantly Greater Overall Threat to Human Health and the Environment as Compared to Other Alternatives**

Ecology expects that any cleanup actions chosen with consideration of WAC 173-340-370 will not result in a significantly greater overall threat to human health and the environment than with other alternatives. The selected alternative will minimize threats to human health and the environment during the cleanup action.

## **8.4 Selected Cleanup Action**

Alternative 1 (removal and restoration) is selected for the residential areas. Soil in yards and ROWs with dioxin concentrations exceeding the CUL will be removed and areas will be restored (see Section 8.3). The total estimated costs are provided in Table 8-1. The cleanup areas are shown in Figure 8-1.

The recommended cleanup action components for residential yards and ROWs includes:

- Excavation of soil with dioxin concentrations exceeding 13 ng/kg TEQ. The vertical extents of excavation will be further refined during design for one property and for ROWs.
- Soil around large trees to remain will be excavated under the oversight of a certified arborist to preserve the trees.
- Clean fill material will be imported and placed to restore residential yards and ROWs.
- Excavated material will be disposed of as nonhazardous material waste at a Subtitle D landfill facility. The excavated material will not be designated as either a Resource Conservation and Recovery Act (RCRA)-listed hazardous waste or a RCRA characteristic waste (see Appendix K).
- Fencing which requires removal for construction and smaller vegetation will be restored.
- ROW features (sidewalks, signage, etc.) removed or disturbed during construction will be restored.

## LIMITATIONS

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

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

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# TABLES



**Table 2-1  
Soil Sample Results (2010–2012)  
Former PWT Site  
Ridgefield, Washington**



Location ID	MTCA Method B Soil CUL	SS-34	SS-35	SS-36	SS-43	SS-44	SS-45	SS-46	SS-47	SS-48	SS-49	SS-54
Sample ID		SS-34	SS-35	SS-36	SS-43	SS-44	SS-45	SS-46	SS-47	SS-48	SS-49	SS-54
Sample Date		06/17/2010	06/17/2010	06/17/2010	09/21/2010	09/21/2010	09/21/2010	05/24/2011	05/24/2011	05/24/2011	05/24/2011	05/24/2011
Sample Depth (feet bgs)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Area		Residential	Residential	Residential	Phase 1 OPP	Phase 1 OPP	Phase 1 OPP	Residential	Phase 1 OPP	Phase 1 OPP	Phase 1 OPP	Phase 1 OPP
<b>Phenols (ug/kg)</b>												
Pentachlorophenol	8,300	19.9 U	18.3 U	18.7 U	23.2	17.8 U	18 U	--	--	--	--	--
<b>Metals (mg/kg)</b>												
Arsenic	20 <sup>a</sup>	9.52	8.90	6.89	7.99	6.58	7.17	--	--	--	--	--
Chromium	120,000	15.6	18.2	12.5	15.9	17.3	18.1	--	--	--	--	--
Copper	3,000	9.56	15.3	11.7	12	16.5	8.1	--	--	--	--	--
Zinc	24,000	99.7	97.4	82.5	119	160	76.2	--	--	--	--	--
<b>PAHs (ug/kg)</b>												
Total PAH	--	ND	110	ND	251	143	ND	--	--	--	--	--
Naphthalene	1,600,000	8.83 U	8.12 U	8.32 U	7.49 U	7.89 U	8 U	--	--	--	--	--
Acenaphthylene	--	8.83 U	8.12 U	8.32 U	7.49 U	7.89 U	8 U	--	--	--	--	--
Acenaphthene	4,800,000	8.83 U	8.12 U	8.32 U	7.49 U	7.89 U	8 U	--	--	--	--	--
Fluorene	3,200,000	8.83 U	8.12 U	8.32 U	7.49 U	7.89 U	8 U	--	--	--	--	--
Phenanthrene	--	8.83 U	8.12	8.32 U	14.2	11.8	8 U	--	--	--	--	--
Anthracene	24,000,000	8.83 U	8.12 U	8.32 U	7.49 U	7.89 U	8 U	--	--	--	--	--
2-Methylnaphthalene	320,000	--	--	--	7.49 U	7.89 U	8 U	--	--	--	--	--
Fluoranthene	3,200,000	8.83 U	9.74	8.32 U	37.4	18.9	8 U	--	--	--	--	--
Pyrene	2,400,000	8.83 U	9.74	8.32 U	24.7	14.2	8 U	--	--	--	--	--
Benzo(a)anthracene	--	8.83 U	8.12 U	8.32 U	12.7	7.89 U	8 U	--	--	--	--	--
Chrysene	--	8.83 U	8.12 U	8.32 U	27.7	13.4	8 U	--	--	--	--	--
Benzo(a)pyrene	140	8.83 U	11.4	8.32 U	15.7	8.68	8 U	--	--	--	--	--
Indeno(1,2,3-c,d)-pyrene	--	8.83 U	9.74	8.32 U	18.7	11	8 U	--	--	--	--	--
Dibenzo(a,h)anthracene	--	8.83 U	8.12 U	8.32 U	11.2	7.89 U	8 U	--	--	--	--	--
Benzo(ghi)perylene	--	8.83 U	12.2	8.32 U	21	11.8	8 U	--	--	--	--	--
Benzo(b)fluoranthene	--	8.83 U	12.2	8.32 U	30.7	13.4	8 U	--	--	--	--	--
Benzo(k)fluoranthene	--	8.83 U	8.12 U	8.32 U	10.5	7.89 U	8 U	--	--	--	--	--
1-Methylnaphthalene	24,000	--	--	--	7.49 U	7.89 U	8 U	--	--	--	--	--
cPAH TEQ	140	ND	14.9	ND	24.4	12.4	ND	--	--	--	--	--

**Table 2-1  
Soil Sample Results (2010–2012)  
Former PWT Site  
Ridgefield, Washington**



Location ID	MTCA Method B Soil CUL	SS-55	SS-56	SS-57	SS-58	SS-59	SS-43-Comp-0-6	SS-44-Comp-0-6	SS-47-Comp-0-6	SS-48-Comp-0-6	SS-49-Comp-0-6	SS-57-Comp-0-6	
Sample ID		SS-55	SS-56	SS-57	SS-58	SS-59	SS-43-Comp	SS-44-Comp	SS-47-Comp	SS-48-Comp	SS-49-Comp	SS-57-Comp	
Sample Date		05/24/2011	05/24/2011	05/24/2011	05/24/2011	05/24/2011	09/20/2012	09/20/2012	09/20/2012	09/20/2012	09/20/2012	09/20/2012	09/20/2012
Sample Depth (feet bgs)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-6	0-6	0-6	0-6	0-6	0-6	0-6
Area		Phase 2 OPP	Phase 1 OPP	Phase 1 OPP	Residential	Residential	Phase 1 OPP	Phase 1 OPP	Phase 1 OPP	Phase 1 OPP	Phase 1 OPP	Phase 1 OPP	Phase 1 OPP
<b>Phenols (ug/kg)</b>													
Pentachlorophenol	8,300	--	--	--	--	--	--	--	--	--	--	--	
<b>Metals (mg/kg)</b>													
Arsenic	20 <sup>a</sup>	--	--	--	--	--	--	--	--	--	--	--	
Chromium	120,000	--	--	--	--	--	--	--	--	--	--	--	
Copper	3,000	--	--	--	--	--	--	--	--	--	--	--	
Zinc	24,000	--	--	--	--	--	--	--	--	--	--	--	
<b>PAHs (ug/kg)</b>													
Total PAH	--	--	--	--	--	--	--	--	--	--	--	--	
Naphthalene	1,600,000	--	--	--	--	--	--	--	--	--	--	--	
Acenaphthylene	--	--	--	--	--	--	--	--	--	--	--	--	
Acenaphthene	4,800,000	--	--	--	--	--	--	--	--	--	--	--	
Fluorene	3,200,000	--	--	--	--	--	--	--	--	--	--	--	
Phenanthrene	--	--	--	--	--	--	--	--	--	--	--	--	
Anthracene	24,000,000	--	--	--	--	--	--	--	--	--	--	--	
2-Methylnaphthalene	320,000	--	--	--	--	--	--	--	--	--	--	--	
Fluoranthene	3,200,000	--	--	--	--	--	--	--	--	--	--	--	
Pyrene	2,400,000	--	--	--	--	--	--	--	--	--	--	--	
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	
Chrysene	--	--	--	--	--	--	--	--	--	--	--	--	
Benzo(a)pyrene	140	--	--	--	--	--	--	--	--	--	--	--	
Indeno(1,2,3-c,d)-pyrene	--	--	--	--	--	--	--	--	--	--	--	--	
Dibenzo(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	
Benzo(ghi)perylene	--	--	--	--	--	--	--	--	--	--	--	--	
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	
1-Methylnaphthalene	24,000	--	--	--	--	--	--	--	--	--	--	--	
cPAH TEQ	140	--	--	--	--	--	--	--	--	--	--	--	

**Table 2-1  
Soil Sample Results (2010–2012)  
Former PWT Site  
Ridgefield, Washington**



Location ID	MTCA Method B Soil CUL	SS-34	SS-35	SS-36	SS-43	SS-44	SS-45	SS-46	SS-47	SS-48	SS-49	SS-54
Sample ID		SS-34	SS-35	SS-36	SS-43	SS-44	SS-45	SS-46	SS-47	SS-48	SS-49	SS-54
Sample Date		06/17/2010	06/17/2010	06/17/2010	09/21/2010	09/21/2010	09/21/2010	05/24/2011	05/24/2011	05/24/2011	05/24/2011	05/24/2011
Sample Depth (feet bgs)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
<b>Dioxins and Furans (ng/kg)</b>												
1,2,3,4,6,7,8-HpCDD	--	9.7	59	68	1100	550	160	21	1400	670	590	21
1,2,3,4,6,7,8-HpCDF	--	1.5 J	7.8	8.2	170	110	25	5.3	190	160	93	12
1,2,3,4,7,8,9-HpCDF	--	0.33 U	0.63 J	0.61 J	11	6.1	2.1 J	0.22 U	13	10	5.5	0.12 U
1,2,3,4,7,8-HxCDD	--	0.17 J	0.61 J	0.33 U	14	7.5	2.5 J	0.091 U	14	8.8	9.5	0.38
1,2,3,4,7,8-HxCDF	--	0.35 J	1.4 J	2.1 J	25	12	2.3 J	0.072 U	50	16	13	0.09 U
1,2,3,6,7,8-HxCDD	--	0.54 J	3.1 J	3.3 J	72	32	9	0.11 U	71	30	33	0.11 U
1,2,3,6,7,8-HxCDF	--	0.15 U	0.74 J	0.99 J	16	4.9	1.3 J	1.1 U	31 U	28 U	16 U	0.14 U
1,2,3,7,8,9-HxCDD	--	0.25 J	1.3 J	1.4 J	34	16	4.9	0.077 U	32	15	19	0.14 U
1,2,3,7,8,9-HxCDF	--	0.18 U	0.39 J	0.66 J	6.6	3.4 J	0.7 J	0.081 U	13	0.17 U	0.15 U	0.13 U
1,2,3,7,8-PeCDD	--	0.15 J	0.37 J	0.35 J	8.2	3.9 J	1.3 J	0.077 U	5.6	0.27 U	0.17 U	0.18 U
1,2,3,7,8-PeCDF	--	0.088 U	0.18 U	0.41 J	4.6	3.1 J	0.53 J	0.14 U	7.6	3.3 U	0.2 U	0.14 U
2,3,4,6,7,8-HxCDF	--	0.21 J	0.81 J	1.2 J	17	8.6	2 J	0.068 U	27	11	11	0.11 U
2,3,4,7,8-PeCDF	--	0.13 J	0.8 J	1.4 J	11	6	1.2 J	0.19 U	23	7.3	9.5	0.13 U
2,3,7,8-TCDD	--	0.13 U	0.12 U	0.2 U	3.1	0.76 J	0.28 J	0.11 U	2.3	4.5	0.12 U	0.16 U
2,3,7,8-TCDF	--	0.24 J	0.25 J	0.3 J	1.9 U	1.7 U	1 U	0.51	3.1	3	1.3	0.16 U
OCDD	--	69	370	500	6500 J	3500	1400	150	11000 J	5200	3500	130
OCDF	--	4.3 J	17	10	210	150	79	18	230	510	160	0.13 U
Total HpCDDs	--	19	100	140	2000	960	270	38	2200	1100	980	34
Total HpCDFs	--	4.3 J	8.4	24	460	270	76	18	410	520	250	34
Total HxCDDs	--	3.4 J	14	15	330	170	51	5.8	310	170	190	6.2
Total HxCDFs	--	1.8 J	12	17	350	190	40	6.8	540	230	200	22
Total PeCDDs	--	0.24 J	1.4 J	0.88 J	31	24	7.8	0.77 J	30	30	25	0.11 U
Total PeCDFs	--	1.3 J	6.8	9.7	79	56	14	1.1 J	180	76	95	5 J
Total TCDDs	--	0.37 J	0.12 U	0.23 J	8.7	7.4	4.3	0.86 J	9.1	19	4.6	0.16 U
Total TCDFs	--	1.2	1.6	1.3	15	16	5.8	0.088 U	29	47	22	0.45 J
Dioxin TEQ	<b>13</b>	0.49	2.3	2.8	<b>48</b>	<b>23</b>	6.6	0.57	<b>57</b>	<b>27</b>	<b>20</b>	0.64

**Table 2-1  
Soil Sample Results (2010–2012)  
Former PWT Site  
Ridgefield, Washington**



Location ID	MTCA Method B Soil CUL	SS-55	SS-56	SS-57	SS-58	SS-59	SS-43-Comp-0-6	SS-44-Comp-0-6	SS-47-Comp-0-6	SS-48-Comp-0-6	SS-49-Comp-0-6	SS-57-Comp-0-6	
Sample ID		SS-55	SS-56	SS-57	SS-58	SS-59	SS-43-Comp	SS-44-Comp	SS-47-Comp	SS-48-Comp	SS-49-Comp	SS-57-Comp	
Sample Date		05/24/2011	05/24/2011	05/24/2011	05/24/2011	05/24/2011	05/24/2011	09/20/2012	09/20/2012	09/20/2012	09/20/2012	09/20/2012	09/20/2012
Sample Depth (feet bgs)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-6	0-6	0-6	0-6	0-6	0-6
<b>Dioxins and Furans (ng/kg)</b>													
1,2,3,4,6,7,8-HpCDD	--	140	82	670	63	54	83	9.3	590	9.9	31	4.2 U	
1,2,3,4,6,7,8-HpCDF	--	26	12	100	11	9.6	12	1.6 J	55 U	2.3 J	3.4 J	0.65 U	
1,2,3,4,7,8,9-HpCDF	--	0.24 U	0.69	6.5	0.3 U	0.52	0.65 J	0.13 U	6.1	0.22 U	0.23 J	0.28 U	
1,2,3,4,7,8-HxCDD	--	0.18 U	0.22 U	9.7	0.15 U	0.15 U	0.99 J	0.14 U	5.4	0.25 U	0.64 J	0.16 U	
1,2,3,4,7,8-HxCDF	--	0.24 U	0.12 U	21 U	2.9 U	0.24 U	1.4 J	0.15 U	29	0.24 U	0.56 J	0.25 U	
1,2,3,6,7,8-HxCDD	--	7.5	0.14 U	40	0.15 U	0.15 U	4 J	0.58 J	36	0.64 J	1.8 J	0.5 J	
1,2,3,6,7,8-HxCDF	--	0.09 U	0.097 U	11	0.17 U	0.24 U	0.51 J	0.2 U	16 U	0.2 U	0.3 J	1.7 U	
1,2,3,7,8,9-HxCDD	--	0.13 U	0.13 U	18	0.15 U	0.13 U	2 J	0.3 J	11	0.31 J	1 J	0.42 J	
1,2,3,7,8,9-HxCDF	--	0.17 U	0.15 U	0.18 U	0.15 U	0.12 U	0.11 U	0.085 U	6.1	0.26 U	0.12 U	0.23 U	
1,2,3,7,8-PeCDD	--	0.12 U	0.42	0.16 U	0.48	0.2 U	0.41 U	0.16 U	1.8 J	0.18 U	0.21 J	0.17 U	
1,2,3,7,8-PeCDF	--	0.12 U	0.14 U	0.11 U	0.28 U	0.22 U	0.31 U	0.15 U	4.4 J	0.19 U	0.18 U	0.26 U	
2,3,4,6,7,8-HxCDF	--	0.12 U	0.1 U	13	0.074 U	0.11 U	0.94 J	0.14 U	13	0.27 J	0.59 J	0.78 J	
2,3,4,7,8-PeCDF	--	8	0.11 U	13	0.12 U	0.16 U	0.58 J	0.13 U	5.9	0.21 J	0.59 J	0.38 J	
2,3,7,8-TCDD	--	0.12 U	0.26 U	0.19 U	0.12 U	0.12 U	0.13 J	0.1 U	0.19 U	0.37 J	0.12 U	0.18 U	
2,3,7,8-TCDF	--	0.28 U	0.23 U	1.4	0.12 U	0.24 U	0.19 J	0.13 U	1.1 U	0.16 U	0.2 U	0.25 U	
OCDD	--	770	460	3500	360	330	440	74	4600	78	170	31	
OCDF	--	36	0.15 U	110	13	16	12	2.6 J	87	5.9 J	5.2 J	1.1 U	
Total HpCDDs	--	230	140	1200	110	97	130	18	1100	18	51	4.6 J	
Total HpCDFs	--	73	28	260	31	25	26	4.1 J	160	6.4	8.7	1.5 J	
Total HxCDDs	--	35	18	190	20	16	20	2.8 J	140	3.6 J	9.1	3.3 J	
Total HxCDFs	--	99	28	270	24	24	19	2.3 J	310	3 J	8.7	8.7	
Total PeCDDs	--	5.7 J	1.4 J	23	1.3 J	1.5 J	0.7 J	0.16 U	5.8	0.18 U	0.73 J	0.17 U	
Total PeCDFs	--	120	11	150	14	13	6.7	1.1 J	120	1.4 J	6	12	
Total TCDDs	--	0.36 J	0.098 U	4.7	0.12 U	0.56 J	0.54 J	0.1 U	0.19 U	0.67 J	0.44 J	0.18 U	
Total TCDFs	--	20	0.48 J	26	3.6	1.7	0.89 J	0.13 UJ	7.7	0.22 U	1.5	2.5	
Dioxin TEQ	<b>13</b>	5.2	1.7	<b>23</b>	1.6	1.0	2.6	0.41	<b>22</b>	0.85	1.4	0.63	

**Table 2-1**  
**Soil Sample Results (2010–2012)**  
**Former PWT Site**  
**Ridgefield, Washington**

**Notes**

**Bold** indicates values that exceed MTCA Method B Soil CUL.

Total PAH includes the following PAHs: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, anthracene, 2-methylnaphthalene, 1-methylnaphthalene (if available), fluoranthene, pyrene, benzo(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.

-- = no value.

bgs = below ground surface.

cPAH = carcinogenic PAH.

CUL = cleanup level.

J = Estimated value. Value used in calculations.

mg/kg = milligrams per kilogram.

MTCA = Model Toxics Control Act.

ND = not detected.

ng/kg = nanograms per kilogram.

OPP = off-property portion.

PAH = polycyclic aromatic hydrocarbon.

PWT = Pacific Wood Treating Co.

TEQ = toxicity equivalent.

U = Not detected. One half the reported concentration used in TEQ and Total PAH calculations.

ug/kg = micrograms per kilogram.

<sup>a</sup>MTCA Method A level adjusted for background.



**Table 4-1  
Environmental Justice Criteria Ranking  
Former PWT Site  
Ridgefield, Washington**



Environmental Justice Evaluation Criteria		Rank
Environmental Health Disparities		1
<b>Environmental Exposures</b>		5
	Diesel Exhaust PM 2.5 Emissions	4
	Ozone Concentration	6
	PM 2.5 Concentration	4
	Proximity to Heavy Traffic Roadways	8
	Toxic Releases from Facilities	6
<b>Environmental Factors</b>		4
	Lead Risk from Housing (%)	4
	Proximity to Hazardous Waste Treatment Storage and Disposal Facilities	4
	Proximity to National Priorities List Facilities	4
	Proximity to Risk Management Plan Facilities	4
	Wastewater Discharge	4
<b>Socioeconomic Factors</b>		1
	ACS: Limited English (LEP)	6
	No High School Diploma (%)	2
	People of Color (Race/Ethnicity)	1
	Population Living in Poverty <= 185% of Federal Poverty Level (%)	2
	Transportation Expense	8
	Unaffordable Housing (> 30% of Income)	3
	Unemployed (%)	1
<b>Sensitive Populations</b>		1
	Death from Cardiovascular Disease	1
	Low Birth Weight - Combined (%)	3
<b>Notes</b>		
Environmental justice criteria and ranking obtained from <a href="https://fortress.wa.gov/doh/wtnibl/WTNIBL/">https://fortress.wa.gov/doh/wtnibl/WTNIBL/</a> , accessed on April 12, 2024.		
Ranking: High = 10, Low = 1		

**Table 5-1  
Property Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (feet bgs)	Sample Type	Area	Dioxin TEQ <sup>(a)(1)(2)</sup> (ng/kg)	1,2,3,4,6,7,8-HpCDD (ng/kg)	1,2,3,4,6,7,8-HpCDF (ng/kg)	1,2,3,4,7,8,9-HpCDF (ng/kg)	1,2,3,4,7,8-HxCDD (ng/kg)	1,2,3,4,7,8-HxCDF (ng/kg)	1,2,3,6,7,8-HxCDD (ng/kg)	1,2,3,6,7,8-HxCDF (ng/kg)	1,2,3,7,8,9-HxCDD (ng/kg)
Property 001	COMP-AOI001-0.5	11/20/2015	0-0.5	Composite	Phase 1 OPP	52.7	992	241	16.3	25.5	29.4	110	15.1 U	63.7
Property 002	ISM-AOI002-0.5	11/20/2015	0-0.5	ISM	Phase 1 OPP	15.1	322	157	3.98	4.89	9.82	20.2	4.64	12.6
Property 002	SBS-AOI002-1.5	03/22/2016	1.0-1.5	Discrete	Phase 1 OPP	5.41	159	19	1.27 J	2.2 J	2.63 J	7.23	1.38 J	5.91
Property 003	ISM-AOI003-0.5	02/09/2016	0-0.5	ISM	Phase 1 OPP	15.4	334	48.4	2.73	4.83	6.75	16.1	3.36	13
Property 004	COMP-AOI004-0.5	07/28/2015	0-0.5	Composite	Phase 1 OPP	13.0	320	42.1	2.63 J	4.65 J	5.98	20.3	2.81 J	12.4
Property 004	ISM-AOI004-0.5	07/12/2017	0-0.5	ISM	Phase 1 OPP	18.6	456	57.3	4	6.68	8.7	27.5	4.34 J	16.2
Property 005	ISM-AOI005-0.5	04/16/2015	0-0.5	ISM	Phase 1 OPP	68.8	1,810	249	15.3	18.1	44.4	94.6	22	55.5
Property 005	SBS-AOI005-1.0	04/16/2015	0.5-1.0	Discrete	Phase 1 OPP	60.7	1,900	288	17.6	17.1	48.3	93.5	21.4	51
Property 005	SBS-AOI005-1.0-DUP	04/16/2015	0.5-1.0	Discrete Dup	Phase 1 OPP	69.8	2,180	316	19.5	20.3	56	104	25.5	60.4
Property 006	ISM-AOI006-0.5	04/16/2015	0-0.5	ISM	Phase 1 OPP	39.8	930	123	6.94	10	18.1	46.9	8.23	29.1
Property 006	SBS-AOI006-1.0	04/16/2015	0.5-1.0	Discrete	Phase 1 OPP	23.6	572	74.6	4.32	5.03	12.8	26.6	5.29	14.1
Property 007	ISM-AOI007-0.5	04/16/2015	0-0.5	ISM	Phase 1 OPP	53.1	1,650	246	15.2	11.7	58.8	81.8	22.3	35.9
Property 008	ISM-AOI008-0.5	05/21/2015	0-0.5	ISM	Phase 1 OPP	11.4	288	46.8	2.76	3.19	4.07	12.7	2.15	8.79
Property 009	ISM-AOI009-0.5	11/20/2015	0-0.5	ISM	Phase 1 OPP	5.88	124	28.8	2.33	1.55	6.79	5.35	1.54	3.75
Property 010	ISM-AOI010-0.5	12/02/2015	0-0.5	ISM	Phase 1 OPP	4.12	142	18.1	1.03	0.974	1.9	4.38	0.694	2.69
Property 011	ISM-AOI011-0.5	04/16/2015	0-0.5	ISM	Phase 1 OPP	10.7	341	71.4	4.05	3.17	4.95	15.7	3.21	9.88
Property 012	ISM-AOI012-0.5	04/23/2015	0-0.5	ISM	Phase 1 OPP	18.4	542	101	5.4	6.27	12.6	24.6	7.46	15.1
Property 013	ISM-AOI013-0.5-B	04/16/2015	0-0.5	ISM	Phase 1 OPP	47.0	1,450	199	11.4	13.8	31.7	72	14.9	38.9
Property 013	ISM-AOI013-0.5-F	04/16/2015	0-0.5	ISM	Phase 1 OPP	106	3,560	500	29.8	28.2	91.6	159	37.5	66.4
Property 014	ISM-AOI014-0.5	04/23/2015	0-0.5	ISM	Phase 1 OPP	40.0	1,230	205 UJ	10.7	14.8	32.2	58	15.7	31.6
Property 015	ISM-AOI015-0.5	04/23/2015	0-0.5	ISM	Phase 1 OPP	183	4,080	584	26.3	80	74	285	83.7	191
Property 016	ISM-AOI016-0.5	05/07/2015	0-0.5	ISM	Phase 1 OPP	34.4	972	142	8.19	13.1	24	46.7	11.8	30.5
Property 017	ISM-AOI017-0.5-A	04/23/2015	0-0.5	ISM Triplicate	Phase 1 OPP	45.2	1,180	214	13.6	18.6	22.9	63.8	14.4	40
Property 017	ISM-AOI017-0.5-B	04/23/2015	0-0.5	ISM Triplicate	Phase 1 OPP	30.5	836	139	7.28	11.3	16.6	41.3	9.41	23.3
Property 017	ISM-AOI017-0.5-C	04/23/2015	0-0.5	ISM Triplicate	Phase 1 OPP	42.6	1,100	187	10.1	15.2	22.5	54.9	12.5	36.5
Property 017	SBS-AOI017-1.0	04/23/2015	0.5-1.0	Discrete	Phase 1 OPP	10.3	175	25.8	3.43	3.69	5.52	10.4	3.66	6.93
Property 018	ISM-AOI018-0.5-B-A	04/16/2015	0-0.5	ISM Triplicate	Phase 1 OPP	14.0	379	96.1	3.62	4.4	8.65	20.2	4.57	14.1
Property 018	ISM-AOI018-0.5-B-B	04/16/2015	0-0.5	ISM Triplicate	Phase 1 OPP	13.7	444	73.2	3.39	4.62	7.66 U	21.4	3.98	14.8 U
Property 018	ISM-AOI018-0.5-B-C	04/16/2015	0-0.5	ISM Triplicate	Phase 1 OPP	12.1	390	66.4	2.96	4.32	6.73 U	20.1	3.47	13 U
Property 018	ISM-AOI018-0.5-F	04/16/2015	0-0.5	ISM	Phase 1 OPP	18.3	553	78.6	4.04	6.43	9.91	27.8	5.2	17.1
Property 018	SBS-AOI018-1.0	04/16/2015	0.5-1.0	Discrete	Phase 1 OPP	1.85	54.9	9.37	0.466 J	0.609 J	1.16 U	2.74	0.607 J	2.03 U
Property 019	ISM-AOI019-0.5	06/22/2015	0-0.5	ISM	Phase 1 OPP	22.2	529	81.3	4.46	5.92	17.2	30.1	6.87	16.9
Property 019	SBS-AOI019-1.5	03/25/2016	1.0-1.5	Discrete	Phase 1 OPP	22.7	800	94.5	6.5	7.57	16.1	31.4	7.36	19.7
Property 020B	ISM-AOI020B-0.5	04/30/2015	0-0.5	ISM	Phase 1 OPP	25.6	734	134	5.95	8.4	16.7	33.2	8.46	24.8
Property 020B	SBS-AOI020B-1.0	04/30/2015	0-0.5	Discrete	Phase 1 OPP	4.17	119	23.3	0.907	1.12	2.41	4.93	1.23	4.65
Property 021	ISM-AOI021-0.5	04/30/2015	0-0.5	ISM	Phase 1 OPP	3.44	115	17.6	0.856 J	1.06	1.49	4	0.774 J	3.74
Property 022	ISM-AOI022-0.5	12/02/2015	0-0.5	ISM	Phase 1 OPP	8.65	252	34.4	2.12	2.33	4.94	12.4	2.2	6.39
Property 023	ISM-AOI023-0.5	06/15/2016	0-0.5	ISM	Phase 1 OPP	18.6	569	83.5	5.63	6.27	9.57	26.8	4.79	18.4
Property 024	ISM-AOI024-0.5	04/30/2015	0-0.5	ISM	Phase 1 OPP	15.1	397	81.4	4.04	4.18	8.03	16.7	7.22	13.7
Property 025	ISM-AOI025-0.5	04/30/2015	0-0.5	ISM	Phase 1 OPP	17.4	454	80.6	3.96	5.87	8.34	23.3	5.35	20.7
Property 026	ISM-AOI026-0.5	09/21/2015	0-0.5	ISM	Phase 1 OPP	9.22	273	37.1	2.09	2.66	4.46	14.2	2.24	7.29
Property 027	ISM-AOI027-0.5	04/30/2015	0-0.5	ISM	Phase 1 OPP	10.6	309	49.1	2.48	3.4	5.4	13.8	2.6	11.8
Property 028A	ISM-AOI028A-0.5	12/02/2015	0-0.5	ISM	Phase 1 OPP	7.91	227	31.8	1.86	2.72	3.75	10.9	1.82	7.26
Property 028B	ISM-AOI028B-0.5	12/02/2015	0-0.5	ISM	Phase 1 OPP	15.9	424	89.4	4.22	5.24	8.1	24.6	4.48	13.6
Property 028B	SBS-AOI028B-1.5	03/22/2016	1.0-1.5	Discrete	Phase 1 OPP	14.0	479	54.7	3.77 J	4.86 J	9.12	19.3	4.06 J	12.4

**Table 5-1  
Property Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (feet bgs)	Sample Type	Area	Dioxin TEQ <sup>(a)(1)(2)</sup> (ng/kg)	1,2,3,4,6,7,8-HpCDD (ng/kg)	1,2,3,4,6,7,8-HpCDF (ng/kg)	1,2,3,4,7,8,9-HpCDF (ng/kg)	1,2,3,4,7,8-HxCDD (ng/kg)	1,2,3,4,7,8-HxCDF (ng/kg)	1,2,3,6,7,8-HxCDD (ng/kg)	1,2,3,6,7,8-HxCDF (ng/kg)	1,2,3,7,8,9-HxCDD (ng/kg)
Property 029A	ISM-AOI029A-0.5	04/30/2015	0-0.5	ISM	Phase 1 OPP	17.1	475	73	4.09	5.21	8.26	23	4	23.1
Property 029B	ISM-AOI029B-0.5	04/23/2015	0-0.5	ISM	Phase 1 OPP	27.7	763	130	6.97	10.5	13.7	38.5	7.73	23.8
Property 030	ISM-AOI030-0.5	04/30/2015	0-0.5	ISM	Phase 1 OPP	9.49	299	49	2.21	3.66	5.19	12.5	2.41	9.36
Property 030	ISM-AOI030-0.5	05/21/2015	0-0.5	ISM Dup	Phase 1 OPP	11.4	337	45.1	2.45	4.41	5.3	15.3	2.47	12.3
Property 031	ISM-AOI031-0.5	04/16/2015	0-0.5	ISM	Phase 1 OPP	11.9	397	65.9	3.4	4.15	6.15 U	18.8	3.24	11.8 U
Property 032	ISM-AOI032-0.5	04/23/2015	0-0.5	ISM	Phase 1 OPP	16.4	390	80.2	3.88	5.72	9.61	19.6	5.7	13.1
Property 032	SBS-AOI032-1.0	04/23/2015	0.5-1.0	Discrete	Phase 1 OPP	5.24	169	36.9	1.61	2	1.77	6.3	1.23	5.4
Property 034	ISM-AOI034-0.5	12/02/2015	0-0.5	ISM	Phase 1 OPP	9.68	215	40.5	2.36	2.67	7.17	10.6	3.01	7.63
Property 035	ISM-AOI035-0.5	12/23/2015	0-0.5	ISM	Phase 1 OPP	48.4	430	342	19	8.75	81.1	25.9	37	26.1
Property 036	ISM-AOI036-0.5	04/23/2015	0-0.5	ISM	Phase 1 OPP	29.4	563	122	6.37	8.11	13.8	28.2	7.03	19
Property 037	ISM-AOI037-0.5	11/20/2015	0-0.5	ISM	Phase 1 OPP	17.7	417	75.7	4.69	4.54	11.5	20.6	4.34	12.1
Property 037	SBS-AOI037-1.5	03/22/2016	1.0-1.5	Discrete	Phase 1 OPP	0.730	19.3	2.4 J	0.311 J	0.364 J	0.528 J	0.963 J	0.272 J	0.906 J
Property 038	ISM-AOI038-0.5	05/29/2015	0-0.5	ISM	Phase 1 OPP	31.3	747	129	6.61	14.1	13.1	37.5	7.06	37.7
Property 039	ISM-AOI039-0.5	05/29/2015	0-0.5	ISM	Phase 1 OPP	18.3	428	94.7	6.6	4.77	17.4	19	4.85	12.1
Property 041A	ISM-AOI041A-0.5	05/04/2016	0-0.5	ISM	Phase 2 OPP	11.7	415	49.3	3.03 U	4.04	8.08	17.6	3.64	11
Property 041B	ISM-AOI041B-0.5	05/04/2016	0-0.5	ISM	Phase 2 OPP	192	5,510	1,010	57	40.1	248	284	102	111
Property 043	ISM-AOI043-0.5	03/08/2017	0-0.5	ISM	Phase 2 OPP	16.1	360	52.5	3.36	3.67	7.06	17.6	5.09	10.4
Property 043	AOI-043-1.0-1.5	12/06/2023	1.0-1.5	Discrete	Phase 2 OPP	53.4	984 J	131 J	12.0 J	14.1 J	22.9 J	66.5 J	16.1 J	34.0 J
Property 043	AOI-043-1.5-2.0	12/06/2023	1.5-2.0	Discrete	Phase 2 OPP	30.2	576 J	81.6 J	5.64 J	9.79 J	14.9 J	36.4 J	9.62 J	18.7 J
Property 043	AOI043-2.0-2.5	03/13/2024	2.0-2.5	Discrete	Phase 3 OPP	4.41	67.5 J	8.08 J	0.733 UJK	1.51 UJ	2.77 J	4.66 J	1.99 J	3.33 J
Property 043	AOI043-2.5-3.0	03/13/2024	2.5-3.0	Discrete	Phase 3 OPP	0.562	6.29	0.935 J	0.274 U	0.33 U	0.347 J	0.629 J	0.200 UJK	0.421 J
Property 044	ISM-AOI044-0.5	03/08/2017	0-0.5	ISM	Phase 2 OPP	6.92	184	29.2	1.6 J	1.79 J	3.87	7.51	1.87 J	4.23 U
Property 045	ISM-AOI045-0.5	08/07/2017	0-0.5	ISM	Phase 2 OPP	5.04	139	20.9	1.16 J	1.57 J	3.18	6.24	1.46 J	3.06
Property 046	ISM-AOI046-0.5	06/14/2017	0-0.5	ISM	Phase 2 OPP	20.3	557	82.6	5.33	5.15	19.8	25.3	7.15	12.2
Property 046	AOI-046-1.0-1.5	12/06/2023	1.0-1.5	Discrete	Phase 2 OPP	1.64	44.5	6.73	0.445 J	0.379 U	1.56 J	2.18 J	0.63 J	0.909 J
Property 048	ISM-AOI048-0.5	08/07/2017	0-0.5	ISM	Phase 2 OPP	9.25	277	56.9	3.35	2.09 J	5.66	9.32	2.38 J	4.29
Property 049	ISM-AOI049-0.5	03/08/2017	0-0.5	ISM	Phase 2 OPP	3.40	99.5	17.7	1.01 J	0.809 UJ	1.58 J	3.47	0.904 J	1.97
Property 051	ISM-AOI051-0.5	03/08/2017	0-0.5	ISM	Phase 2 OPP	5.08	102	25.3	1.41 J	1.19 J	3.99	3.5	1.48 UJ	2.45
Property 052	ISM-AOI052-0.5	03/08/2017	0-0.5	ISM	Phase 2 OPP	6.85	170	30	1.36 J	1.39 J	1.99 J	6.59	1.56 J	3.26
Property 054	ISM-AOI054-0.5	03/08/2017	0-0.5	ISM	Phase 2 OPP	2.48	63.7	11.3	0.605 U	0.75 UJ	1.16 UJ	2.15 J	0.684 UJ	1.4 J
Property 056	ISM-AOI056-0.5	03/08/2017	0-0.5	ISM	Phase 2 OPP	22.4	740	106	5.68	6.35	14.9	26.5	6.84	12 U
Property 056	AOI-056-1.0-1.5	12/06/2023	1.0-1.5	Discrete	Phase 2 OPP	3.28	78.8	10.9	0.808 J	1.21 J	2.04 J	4.05	1.14 J	2.21 J
Property 057	ISM-AOI057-0.5	06/14/2017	0-0.5	ISM	Phase 2 OPP	20.8	537	80	4.6	4.72	13.4	23.6	6.8	10.9
Property 057	AOI057-1.0-1.5	12/15/2023	1.0-1.5	Discrete	Phase 2 OPP	1.34	41.9 J	5.01 J	0.56 UJ	0.654 UJ	0.768 UJK	1.95 J	0.402 J	0.733 UJK
Property 059	ISM-AOI059-0.5	08/07/2017	0-0.5	ISM	Phase 2 OPP	46.3	1,750	244	14.2	11	19.7	67.8	11.5	24.1
Property 061	ISM-AOI061-0.5	03/08/2017	0-0.5	ISM	Phase 2 OPP	22.2	835	104	7.09	4.09	9.75	22.3	4.81	8.28
Property 061	AOI-061-1.0-1.5	12/06/2023	1.0-1.5	Discrete	Phase 2 OPP	6.99	220	31.4	2.05 J	1.51 J	3.33 J	13.7	2.21 J	3.09
Property 062	ISM-AOI062-0.5	06/14/2017	0-0.5	ISM	Phase 2 OPP	13.6	366	59.6	3.99	3.89	9.07	16.9	4.01	8.92
Property 063	ISM-AOI063-0.5-1	06/14/2017	0-0.5	ISM Triplicate	Phase 2 OPP	4.27	103 J	19 J	1.14 J	1.07 J	2.39 J	4.52 J	1.2 J	2.32 J
Property 063	ISM-AOI063-0.5-2	06/14/2017	0-0.5	ISM Triplicate	Phase 2 OPP	11.1	295 J	61.3 J	3.87 J	2.79 J	7.4 J	12.7 J	3.85 J	6.06 J
Property 063	ISM-AOI063-0.5-3	06/14/2017	0-0.5	ISM Triplicate	Phase 2 OPP	7.71	145 J	32.8 J	2.11 J	1.83 J	5.07 J	7.04 J	3.24 J	3.87 J
Property 064	ISM-AOI064-0.5	03/08/2017	0-0.5	ISM	Phase 2 OPP	11.2	187	35.1	2.47	1.73 UJ	4.56	6.74 U	2.7	2.98 U
Property 066	ISM-AOI066-0.5-1	03/09/2017	0-0.5	ISM Triplicate	Phase 2 OPP	17.0	595	80.1	5.5	4.97	7.5	17.4	6.39	12
Property 066	ISM-AOI066-0.5-2	03/09/2017	0-0.5	ISM Triplicate	Phase 2 OPP	44.7	1,600	243	15.8	13.8	23.4	44.4	11.4	30.6
Property 066	ISM-AOI066-0.5-3	03/09/2017	0-0.5	ISM Triplicate	Phase 2 OPP	20.7	777	108	7	6.51	8.98	21.1	6.37	14.1

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Property 066	AOI-066-1.0-1.5	12/06/2023	1.0-1.5	Discrete	Phase 2 OPP	2.99	73.1	11.2	1.08 J	1.21 J	1.12 J	3.36	1.21 J	2.51
Property 067	ISM-AOI067-0.5	03/09/2017	0-0.5	ISM	Phase 2 OPP	2.07	63.6	8.88	0.533 J	0.581 J	1.14 J	2.51	0.613 J	1.46 J
Property 068	ISM-AOI068-0.5	05/23/2017	0-0.5	ISM	Phase 2 OPP	9.29	277	38.2	3.05	2.53	5.28	11.3	2.54	6.39
Property 071	ISM-AOI071-0.5	06/14/2017	0-0.5	ISM	Phase 2 OPP	11.2	320	45.2	2.65	2.78	8.31	15.1	3.6	6.55
Property 072	ISM-AOI072-0.5	03/09/2017	0-0.5	ISM	Phase 2 OPP	9.32	349	49.9	4.19	2.52	3.31	12.6	2.2 J	6.4
Property 073	ISM-AOI073-0.5	05/23/2017	0-0.5	ISM	Phase 2 OPP	12.5	361	48.2	2.57	3.15	8.19	15.6	3.84	7.61
Property 075	ISM-AOI075-0.5	05/23/2017	0-0.5	ISM	Phase 2 OPP	11.6	322	44.2	2.38 J	2.95 U	6.07	14.5	3.06	7.85
Property 076	ISM-AOI076-0.5	03/09/2017	0-0.5	ISM	Phase 2 OPP	9.53	256	42.9	2.3	2.33	5.5	10.3	3.2	5.81
Property 077	ISM-AOI077-0.5	03/09/2017	0-0.5	ISM	Phase 2 OPP	11.6	316	59.5	2.93	2.71	7.83	12.3	3.97	6.26
Property 078	ISM-AOI078-0.5	08/18/2017	0-0.5	ISM	Phase 2 OPP	21.1	552	73.9	3.91	7.02	8.27	29.5	5.65	17.7
Property 079	ISM-AOI079-0.5	08/13/2019	0-0.5	ISM	Phase 3 OPP	40.8	827	111	6.4	12.6	13.6	45.5	10.8	27.8
Property 079	AOI079-1.0-1.5	12/15/2023	1.0-1.5	Discrete	Phase 3 OPP	23.0	482 J	58.1 J	3.38 J	8.53 J	8.89 J	34.3 J	5.18 J	18.4 J
Property 079	AOI-079-1.5-2.0	12/15/2023	1.5-2.0	Discrete	Phase 3 OPP	5.16	113 J	13.9 J	0.739 J	2.32 J	2.02 J	8.67 J	1.32 J	5.31 J
Property 080	ISM-AOI080-0.5	08/13/2019	0-0.5	ISM	Phase 3 OPP	31.7	538	117	8.26	7.85	37.9	27.5	11.6	15.4
Property 081	ISM-AOI081-0.5	08/13/2019	0-0.5	ISM	Phase 3 OPP	16.4	399	49.8	2.7 J	5.29	5.58	23.9	3.43 J	13.4
Property 081	AOI081-1.0-1.5	12/15/2023	1.0-1.5	Discrete	Phase 3 OPP	2.00	43.7 J	5.61 J	0.513 UJ	0.812 UJK	0.717 J	3.25 J	0.419 UJK	2.13 J
Property 081	COMP-AOI081-0.5	06/21/2024	0-0.5	Composite	Phase 3 OPP	5.71	155	22.2	1.61 J	2.22 J	1.46 UJK	10.3	1.09 J	4.69
Property 082	ISM-AOI082-0.5	08/13/2019	0-0.5	ISM	Phase 3 OPP	15.9	329	53.5	3.6 J	3.82 J	8.09	15.5	5.28	8.43
Property 083	ISM-AOI083-0.5	08/13/2019	0-0.5	ISM	Phase 3 OPP	19.3	449	70.5	4.35 J	4.81 J	13.9	22.3	6.32	10.1
Property 083	AOI-083-1.0-1.5	12/06/2023	1.0-1.5	Discrete	Phase 3 OPP	14.1	244	49.2	2.62 J	3.74	6.18 J	14.7	3.86	7.85
Property 083	AOI-083-1.5-2.0	12/06/2023	1.5-2.0	Discrete	Phase 3 OPP	4.09	83.7 J	15.5 J	0.567 J	1.27 J	2.18 J	4.87 J	1.15 J	2.45 J
Property 084	ISM-AOI084-0.5	08/13/2019	0-0.5	ISM	Phase 3 OPP	5.41	157	24.8	1.24 J	1.59 J	1.86 J	7.46	1.27 J	3.84 J
Property 085	ISM-AOI085-0.5	08/13/2019	0-0.5	ISM	Phase 3 OPP	5.42	140	18.8	1.17 J	1.8 J	1.94 J	7.26	1.16 J	4.17 J
Property 086	ISM-AOI086-0.5	08/13/2019	0-0.5	ISM	Phase 3 OPP	11.1	301	37	2.16 J	3.25 J	3.84 J	16.3	2.33 J	7.85
Property 087	ISM-AOI087-0.5	01/29/2020	0-0.5	ISM	Phase 3 OPP	14.1	311	50.8	2.53 J	4.48 J	5.02	15.9	3.67 J	9.36
Property 087	AOI-087-1.0-1.5	12/06/2023	1.0-1.5	Discrete	Phase 3 OPP	10.4	203 J	28.0 J	7.40 UJ	6.83 UJ	4.01 UJK	17.1 J	3.83 UJ	11.0 J
Property 088	ISM-AOI088-0.5	02/17/2020	0-0.5	ISM	Phase 3 OPP	9.9	204 J	59 J	7.63 J	2.94 UJ	18.3 J	8.91 J	3.81 J	4.26 UJ
Property 089	ISM-AOI089-0.5	01/29/2020	0-0.5	ISM	Phase 3 OPP	20.4	428	86.3	6.63	6.9	14.2	23.9	4.97	13.6
Property 089	AOI-089-1.0-1.5	12/06/2023	1.0-1.5	Discrete	Phase 3 OPP	19.2	597	46.8	2.41 J	6.74	5.68 J	35.2	3.54	13.5
Property 089	AOI-089-1.5-2.0	12/06/2023	1.5-2.0	Discrete	Phase 3 OPP	1.44	44.5 J	4.21 J	0.476 UJ	0.465 UJ	0.572 J	2.67 J	0.221 UJK	1.24 J

**Table 5-1  
Property Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (feet bgs)	Sample Type	1,2,3,7,8,9-HxCDF (ng/kg)	1,2,3,7,8-PeCDD (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,6,7,8-HxCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	OCDD (ng/kg)	OCDF (ng/kg)	Total HpCDDs (ng/kg)
Property 001	COMP-A0I001-0.5	11/20/2015	0-0.5	Composite	0.615	11.8	4.53	9.61	5.48	1.09	1.43	2,130 J	349	1,830
Property 002	ISM-A0I002-0.5	11/20/2015	0-0.5	ISM	0.236 J	2.24	1.29	4.68	3.37	0.549	0.703	2,210	108	541
Property 002	SBS-A0I002-1.5	03/22/2016	1.0-1.5	Discrete	0.146 UJ	0.815 J	0.621 UJ	1.06 J	0.774 UJ	0.296 J	0.841 U	926	25.8	278
Property 003	ISM-A0I003-0.5	02/09/2016	0-0.5	ISM	0.135 J	2	0.847	2.65	1.64	3.71	1.33	1,760	66.3	569
Property 004	COMP-A0I004-0.5	07/28/2015	0-0.5	Composite	0.176 J	2.49 J	1.28 J	2.35 J	1.46 J	0.856 J	0.74 J	1,860	68.6	537
Property 004	ISM-A0I004-0.5	07/12/2017	0-0.5	ISM	0.618 U	4.13 J	1.78 J	2.75 J	2.85 J	0.762 J	1.67	2,740	112	767
Property 005	ISM-A0I005-0.5	04/16/2015	0-0.5	ISM	0.854 J	8.29	5.7	14	9.1	8.64	2.28	9,800	265	3,020
Property 005	SBS-A0I005-1.0	04/16/2015	0.5-1.0	Discrete	0.9 J	6.98	5.77	13.6	8.31	0.845	1.89	10,800	354	3,150
Property 005	SBS-A0I005-1.0-DUP	04/16/2015	0.5-1.0	Discrete Dup	1.14	7.94	6.96	15.3	10.8	1.12	2.65	11,800	372	3,770
Property 006	ISM-A0I006-0.5	04/16/2015	0-0.5	ISM	0.487 J	4	2.36	5.11	3.14	10.8	0.9 U	4,960	148	1,520
Property 006	SBS-A0I006-1.0	04/16/2015	0.5-1.0	Discrete	0.329 J	1.98	1.51	3.36	2.21	6.74	0.68 J	2,890	79.1	936
Property 007	ISM-A0I007-0.5	04/16/2015	0-0.5	ISM	1.12	4.25	6.39	12	10.2	0.317	1.98	11,800	207	2,770
Property 008	ISM-A0I008-0.5	05/21/2015	0-0.5	ISM	0.276 J	1.92	0.829 J	1.46	0.999 J	1.87	0.95 J	1,720	90.2	468
Property 009	ISM-A0I009-0.5	11/20/2015	0-0.5	ISM	0.118 J	0.627 J	0.414 J	1.05	0.814	1.12	0.404 J	841	62.2	216
Property 010	ISM-A0I010-0.5	12/02/2015	0-0.5	ISM	0.0691 J	0.396 J	0.236 J	0.67	0.371 J	0.359	0.636 J	1,410	42.1	284
Property 011	ISM-A0I011-0.5	04/16/2015	0-0.5	ISM	0.19 U	1.45	0.83 J	2.24	1.04	0.142 J	0.5 J	1,810	141	549
Property 012	ISM-A0I012-0.5	04/23/2015	0-0.5	ISM	0.27 J	2.45	1.88	4.93	2.57	0.471 UJ	2.03	3,500	122	906
Property 013	ISM-A0I013-0.5-B	04/16/2015	0-0.5	ISM	0.833 J	6.25	5	9.39	6.27	0.964	2.67	8,790	288	2,480
Property 013	ISM-A0I013-0.5-F	04/16/2015	0-0.5	ISM	1.8	8.81	11	23.4	15.7	3.79	3.08	20,400	557	6,120
Property 014	ISM-A0I014-0.5	04/23/2015	0-0.5	ISM	0.608 J	5.4	4.33	9.89	5.93	0.589	0.76 U	7,750	219	2,180
Property 015	ISM-A0I015-0.5	04/23/2015	0-0.5	ISM	1	45.5	14.6	45.9	14.1	3.37	4.92	19,400	375	7,470
Property 016	ISM-A0I016-0.5	05/07/2015	0-0.5	ISM	0.462 J	5.87	3.56	7.48	5.06	0.485 J	1.61	5,390	166	1,700
Property 017	ISM-A0I017-0.5-A	04/23/2015	0-0.5	ISM Triplicate	0.47 J	7.15	3.52	8.15	4.32	3.37	1.48	7,020	290	1,920
Property 017	ISM-A0I017-0.5-B	04/23/2015	0-0.5	ISM Triplicate	0.273 UJ	4.39	2.4	6.01	3.14	2.77	0.95 J	5,060	172	1,410
Property 017	ISM-A0I017-0.5-C	04/23/2015	0-0.5	ISM Triplicate	0.327 J	6.84	3.34	7.47	4.54	4.13	2.4 U	6,960	230	1,850
Property 017	SBS-A0I017-1.0	04/23/2015	0.5-1.0	Discrete	1.78	2.47	2.26	3.14	2.33	1.22	0.51 U	863	31	292
Property 018	ISM-A0I018-0.5-B-A	04/16/2015	0-0.5	ISM Triplicate	0.25 J	2.14	1.28	3.17	1.72	0.324	0.84 U	1,990	87.6	636
Property 018	ISM-A0I018-0.5-B-B	04/16/2015	0-0.5	ISM Triplicate	0.229 U	2.32	1.4	2.78	1.73	0.326	1 U	2,480	107	753
Property 018	ISM-A0I018-0.5-B-C	04/16/2015	0-0.5	ISM Triplicate	0.207 J	2.05	1.04	2.41	1.31	0.255	0.66 J	2,070	84.6	648
Property 018	ISM-A0I018-0.5-F	04/16/2015	0-0.5	ISM	0.323 J	2.8	1.45	3.48	2.02	0.461	0.84 J	2,940	97.1	933
Property 018	SBS-A0I018-1.0	04/16/2015	0.5-1.0	Discrete	0.107 U	0.319 J	0.293 J	0.44 J	0.3 J	0.109 U	0.668 U	290	9.09	92.6
Property 019	ISM-A0I019-0.5	06/22/2015	0-0.5	ISM	0.304 J	3.27	2.18	4.57	3.23	2.69	1.25	2,540	67.4	866
Property 019	SBS-A0I019-1.5	03/25/2016	1.0-1.5	Discrete	0.337 U	1.69 J	2.29 J	5.81	3.9 J	0.262 J	1.4 U	5,350	155	1,370
Property 020B	ISM-A0I020B-0.5	04/30/2015	0-0.5	ISM	0.268 J	3.26	2.1	5.52	2.98	1.54	1.34	3,800	187	1,240
Property 020B	SBS-A0I020B-1.0	04/30/2015	0-0.5	Discrete	0.056	0.496	0.377	0.92	0.554	0.272	0.32	745	33.8	173
Property 021	ISM-A0I021-0.5	04/30/2015	0-0.5	ISM	0.103 U	0.478 J	0.233 J	0.556 J	0.313 J	0.116 U	0.13 U	946	34.8	195
Property 022	ISM-A0I022-0.5	12/02/2015	0-0.5	ISM	0.101 J	1.01	0.726	1.55	0.956	0.895	0.863	1,510	63.7	437
Property 023	ISM-A0I023-0.5	06/15/2016	0-0.5	ISM	0.191 J	2.51	1.44	2.94	2.27	0.662	0.97 J	3,520	133	993
Property 024	ISM-A0I024-0.5	04/30/2015	0-0.5	ISM	0.208 J	2.09	1.53	7.04	3.21	0.501	1.93	2,600	138	680
Property 025	ISM-A0I025-0.5	04/30/2015	0-0.5	ISM	0.234 J	2.86	1.56	3.69	2.05	0.695	1.44	2,740	122	764
Property 026	ISM-A0I026-0.5	09/21/2015	0-0.5	ISM	0.135 U	1.61	1.05	1.95	1.15	0.29 U	0.85 J	1,900	71.6	453
Property 027	ISM-A0I027-0.5	04/30/2015	0-0.5	ISM	0.137 J	1.58	0.763 J	2.2	1.03	0.488	0.64 J	2,050	73.9	523
Property 028A	ISM-A0I028A-0.5	12/02/2015	0-0.5	ISM	0.122 J	1.27	0.678 J	1.45	0.899 J	0.382	1.06	1,470	50.8	404
Property 028B	ISM-A0I028B-0.5	12/02/2015	0-0.5	ISM	0.247 J	2.32	1.44	3.76	2.13	0.859	1.25	2,190	168	744
Property 028B	SBS-A0I028B-1.5	03/22/2016	1.0-1.5	Discrete	0.339 UJ	1.22 J	1.43 J	3.42 J	2.36 J	0.266 J	0.71 J	3,050	99.3	862



**Table 5-1  
Property Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (feet bgs)	Sample Type	1,2,3,7,8,9-HxCDF (ng/kg)	1,2,3,7,8-PeCDD (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,6,7,8-HxCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	OCDD (ng/kg)	OCDF (ng/kg)	Total HpCDDs (ng/kg)
Property 029A	ISM-AOI029A-0.5	04/30/2015	0-0.5	ISM	0.249 J	2.79	1.55	3.35	1.96	0.359	1.14	3,050	75.4	678
Property 029B	ISM-AOI029B-0.5	04/23/2015	0-0.5	ISM	0.322 J	5.24	2.48	5.96	3.48	0.713	0.79 U	5,080	208	1,390
Property 030	ISM-AOI030-0.5	04/30/2015	0-0.5	ISM	0.465 U	1.2	0.581 U	2.29	1	0.625 U	0.45 J	1,800	72.3	541
Property 030	ISM-AOI030-0.5	05/21/2015	0-0.5	ISM Dup	0.165 U	2.15	0.926 J	1.69	1.2	0.265 J	0.699 J	1,720	74.4	571
Property 031	ISM-AOI031-0.5	04/16/2015	0-0.5	ISM	0.168 U	1.95	0.983 J	2.23	1.39	0.248	1.27	2,170	176	661
Property 032	ISM-AOI032-0.5	04/23/2015	0-0.5	ISM	0.24 J	3.4	1.65	5.05	2.45	0.599	1.39	2,470	154	659
Property 032	SBS-AOI032-1.0	04/23/2015	0.5-1.0	Discrete	0.158 U	0.851 J	0.243 J	1.16	0.349 J	0.18 U	0.371 U	893	105	285
Property 034	ISM-AOI034-0.5	12/02/2015	0-0.5	ISM	0.13 J	1.58	1.04	2.94	1.71	1.02	1.25	1,330	62.6	393
Property 035	ISM-AOI035-0.5	12/23/2015	0-0.5	ISM	1.75	5.8	14.7	55.7	26.4	1.2	10.8	1,050	476	692
Property 036	ISM-AOI036-0.5	04/23/2015	0-0.5	ISM	0.263 J	4.45	2.15	6.01	3.4	7.33	2.24	3,560	250	951
Property 037	ISM-AOI037-0.5	11/20/2015	0-0.5	ISM	0.205 J	1.95	1.24	3.16	1.97	3.63	0.99	2,460	145	717
Property 037	SBS-AOI037-1.5	03/22/2016	1.0-1.5	Discrete	0.165 J	0.245 J	0.216 J	0.236 J	0.225 J	0.202 U	0.258 J	126	7.62 J	31.9
Property 038	ISM-AOI038-0.5	05/29/2015	0-0.5	ISM	0.283 U	6.94	1.86	4.97	2.67	1.81	1.51	3,960	282	1,280
Property 039	ISM-AOI039-0.5	05/29/2015	0-0.5	ISM	0.231 U	2.71	1.33	3.11	2.43	2.45	1.34	2,580	140	716
Property 041A	ISM-AOI041A-0.5	05/04/2016	0-0.5	ISM	0.285 U	1.61 U	1.2 U	2.59	2.06 U	0.353	0.6 U	2,530	74.9	734
Property 041B	ISM-AOI041B-0.5	05/04/2016	0-0.5	ISM	3.31	10.9	31.1	56	55.6	0.563	9.1	38,200	752	9,810
Property 043	ISM-AOI043-0.5	03/08/2017	0-0.5	ISM	2.19	3.15	1.35 UJ	7.46	8.23	0.469 U	0.971	2,110	51.3	614
Property 043	AOI-043-1.0-1.5	12/06/2023	1.0-1.5	Discrete	7.24 J	11.7 J	4.36 UJK	21.1 J	30.4 J	2.07 UJK	2.27 UJ	6,280 J	152 J	1,700 J
Property 043	AOI-043-1.5-2.0	12/06/2023	1.5-2.0	Discrete	1.45 J	6.33 J	3.05 J	5.93 J	17.3 J	0.998 J	1.72 J	3,640 J	75.3 J	1,020 J
Property 043	AOI043-2.0-2.5	03/13/2024	2.0-2.5	Discrete	0.947 J	0.954 UJK	0.678 J	2.17 J	3.88 J	0.385 UJ	0.545 UJ	335 J	8.03 J	117 J
Property 043	AOI043-2.5-3.0	03/13/2024	2.5-3.0	Discrete	0.392 U	0.246 U	0.133 U	0.247 U	0.562 UJK	0.131 U	0.121 U	29.3	1.05 J	12.0
Property 044	ISM-AOI044-0.5	03/08/2017	0-0.5	ISM	1.18 J	1.36 UJ	0.927 UJ	2.44	1.94 J	0.998	0.713 U	1,240	47.5	334
Property 045	ISM-AOI045-0.5	08/07/2017	0-0.5	ISM	0.816 J	0.849 UJ	0.668 UJ	2.05 J	1.82 J	0.483 U	0.756	962	27	243
Property 046	ISM-AOI046-0.5	06/14/2017	0-0.5	ISM	4.59	2.09 J	2.3 J	7.81	7.16	0.326 UJ	0.806	3,530	78.9	943
Property 046	AOI-046-1.0-1.5	12/06/2023	1.0-1.5	Discrete	0.245 UJK	0.339 U	0.325 J	0.651 J	0.850 UJK	0.128 U	0.209 J	353	5.07 J	75.8
Property 048	ISM-AOI048-0.5	08/07/2017	0-0.5	ISM	1.37 UJ	1.36 J	0.945 J	3.53	2.57	0.453 UJ	0.816	1,910	133	480
Property 049	ISM-AOI049-0.5	03/08/2017	0-0.5	ISM	0.446 J	0.505 J	0.46 UJ	1.08 J	0.894 J	0.193 J	0.383 U	784	26.8	191
Property 051	ISM-AOI051-0.5	03/08/2017	0-0.5	ISM	0.984 J	0.587 U	0.587 UJ	1.64 J	1.79 J	1.23	0.539 U	796	41.7	180
Property 052	ISM-AOI052-0.5	03/08/2017	0-0.5	ISM	0.608 J	0.905 J	0.585 UJ	2.19 J	1.78 J	1.21	0.599	1,160	55.8	299
Property 054	ISM-AOI054-0.5	03/08/2017	0-0.5	ISM	0.539 U	0.625 J	0.288 U	0.739 UJ	0.718 J	0.27 U	0.444 J	503	25.7	114
Property 056	ISM-AOI056-0.5	03/08/2017	0-0.5	ISM	3.44	3.16	1.92 J	8.57	5.51	0.472 U	0.934	4,640 J	108	1,280
Property 056	AOI-056-1.0-1.5	12/06/2023	1.0-1.5	Discrete	0.253 J	0.649 J	0.522 J	0.427 J	1.04 J	0.207 U	0.216 U	492	9.48 J	134
Property 057	ISM-AOI057-0.5	06/14/2017	0-0.5	ISM	3.57	2.25 J	2.32 J	9.01	9.57	0.946	1.43	3,650	101	919
Property 057	AOI057-1.0-1.5	12/15/2023	1.0-1.5	Discrete	0.702 UJ	0.467 UJK	0.270 UJK	0.330 UJK	0.184 UJK	0.138 UJ	0.174 UJ	411 J	9.67 J	71.9 J
Property 059	ISM-AOI059-0.5	08/07/2017	0-0.5	ISM	5.74	5.27	2.6	13.8	5.52	0.532 U	0.823	11,400 J	400	2,750 J
Property 061	ISM-AOI061-0.5	03/08/2017	0-0.5	ISM	3.53	2.04 J	1.8 J	5.97	3.75	0.472 U	1.1 U	10,700 J	378	1,410
Property 061	AOI-061-1.0-1.5	12/06/2023	1.0-1.5	Discrete	0.822 UJK	0.84 J	0.814 J	2.4 J	1.6 J	0.192 U	0.153 U	1,130	27 J	344
Property 062	ISM-AOI062-0.5	06/14/2017	0-0.5	ISM	2.11 J	2.03 J	1.49 J	4.92	4.31	0.267 UJ	0.954 U	2,560	135	612
Property 063	ISM-AOI063-0.5-1	06/14/2017	0-0.5	ISM Triplicate	0.704 J	0.554 J	0.449 UJ	1.74 J	2.03 J	0.362 UJ	0.659 J	712 J	35.8 J	179 J
Property 063	ISM-AOI063-0.5-2	06/14/2017	0-0.5	ISM Triplicate	1.88 J	1.24 J	1.04 J	5.01 J	4.51 J	0.307 UJ	0.726 J	2,210 J	137 J	487 J
Property 063	ISM-AOI063-0.5-3	06/14/2017	0-0.5	ISM Triplicate	1.54 J	1.07 J	1.49 J	5.4 J	4.78 J	0.282 UJ	1.26 J	944 J	48.8 J	242 J
Property 064	ISM-AOI064-0.5	03/08/2017	0-0.5	ISM	1.5 J	1.01 J	0.813 UJ	4.92	6.74	3.42	0.595	1,450	72.7	325
Property 066	ISM-AOI066-0.5-1	03/09/2017	0-0.5	ISM Triplicate	1.83 J	2.16 J	2.15 J	6.05	2.75	0.28 J	0.834	3,880 J	118	947
Property 066	ISM-AOI066-0.5-2	03/09/2017	0-0.5	ISM Triplicate	6.01	5.59	4.24	11.3	5.84	0.536	1.31	12,500 J	339	2,540 J
Property 066	ISM-AOI066-0.5-3	03/09/2017	0-0.5	ISM Triplicate	2.32 J	2.67	1.8 J	6.33	2.54	0.263 UJ	0.531 U	5,200 J	167	1,220

**Table 5-1  
Property Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (feet bgs)	Sample Type	1,2,3,7,8,9-HxCDF (ng/kg)	1,2,3,7,8-PeCDD (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,6,7,8-HxCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	OCDD (ng/kg)	OCDF (ng/kg)	Total HpCDDs (ng/kg)
Property 066	AOI-066-1.0-1.5	12/06/2023	1.0-1.5	Discrete	0.428 UJ	0.762 J	0.429 J	0.712 J	0.483 UJK	0.212 U	0.173 U	469	15.7 J	117
Property 067	ISM-AOI067-0.5	03/09/2017	0-0.5	ISM	0.379 J	0.325 UJ	0.376 UJ	0.832 J	0.693 J	0.111 UJ	0.216 UJ	473	12.3	111
Property 068	ISM-AOI068-0.5	05/23/2017	0-0.5	ISM	1.39 J	1.34 J	1.1 J	3.14	2.16 J	0.255 J	0.612 U	1,750	68.1	467
Property 071	ISM-AOI071-0.5	06/14/2017	0-0.5	ISM	2.06 J	1.29 J	1.43 J	4.61	3.61	0.245 UJ	0.854	2,060	47.1	532
Property 072	ISM-AOI072-0.5	03/09/2017	0-0.5	ISM	0.948 J	1.37 UJ	0.676 UJ	2.75	1.38 J	0.302 J	0.383 UJ	2,470	160	627
Property 073	ISM-AOI073-0.5	05/23/2017	0-0.5	ISM	2.16 J	1.4 J	1.36 J	4.58	3.56	0.625	0.917	2,240	49.8	616
Property 075	ISM-AOI075-0.5	05/23/2017	0-0.5	ISM	1.82 J	1.7 J	1.52 UJ	4.2	3.45	1.2 U	1.07	1,800	47.4	537
Property 076	ISM-AOI076-0.5	03/09/2017	0-0.5	ISM	1.26 J	1.6 J	1.62 J	3.67	3	0.311 UJ	1.35	1,520	60.6	439
Property 077	ISM-AOI077-0.5	03/09/2017	0-0.5	ISM	1.97 J	1.47 J	1.46 J	5.5	4.42	0.304 J	1	1,740	49.4	536
Property 078	ISM-AOI078-0.5	08/18/2017	0-0.5	ISM	2.6	4.08	2.46 J	6.73	4.51	0.768 U	2.94 U	3,140	88.2	921
Property 079	ISM-AOI079-0.5	08/13/2019	0-0.5	ISM	5.08	7.7	3.35 J	19	24.8	0.918 J	2.9	4,700 J	181	1,570
Property 079	AOI079-1.0-1.5	12/15/2023	1.0-1.5	Discrete	1.98 J	5.41 J	2.17 J	5.59 J	6.94 J	0.698 J	1.33 J	2,750 J	56.5 J	821 J
Property 079	AOI-079-1.5-2.0	12/15/2023	1.5-2.0	Discrete	0.339 UJK	1.35 J	0.619 J	0.79 J	0.696 UJK	0.200 UJK	0.532 J	640 J	14.6 J	200 J
Property 080	ISM-AOI080-0.5	08/13/2019	0-0.5	ISM	8.18	4.78 J	3.99 J	13	16.5	1.57	3.38	3,690	104	1,060
Property 081	ISM-AOI081-0.5	08/13/2019	0-0.5	ISM	1.81 J	4.14 J	1.57 J	4.85	2.84 J	0.316 J	1.11 U	2,150	63.2	718
Property 081	AOI081-1.0-1.5	12/15/2023	1.0-1.5	Discrete	0.561 UJ	0.496 J	0.226 UJK	0.771 J	0.428 UJK	0.141 UJ	0.243 UJ	262 J	7.40 J	75.6 J
Property 081	COMP-AOI081-0.5	06/21/2024	0-0.5	Composite	0.377 UJK	1.1 J	0.416 UJK	1.41 J	0.919 J	0.193 UJK	0.261 J	1,080	112	268
Property 082	ISM-AOI082-0.5	08/13/2019	0-0.5	ISM	2.71 J	2.81 J	2.91 J	7.22	7.8	0.672 J	2.79	2,230	90.1	649
Property 083	ISM-AOI083-0.5	08/13/2019	0-0.5	ISM	3.57 J	3.08 J	2.92 J	7.88	8.22	0.398 J	2.5	2,860	70.5	894
Property 083	AOI-083-1.0-1.5	12/06/2023	1.0-1.5	Discrete	0.507 J	3.54	2.63	2.43 J	6.08	0.911	2.84	1,760	69.6 J	453
Property 083	AOI-083-1.5-2.0	12/06/2023	1.5-2.0	Discrete	0.412 J	1.14 J	0.715 J	1.13 J	1.27 UJK	0.312 UJK	1.28 UJK	570 J	24.9 J	159 J
Property 084	ISM-AOI084-0.5	08/13/2019	0-0.5	ISM	0.667 J	0.892 J	0.675 J	1.78 J	1.15 J	0.144 UJ	0.64 UJ	951	34.7	291
Property 085	ISM-AOI085-0.5	08/13/2019	0-0.5	ISM	0.653 J	1.15 J	0.738 J	1.63 J	1.2 J	0.125 UJ	0.659 UJ	856	34.6	252
Property 086	ISM-AOI086-0.5	08/13/2019	0-0.5	ISM	1.34 J	2.32 J	1.2 J	3.15 J	2.4 J	0.255 J	1.14 U	1,780	58.4	543
Property 087	ISM-AOI087-0.5	01/29/2020	0-0.5	ISM	1.53 UJ	2.71 J	1.22 UJ	5.59	7.29	0.4 J	0.885 UJ	2,000	60.7	564
Property 087	AOI-087-1.0-1.5	12/06/2023	1.0-1.5	Discrete	6.14 UJ	3.69 UJ	1.88 UJ	6.32 J	3.47 UJK	1.46 UJ	1.45 UJ	1,200 J	28.3 J	344 J
Property 088	ISM-AOI88-0.5	02/17/2020	0-0.5	ISM	2.89 J	1.03 J	0.592 UJ	5.11 J	3.3 J	0.321 UJ	0.467 UJ	2,320 J	69.7 J	368 J
Property 089	ISM-AOI89-0.5	01/29/2020	0-0.5	ISM	3.39 J	3.77 J	1.94 J	6.73	5.67	1.18	1.58	3,110	133	755
Property 089	AOI-089-1.0-1.5	12/06/2023	1.0-1.5	Discrete	1.44 J	3.19	1.95 J	1.61 J	3.98	0.303 UJK	0.919	4,280	30.8 J	998
Property 089	AOI-089-1.5-2.0	12/06/2023	1.5-2.0	Discrete	0.399 UJ	0.371 UJK	0.230 UJ	0.225 UJK	0.425 UJK	0.155 UJ	0.136 UJ	323 J	3.51 J	80.6 J

**Table 5-1  
Property Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (feet bgs)	Sample Type	Total HpCDFs (ng/kg)	Total HxCDDs (ng/kg)	Total HxCDFs (ng/kg)	Total PeCDDs (ng/kg)	Total PeCDFs (ng/kg)	Total TCDDs (ng/kg)	Total TCDFs (ng/kg)	Total Organic Carbon (mg/kg)
Property 001	COMP-AOI001-0.5	11/20/2015	0-0.5	Composite	644	451	402	44.6	122	11.6	28.8	18,000
Property 002	ISM-AOI002-0.5	11/20/2015	0-0.5	ISM	295	100	141	10.1	65.5	6.82	23.2	18,000
Property 002	SBS-AOI002-1.5	03/22/2016	1.0-1.5	Discrete	49.1	39.3	36.2	3.49 J	17.2	1.73	7.38	7,900
Property 003	ISM-AOI003-0.5	02/09/2016	0-0.5	ISM	121	90	88.6	10.3	23.5	5.63	6.44	17,000
Property 004	COMP-AOI004-0.5	07/28/2015	0-0.5	Composite	109	98.4	76.8	13.1	13	3.27	10.3	21,000
Property 004	ISM-AOI004-0.5	07/12/2017	0-0.5	ISM	156	134	124	24.1 U	60.5	7.69	50 U	28,000
Property 005	ISM-AOI005-0.5	04/16/2015	0-0.5	ISM	649	429	537	42.5	150	23.5	56.2	17,000
Property 005	SBS-AOI005-1.0	04/16/2015	0.5-1.0	Discrete	792	408	579	30.8	127	7.57	32.4	13,000
Property 005	SBS-AOI005-1.0-DUP	04/16/2015	0.5-1.0	Discrete Dup	869	470	651	36.2	147	9.59	44	12,000
Property 006	ISM-AOI006-0.5	04/16/2015	0-0.5	ISM	326	214	218	16.8	35.6	13.5	9.18	17,000
Property 006	SBS-AOI006-1.0	04/16/2015	0.5-1.0	Discrete	198	122	144	10.2	23	8.29	5.4	10,000
Property 007	ISM-AOI007-0.5	04/16/2015	0-0.5	ISM	657	311	601	16.8	142	2.33	15.5	21,000
Property 008	ISM-AOI008-0.5	05/21/2015	0-0.5	ISM	132	67.7	50.7	9.15	9.77	4.37	6.97	19,000
Property 009	ISM-AOI009-0.5	11/20/2015	0-0.5	ISM	81.1	31.1	46	4.06	12.9	2.82	5.27	14,000
Property 010	ISM-AOI010-0.5	12/02/2015	0-0.5	ISM	53	29.2	23.5	2.03	7.72	1.48	3.14	16,000
Property 011	ISM-AOI011-0.5	04/16/2015	0-0.5	ISM	207	76.8	90.1	7.37	14.7	1.37	5.74	13,000
Property 012	ISM-AOI012-0.5	04/23/2015	0-0.5	ISM	231	135	160	14.5	57.6	3.61	16.1	17,000
Property 013	ISM-AOI013-0.5-B	04/16/2015	0-0.5	ISM	541	349	374	38.9	70.7	16.5	32.5	17,000
Property 013	ISM-AOI013-0.5-F	04/16/2015	0-0.5	ISM	1,350	641	1,070	38.4	208	8.76	24.6	16,000
Property 014	ISM-AOI014-0.5	04/23/2015	0-0.5	ISM	284	276	360	29.8	102	6.26	17.9	16,000
Property 015	ISM-AOI015-0.5	04/23/2015	0-0.5	ISM	1,080	2,090	1,060	301	365	28	43.4	18,000
Property 016	ISM-AOI016-0.5	05/07/2015	0-0.5	ISM	362	262	311	35.6	118	7.4	23.8	21,000
Property 017	ISM-AOI017-0.5-A	04/23/2015	0-0.5	ISM Triplicate	532	329	306	34.2	77	9.97	18	17,000
Property 017	ISM-AOI017-0.5-B	04/23/2015	0-0.5	ISM Triplicate	329	209	214	23.3	57.2	6.09	12.4	16,000
Property 017	ISM-AOI017-0.5-C	04/23/2015	0-0.5	ISM Triplicate	452	283	291	38	80	10.3	17.2	17,000
Property 017	SBS-AOI017-1.0	04/23/2015	0.5-1.0	Discrete	68.6	45.9	53.9	3.72	13.3	3.34	3.53	11,000
Property 018	ISM-AOI018-0.5-B-A	04/16/2015	0-0.5	ISM Triplicate	213	112	110	14.6	24.5	4.54	11.7	16,000
Property 018	ISM-AOI018-0.5-B-B	04/16/2015	0-0.5	ISM Triplicate	186	119	96.4	13.8	19.4	3.97	12.6	17,000
Property 018	ISM-AOI018-0.5-B-C	04/16/2015	0-0.5	ISM Triplicate	160	109	89.5	12.5	16.6	2.76	6.94	17,000
Property 018	ISM-AOI018-0.5-F	04/16/2015	0-0.5	ISM	196	143	140	15.2	42.7	4.43	13.1	19,000
Property 018	SBS-AOI018-1.0	04/16/2015	0.5-1.0	Discrete	21.7	14	13.3	1.06	2.8	0.641	3.33	7,500
Property 019	ISM-AOI019-0.5	06/22/2015	0-0.5	ISM	206	141	188	16.1	62.1	7.32	20.4	19,000
Property 019	SBS-AOI019-1.5	03/25/2016	1.0-1.5	Discrete	261	163	231	8.49	81.1	2.47	20.6	11,000
Property 020B	ISM-AOI020B-0.5	04/30/2015	0-0.5	ISM	306	181	175	16	27	4.14	7.91	22,000
Property 020B	SBS-AOI020B-1.0	04/30/2015	0-0.5	Discrete	47.8	21.6	15.6	1.47	3.22	0.569	1.67	15,000
Property 021	ISM-AOI021-0.5	04/30/2015	0-0.5	ISM	48	21.8	14.3	1.6	1.69	0.159 J	0.24	11,000
Property 022	ISM-AOI022-0.5	12/02/2015	0-0.5	ISM	91.8	56.6	58.5	5.09	19.3	2.55	6.99	14,000
Property 023	ISM-AOI023-0.5	06/15/2016	0-0.5	ISM	241	152	121	13.2	16.1	3.83	6.57	18,000
Property 024	ISM-AOI024-0.5	04/30/2015	0-0.5	ISM	212	90.6	161	12.7	91.2	2.15	41.4	22,000
Property 025	ISM-AOI025-0.5	04/30/2015	0-0.5	ISM	193	132	101	16.2	22.4	2.98	9.35	15,000
Property 026	ISM-AOI026-0.5	09/21/2015	0-0.5	ISM	98.2	71.2	60.2	8.84	9.72	1.03	4.87	16,000
Property 027	ISM-AOI027-0.5	04/30/2015	0-0.5	ISM	116	76.8	54.6	8.27	8.3	1.16	4.1	20,000
Property 028A	ISM-AOI028A-0.5	12/02/2015	0-0.5	ISM	82.1	58.2	46.7	7.14	14.6	2.77	7.4	15,000
Property 028B	ISM-AOI028B-0.5	12/02/2015	0-0.5	ISM	235	119	132	15	81	7.19	30.7	19,000
Property 028B	SBS-AOI028B-1.5	03/22/2016	1.0-1.5	Discrete	150	99.9	129	6.36	45.1	2.22	12.6	17,000



**Table 5-1  
Property Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (feet bgs)	Sample Type	Total HpCDFs (ng/kg)	Total HxCDDs (ng/kg)	Total HxCDFs (ng/kg)	Total PeCDDs (ng/kg)	Total PeCDFs (ng/kg)	Total TCDDs (ng/kg)	Total TCDFs (ng/kg)	Total Organic Carbon (mg/kg)
Property 029A	ISM-AOI029A-0.5	04/30/2015	0-0.5	ISM	152	97.5	49	7.82	9.05	1.66	3.82	22,000
Property 029B	ISM-AOI029B-0.5	04/23/2015	0-0.5	ISM	329	214	179	34.4	57.7	10.5	18.6	13,000
Property 030	ISM-AOI030-0.5	04/30/2015	0-0.5	ISM	121	79.5	61.2	5.41	8.14	0.625 U	1.69	17,000
Property 030	ISM-AOI030-0.5	05/21/2015	0-0.5	ISM Dup	120	92.6	61.3	11.7	11.9	2.37	5.63	19,000
Property 031	ISM-AOI031-0.5	04/16/2015	0-0.5	ISM	196	96.1	83.5	10.4	19.3	4.03	11.9	16,000
Property 032	ISM-AOI032-0.5	04/23/2015	0-0.5	ISM	201	114	125	28.8	69.3	12.3	23.5	15,000
Property 032	SBS-AOI032-1.0	04/23/2015	0.5-1.0	Discrete	110	39.1	41.6	3.36	12.2	0.769	4.53	12,000
Property 034	ISM-AOI034-0.5	12/02/2015	0-0.5	ISM	95.4	64	60.4	8.02	28.8	7.58	23.3	19,000
Property 035	ISM-AOI035-0.5	12/23/2015	0-0.5	ISM	639	141	272	41.5	160	4.76	64.2	17,000
Property 036	ISM-AOI036-0.5	04/23/2015	0-0.5	ISM	323	189	165	35.5	67.5	22.1	31.3	13,000
Property 037	ISM-AOI037-0.5	11/20/2015	0-0.5	ISM	211	103	121	13.5	45.1	10.1	16.2	23,000
Property 037	SBS-AOI037-1.5	03/22/2016	1.0-1.5	Discrete	5.47	5.97	5.18	0.35 J	2.21 J	0.465 J	0.749 J	10,000
Property 038	ISM-AOI038-0.5	05/29/2015	0-0.5	ISM	359	260	156	34.4	27.1	8.14	13.5	20,000
Property 039	ISM-AOI039-0.5	05/29/2015	0-0.5	ISM	284	103	143	16.1	24.7	7.12	14.5	26,000
Property 041A	ISM-AOI041A-0.5	05/04/2016	0-0.5	ISM	145	98.7	107	9.1	32.2	2.05	8.72	13,000
Property 041B	ISM-AOI041B-0.5	05/04/2016	0-0.5	ISM	2,880	1,220	3,020	43.9	695	4.72	52.4	16,000
Property 043	ISM-AOI043-0.5	03/08/2017	0-0.5	ISM	137	90.3	138 UJ	17.1	154 UJ	4.61 U	38.8 UJ	18,000
Property 043	AOI-043-1.0-1.5	12/06/2023	1.0-1.5	Discrete	357 J	320 J	439 J	56.1 JK	380 JK	13.1 UJK	103 UJK	--
Property 043	AOI-043-1.5-2.0	12/06/2023	1.5-2.0	Discrete	234 J	211 J	325 J	47.4 JK	310 JK	12.9 JK	95.7 JK	--
Property 043	AOI043-2.0-2.5	03/13/2024	2.0-2.5	Discrete	24.2 JK	32.0 J	50.3 JK	11.4 UJK	50.9 JK	1.41 J	17.2 UJK	--
Property 043	AOI043-2.5-3.0	03/13/2024	2.5-3.0	Discrete	3.17	3.89 JK	6.76 JK	1.61 UJK	6.92 UK	0.156 UJK	1.78 UK	--
Property 044	ISM-AOI044-0.5	03/08/2017	0-0.5	ISM	85.4	48 U	52.1	10.1 U	30.5 U	3.69 U	10.5 U	23,000
Property 045	ISM-AOI045-0.5	08/07/2017	0-0.5	ISM	54.8 U	37.6 U	40.3 U	8.72 U	18.1 U	3.49	5.36 U	18,000
Property 046	ISM-AOI046-0.5	06/14/2017	0-0.5	ISM	225 U	119	183 U	11.8 U	55.3 U	2.91 U	9.5 U	18,000
Property 046	AOI-046-1.0-1.5	12/06/2023	1.0-1.5	Discrete	16.9	10.6 K	18.8 K	0.431 UJK	7.19 K	0.128 U	1.87 K	--
Property 048	ISM-AOI048-0.5	08/07/2017	0-0.5	ISM	194	55.1 U	84.4 U	8.84	29 U	3.48 U	7.79 U	19,000
Property 049	ISM-AOI049-0.5	03/08/2017	0-0.5	ISM	48.8	23.2 U	23.2 U	4.38	13.7 U	1.76 U	4.21 U	18,000
Property 051	ISM-AOI051-0.5	03/08/2017	0-0.5	ISM	72	26.2	39.5 U	4.23 J	22.9 U	2.69 U	5.16 U	24,000
Property 052	ISM-AOI052-0.5	03/08/2017	0-0.5	ISM	86.7 U	38.6	45.6	7.66 U	24.7 U	3.55 U	7.95 U	21,000
Property 054	ISM-AOI054-0.5	03/08/2017	0-0.5	ISM	31.4	17 U	13.8 U	4.51 U	9.02	2.22 U	4.25 U	18,000
Property 056	ISM-AOI056-0.5	03/08/2017	0-0.5	ISM	294 U	137 U	197	16.7 U	83.1	3.42 U	12 U	22,000
Property 056	AOI-056-1.0-1.5	12/06/2023	1.0-1.5	Discrete	27.5	23.4 K	26.9 K	2.59	9.05 K	0.313 UJK	1.53	--
Property 057	ISM-AOI057-0.5	06/14/2017	0-0.5	ISM	208	115	178 J	15.4	107 J	6.66 U	36 J	25,000
Property 057	AOI057-1.0-1.5	12/15/2023	1.0-1.5	Discrete	14.8 J	10.2 JK	12.0 JK	2.23 UJK	5.48 UJK	0.522 UJK	1.20 UJK	--
Property 059	ISM-AOI059-0.5	08/07/2017	0-0.5	ISM	704 U	278	387 U	23.8 U	78.9 U	4.89 U	7.53 U	16,000
Property 061	ISM-AOI061-0.5	03/08/2017	0-0.5	ISM	410	95.4	180	11.3 U	54.1 U	2.12 U	5.25 U	18,000
Property 061	AOI-061-1.0-1.5	12/06/2023	1.0-1.5	Discrete	89.1	49.9	74.2 K	4.72 JK	16.0 K	0.257 UJK	2.73	--
Property 062	ISM-AOI062-0.5	06/14/2017	0-0.5	ISM	174	84.6	106 U	11.4 U	43.3 U	3.17 U	11.2 U	28,000
Property 063	ISM-AOI063-0.5-1	06/14/2017	0-0.5	ISM Triplicate	55.2 J	27.2 UJ	35.7 UJ	4.9 UJ	20.7 UJ	1.78 J	9.87 UJ	19,000
Property 063	ISM-AOI063-0.5-2	06/14/2017	0-0.5	ISM Triplicate	209 UJ	61.6 J	118 UJ	7.99 UJ	52 UJ	2.89 UJ	13.2 UJ	20,000
Property 063	ISM-AOI063-0.5-3	06/14/2017	0-0.5	ISM Triplicate	85 J	43.9 J	69.7 J	11.8 UJ	51.6 UJ	7.16 UJ	31.8 UJ	18,000
Property 064	ISM-AOI064-0.5	03/08/2017	0-0.5	ISM	116	37.4 U	89.1 UJ	7.6	109 UJ	5.82 U	22.8 UJ	19,000
Property 066	ISM-AOI066-0.5-1	03/09/2017	0-0.5	ISM Triplicate	203	106	112 U	16.8 U	44.1	4.73 U	13.7 U	20,000
Property 066	ISM-AOI066-0.5-2	03/09/2017	0-0.5	ISM Triplicate	674	231	307 U	25.2	78.4 U	8.2 U	20.6 U	20,000
Property 066	ISM-AOI066-0.5-3	03/09/2017	0-0.5	ISM Triplicate	279 U	124	134 U	14 U	40.5	1.87 U	5.99 U	24,000

**Table 5-1  
Property Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (feet bgs)	Sample Type	Total HpCDFs (ng/kg)	Total HxCDDs (ng/kg)	Total HxCDFs (ng/kg)	Total PeCDDs (ng/kg)	Total PeCDFs (ng/kg)	Total TCDDs (ng/kg)	Total TCDFs (ng/kg)	Total Organic Carbon (mg/kg)
Property 066	AOI-066-1.0-1.5	12/06/2023	1.0-1.5	Discrete	27.8	22.9	19.5 K	3.13	7.05 K	0.212 U	1.02 UK	--
Property 067	ISM-AOI067-0.5	03/09/2017	0-0.5	ISM	24.5	17 U	16.9 U	2.98 UJ	8.47 U	1.13 U	2.31 U	14,000
Property 068	ISM-AOI068-0.5	05/23/2017	0-0.5	ISM	107 U	58.1	63.6 U	7.9 U	24.8	2.19 U	5.96 U	19,000
Property 071	ISM-AOI071-0.5	06/14/2017	0-0.5	ISM	116	66.4 U	100	7.06 U	37.3 U	2.28 U	8.8 U	21,000
Property 072	ISM-AOI072-0.5	03/09/2017	0-0.5	ISM	165	74.3	62.5	10.1 U	23.3 U	2.37 U	8.11 U	16,000
Property 073	ISM-AOI073-0.5	05/23/2017	0-0.5	ISM	122	77.7 U	99.9	13.1 U	36.2	8.03 U	8.53 U	17,000
Property 075	ISM-AOI075-0.5	05/23/2017	0-0.5	ISM	113	75.2 U	83.5	13.3 U	36.8 U	9.02 U	14.3 U	19,000
Property 076	ISM-AOI076-0.5	03/09/2017	0-0.5	ISM	113	59.3 U	75.6 U	14.2	38.1 U	6.53 U	19.3 U	23,000
Property 077	ISM-AOI077-0.5	03/09/2017	0-0.5	ISM	139	70.8 U	103	12.5 U	60.1 U	3.77 U	17.7 U	19,000
Property 078	ISM-AOI078-0.5	08/18/2017	0-0.5	ISM	184	152	131	26.5 U	57.6	8.73	40.5 U	23,000
Property 079	ISM-AOI079-0.5	08/13/2019	0-0.5	ISM	307 J	271 J	319 J	53 J	465 UJ	15.6 UJ	112 J	28,000
Property 079	AOI079-1.0-1.5	12/15/2023	1.0-1.5	Discrete	155 J	167 JK	149 JK	25.7 JK	66.0 JK	5.42 JK	21.7 JK	--
Property 079	AOI-079-1.5-2.0	12/15/2023	1.5-2.0	Discrete	37.9 J	46.6 J	39.7 JK	7.89 JK	25.8 JK	1.89 UJK	8.30 JK	--
Property 080	ISM-AOI080-0.5	08/13/2019	0-0.5	ISM	309 J	175 J	277 J	40.7 J	162 UJ	18.2 UJ	62.3 UJ	30,000
Property 081	ISM-AOI081-0.5	08/13/2019	0-0.5	ISM	138 J	119 J	105 J	17.6 UJ	52 UJ	4.14 UJ	11.8 UJ	30,000
Property 081	AOI081-1.0-1.5	12/15/2023	1.0-1.5	Discrete	14.7 J	17.8 JK	12.6 UJK	2.08 JK	4.94 UJK	1.34 J	2.31 UJK	--
Property 081	COMP-AOI081-0.5	06/21/2024	0-0.5	Composite	104	44.7	42.7 K	4.3 K	13.7 K	1.13 JK	3.79 K	--
Property 082	ISM-AOI082-0.5	08/13/2019	0-0.5	ISM	152 J	96 J	124 J	23 J	111 UJ	11.5 UJ	55.7 UJ	27,000
Property 083	ISM-AOI083-0.5	08/13/2019	0-0.5	ISM	188 J	118 J	170 UJ	19.3 J	104 UJ	7.27 UJ	36.7 UJ	35,000
Property 083	AOI-083-1.0-1.5	12/06/2023	1.0-1.5	Discrete	129	102	93.8	36.9 K	64.4 K	22.4 K	60.7 K	--
Property 083	AOI-083-1.5-2.0	12/06/2023	1.5-2.0	Discrete	42.9 J	38.4 J	33.4 JK	13.6 JK	26.5 JK	6.72 UJK	25.0 UJK	--
Property 084	ISM-AOI084-0.5	08/13/2019	0-0.5	ISM	65.1 J	39.6 J	43.4 UJ	5.86 UJ	22.5 UJ	1.67 UJ	5.52 UJ	16,000
Property 085	ISM-AOI085-0.5	08/13/2019	0-0.5	ISM	54.6 J	38.9 J	34.7 UJ	6.48 UJ	19.2 UJ	2.51 UJ	7.59 UJ	25,000
Property 086	ISM-AOI086-0.5	08/13/2019	0-0.5	ISM	104 J	77.1 J	72.3 UJ	11.8 J	40.2 UJ	4.6 UJ	11.2 UJ	25,000
Property 087	ISM-AOI087-0.5	01/29/2020	0-0.5	ISM	131 J	91.1 J	110 J	16.6 J	99.6 J	5.22 J	26.5 UJ	21,000
Property 087	AOI-087-1.0-1.5	12/06/2023	1.0-1.5	Discrete	67.2 J	76.5 J	64.6 JK	3.69 UJ	35.3 UJK	1.46 UJ	6.93 UJK	--
Property 088	ISM-AOI088-0.5	02/17/2020	0-0.5	ISM	206 J	50.9 J	126 J	6.65 J	31.8 J	1.43 UJ	4.7 UJ	25,000
Property 089	ISM-AOI089-0.5	01/29/2020	0-0.5	ISM	268 J	130 J	159 J	26 J	60.6 J	9.2 J	21.9 J	27,000
Property 089	AOI-089-1.0-1.5	12/06/2023	1.0-1.5	Discrete	129	145	121 K	17.4 K	36.0 K	4.98 UK	16.1 K	--
Property 089	AOI-089-1.5-2.0	12/06/2023	1.5-2.0	Discrete	11.5 J	13.2 J	10.5 JK	2.01 UJK	4.39 UJK	0.511 UJK	1.62 UJK	--

Table 5-1  
Property Soil Results  
Former PWT Site  
Ridgefield, Washington



**Notes**

**Bold** indicates values that exceed the Model Toxics Control Act Method B Soil cleanup level of 13.0 ng/kg.

bgs = below ground surface.

Dup = duplicate sample.

ISM = incremental sampling methodology.

J = result is estimated.

JK = result is estimated and an estimated maximum potential concentration.

mg/kg = milligrams per kilogram.

ng/kg = nanograms per kilogram.

OPP = off-property portion.

PWT = Pacific Wood Treating Co.

TEQ = toxicity equivalent.

U = result is non-detect.

UJ = result is non-detect with an estimated detection limit.

UJK = result is non-detect, an estimated value, and an estimated maximum potential concentration.

<sup>(a)</sup>Dioxin/furan TEQ calculated as the sum of each congener concentration multiplied by the corresponding mammalian TEF value. Detected results qualified as estimated are included in the calculation. Non-detect values are multiplied by one-half.

**References**

<sup>(1)</sup>Ecology. 2024. *Cleanup Levels and Risk Calculation (CLARC) table*. Washington State Department of Ecology, Toxics Cleanup Program. February.

<sup>(2)</sup>Ecology. 2007. *Evaluating the Toxicity and Assessing the Carcinogenic Risk of Environmental Mixtures Using Toxicity Equivalency Factors*. Supporting Material for CLARC. Washington State Department of Ecology.

**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	Dioxin TEQ <sup>(a)(1)(2)</sup> (ng/kg)	1,2,3,4,6,7,8-HpCDD (ng/kg)	1,2,3,4,6,7,8-HpCDF (ng/kg)	1,2,3,4,7,8,9-HpCDF (ng/kg)	1,2,3,4,7,8-HxCDD (ng/kg)	1,2,3,4,7,8-HxCDF (ng/kg)	1,2,3,6,7,8-HxCDD (ng/kg)
ROW001	SS-ROW001-0.5	05/04/2016	0-0.5	Discrete	Phase 1 OPP	<b>30.5</b>	694	80.7	5.37 J	11.7	12.1	45.7
ROW004	SS-ROW004-0.5	05/07/2015	0-0.5	Discrete	Phase 1 OPP	1.12	21.2	6.66	0.303 J	0.391 J	0.517 J	1.09 J
ROW005	SS-ROW005-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	<b>46.9</b>	1,400	194	12.3	16.5	31.6	65.3
ROW005	SBS-ROW005-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	<b>38.1</b>	1,230	175	11.4	13.6	24	59.1
ROW005	SBS-ROW005-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	9.93	279	49.9	3.21	3.89	6.06	14.2
ROW008	SBS-ROW008-0.5	05/07/2015	0-0.5	Discrete	Phase 1 OPP	10.7	344	57.4	3.06 J	3.8 J	4.74 J	14.3
ROW010W	SS-ROW010W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	<b>20.4</b>	533	114	6.24 J	6.91 J	19.1	28
ROW010W	SBS-ROW010W-1.5	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	1.09	27.5	5.45	0.393 J	0.351 J	0.784 J	1.19
ROW011	SS-ROW011-0.5	03/22/2016	0-0.5	Discrete	Phase 1 OPP	<b>33.9</b>	1,090	132	9.29	10.3	25.2	48.9
ROW011	SBS-ROW011-1.5	03/22/2016	1.0-1.5	Discrete	Phase 1 OPP	<b>14.8</b>	370	46.3	4.38 J	3.93 J	11.3	16.3
ROW012	SS-ROW012-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	10.0	345	44.1	2.5	3.34	4.29	16.3
ROW013	SS-ROW013-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	<b>266</b>	8,550	1,120	71.6	70.7	280	378
ROW013	SBS-ROW013-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	<b>241</b>	7,280	1,080	68.2	50.5	331	367
ROW013	SBS-ROW013-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	7.99	248	40.3	2.41	2.42	8.01	12
ROW014	SS-ROW014-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	<b>352</b>	11,100	1,700	99.9	88.6	403	569
ROW014	SS-ROW014-1.0	04/23/2015	0.5-1.0	Discrete	Phase 1 OPP	<b>70.4</b>	2,400	358	19.1	17.7	80.7	98.9
ROW014	SBS-ROW014-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	8.63	271	42.4	2.35	2.5	9.42	12.3
ROW016	SS-ROW016-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	<b>24.7</b>	665	105	5.25	8.74	17.3	34.2
ROW016	SBS-ROW016-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	<b>28.9</b>	861	115	8.26	11	24.6	50.5
ROW016	SBS-ROW016-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	3.8	113	14.9	0.89 J	1.39	2.63	5.02
ROW018	SS-ROW018-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	<b>17.9</b>	521	84.3	5.87	7.71	7.33	22.8
ROW018	SBS-ROW018-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	10.0	298	50.5	3.27	3.61	4.23	15.9
ROW019	SS-ROW019-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	<b>23.4</b>	673	93.5	5.15	7.15	19.6	31.9
ROW019	SBS-ROW019-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	<b>15.6</b>	437	69.1	4.74	4.82	16.2	24.1
ROW019	SBS-ROW019-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	<b>40.7</b>	1,220	197	10.5	12.8	40.9	54.8
ROW019	SBS-ROW019-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	7.94	229	40.2	2.14	2.18	9.1	11.3
ROW022	SS-ROW022-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	<b>19.5</b>	572	84.6	4.88	7.19	11.3	26.2
ROW022	SBS-ROW022-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	<b>23.1</b>	600	107	7.29	8.06	15.7	36.5
ROW022	SBS-ROW022-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	6.77	174	28.4	1.83	2.31	4.1	8.1
ROW022W	SS-ROW022W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	<b>58.9</b>	1,750	342	20.1	21.4	47.7	84.4
ROW022W	SBS-ROW022W-1.5	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	4.98	154	27.6	1.83	1.44	3.41	6.35
ROW023	SS-ROW023-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	<b>40.3</b>	1,240	284	21.4	17	20.2	53.6
ROW023	SBS-ROW023-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	<b>38.7</b>	1,080	240	19.5	14	21.8	60.6
ROW023	SBS-ROW023-1.5	09/01/2015	1.0-1.5	Discrete	Phase 1 OPP	9.14	263	101	6.57	2.97	6.21	11.9
ROW023	SBS-ROW023-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	2.39	71.4	21.3	1.71	0.741 J	1.3	2.6
ROW025	SS-ROW025-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	<b>47.1</b>	1,430	186	12.1	22.3	17.5	63.6
ROW025	SBS-ROW025-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	<b>14.2</b>	395	60.8	4.26	5.44	6.64	22.4

**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	Dioxin TEQ <sup>(a)(1)(2)</sup> (ng/kg)	1,2,3,4,6,7,8-HpCDD (ng/kg)	1,2,3,4,6,7,8-HpCDF (ng/kg)	1,2,3,4,7,8,9-HpCDF (ng/kg)	1,2,3,4,7,8-HxCDD (ng/kg)	1,2,3,4,7,8-HxCDF (ng/kg)	1,2,3,6,7,8-HxCDD (ng/kg)
ROW025	SBS-ROW025-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	9.10	207	34.9	2.37	3.77	4.73	12.2
ROW026	SS-ROW026-0.5	05/21/2015	0-0.5	Discrete	Phase 1 OPP	<b>14.7</b>	424	72.2	3.8	5.27	8.48	18.8
ROW026	SBS-ROW026-1.0	05/21/2015	0.5-1.0	Discrete	Phase 1 OPP	<b>23.6</b>	653	131	6.46	7.46	16.1	36.2
ROW026	SBS-ROW026-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	<b>17.8</b>	460	83.5	4.72	5.75	15.2	24.9
ROW026	SBS-ROW026-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	8.81	232	44.1	2.47	2.68	8.03	11.9
ROW029B	SS-ROW029B-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	<b>34.9</b>	990	152	9.96	16.2	17.4	45.4
ROW029B	SBS-ROW029B-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	<b>19.6</b>	523	84.4	6.76	8.12	11.8	28.9
ROW029B	SBS-ROW029B-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	10.0	300	51.4	3.36	3.5	5.56	12.1
ROW030	SS-ROW030-0.5	04/30/2015	0-0.5	Discrete	Phase 1 OPP	<b>15.4</b>	430	70.2	3.52	6.25	8.45	21.4
ROW030	SS-ROW030-1.0	04/30/2015	0.5-1.0	Discrete	Phase 1 OPP	7.42	199	23.9	1.53	3.05	3.63	9.45
ROW033W	SS-ROW033W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	<b>51.0</b>	999	248	15.1	14.7	36.5	58.3
ROW033W	SBS-ROW033W	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	<b>26.6</b>	463	107	8.1	6.1	22.4	25.5
ROW036	SS-ROW036-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	<b>16.0</b>	363	61.6	5.37	6.07	5.95	14.1
ROW036	SS-ROW036-1.0	04/23/2015	0.5-1.0	Discrete	Phase 1 OPP	0.746	13	2.78	0.214 J	0.266 J	0.447 J	0.539 J
ROWRRW	SS-ROWRRW-0.5	03/22/2016	0-0.5	Discrete	Phase 1 OPP	<b>22.4</b>	687	87.3	6.06	8.33	11.8	33.2
ROWRRW	SBS-ROWRRW-1.5	03/22/2016	1.0-1.5	Discrete	Phase 1 OPP	3.17	89.3	11.6	1.36 J	1.49 J	2.09 J	4.33 J
ROW-002N	ROW-002N-0.5	08/11/2016	0-0.5	Discrete	Phase 2 OPP	<b>24.5</b>	477	72.1	5.05	7.7	12.1	35.2
ROW010E	SS-ROW010E-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	<b>23.6</b>	561	101	6.69	6.84	19.9	29.8
ROW022E	SS-ROW022E-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	<b>41.8</b>	1,250	224	13.6	14.9	39.5	67.5
ROW022E	SS-ROW022E-0.5	11/02/2015	0-0.5	Discrete Dup	Phase 2 OPP	<b>46.8</b>	1,600	218	14.3	14.3	41.1	72.6
ROW029BS	SS-ROW029BS-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	<b>36.1</b>	990	197	14.5	13.3	26.3	50.3
ROW029BS	SBS-ROW029BS-1.5	11/02/2015	1.0-1.5	Discrete	Phase 2 OPP	2.15	55.6	8.46	0.797 J	0.608 J	1.31	2.37
ROW038S	SS-ROW038S-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	3.78	107	19.1	1 J	1.52 J	1.8 J	4.9 J
ROW-P2-001	ROW-P2-001-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>23.4</b>	669 J	108	6.68	6.55	25.4	32.7
ROW-P2-002	ROW-P2-002-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>22.5</b>	472	64.9	5.65	4.76 J	16.8	22.8
ROW-P2-002	ROW-P2-002-0.5-DUP	04/15/2016	0-0.5	Discrete Dup	Phase 2 OPP	<b>21.9</b>	451	63.4	5.51	4.52 J	16.5	23
ROW-P2-003	ROW-P2-003-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>51.0</b>	1,580	213	12.1	13.2	50.4	76.6
ROW-P2-004	ROW-P2-004-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>15.9</b>	568	58.3	3.07 J	3.7 J	7.27	29
ROW-P2-005	ROW-P2-005-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>46.1</b>	1,440	197	10.6	12.2	40.4	75
ROW-P2-006	ROW-P2-006-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>18.2</b>	499	86.3	5.29	5.25	17.9	23.6
ROW-P2-007	ROW-P2-007-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	9.97	335	54.4	3.79	2.81	5.99	13.4
ROW-P2-008	ROW-P2-008-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>69.3</b>	2,200	557	42.9	22.7	45.2	83.3
ROW-P2-009	ROW-P2-009-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>26.9</b>	69.3	39	8.15	2.26	42.6	12
ROW-P2-010	ROW-P2-010-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	3.53	118	15.3	0.945 J	0.842 J	2.45	5.05
ROW-P2-011A	ROW-P2-011A-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>183</b>	5,290	813	58.9	45.2	228	305
ROW-P2-011B	ROW-P2-011B-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>101</b>	2,880	426	30.1	27	119	150
ROW-P2-012	ROW-P2-012-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	9.85	287	34.7	2.05	3.19	7	13.2

**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	Dioxin TEQ <sup>(a)(1)(2)</sup> (ng/kg)	1,2,3,4,6,7,8-HpCDD (ng/kg)	1,2,3,4,6,7,8-HpCDF (ng/kg)	1,2,3,4,7,8,9-HpCDF (ng/kg)	1,2,3,4,7,8-HxCDD (ng/kg)	1,2,3,4,7,8-HxCDF (ng/kg)	1,2,3,6,7,8-HxCDD (ng/kg)
ROW-P2-013	ROW-P2-013-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	3.59	116	13.5	0.862 J	1.28	2.03	5.15
ROW-P2-014	ROW-P2-014-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	7.52	234	29.1	1.86	2.36	5.25	10.3
ROW-P2-015	ROW-P2-015-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	9.84	308	43.3	2.58	3.38	5.78	15.4
ROW-P2-016	ROW-P2-016-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>277</b>	2,440	1,800	71.4	93	393	606
ROW-P2-017	ROW-P2-017-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	<b>73.2</b>	2,440	302	17.8	18.5	82.2	105
ROW-P2-018	ROW-P2-018-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	8.26	209	39.5	2.52	2.22	5.01	10.4
ROW-P2-019	ROW-P2-019-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	11.5	349	77.2	4.21	3.72	7.39	15.6
ROW-P2-020	ROW-P2-020-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	<b>14.3</b>	454	110	7.07	2.5	8.59	21
ROW-P2-021	ROW-P2-021-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	<b>30.8</b>	857	175	11.6	7.64	34	43.2
ROW-P2-022	ROW-P2-022-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	2.98	88.6	11.8	0.864 J	0.483 J	1.27	2.64
ROW-P2-033	ROW-P2-033-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	<b>101</b>	2,810 J	514	31.1	20	126	150
ROW-P2-034	ROW-P2-034-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	<b>29.5</b>	804	131	7.22	7.67	26.3	42.4
ROW078N	ROW-078N	11/22/2017	0-0.5	Discrete	Phase 3 OPP	<b>47.9</b>	985	150	10.3	19	22.7	60.2
ROW078NE	ROW-078NE	11/22/2017	0-0.5	Discrete	Phase 3 OPP	<b>14.0</b>	271	43.3	3.28 J	4.76 J	10.9	16.6
ROW078NW	ROW-078NW	11/22/2017	0-0.5	Discrete	Phase 3 OPP	<b>21.2</b>	445	58.3	3.35 J	7.98	7.41	29.8



**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	1,2,3,6,7,8-HxCDF (ng/kg)	1,2,3,7,8,9-HxCDD (ng/kg)	1,2,3,7,8,9-HxCDF (ng/kg)	1,2,3,7,8-PeCDD (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,6,7,8-HxCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)
ROW001	SS-ROW001-0.5	05/04/2016	0-0.5	Discrete	Phase 1 OPP	8.18 J	33.2	0.315 U	7.29 J	2.07 J	8.95 J	4.93 J
ROW004	SS-ROW004-0.5	05/07/2015	0-0.5	Discrete	Phase 1 OPP	0.378 J	0.876 J	0.143 U	0.259 J	0.1 U	0.301 J	0.148 J
ROW005	SS-ROW005-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	14.9	45.4	0.712 J	7.09	4.43	8.7	6.08
ROW005	SBS-ROW005-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	11	35.8	0.667 J	5.05	2.68	7.9	4.1
ROW005	SBS-ROW005-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	3.09	9.58	0.183 J	1.56	1.06	2.03	1.35
ROW008	SBS-ROW008-0.5	05/07/2015	0-0.5	Discrete	Phase 1 OPP	3.12 J	9.15	0.184 UJ	1.65 J	0.763 J	2.16 J	1.01 J
ROW010W	SS-ROW010W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	8 J	17.2	0.314 J	2.53 J	1.81 J	6.04 J	3.54 J
ROW010W	SBS-ROW010W-1.5	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	0.419 J	0.847 J	0.106 J	0.163 J	0.185 J	0.448 J	0.209 J
ROW011	SS-ROW011-0.5	03/22/2016	0-0.5	Discrete	Phase 1 OPP	11.2	28.1	0.658 J	2.95 J	4.14 J	8.91	7.25
ROW011	SBS-ROW011-1.5	03/22/2016	1.0-1.5	Discrete	Phase 1 OPP	7.16	9.34	1.42 J	1.71 J	2.57 J	7.12	4.84 J
ROW012	SS-ROW012-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	2.9	8.66	0.157 J	1.25	0.609 J	2.13	0.862 J
ROW013	SS-ROW013-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	109	188	4.57	23.4	36.3	60.3	58.6
ROW013	SBS-ROW013-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	107	142	5.01	16.3	37.4	66.7	63
ROW013	SBS-ROW013-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	3.06	6.92	0.159 J	0.671 J	1.08	2.12	1.15
ROW014	SS-ROW014-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	161	208	6.69	25.1	47.7	88.3	69.7
ROW014	SS-ROW014-1.0	04/23/2015	0.5-1.0	Discrete	Phase 1 OPP	32.1	42.4	1.3	4.54	8.48	17.8	12.7
ROW014	SBS-ROW014-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	3.61	6.41	0.174 J	0.707 J	1.33	2.13	1.58
ROW016	SS-ROW016-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	8.35	23.6	0.353 J	4.05	2.78	5.23	4.09
ROW016	SBS-ROW016-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	11.3	28.1	0.419 J	4.9 U	3.58	6.65	4.92
ROW016	SBS-ROW016-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	1.45	4.1	0.102 U	0.452 J	0.344 J	1.47	0.642 J
ROW018	SS-ROW018-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	4.41	20.4	0.216 J	3.29	1.31	2.71	1.54
ROW018	SBS-ROW018-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	2.22 U	11.3	0.103 U	1.62	0.776 J	1.61	0.918 J
ROW019	SS-ROW019-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	7.93	20.1	0.473 J	3.23	2.77	4.55	4.11
ROW019	SBS-ROW019-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	6.27	13.2	0.24 J	1.66	1.62	3.78	2.55
ROW019	SBS-ROW019-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	16	31.3	0.526 J	4.13	4.95	10.2	6.79
ROW019	SBS-ROW019-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	3.39	5.91	0.194 J	0.749 J	1.02	1.92	1.54
ROW022	SS-ROW022-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	5.68	20.1	0.278 J	2.98	1.79	3.71	2.76
ROW022	SBS-ROW022-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	7.71	24.3	0.311 J	3.54	2.34	5.08	3.57
ROW022	SBS-ROW022-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	2.75	6.42	0.119 J	1.11	0.648 J	2.68	1.4
ROW022W	SS-ROW022W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	23.3	44.6	0.755 J	5.6 J	5.24 J	15.3	8.53 J
ROW022W	SBS-ROW022W-1.5	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	1.85	3.51	0.105 U	0.505 J	0.471 J	1.44	0.975 J
ROW023	SS-ROW023-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	9.45	42.5	0.439 J	6.08	2.34	6.75	3.09
ROW023	SBS-ROW023-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	10.2	37.5	0.41 J	6.75	2.81	6.76	3.74
ROW023	SBS-ROW023-1.5	09/01/2015	1.0-1.5	Discrete	Phase 1 OPP	2.62	8.04	0.136 J	1.02	0.617 J	1.95	0.95 J
ROW023	SBS-ROW023-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	0.626 J	2.36	0.106 U	0.315 J	0.149 J	0.543 J	0.264 J
ROW025	SS-ROW025-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	10.9	55.6	0.456 J	8.46	2.99	6.85	3.59
ROW025	SBS-ROW025-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	4.16	15.5	0.19 J	2.62	1.11	2.81	1.4

**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	1,2,3,6,7,8-HxCDF (ng/kg)	1,2,3,7,8,9-HxCDD (ng/kg)	1,2,3,7,8,9-HxCDF (ng/kg)	1,2,3,7,8-PeCDD (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,6,7,8-HxCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)
ROW025	SBS-ROW025-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	2.38	9.28	0.458 J	2.08	1.21	1.98	1.2
ROW026	SS-ROW026-0.5	05/21/2015	0-0.5	Discrete	Phase 1 OPP	3.95	13.1	0.22 J	2.59	1.42	2.1	1.88
ROW026	SBS-ROW026-1.0	05/21/2015	0.5-1.0	Discrete	Phase 1 OPP	7.05	23.3	0.284 J	3.5	2.43	4.12	3.09
ROW026	SBS-ROW026-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	6.62	15.6	0.229 J	2.69	2.31	3.88	3.19
ROW026	SBS-ROW026-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	3.44	7.87	0.218 J	1.11	1.18	1.93	1.68
ROW029B	SS-ROW029B-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	8.97	43.2	0.366 J	6.05	2.39	6.46	3.45
ROW029B	SBS-ROW029B-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	5.98 U	21.7	0.268 J	3.69	1.66	3.46	2.45
ROW029B	SBS-ROW029B-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	2.79	9.61	0.132 J	1.57	0.786 J	2.28	1.15
ROW030	SS-ROW030-0.5	04/30/2015	0-0.5	Discrete	Phase 1 OPP	4.38	20.9	0.151 J	2.78	1.24	2.71	1.47
ROW030	SS-ROW030-1.0	04/30/2015	0.5-1.0	Discrete	Phase 1 OPP	1.84	7.98	0.275 J	1.67	0.703 J	1.19	0.934 J
ROW033W	SS-ROW033W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	32	36.3	0.586 J	8.08 J	5.13 J	34.7	16.2
ROW033W	SBS-ROW033W	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	22.3	13.5	0.278 J	3.81	3.17	25.7	12
ROW036	SS-ROW036-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	3.26	15.5	0.22 U	3.88	0.84 J	2.46	3.96
ROW036	SS-ROW036-1.0	04/23/2015	0.5-1.0	Discrete	Phase 1 OPP	0.261 J	0.555 J	0.0983 UJ	0.183 J	0.146 U	0.27 J	0.205 J
ROWRRW	SS-ROWRRW-0.5	03/22/2016	0-0.5	Discrete	Phase 1 OPP	6.08	21.5	0.447 J	3.04 J	2.34 J	4.62 J	3.3 J
ROWRRW	SBS-ROWRRW-1.5	03/22/2016	1.0-1.5	Discrete	Phase 1 OPP	1.04 J	3.18 J	0.386 UJ	0.658 UJ	0.642 UJ	0.95 J	0.818 UJ
ROW-002N	ROW-002N-0.5	08/11/2016	0-0.5	Discrete	Phase 2 OPP	11.6	23.1	0.284 U	4.99	2.1 J	10.6	6.75
ROW010E	SS-ROW010E-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	10.7	16.3	0.512 J	3.17	3.08	8.94	5.85
ROW022E	SS-ROW022E-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	17	34.9	0.56 J	4.13	4.69	11.2	7.66
ROW022E	SS-ROW022E-0.5	11/02/2015	0-0.5	Discrete Dup	Phase 2 OPP	19.6	35.1	0.717 J	4.62	5.02	12.7	8.08
ROW029BS	SS-ROW029BS-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	9.76 J	33.8	0.409 J	4.78 J	2.6 J	7.11 J	3.81 J
ROW029BS	SBS-ROW029BS-1.5	11/02/2015	1.0-1.5	Discrete	Phase 2 OPP	0.54 J	1.69	0.124 J	0.271 J	0.261 J	0.371 J	0.276 J
ROW038S	SS-ROW038S-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	0.84 J	4.65 J	0.221 U	0.638 J	0.21 U	0.672 J	0.261 U
ROW-P2-001	ROW-P2-001-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	9.76	15.6	0.526 J	2.32 J	3.64 J	5.27	5.91
ROW-P2-002	ROW-P2-002-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	7.61	12.5	0.613 J	4.56 J	2.82 J	7.34	7.97
ROW-P2-002	ROW-P2-002-0.5-DUP	04/15/2016	0-0.5	Discrete Dup	Phase 2 OPP	7.68	12.1	0.553 J	4.44 J	2.74 J	7.37	7.65
ROW-P2-003	ROW-P2-003-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	20.3	35.5	0.958 J	4.59 J	6.72	10.9	11
ROW-P2-004	ROW-P2-004-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	3.32 J	9.64	0.368 J	1.5 J	1.83 J	2.43 J	1.92 J
ROW-P2-005	ROW-P2-005-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	16.4	32.8	1.01 J	4.38 J	6.35	10.6	9.81
ROW-P2-006	ROW-P2-006-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	6.21	14.4	0.334 J	2.36 J	1.97 J	3.91 J	4.05 J
ROW-P2-007	ROW-P2-007-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	2.26	8.05	0.129 J	0.99 J	0.686 J	1.95	1.31
ROW-P2-008	ROW-P2-008-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	17.8	50.1	0.533 J	8.03	4.23	14.8	7.24
ROW-P2-009	ROW-P2-009-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	20.3	7.82	0.27 J	7.75	2.5	26.1	18.2
ROW-P2-010	ROW-P2-010-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	1.04	2.89	0.136 J	0.391 J	0.424 J	0.721 J	0.5 J
ROW-P2-011A	ROW-P2-011A-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	83.8	122	3.68	12	29	47.9	47.8
ROW-P2-011B	ROW-P2-011B-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	48	65.1	1.94	8.77	14.6	26	25.9
ROW-P2-012	ROW-P2-012-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	2.81	8.36	0.183 J	1.48	1.06	2.01	1.55



**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	1,2,3,6,7,8-HxCDF (ng/kg)	1,2,3,7,8,9-HxCDD (ng/kg)	1,2,3,7,8,9-HxCDF (ng/kg)	1,2,3,7,8-PeCDD (ng/kg)	1,2,3,7,8-PeCDF (ng/kg)	2,3,4,6,7,8-HxCDF (ng/kg)	2,3,4,7,8-PeCDF (ng/kg)
ROW-P2-013	ROW-P2-013-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.821 J	3.52	0.14 U	0.506 J	0.33 U	0.654 J	0.405 J
ROW-P2-014	ROW-P2-014-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	2.01	6.1	0.248 J	1.04	0.871 J	1.69	1.23
ROW-P2-015	ROW-P2-015-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	2.28	8.88	0.126 J	1.44	0.83 J	1.77	1.2
ROW-P2-016	ROW-P2-016-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	130	223	13.2	32.2	135	74.4	107
ROW-P2-017	ROW-P2-017-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	29.2	46.6	0.959 J	5.51	9.67	17.6	15.7
ROW-P2-018	ROW-P2-018-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	2.38	6.32	1.27	1.41	0.783 J	1.75	1.35
ROW-P2-019	ROW-P2-019-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	3.14	9.63	0.12 J	1.54	0.914 J	2.49	1.42
ROW-P2-020	ROW-P2-020-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	3.45	7.44	0.124 U	1.26	1.17	2.49	1.89
ROW-P2-021	ROW-P2-021-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	12.8	20.3	0.43 J	3.46	3.43	5.49	6.46
ROW-P2-022	ROW-P2-022-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	0.775 J	1.89	0.126 U	0.355 J	0.132 U	0.49 U	0.439 J
ROW-P2-033	ROW-P2-033-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	51.2	53.8	1.71	7.4	13.9	28.5	30.3
ROW-P2-034	ROW-P2-034-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	12.3	22.5	0.413 J	3.76	2.92	7.18	6.82
ROW078N	ROW-078N	11/22/2017	0-0.5	Discrete	Phase 3 OPP	12.4	37.8	6.18	9.97	3.45 J	18.3	18.2
ROW078NE	ROW-078NE	11/22/2017	0-0.5	Discrete	Phase 3 OPP	3.78 J	8.46	2.25 J	2.98 J	1.52 J	4.82 J	5.18
ROW078NW	ROW-078NW	11/22/2017	0-0.5	Discrete	Phase 3 OPP	4.18 J	16.6	2.21 J	4.75 J	1.66 J	5.68	3.81 J

**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	OCDD (ng/kg)	OCDF (ng/kg)	Total HpCDDs (ng/kg)	Total HpCDFs (ng/kg)	Total HxCDDs (ng/kg)
ROW001	SS-ROW001-0.5	05/04/2016	0-0.5	Discrete	Phase 1 OPP	0.604 J	3.24 U	3,660	135	1,170	243	244
ROW004	SS-ROW004-0.5	05/07/2015	0-0.5	Discrete	Phase 1 OPP	0.111 J	0.38 U	122	8.05 J	36.9	14.3	6.79
ROW005	SS-ROW005-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	0.664	1.84	8,630	257	2,380	519	330
ROW005	SBS-ROW005-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	0.503 U	1.6 U	6,600	210	2,100	474	294
ROW005	SBS-ROW005-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	0.155 J	0.48 J	1,590	82.1	517	138	79.7
ROW008	SBS-ROW008-0.5	05/07/2015	0-0.5	Discrete	Phase 1 OPP	0.283 J	0.32 U	1,980	117	577	159	80.2
ROW010W	SS-ROW010W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	0.392 J	1.18 J	3,740	204	906	309	152
ROW010W	SBS-ROW010W-1.5	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	0.0968 U	0.15 J	157	11.1	46.3	14.2	6.26
ROW011	SS-ROW011-0.5	03/22/2016	0-0.5	Discrete	Phase 1 OPP	0.473 J	2.69	7,300	219	1,960	375	235
ROW011	SBS-ROW011-1.5	03/22/2016	1.0-1.5	Discrete	Phase 1 OPP	0.828 J	1.11	2,410	60	598	114	74.7
ROW012	SS-ROW012-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	0.189 U	0.569 UJ	2,160	72.6	601	116	74.9
ROW013	SS-ROW013-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	1.49	9.5 U	50,400	1,080	14,900	3,070	1,640
ROW013	SBS-ROW013-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	2 U	11.5	38,300	531	11,800	2,870	1,330
ROW013	SBS-ROW013-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	0.109 U	0.38 J	1,520	49.6	449	107	59.2
ROW014	SS-ROW014-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	1.36	11.2	66,200	1,440	18,900	4,370	2,190
ROW014	SS-ROW014-1.0	04/23/2015	0.5-1.0	Discrete	Phase 1 OPP	0.217 U	1.97	15,300	262	4,080	897	418
ROW014	SBS-ROW014-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	0.109 U	0.24 U	1,730	39.2	482	110	57
ROW016	SS-ROW016-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	0.435	1.56	3,860	133	1,200	270	190
ROW016	SBS-ROW016-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	0.426 J	0.11 U	4,460	112	1,540	320	246
ROW016	SBS-ROW016-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	0.101 U	0.17 J	578	16.8	204	36.2	28.3
ROW018	SS-ROW018-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	0.396	0.87 J	2,910	199	916	251	146
ROW018	SBS-ROW018-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	0.249 J	1.1 U	1,650	104	526	168	85.2
ROW019	SS-ROW019-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	0.803	1.21	3,540	87.4	1,080	229	144
ROW019	SBS-ROW019-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	0.333 J	0.64 J	2,400	46.3	735	178	103
ROW019	SBS-ROW019-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	0.796	1.31	8,410	160	2,190	493	277
ROW019	SBS-ROW019-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	0.1 U	0.28 J	1,660	28.4	391	96.9	50.5
ROW022	SS-ROW022-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	0.43	1.18	3,220	193	987	237	142
ROW022	SBS-ROW022-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	0.352 J	2.05	3,000	173	1,040	320	179
ROW022	SBS-ROW022-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	0.193 U	0.67 J	1,170	61.6	329	77	55.1
ROW022W	SS-ROW022W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	1.32 J	1.66 J	13,300	920	2,900	1,010	418
ROW022W	SBS-ROW022W-1.5	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	0.161 J	0.21 U	1,130	73.3	265	78.6	31.5
ROW023	SS-ROW023-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	0.484	1.11	6,530	783	1,970	946	277
ROW023	SBS-ROW023-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	0.466 J	1.7 U	5,150	469	1,740	852	278
ROW023	SBS-ROW023-1.5	09/01/2015	1.0-1.5	Discrete	Phase 1 OPP	0.106 U	0.18 U	1,880	346	411	365	57.4
ROW023	SBS-ROW023-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	0.106 U	0.15 U	462	81.8	115	76.9	15.2
ROW025	SS-ROW025-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	0.715	1.73	8,360	385	2,390	512	373
ROW025	SBS-ROW025-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	0.188 U	0.787 J	1,930	87.7	666	174	118

**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	OCDD (ng/kg)	OCDF (ng/kg)	Total HpCDDs (ng/kg)	Total HpCDFs (ng/kg)	Total HxCDDs (ng/kg)
ROW025	SBS-ROW025-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	0.253	0.59 J	1,250	58.6	384	95.2	64.9
ROW026	SS-ROW026-0.5	05/21/2015	0-0.5	Discrete	Phase 1 OPP	0.494 J	0.937 J	2,470	77.8	749	175	106
ROW026	SBS-ROW026-1.0	05/21/2015	0.5-1.0	Discrete	Phase 1 OPP	0.566	1.52	3,190	102	1,100	309	181
ROW026	SBS-ROW026-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	0.451	1.16	2,640	89.4	845	223	131
ROW026	SBS-ROW026-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	0.213	0.62 J	1,610	43.7	389	107	60.7
ROW029B	SS-ROW029B-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	0.573	1.34	5,360	311	1,810	424	303
ROW029B	SBS-ROW029B-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	0.342 J	1.32	2,540	127	995	250	174
ROW029B	SBS-ROW029B-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	0.206	0.61 J	2,010	144	579	161	80.9
ROW030	SS-ROW030-0.5	04/30/2015	0-0.5	Discrete	Phase 1 OPP	0.296	0.495	976	85.7	702	182	122
ROW030	SS-ROW030-1.0	04/30/2015	0.5-1.0	Discrete	Phase 1 OPP	0.158 J	0.34 U	924	32.4	322	60.1	50.9
ROW033W	SS-ROW033W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	1.15 J	3.27	7,780	637	1,720	763	335
ROW033W	SBS-ROW033W	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	0.604	1.82	2,880	202	849	304	154
ROW036	SS-ROW036-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	0.913	2.11 U	2,520	223	630	212	109
ROW036	SS-ROW036-1.0	04/23/2015	0.5-1.0	Discrete	Phase 1 OPP	0.114 U	0.24 U	99.2	7.13	24.1	7.55	4.13
ROWRRW	SS-ROWRRW-0.5	03/22/2016	0-0.5	Discrete	Phase 1 OPP	0.41 J	1.9 U	4,530	143	1,240	242	167
ROWRRW	SBS-ROWRRW-1.5	03/22/2016	1.0-1.5	Discrete	Phase 1 OPP	0.275 U	0.449 J	553	22.3	149	32.3	22.1
ROW-002N	ROW-002N-0.5	08/11/2016	0-0.5	Discrete	Phase 2 OPP	0.572 J	4.21	2,710	78	802	191	169
ROW010E	SS-ROW010E-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	1.66	1.42	2,580	134	974	290	150
ROW022E	SS-ROW022E-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	0.432	1.42	3,690	324	2,060	624	310
ROW022E	SS-ROW022E-0.5	11/02/2015	0-0.5	Discrete Dup	Phase 2 OPP	0.449	1.35	3,210	325	2,760	597	319
ROW029BS	SS-ROW029BS-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	1.31 J	1.82 J	7,820	467	1,610	580	242
ROW029BS	SBS-ROW029BS-1.5	11/02/2015	1.0-1.5	Discrete	Phase 2 OPP	0.304	0.19 J	365	20.9	94.8	24.6	11.9
ROW038S	SS-ROW038S-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	0.186 U	0.302 J	803	45.1	190	51.7	30.1
ROW-P2-001	ROW-P2-001-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.128 U	0.829 J	5,280	99.8	1,150	295	137
ROW-P2-002	ROW-P2-002-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	1.36	3.63	3,400	109	822	195	137
ROW-P2-002	ROW-P2-002-0.5-DUP	04/15/2016	0-0.5	Discrete Dup	Phase 2 OPP	1.33	3.15	3,450	126	776	194	133
ROW-P2-003	ROW-P2-003-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.614 J	2.74	10,500	197	2,660	564	334
ROW-P2-004	ROW-P2-004-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.235 J	0.7 J	5,400	88.6	962	177	101
ROW-P2-005	ROW-P2-005-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.306 U	2.56	9,270	157	2,350	510	303
ROW-P2-006	ROW-P2-006-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.339 J	0.834 J	3,460	137	829	233	125
ROW-P2-007	ROW-P2-007-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.311 U	0.72 J	2,860	316	588	210	68
ROW-P2-008	ROW-P2-008-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.712	2.11	19,700	2,440	3,680	2,550	385
ROW-P2-009	ROW-P2-009-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.855	3.54	467	23.2	133	93	118
ROW-P2-010	ROW-P2-010-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.105 U	0.3 U	810	19.5	174	37.2	33.4
ROW-P2-011A	ROW-P2-011A-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.614	9.01	29,400	714	8,920	2,180	1,110
ROW-P2-011B	ROW-P2-011B-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.815	6.23	16,500	370	4,920	1,130	579
ROW-P2-012	ROW-P2-012-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.421	0.5 J	1,570	55.2	498	89.1	73.4

**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	2,3,7,8-TCDD (ng/kg)	2,3,7,8-TCDF (ng/kg)	OCDD (ng/kg)	OCDF (ng/kg)	Total HpCDDs (ng/kg)	Total HpCDFs (ng/kg)	Total HxCDDs (ng/kg)
ROW-P2-013	ROW-P2-013-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.11 U	0.25 J	720	32.4	184	26.4	27.9
ROW-P2-014	ROW-P2-014-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.177 J	0.54 J	1,310	51.8	413	79.6	53.7
ROW-P2-015	ROW-P2-015-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.156 U	0.537 J	1,860 J	93.2	531	120	79.1
ROW-P2-016	ROW-P2-016-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	2.12	56.7	14,100	1,570	4,280	5,620	2,260
ROW-P2-017	ROW-P2-017-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	0.38	3.98	14,100	283	4,280	756	451
ROW-P2-018	ROW-P2-018-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	0.405	1.84	1,210	71.8	350	114	50.9
ROW-P2-019	ROW-P2-019-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	0.206	0.97 J	2,190	258	597	257	82.7
ROW-P2-020	ROW-P2-020-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	0.771	1.25	3,710	528 J	947	404	85.7
ROW-P2-021	ROW-P2-021-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	0.539	1.63	5,520	373	1,430	589	175
ROW-P2-022	ROW-P2-022-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	0.461	0.35 U	844	33.5	160	37.4	16.5
ROW-P2-033	ROW-P2-033-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	0.616	9.56	19,300 J	433	4,640	1,400	609
ROW-P2-034	ROW-P2-034-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	0.596	2.52	4,820	124	1,380	330	186
ROW078N	ROW-078N	11/22/2017	0-0.5	Discrete	Phase 3 OPP	0.922 J	2.41	6,720 J	315	1,720	428	368
ROW078NE	ROW-078NE	11/22/2017	0-0.5	Discrete	Phase 3 OPP	0.369 UJ	1.65	2,280	69.1	487	123	91 J
ROW078NW	ROW-078NW	11/22/2017	0-0.5	Discrete	Phase 3 OPP	1.87	1.17	2,800	67	797	152	174

**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	Total HxCDFs (ng/kg)	Total PeCDDs (ng/kg)	Total PeCDFs (ng/kg)	Total TCDDs (ng/kg)	Total TCDFs (ng/kg)	Total Organic Carbon (mg/kg)
ROW001	SS-ROW001-0.5	05/04/2016	0-0.5	Discrete	Phase 1 OPP	271	36 J	96.8 J	3.61	11.9 J	16,000
ROW004	SS-ROW004-0.5	05/07/2015	0-0.5	Discrete	Phase 1 OPP	9.45	0.636 J	3.07 J	0.263 J	0.792 J	4,000
ROW005	SS-ROW005-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	382	31.6	56.7	4.92	13	15,000
ROW005	SBS-ROW005-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	308	24.2	55.4	0.583 U	6.54	17,000
ROW005	SBS-ROW005-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	95.4	8.03	19.1	0.639	6.56	9,900
ROW008	SBS-ROW008-0.5	05/07/2015	0-0.5	Discrete	Phase 1 OPP	94.4	9.11	29.8	1.52	6.64	16,000
ROW010W	SS-ROW010W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	227	15.5	114	4.97	30	21,000
ROW010W	SBS-ROW010W-1.5	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	10.7	0.505 J	7.29	0.245	2.3	8,400
ROW011	SS-ROW011-0.5	03/22/2016	0-0.5	Discrete	Phase 1 OPP	352	15.1	199	5.62	43.5	18,000
ROW011	SBS-ROW011-1.5	03/22/2016	1.0-1.5	Discrete	Phase 1 OPP	218	5.57	182	1.86	30.3	9,600
ROW012	SS-ROW012-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	85.6	4.94	24.7	1.16	6.44	15,000
ROW013	SS-ROW013-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	2,940	112	462	13.4	57.4	20,000
ROW013	SBS-ROW013-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	2,180	48	423	2 U	15.3	15,000
ROW013	SBS-ROW013-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	96.5	2.29	13.6	0.109 U	2.04	6,800
ROW014	SS-ROW014-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	4,700	104	1,100	8.54	64.8	19,000
ROW014	SS-ROW014-1.0	04/23/2015	0.5-1.0	Discrete	Phase 1 OPP	915	20	241	1.64	18.7	11,000
ROW014	SBS-ROW014-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	111	2.43	13.6	0.109 U	1.2	8,400
ROW016	SS-ROW016-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	213	21.8	43.9	1.87	5.38	20,000
ROW016	SBS-ROW016-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	306	25	134	5.22	20.6	18,000
ROW016	SBS-ROW016-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	42.7	2.25	12.3	0.101 U	2.22	3,800
ROW018	SS-ROW018-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	115	18.5	18.7	2.49	6.25	19,000
ROW018	SBS-ROW018-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	61.8	8.45	22.3	2.71	9.88	18,000
ROW019	SS-ROW019-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	192	12.4	30.8	1.28	2.41	14,000
ROW019	SBS-ROW019-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	163	6.57	48.2	0.892 J	4.26	10,000
ROW019	SBS-ROW019-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	488	17.3	70.3	2.98	13.4	9,100
ROW019	SBS-ROW019-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	95	2.52	15.5	0.14 J	2.63	4,000
ROW022	SS-ROW022-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	156	15.4	29.8	3.04	12.3	21,000
ROW022	SBS-ROW022-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	196	18.9	95.9	3.38	27.1	16,000
ROW022	SBS-ROW022-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	87.4	7.03	32.1	1.94	12.9	14,000
ROW022W	SS-ROW022W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	617	35.6	288	9.47	62.9	16,000
ROW022W	SBS-ROW022W-1.5	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	52.4	2.7	31.8	1.07	8.05	12,000
ROW023	SS-ROW023-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	285	26.1	23.7	2.76	5.01	24,000
ROW023	SBS-ROW023-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	331	30.9	66.1	4.08	15	16,000
ROW023	SBS-ROW023-1.5	09/01/2015	1.0-1.5	Discrete	Phase 1 OPP	113	4.41	12.3	1.41	3.72	10,000
ROW023	SBS-ROW023-2.0	09/01/2015	1.5-2.0	Discrete	Phase 1 OPP	23.8	1.26	2.94	0.215	0.779	11,000
ROW025	SS-ROW025-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	285	41.7	47.8	6.55	17.9	21,000
ROW025	SBS-ROW025-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	97.4	12.5	41	2.19	12	13,000

**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	Total HxCDFs (ng/kg)	Total PeCDDs (ng/kg)	Total PeCDFs (ng/kg)	Total TCDDs (ng/kg)	Total TCDFs (ng/kg)	Total Organic Carbon (mg/kg)
ROW025	SBS-ROW025-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	59.4	8.27	10.1	1.16	3.99	9,200
ROW026	SS-ROW026-0.5	05/21/2015	0-0.5	Discrete	Phase 1 OPP	103	15.4	20.4	4.57	8.44	20,000
ROW026	SBS-ROW026-1.0	05/21/2015	0.5-1.0	Discrete	Phase 1 OPP	201	19.4	37	5.07	12.8	12,000
ROW026	SBS-ROW026-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	179	17.5	29.2	3.85	12.6	9,600
ROW026	SBS-ROW026-2.0	08/26/2015	1.5-2.0	Discrete	Phase 1 OPP	82.5	6.98	16.5	1.83	5.34	7,900
ROW029B	SS-ROW029B-0.5	06/08/2015	0-0.5	Discrete	Phase 1 OPP	209	31.5	37.7	4.35	10.9	16,000
ROW029B	SBS-ROW029B-1.0	06/08/2015	0.5-1.0	Discrete	Phase 1 OPP	145	15.3	60.6	3.73	14.9	16,000
ROW029B	SBS-ROW029B-1.5	08/26/2015	1.0-1.5	Discrete	Phase 1 OPP	92.8	9.66	19.2	1.02	4.84	13,000
ROW030	SS-ROW030-0.5	04/30/2015	0-0.5	Discrete	Phase 1 OPP	96.8	13.8	15	2.4	4.79	15,000
ROW030	SS-ROW030-1.0	04/30/2015	0.5-1.0	Discrete	Phase 1 OPP	42	6.13	11.6	1.04	2.29	9,400
ROW033W	SS-ROW033W-0.5	11/02/2015	0-0.5	Discrete	Phase 1 OPP	1,040	59.3	1,270	18.5	373	22,000
ROW033W	SBS-ROW033W	11/02/2015	1.0-1.5	Discrete	Phase 1 OPP	780	38.4	1,010	12.7	277	14,000
ROW036	SS-ROW036-0.5	04/23/2015	0-0.5	Discrete	Phase 1 OPP	87.2	22.2	39.7	3.9	60.3	12,000
ROW036	SS-ROW036-1.0	04/23/2015	0.5-1.0	Discrete	Phase 1 OPP	5.3	0.796 J	3.47	0.944	3.68	11,000
ROWRRW	SS-ROWRRW-0.5	03/22/2016	0-0.5	Discrete	Phase 1 OPP	195	13.2	91.2	2.24	20.7	14,000
ROWRRW	SBS-ROWRRW-1.5	03/22/2016	1.0-1.5	Discrete	Phase 1 OPP	26.4	1.51 J	12.7	0.158 J	2.63	9,000
ROW-002N	ROW-002N-0.5	08/11/2016	0-0.5	Discrete	Phase 2 OPP	330	29.3	368	7.91	95.3	29,000
ROW010E	SS-ROW010E-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	294	20.3	248	7.33	66.8	19,000
ROW022E	SS-ROW022E-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	459	21.9	220	5.28	38.1	14,000
ROW022E	SS-ROW022E-0.5	11/02/2015	0-0.5	Discrete Dup	Phase 2 OPP	483	18.1	199	5.41	28.7	15,000
ROW029BS	SS-ROW029BS-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	281	21.5	84.1	6.54	18.2	15,000
ROW029BS	SBS-ROW029BS-1.5	11/02/2015	1.0-1.5	Discrete	Phase 2 OPP	12.5	0.753 J	4.86	0.663	1.46	9,200
ROW038S	SS-ROW038S-0.5	11/02/2015	0-0.5	Discrete	Phase 2 OPP	23.7	1.76 J	5.69 J	0.253 J	1.07 J	17,000
ROW-P2-001	ROW-P2-001-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	283	7.29	92.1	0.439 J	6.03	4,500
ROW-P2-002	ROW-P2-002-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	221	37.6	130	11.4	63.8	16,000
ROW-P2-002	ROW-P2-002-0.5-DUP	04/15/2016	0-0.5	Discrete Dup	Phase 2 OPP	215	37.1	111	10.2	54.4	19,000
ROW-P2-003	ROW-P2-003-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	507	23.4	132	6.11	32.8	16,000
ROW-P2-004	ROW-P2-004-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	131	5.29	33.6	0.992 J	4	8,400
ROW-P2-005	ROW-P2-005-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	464	17.1	102	1.46	13.7	15,000
ROW-P2-006	ROW-P2-006-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	181	12.7	78.2	2.72	15.5	21,000
ROW-P2-007	ROW-P2-007-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	83.1	5.79	17	0.896	6.69	22,000
ROW-P2-008	ROW-P2-008-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	876	32	110	2.77	28	26,000
ROW-P2-009	ROW-P2-009-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	535	56.8	368	10.1	133	16,000
ROW-P2-010	ROW-P2-010-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	33.1	2.7	5.84	0.162 J	1.76	9,200
ROW-P2-011A	ROW-P2-011A-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	1,560	40.1	234	3.59	26.9	21,000
ROW-P2-011B	ROW-P2-011B-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	839	30.8	139	4.93	25.1	15,000
ROW-P2-012	ROW-P2-012-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	73.1	8.26	17.8	0.964	4.84	13,000



**Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington**



Location	Sample Name	Collection Date	Collection Depth (ft bgs)	Sample Type	Area	Total HxCDFs (ng/kg)	Total PeCDDs (ng/kg)	Total PeCDFs (ng/kg)	Total TCDDs (ng/kg)	Total TCDFs (ng/kg)	Total Organic Carbon (mg/kg)
ROW-P2-013	ROW-P2-013-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	22.9	2.12	4.06	0.34	1.08	12,000
ROW-P2-014	ROW-P2-014-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	54.4	4.85	11.6	0.522	2.94	17,000
ROW-P2-015	ROW-P2-015-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	73.5	7.83	14.6	0.973	4.96	20,000
ROW-P2-016	ROW-P2-016-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	5,990	107	988	6.04	110	19,000
ROW-P2-017	ROW-P2-017-0.5	04/15/2016	0-0.5	Discrete	Phase 2 OPP	785	24.5	141	2.62	25.9	16,000
ROW-P2-018	ROW-P2-018-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	40	7.31	8.17	1.99	8.62	19,000
ROW-P2-019	ROW-P2-019-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	103	9.54	17.3	1.45	8.13	28,000
ROW-P2-020	ROW-P2-020-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	165	9.29	48.4	11.7 J	15.1	35,000
ROW-P2-021	ROW-P2-021-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	352	16.6	123	5.19	19.5	35,000
ROW-P2-022	ROW-P2-022-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	23	1.25	18.1	0.461	4.88	16,000
ROW-P2-033	ROW-P2-033-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	1,610	46.4	888	14.2	163	23,000
ROW-P2-034	ROW-P2-034-0.5	04/20/2016	0-0.5	Discrete	Phase 2 OPP	326	21.9	214	6.7	54.3	25,000
ROW078N	ROW-078N	11/22/2017	0-0.5	Discrete	Phase 3 OPP	338 J	64.6	248 J	14 J	60.5	29,000
ROW078NE	ROW-078NE	11/22/2017	0-0.5	Discrete	Phase 3 OPP	106 J	18.7 J	55.3 J	7.91 U	26.9 J	29,000
ROW078NW	ROW-078NW	11/22/2017	0-0.5	Discrete	Phase 3 OPP	128 J	34 J	48.9 J	13.5 J	16.8	30,000

Table 5-2  
ROW Soil Results  
Former PWT Site  
Ridgefield, Washington



**Notes**

**Bold** indicates values that exceed the MTCA Method B Soil CUL of 13.0 ng/kg.

bgs = below ground surface.

Dup = duplicate sample.

J = result is estimated.

mg/kg = milligrams per kilogram.

ng/kg = nanograms per kilogram.

OPP = off-property portion.

PWT = Pacific Wood Treating Co.

ROW = right-of-way.

TEQ = toxicity equivalent.

U = result is non-detect.

<sup>(a)</sup>Dioxin/furan TEQ calculated as the sum of each congener concentration multiplied by the corresponding mammalian TEF value. Detected results qualified as estimated are included in the calculation. Non-detect values are multiplied by one-half.

**References**

<sup>(1)</sup>Ecology. 2023. *Cleanup Levels and Risk Calculation (CLARC) table*. Washington State Department of Ecology, Toxics Cleanup Program. August.

<sup>(2)</sup>Ecology. 2007. *Evaluating the Toxicity and Assessing the Carcinogenic Risk of Environmental Mixtures Using Toxicity Equivalency Factors*. Supporting Material for CLARC. Washington State Department of Ecology.



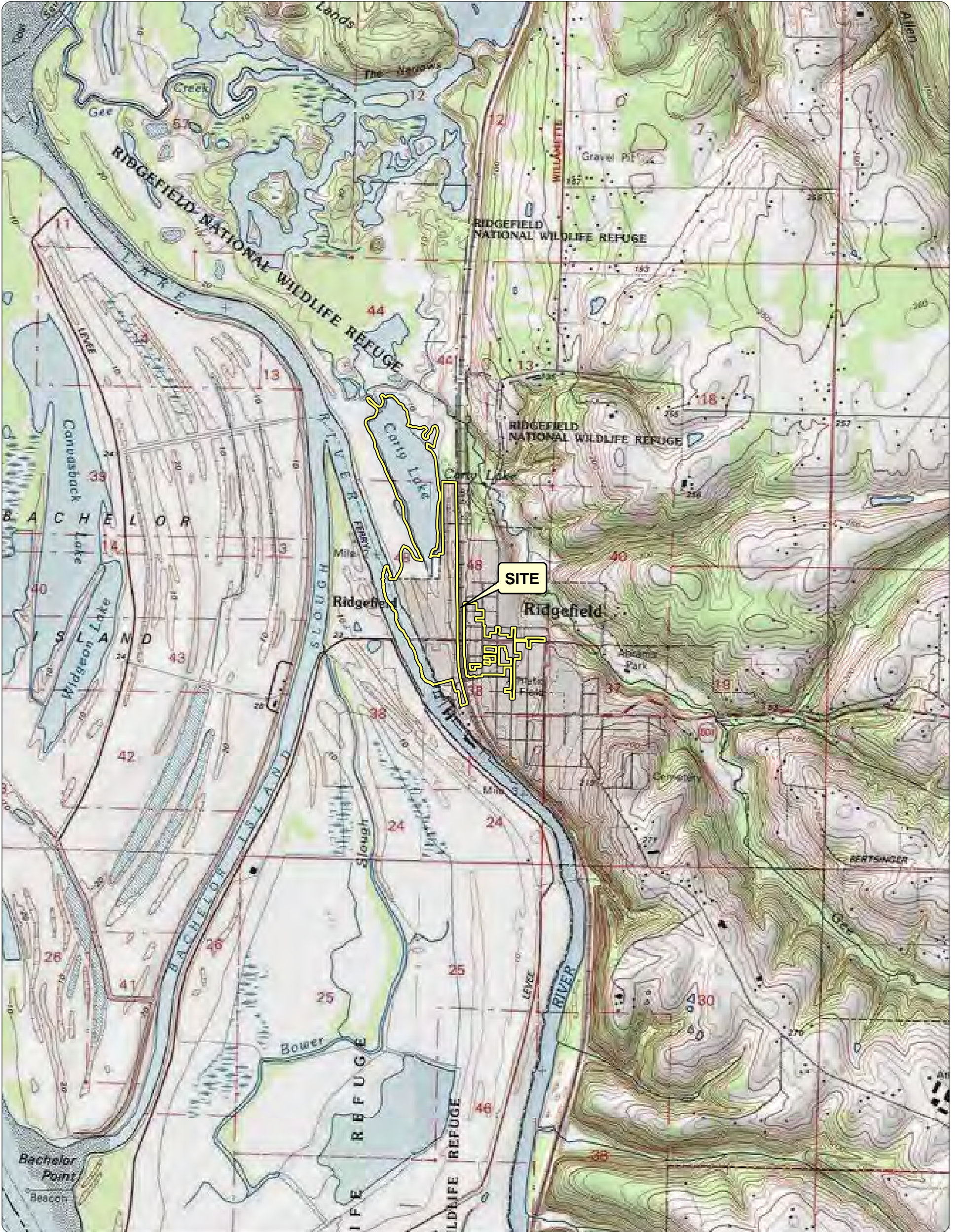
**Table 8-1  
Estimated Cleanup Costs  
Former PWT Site  
Ridgefield, Washington**



Residential Area Properties Cost (RR)			\$ 1,652,234
ROW Cost (RR)			\$ 1,171,161
Subtotal			\$ 2,823,395
Tax	8.4%	\$	237,165
Contingency	30%	\$	847,020
Total Cost Estimate Including Contingency			\$ 3,907,580
<b>Notes</b>			
Estimated costs are for the Phase 2 and 3 off-property portion.			
PWT = Pacific Wood Treating Co.			
ROW = right-of-way.			
RR = soil removal and restoration (selected alternative).			

# FIGURES





Source: Topographic Quadrangle obtained from ArcGIS Online Services/NGS-USGS TOPO/US Geological Survey (1999)  
 7.5-minute topographic quadrangle: Ridgefield  
 Address: Lake River Industrial Site  
 111 W. Division Street, Ridgefield, WA 98642  
 Section: 24 Township: 4N Range: 1W Of Willamette Meridian

**Legend**

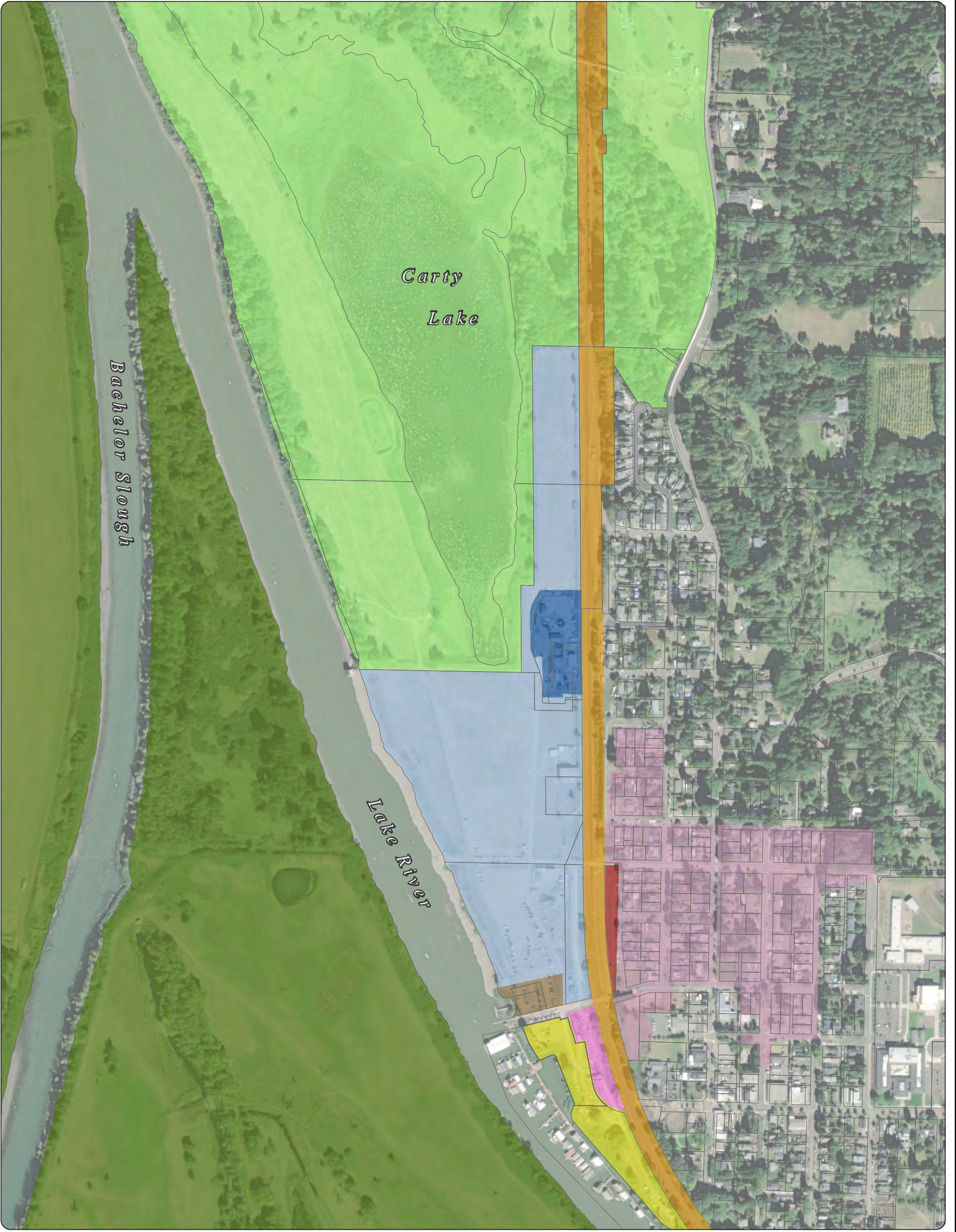
- Former Pacific Wood Treating Site

**Figure 1-1**  
**Site Location**

Former PWT Site  
 Ridgefield, Washington







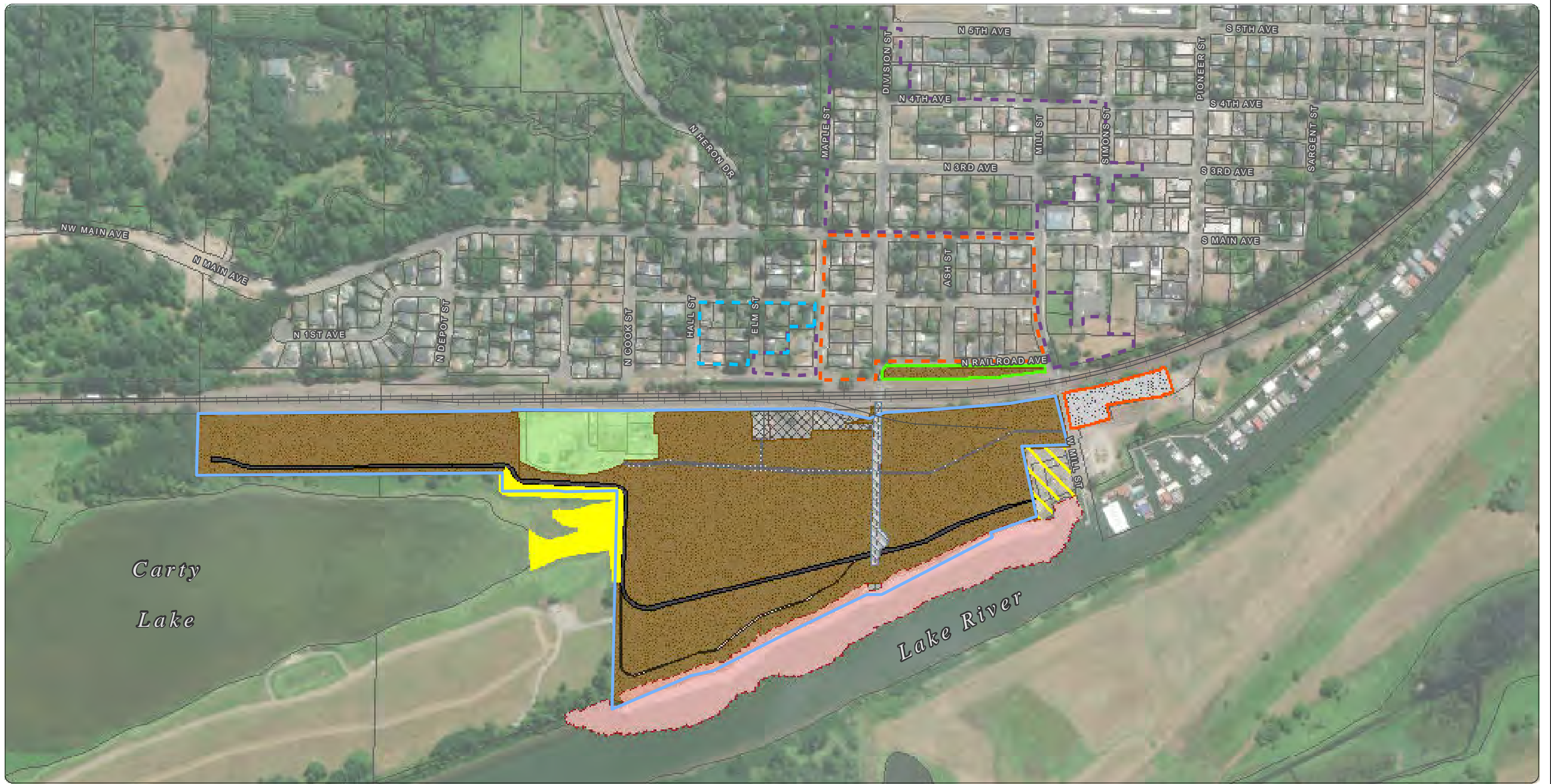
Source: Aerial photograph (2014), tax lots, and zoning data obtained from Clark County GIS.

Notes:  
 BNSF = Burlington Northern Sante Fe.  
 LRIS = Lake River Industrial Site.  
 Port = Port of Ridgefield.  
 PWT = Pacific Wood Treating.  
 RNWR = Ridgefield National Wildlife Refuge.  
 WWTP = Wastewater Treatment Plant.

- Legend**
- Clark County Tax Lots (2014)
  - Port Railroad Avenue Property
  - McCuddy's Marina Property
  - RNWR-Carty Unit
  - RNWR-River S Unit
  - BNSF Railroad Property
  - Port Overpass Property
  - LRIS
  - City of Ridgefield WWTP
  - Off-Property Portion
  - Port Marina Property

**Figure 1-2**  
**Site Vicinity Diagram**  
 Former PWT Site  
 Ridgefield, Washington





Source: Aerial photograph (2014) and streets obtained from Clark County GIS.

Notes:  
1. LRIS = Lake River Industrial Site.

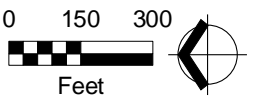


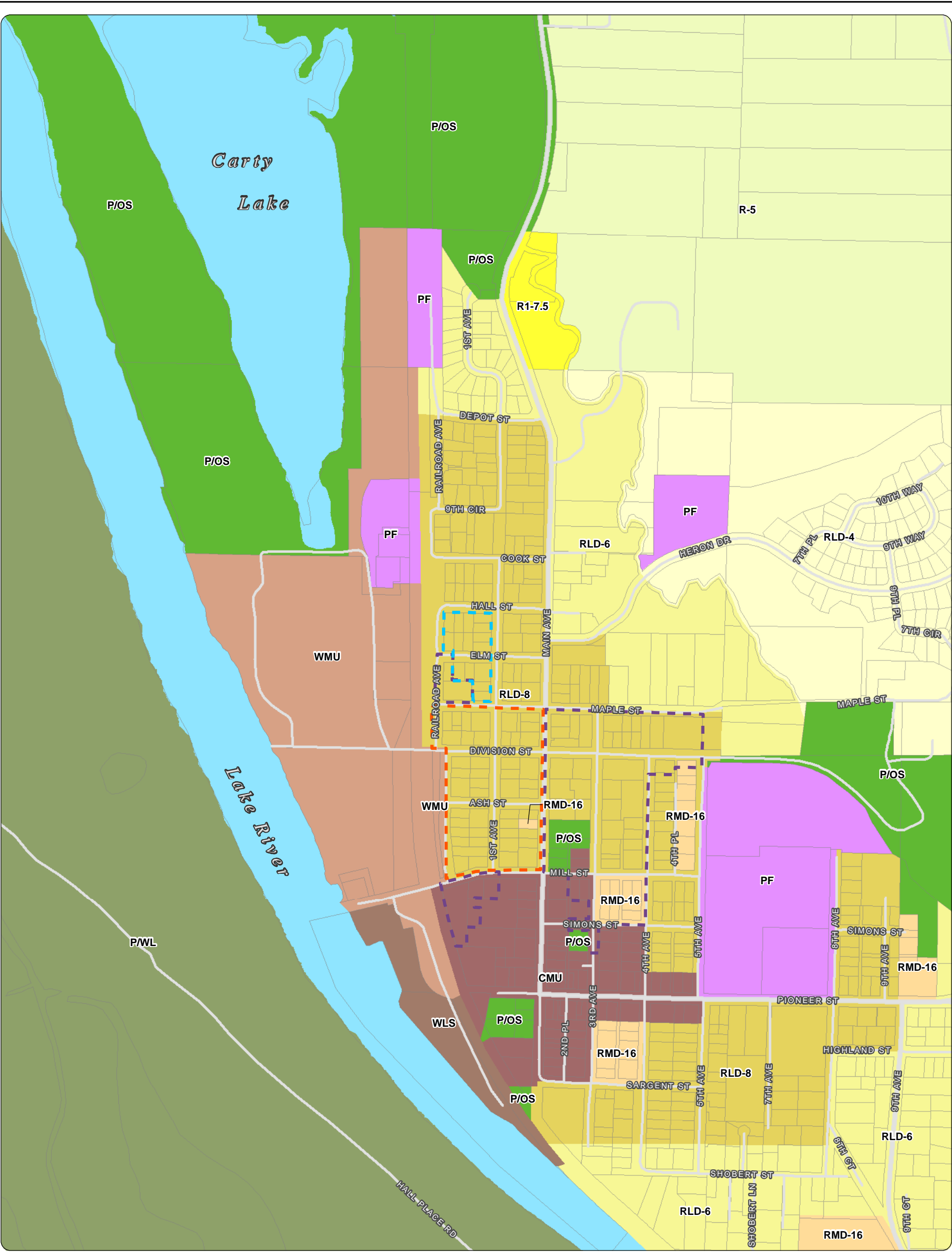
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**Legend**

- Phase 1 Off-Property Portion
- Phase 2 Off-Property Portion
- Phase 3 Off-Property Portion
- Clark County Tax Lots (2014)
- Railroad
- Soil Cap
- Gravel Cap
- Lake River Remedy
- Carty Lake Remedy
- Overpass Property
- Railroad Avenue Property
- Port Marina Property (existing asphalt)
- Wastewater Treatment Plant
- LRIS Boundary
- Asphalt Cap and Building
- Division Street
- Hard Trail
- Soft Trail
- Access Road

**Figure 2-1**  
**Past Cleanup Areas**  
Former PWT Site  
Ridgefield, Washington





Source: Zoning, tax lots, and roads data obtained from Clark County GIS (2014).

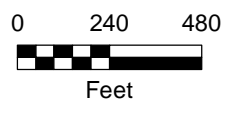
- - - Phase 1 Off-Property Portion
- - - Phase 2 Off-Property Portion
- - - Phase 3 Off-Property Portion
- Clark County Tax Lots (2014)

- Zoning**
- Single Family Residential (R1-7.5)
  - Residential Low Density - 4 (RLD-4)
  - Residential Low Density - 6 (RLD-6)
  - Residential Low Density - 8 (RLD-8)
  - Residential Medium Density (RMD-16)
  - Rural-5 (R-5)

- Parks/Open Space (P/OS)
- Parks/Wildlife Refuge (PWL)
- Public Facilities (PF)
- Central Mixed Use (CMU)
- Waterfront Low Scale (WLS)
- Waterfront Mixed Use (WMU)
- Water

**Figure 2-2**  
**Zoning Designations**  
 Former PWT Site  
 Ridgefield, Washington

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Source: Aerial photograph (2014) and tax lots obtained from Clark County GIS.

- Notes:
1. CUL = cleanup level.
  2. MTCA = Model Toxics Control Act Method B.
  3. ng/kg = nanograms per kilogram.
  4. TEQ = toxicity equivalent quotient.

**Legend**







- Surface Soil Sample Location
- Dioxin TEQ below MTCA B CUL (< 13 ng/kg)
- Dioxin TEQ above MTCA B CUL (> 13 ng/kg)
- Phase 1 Off-Property Portion
- Clark County Tax Lots (2014)
- Railroad

**Figure 2-3**  
**Surface Soil Sample Results (2010-2012)**  
 Former PWT Site  
 Ridgefield, Washington



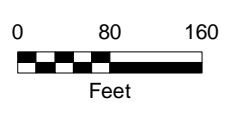


Source: Aerial photograph obtained from MapBox.  
Tax lots obtained from Clark County GIS.

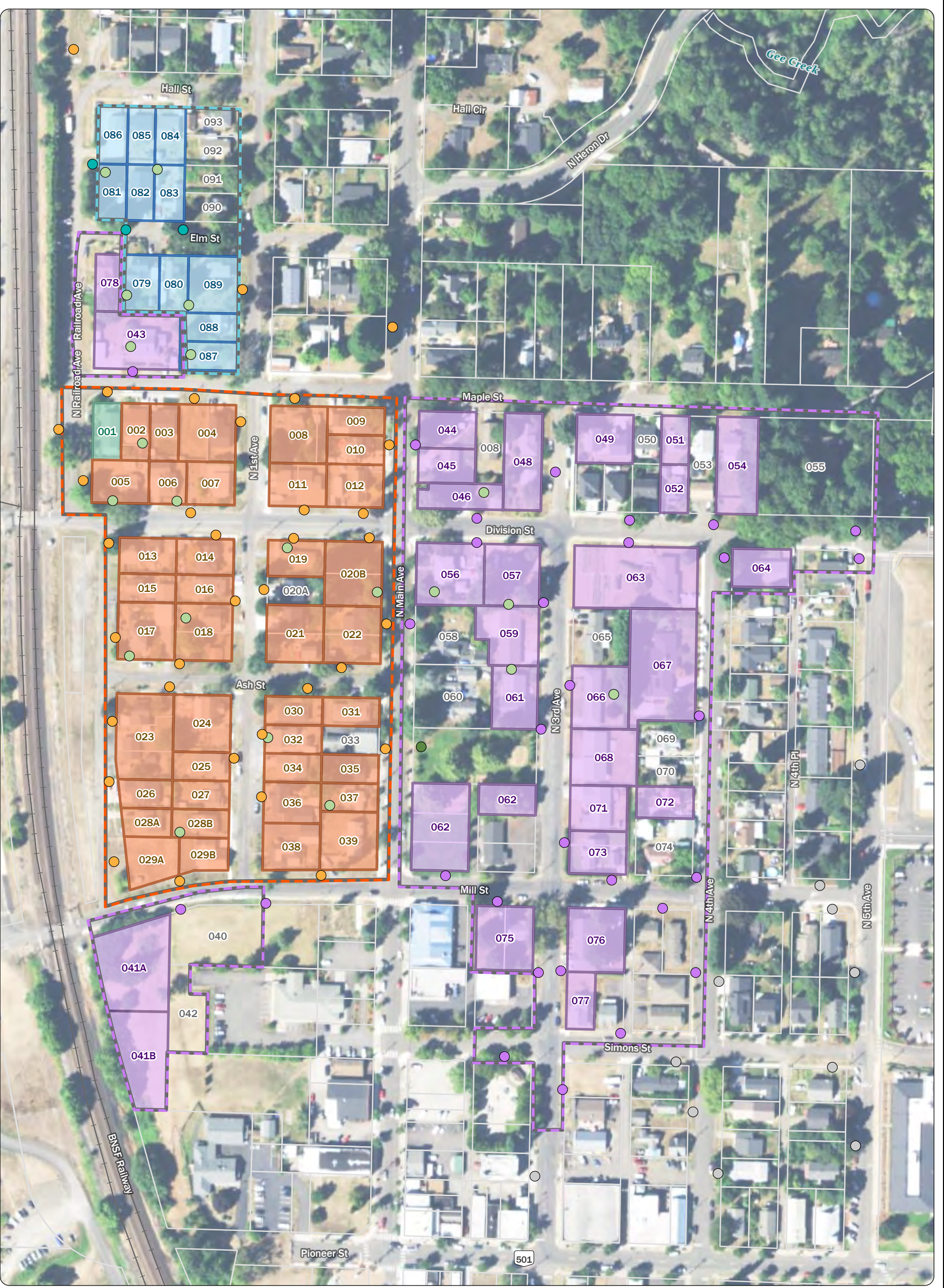
- Legend**
-  Phase 1 Off-Property Portion
  -  Phase 2 Off-Property Portion
  -  Phase 3 Off-Property Portion
  -  Property Boundary (with Property Identification Number)
  -  Clark County Tax Lots (2014)
  -  Railroad

**Figure 3-1**  
**Property and Tax Lot**  
**Boundaries (with Property**  
**Identification Number)**

Former PWT Site  
Ridgefield, Washington







**Notes**  
 One ISM sampling area was identified for each property, with the exception of 013 and 018. For these properties, a front yard and backyard sampling area was identified. See text for details. Composite samples were also collected at properties 004 and 081. See text for details.  
 ISM = incremental sampling methodology.  
 ROW = right of way.

**Data Source**  
 Aerial photograph obtained from the U.S. Department of Agriculture; parcels obtained from Clark County (2024).

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- Sample Locations**
- Discrete Property Surface Sample
  - Discrete Property Subsurface Sample
  - Phase 1 ROW Sample
  - Phase 2 ROW Sample
  - Phase 2 ROW Archive Sample
  - Phase 3 ROW Sample

- Legend**
- Sampling Areas**
- Composite Sampling Area
  - Phase 1 ISM Sampling Area
  - Phase 2 ISM Sampling Area
  - Phase 3 ISM Sampling Area

- Phase 1 Off Property Portion
- Phase 2 Off Property Portion
- Phase 3 Off Property Portion
- Parcel
- Railroad

**Figure 3-2**  
**Soil Sample Locations**

Former Pacific Wood Treating Site  
 Ridgefield, WA

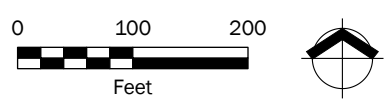
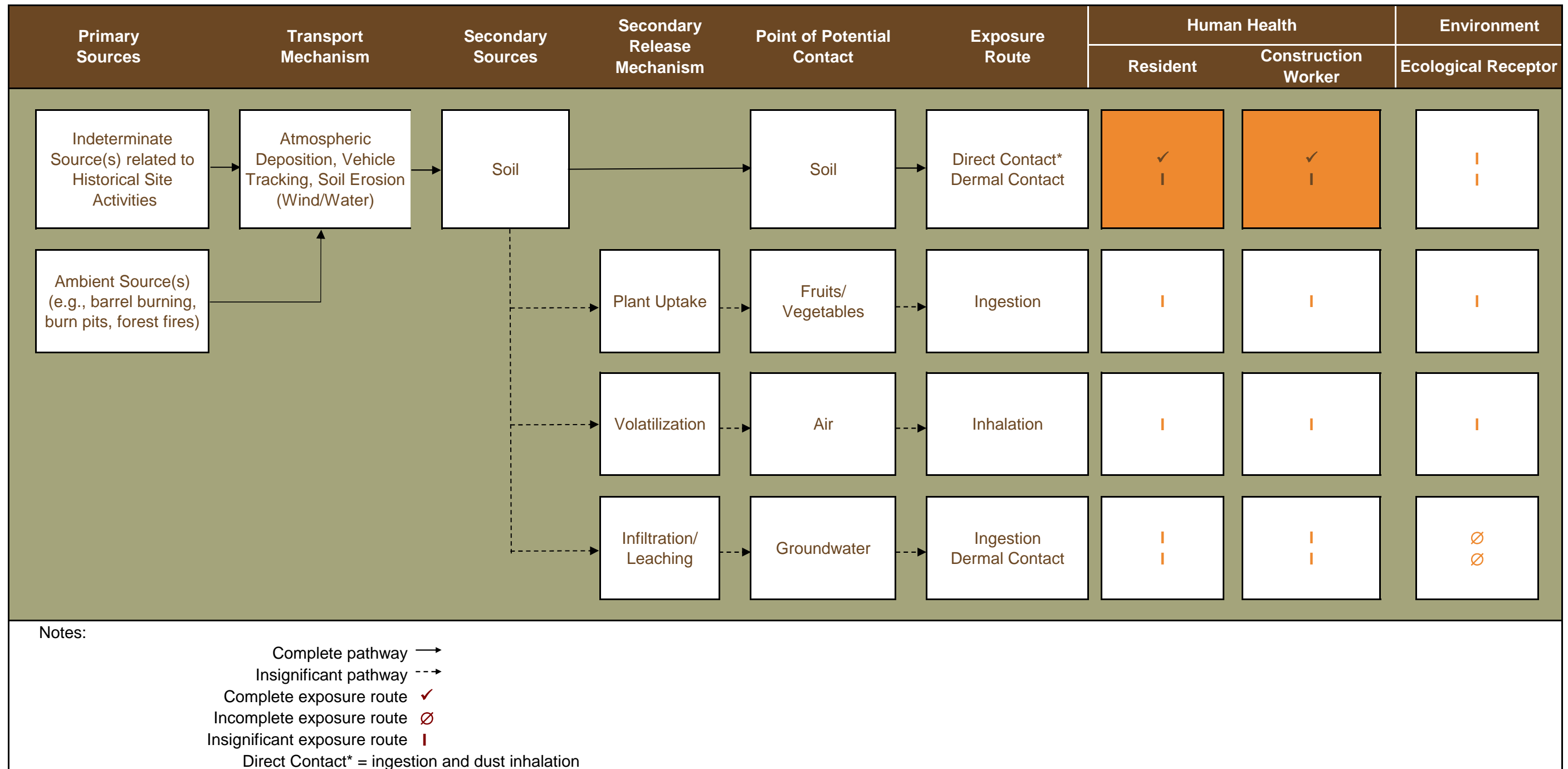
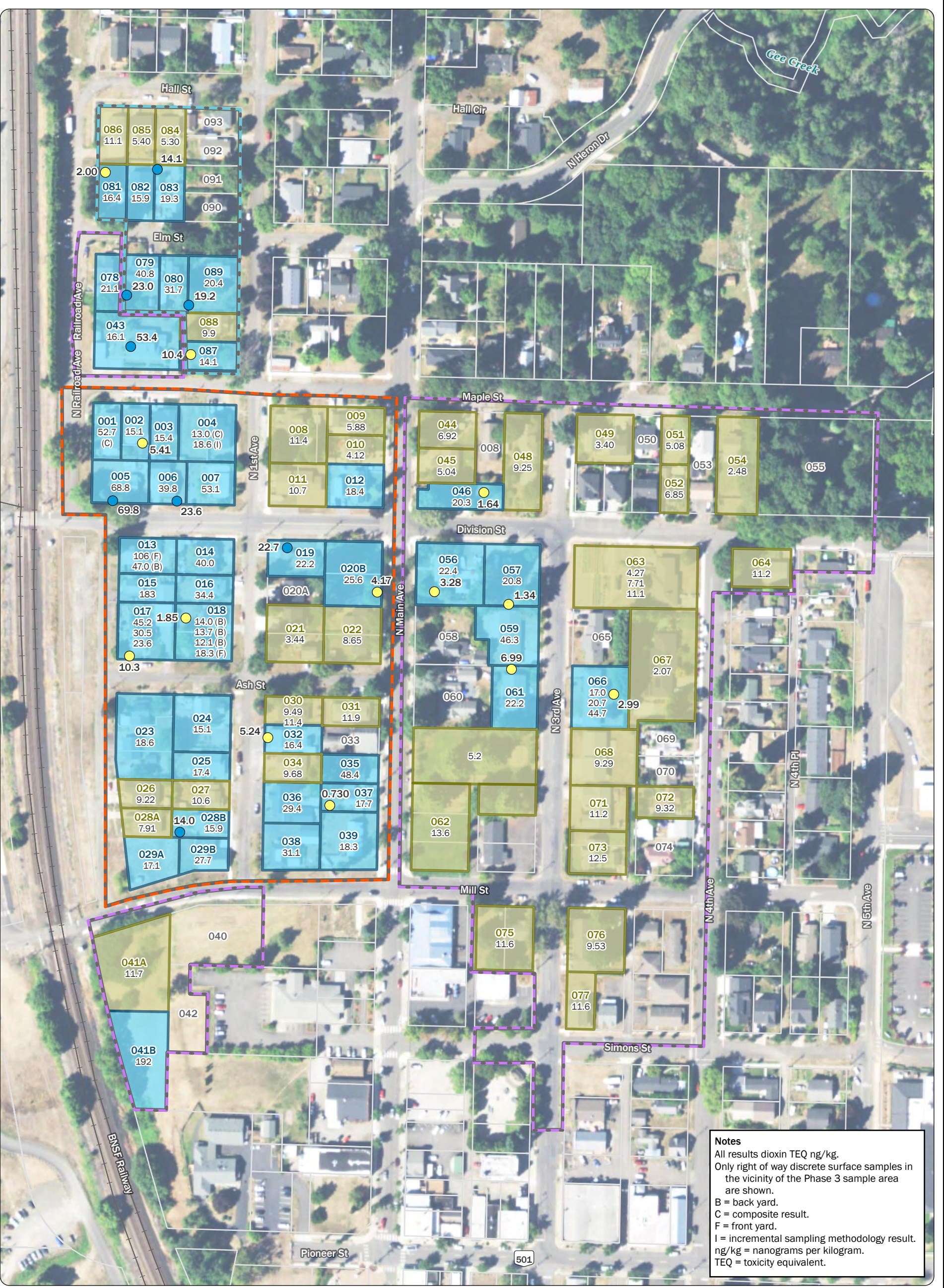




Figure 4-1  
Off-Property Portion Conceptual Model  
Former PWT Site  
Ridgefield, Washington







**Notes**  
 All results dioxin TEQ ng/kg.  
 Only right of way discrete surface samples in the vicinity of the Phase 3 sample area are shown.  
 B = back yard.  
 C = composite result.  
 F = front yard.  
 I = incremental sampling methodology result.  
 ng/kg = nanograms per kilogram.  
 TEQ = toxicity equivalent.

**Data Source**  
 Aerial photograph obtained from the U.S. Department of Agriculture; parcels obtained from Clark County (2024).

- Legend**
- Subsurface Meets Acceptable Risk Level
  - Subsurface Exceeds Acceptable Risk Level
  - Surface Meets Acceptable Risk Level
  - Surface Exceeds Acceptable Risk Level
  - Phase 1 Off Property Portion
  - Phase 2 Off Property Portion
  - Phase 3 Off Property Portion
  - Parcel
  - Railroad

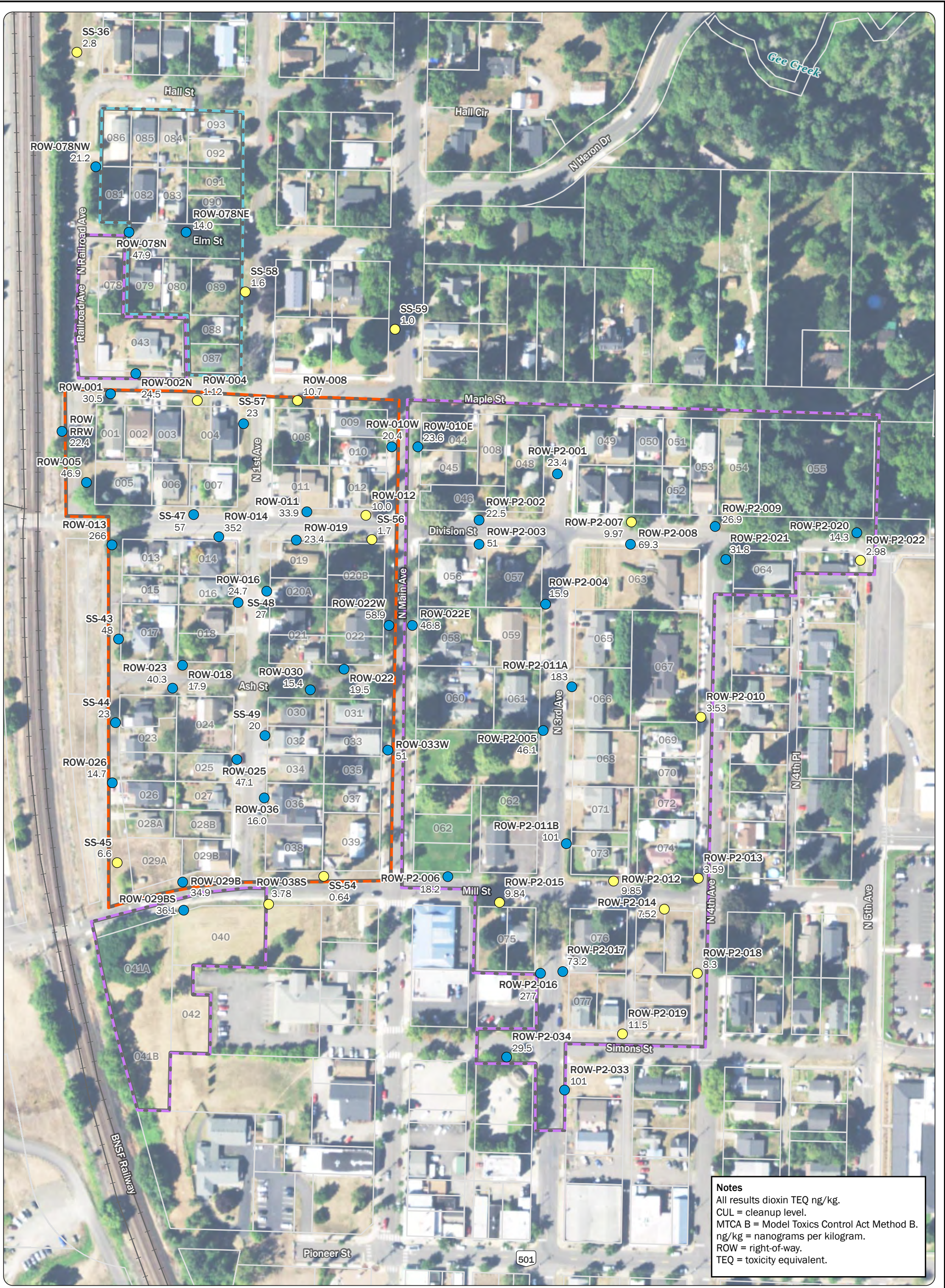
**Figure 5-1**  
**Property Soil Sample Results**  
 Former Pacific Wood Treating Site  
 Ridgefield, WA

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**Notes**  
 All results dioxin TEQ ng/kg.  
 CUL = cleanup level.  
 MTCA B = Model Toxics Control Act Method B.  
 ng/kg = nanograms per kilogram.  
 ROW = right-of-way.  
 TEQ = toxicity equivalent.

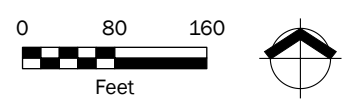
**Data Source**  
 Aerial photograph obtained from the U.S. Department of Agriculture; parcels obtained from Clark County (2024).

- Legend**
- ROW Dioxin TEQ Below MTCA B CUL (< 13 ng/kg)
  - ROW Dioxin TEQ Above MTCA B CUL (> 13 ng/kg)
  - Phase 1 Off Property Portion
  - Phase 2 Off Property Portion
  - Phase 3 Off Property Portion
  - Parcel
  - Railroad

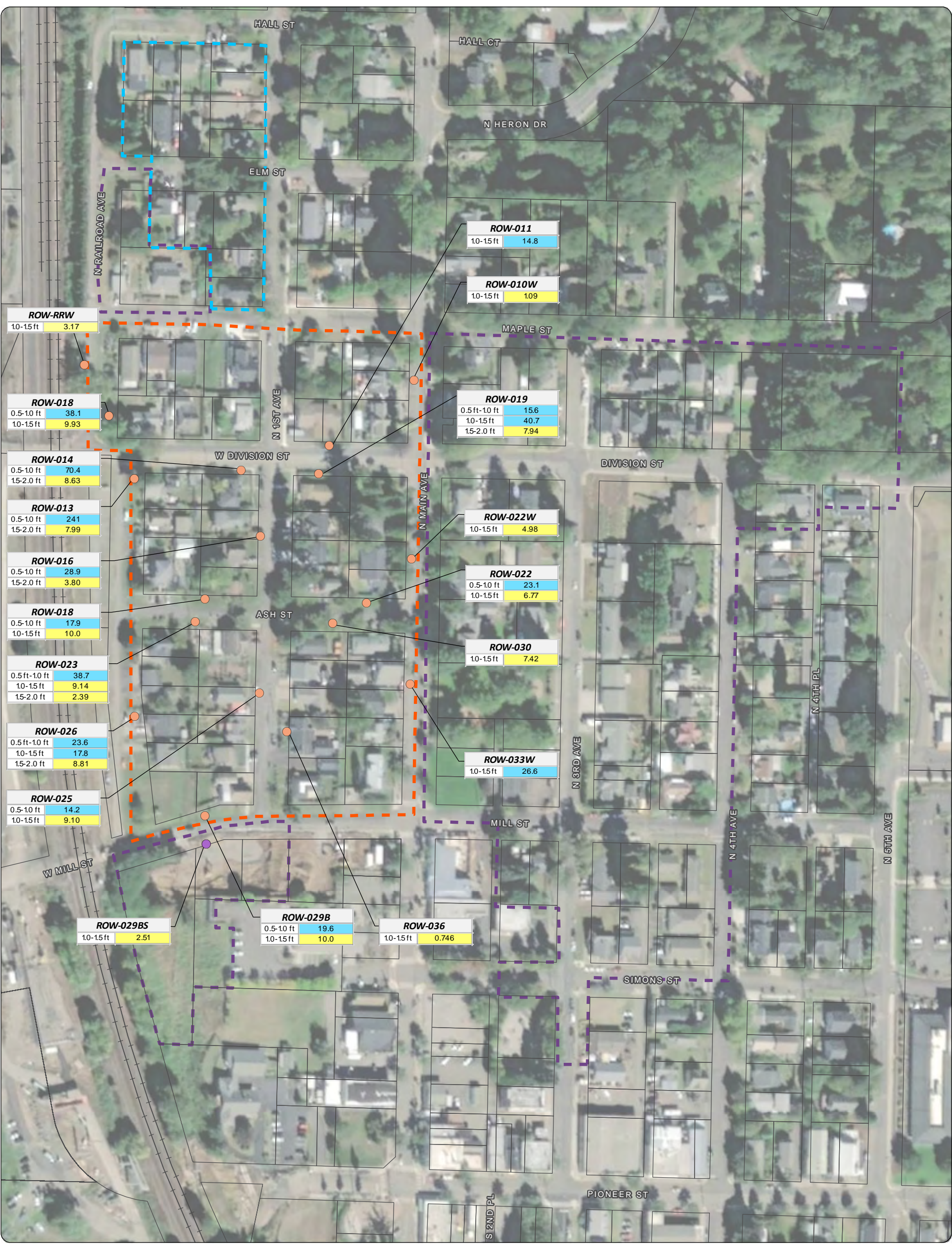
**Figure 5-2**  
**ROW Surface Soil**  
**Sample Results**  
 Former Pacific Wood Treating Site  
 Ridgefield, WA

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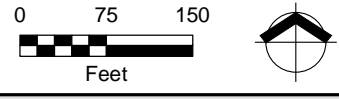
Source: Aerial photograph obtained from Mapbix.  
Tax lots obtained from Clark County GIS.

- Notes:
1. CUL = cleanup level.
  2. MTCA B = Model Toxics Control Act Method B.
  3. ng/kg = nanograms per kilogram.
  4. ROW = right-of-way.
  5. TEQ = toxicity equivalent.

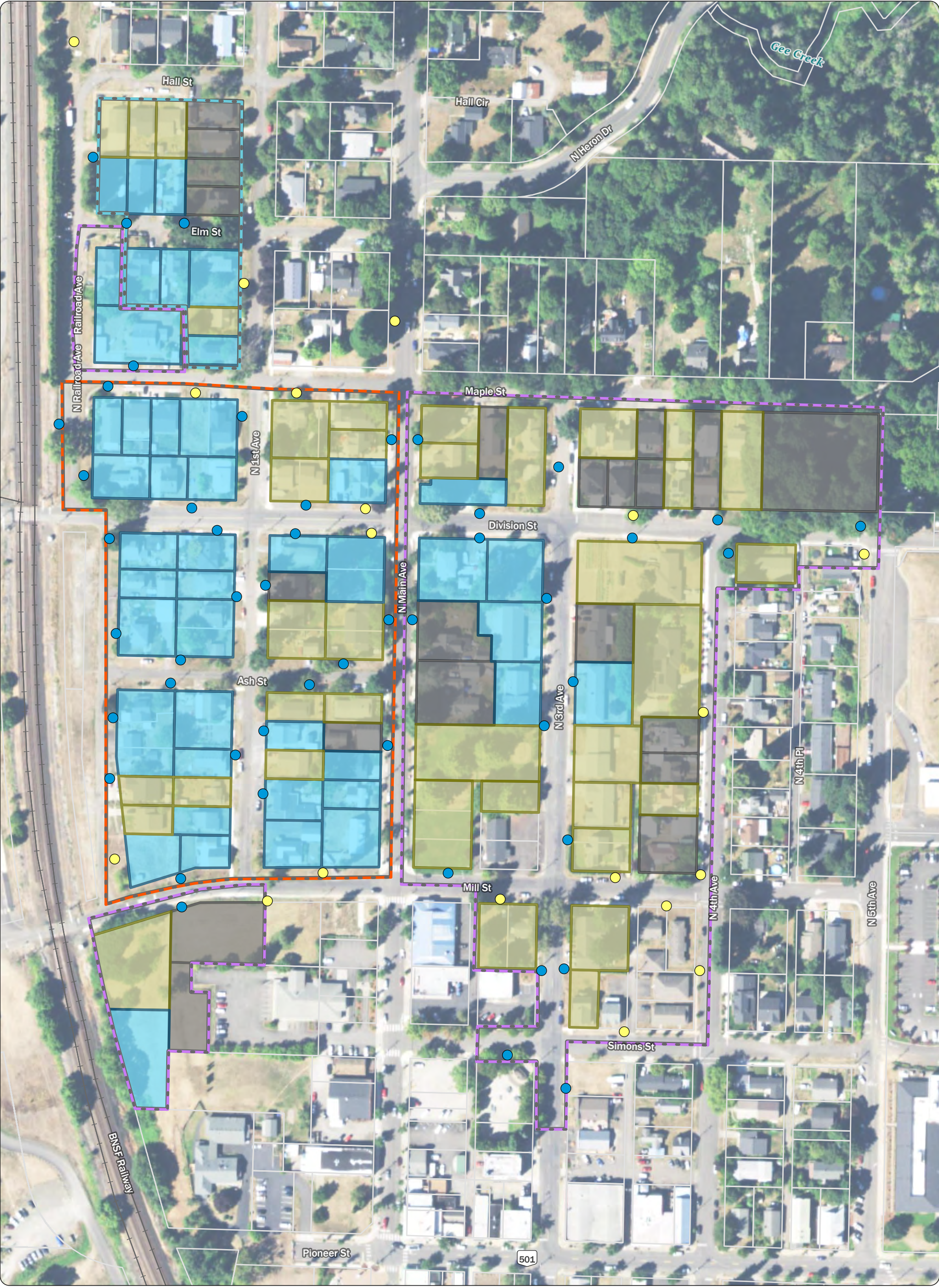
**Legend**

- Phase 1 ROW Sample
  - Phase 2 ROW Sample
  - Phase 1 Off-Property Portion
  - Phase 2 Off-Property Portion
  - Phase 3 Preliminary Cleanup Properties (Not Completed)
  - Clark County Tax Lots (2014)
  - Railroad
  - ROW Dioxin TEQ below MTCA B CUL (< 13 ng/kg)
  - ROW Dioxin TEQ above MTCA B CUL (< 13 ng/kg)
- | ROW Sample ID                |                    |
|------------------------------|--------------------|
| Depth (below ground surface) | Dioxin TEQ (ng/kg) |
|                              |                    |
|                              |                    |

**Figure 5-3**  
**ROW Subsurface Soil Sample Results**  
Former PWT Site  
Ridgefield, Washington







**Note**  
ROW = right of way.

**Data Source**  
Aerial photograph obtained from the U.S. Department of Agriculture; parcels obtained from Clark County (2024).



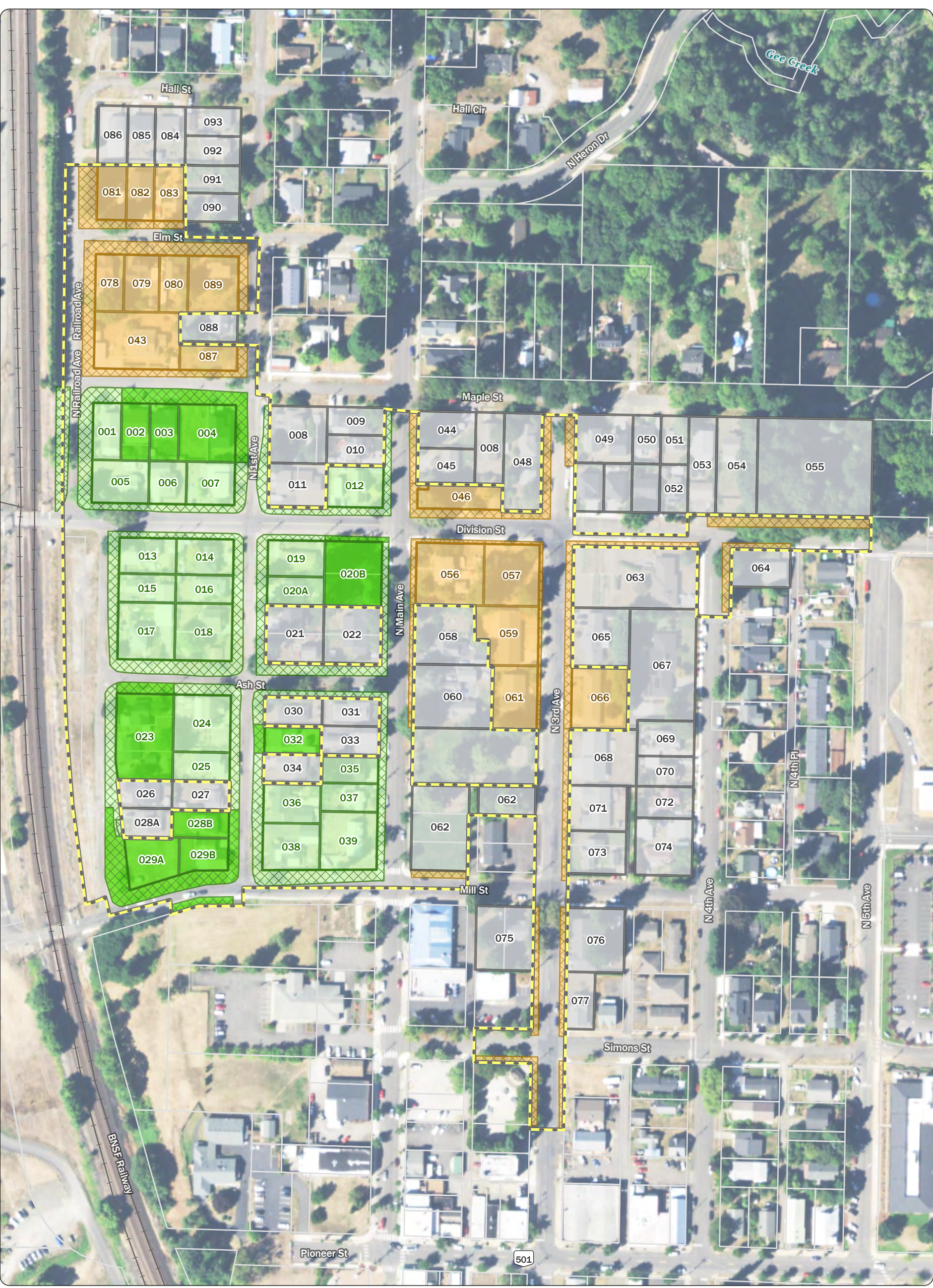
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- |  |                              |
|--|------------------------------|
| ● ROW Meets Acceptable Risk Level        | Phase 1 Off Property Portion |
| ● ROW Exceeds Acceptable Risk Level      | Phase 2 Off Property Portion |
| ■ Property Meets Acceptable Risk Level   | Phase 3 Off Property Portion |
| ■ Property Exceeds Acceptable Risk Level | Parcel                       |
| ■ Sampling Not Conducted                 | — Railroad                   |

**Figure 7-1**  
**Surface Soil Results Summary**  
Former Pacific Wood Treating Site  
Ridgefield, WA

0 80 160  
Feet





**Note**  
ROW = right of way.

**Data Source**  
Aerial photograph obtained from the U.S. Department of Agriculture; parcels obtained from Clark County (2024).

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- Property Cleanup Status**
- Cleanup Property (Not Completed)
  - 2016 Cleanup Property (Completed)
  - 2017 Cleanup Property (Completed)
  - No Cleanup Needed

- Legend**
- Right of Way Cleanup Status**
- ROW Cleanup Area (Not Completed)
  - 2016 ROW Cleanup Area (Completed)
  - 2017 ROW Cleanup Area (Completed)

- Off-Property Portion Site
- Parcel
- Railroad

**Figure 8-1  
Cleanup Status**  
Former Pacific Wood Treating Site  
Ridgefield, WA





# APPENDIX A

## PROPERTY DATABASE





**Appendix A**  
**Property Database**  
**Former PWT Site**  
**Ridgefield, Washington**



Property ID Number	Tax Lot Parcel Number	Property Address	Area (Sq. Ft.)	Year Built	Most Recent Sale	Property Type Description	Date Yard Survey Conducted	Yard Survey Comments	Collected Yard Sample?	Questionnaire Status	Access Agreement Status
001	69314000	512 RAILROAD AVE, RIDGEFIELD, 98624	4,988	1994	2004	HOUSE	9/21/2015	The house was built in 1994. In 2004, the yard consisted of a well-maintained lawn and several evenly spaced small trees that appear to have been installed after home construction. The entire yard has since been heavily re-landscaped. Several feet of soil, mulch and/or pea gravel were placed on top of geosynthetic fabric that separates the former lawn and the landscaping. The owner placed 64,000 pounds of pea gravel throughout property. No lawn remains and there is no exposed soil.	Yes	Received	Received
002	69312000	5 MAPLE ST, RIDGEFIELD, 98642	3,649	1996	2016	HOUSE	11/20/2015	The house was built in 1996. In 2000 the yard consisted of a well-maintained lawn and small shrubs. Current conditions are similar.	Yes	Received	Received
	69310000	NA	1,345	NA	2016	NO BUILDING	11/20/2015				
003	69297000	7 MAPLE ST, RIDGEFIELD, 98642	5,021	1993	2013	HOUSE	2/9/2016	The house was built in 1993. The property is flat, land to the east is elevated several feet, and a retaining wall is present along the eastern property boundary. This suggests that significant soil excavation was conducted to bring the property to level grade. In 2004 the yard consisted of a well-maintained lawn that appears to have been installed after construction. Current conditions are similar.	Yes	Not Received	Received
004	69292000	NA (EMPTY LOT)	9,982	NA	2017	NO BUILDING	3/19/2015	Undeveloped lot overgrown with up to 8 feet of blackberry bushes. Evidence of soil fill on the northwestern portion. Some wood debris present. Because of limited accessibility, a four-point composite surface sample (0 to 0.5 foot bgs) and a four-point composite subsurface sample (0.5 to 1 foot bgs) were initially identified for collection instead of ISM and DSBS samples. In 2017 the property was cleared and an ISM sample was collected.	Yes	Received	Received
005	69315000	4 W DIVISION ST, RIDGEFIELD, 98642	7,482	1925	2016	HOUSE	4/3/2015	Water line trench in northern portion of yard, as well as several piles indicating soil disturbance; these areas are not included in sampling area. Former burn area identified in northwest portion of yard, approximately 6- to 8-foot-diameter. DSBS sample in front yard.	Yes	Received	Received
006	69298000	8 DIVISION ST, RIDGEFIELD, 98642	4,952	1915	2008	HOUSE	4/3/2015	Fire pit and recently constructed deck in northeastern portion of yard; these areas are not included in the sampling area. DSBS sample in front yard.	Yes	Received	Received
007	69316000	14 DIVISION ST, RIDGEFIELD, 98642	6,315	1912	1998	HOUSE	4/3/2015	Eastern portion of yard heavily landscaped/disturbed; western portion driveway includes imported fill; areas along southern property boundary have lumber reinforcements. These areas are not included in the sampling area.	Yes	Not Received	Received
008	69324000	512 N 1ST AVE, RIDGEFIELD, 98642	8,201	1930	1997	HOUSE	5/6/2015	Multiple areas of disturbance, treated-wood storage, burn areas, soil/tree excavations, etc. The northwestern portion of the front yard and the northeastern portion of the backyard are least disturbed.	Yes	Received	Received
	69322000	NA	1,799	NA	1997	NO BUILDING	5/6/2015				
009	69319000	515 N MAIN AVE, RIDGEFIELD, 98642	4,859	2004	2016	HOUSE	3/19/2015	The house was built in 2004. In 2004 the yard consisted of a well-maintained lawn, and one large tree had been retained. Current conditions are similar.	Yes	Not received	Received
010	69318000	511 N MAIN AVE, RIDGEFIELD, 98642	5,142	1920	2014	HOUSE	3/19/2015	The house was built in 2000. A house was present on this property and the adjacent property 009 until at least 1996. In 2004 the yard consisted of a well-maintained lawn, and a large tree had been retained. Current conditions are similar.	Yes	Not received	Received

**Appendix A  
Property Database  
Former PWT Site  
Ridgefield, Washington**



Property ID Number	Tax Lot Parcel Number	Property Address	Area (Sq. Ft.)	Year Built	Most Recent Sale	Property Type Description	Date Yard Survey Conducted	Yard Survey Comments	Collected Yard Sample?	Questionnaire Status	Access Agreement Status
011	69326000	NA	3,752	NA	2017	NO BUILDING	4/2/2015	The southwestern portion of the property consists of imported gravel, and 2 to 3 inches of topsoil were removed/regraded in front and side yards in 2014; these areas are not included in the sampling area.	Yes	Not received	Received
	69328000	100 DIVISION ST, RIDGEFIELD, 98642	3,746	1988	2017	HOUSE	4/2/2015				
012	69330000	503 & 505 N MAIN AVE, RIDGEFIELD, 98642	7,493	1901	2017	HOUSE	4/14/2015	Significant soil disturbance in backyard for construction of boat port; additional soil work conducted in backyard near home; front yard lawn and lawn along western property boundary in backyard undisturbed. Constructed gravel driveway leading to boat port. Some pavers removed along side yard and leading to front yard, adjacent to house.	Yes	Received	Received
013	69416000	5 DIVISION ST, RIDGEFIELD, 98642	6,297	1913	2015	HOUSE	4/3/2015	Water line present in backyard; imported garden bed soils; treated lumber supports in parking area. These areas are not included in the sampling area. Evidence of debris/burning approximately 3 to 4 feet bgs, according to owner. Backyard physically separated from front by fencing and home. Two ISM sampling areas (1 backyard, 1 front yard). ROW sample along Railroad Avenue and Division Street intersection.	Yes	Received	Received
014	69378000	413 N 1ST AVE, RIDGEFIELD, 98642	6,300	1920	2013	HOUSE	4/14/2015	Mostly lawn, with flower beds along edges; oil tank was decommissioned, likely present in right-of-way along east side of property along North 1st Avenue; sewer line along southern property boundary.	Yes	Received	Received
015	69414000	410 RAILROAD AVE, RIDGEFIELD, 98642	4,994	1920	2014	HOUSE	4/14/2015	No significant known soil disturbance in lawn areas; some areas of disturbance along fence line.			
016	69380000	409 N 1ST AVE, RIDGEFIELD, 98642	5,001	1920	2015	HOUSE	4/28/2015	Some minimal soil placement for reseeding grass; a former burn pit is present in southwestern portion of backyard; otherwise there are no known significant disturbances.	Yes	Received	Received
017	69410000	6 ASH ST, RIDGEFIELD, 98642	10,001	1913	2012	HOUSE	4/14/2015	Significant soil disturbance in backyard: former asphalt driveway approximately 20 feet wide was removed; driveway installed along eastern property boundary. Front and side yards relatively undisturbed, except for some landscaped areas (mulched, imported soil in flower/garden beds) and a small area of new sod along eastern edge of home.	Yes	Received	Received
018	69382000	405 N 1ST AVE, RIDGEFIELD, 98642	5,036	1920	2012	HOUSE	4/2/2015	Soil disturbance/regrading along southeastern and northern portions of property; former burn pit to the south of home. These areas are not included in the sampling area. Large front yard and backyard; two ISM sampling areas (one backyard, one front yard). Triplicate samples in backyard sample area. DSBS sample in backyard.	Yes	Received	Received
	69384000	NA	4,960	1990	2012	DETACHED GARAGE	4/2/2015				
019	69348000	412 N 1ST AVE, RIDGEFIELD, 98642	6,301	1991	2004	HOUSE	5/21/2015	The two side yards are primarily lawn. A small backyard includes large shed and brush/dirt areas. Front yard includes large paved driveway and rock garden installed five years ago. Otherwise, yard is relatively undisturbed, according to owner.	Yes	Received	Received
020A	69350000	NA	5,001	NA	1996	NO BUILDING	04/16/2015	Backyard lot; former burn area in center 6 to 8 feet in diameter, included burning of plastics; imported soil in southwest corner; significant disturbance along eastern portion due to septic work; some raised beds.	No	Received	Received
020B	69340000	411 N MAIN AVE, RIDGEFIELD, 98642	11,301	1911	Unknown	HOUSE	04/16/2015	Soil disturbance for tank removal/placement in two areas along home in northeastern property portion; significant soil disturbance along western property portion for septic work; some wood ash spread across side yard in northern property portion for gardening purposes; the front yard in the southeastern property portion is relatively undisturbed.	Yes	Received	Received

**Appendix A**  
**Property Database**  
**Former PWT Site**  
**Ridgefield, Washington**



Property ID Number	Tax Lot Parcel Number	Property Address	Area (Sq. Ft.)	Year Built	Most Recent Sale	Property Type Description	Date Yard Survey Conducted	Yard Survey Comments	Collected Yard Sample?	Questionnaire Status	Access Agreement Status
021	69352000	102 ASH ST, RIDGEFIELD, 98642	10,002	1950	1996	HOUSE	04/21/2015	Most of the front yard and backyard were heavily disturbed as a bobcat was brought in to grade soil throughout much of the property; yard along the northwestern portion is most likely to be undisturbed, according to owner. This area is the former front yard of a house that was demolished in the 1980s.	Yes	Not Received	Received
022	69344000	403 N MAIN AVE, RIDGEFIELD, 98642	5,002	1990	2013	HOUSE	05/06/2015	The yard is primarily lawn with two large trees present in the front yard. ROW samples adjacent to property 023 on Ash Street and on Main Avenue were previously collected.	Yes	Not Received	Received
	69346000	405 N MAIN AVE, RIDGEFIELD, 98642	5,001				05/06/2015				
023	69406000	5 ASH ST, RIDGEFIELD, 98642	4,913	1920	2002	HOUSE	09/21/2015	The property includes several structures (house and garages). The eastern portion of the yard was recently subject to significant soil disturbance: a long trench approximately 10 feet deep along the home was dug and soil appears to have been placed to the east of the trench in the side yard and in the eastern portion of the front yard; excavator track marks are present. These areas are not included in sampling area. ROW samples adjacent to property 022 on Ash Street were previously collected.	Yes	Received	Received
	69407000	NA	5,088	2005	2003	DETACHED GARAGE	09/21/2015				
	69402000	NA	4,926	NA	2002	NO BUILDING	09/21/2015				
024	69386000	327 N 1ST AVE, RIDGEFIELD, 98642	10,001	1927	2017	HOUSE	04/21/2015	Heavily landscaped/garden area along southeastern portion of property; the front and side yards along the northeastern property boundary likely are undisturbed; the backyard has large burn pit, several buried pavers, and an area of mounded soil that was placed; creosote ties were removed from the garden area.	Yes	Received	Received
025	69390000	319 N 1ST AVE, RIDGEFIELD, 98642	5,002	1920	2012	HOUSE	04/21/2015	Undisturbed front yard lawn; side yard along north was excavated for stormwater diversion ditch; water pipe is present along southern portion of home; backyard is somewhat undisturbed, except for a burn pit in center of yard. Current owner noted that the previous resident had left various debris buried in yard.	Yes	Received	Received
026	69401000	314 N RAILROAD AVE, RIDGEFIELD, 98642	4,621	1995	2016	HOUSE	09/21/2015	Heavily disturbed yard; backyard soil was scraped and placed in front yard. A trench has been dug in front yard.	Yes	Received	Received
027	69392000	315 N 1ST AVE, RIDGEFIELD, 98642	5,000	1925	2017	HOUSE	04/21/2015	Heavily landscaped/disturbed front yard; backyard is primarily chicken coops/sheds, with some undisturbed soil/grass paths around the coops, according to owner.	Yes	Received	Received
028A	69394000	311 N 1ST AVE, RIDGEFIELD, 98642	9,305	1998	Unknown	HOUSE	05/06/2015	The house was built in 1998. Aerial imagery indicates undeveloped property with vegetation and several large trees on the southern portion before that date. The large trees were removed between 2010 and 2011. In 2004 the yard consisted of a lawn that appears to have been installed after construction. Current conditions are similar.	Yes	Not Received	Received
028B	69394000			1918	Unknown	HOUSE	05/06/2015	Front yard and backyard largely undisturbed; some landscaping along the property boundary.	Yes	Not Received	Received
029A	69398000	305 N 1ST AVE, RIDGEFIELD, 98642	5,959	NA	2017	NO BUILDING	04/21/2015	Vacant lot (primarily lawn/grasses) with some wood/debris piles along northeastern portion. Large bushes/trees in southwestern portion. Prior lot uses are not known, according to owner.	Yes	Received	Received
029B	69400000	305 N 1ST AVE, RIDGEFIELD, 98642	6,386	1940	2017	HOUSE	04/14/2015	Mostly lawn in front yard and backyard; no significant soil disturbance except for removal of five large trees, which had died. Some landscaping along property boundary and along home in backyard.	Yes	Received	Received
030	69375000	101 ASH ST, RIDGEFIELD, 98642	5,005	1980	2006	HOUSE	04/21/2015	No significant yard modifications in last two years, according to tenant; previous yard history unknown. A few sheds and a manhole are present along eastern property boundary, as well as an aboveground pool area in the southwest. Yard is primarily lawn.	Yes	Received	Received

**Appendix A  
Property Database  
Former PWT Site  
Ridgefield, Washington**



Property ID Number	Tax Lot Parcel Number	Property Address	Area (Sq. Ft.)	Year Built	Most Recent Sale	Property Type Description	Date Yard Survey Conducted	Yard Survey Comments	Collected Yard Sample?	Questionnaire Status	Access Agreement Status
031	69356000	105 ASH ST, RIDGEFIELD, 98642	5,000	1985	2016	HOUSE	04/02/2015	Imported soil in garden beds along home and perhaps in parking strip; these areas are not included in the sampling area. Small backyard and front yard areas are combined into one ISM sampling area.	Yes	Received	Received
032	69374000	322 N 1ST AVE, RIDGEFIELD, 98642	4,998	1920	2015	HOUSE	04/13/2015	Small lawn in front yard and backyard are undisturbed; tractor and other equipment in backyard along house.	Yes	Not Received	Not Received
033	69358000	319 N MAIN AVE, RIDGEFIELD, 98642	4,792	Unknown	2004	HOUSE	04/13/2015	Entire property is paved.	No	Not Received	Not Received
		321 N MAIN AVE, RIDGEFIELD, 98642					04/13/2015				
		323 N MAIN AVE, RIDGEFIELD, 98642					04/13/2015				
034	69372000	318 N 1ST AVE, RIDGEFIELD, 98642	4,988	1995	2003	HOUSE	04/21/2015	The house was built between 1993 (according the Clark County Maps Online) and 1995 (according to the property owner). In 2005 the yard consisted of a lawn that appears to have been installed after construction. According to the property owner, the current lawn and landscaping was installed two to five years ago, and a site visit confirmed that a well-maintained, evenly graded lawn is currently present.	Yes	Received	Received
035	69362000	313 N MAIN AVE, RIDGEFIELD, 98642	4,995	1993	2003	HOUSE	05/06/2015	The house was built in 1993. A shed was installed in the backyard ten years ago. In 2004 the yard consisted of a lawn that appears to have been installed after construction. According to the owner, new sod was installed approximately four years ago, and a site visit confirmed that a well-maintained, evenly graded lawn is currently present.	Yes	Received	Received
036	69370000	314 N 1ST AVE, RIDGEFIELD, 98642	7,194	1920	2006	HOUSE	04/13/2015	Edge landscaping in front yard, lawn area undisturbed; significant landscaping in backyard, lawn area near home undisturbed; some subsurface debris along northern property boundary, up to approximately 5 feet bgs.	Yes	Not Received	Received
037	69364000	309 N MAIN AVE, RIDGEFIELD, 98642	4,997	1940	1999	HOUSE	04/28/2015	According to the owner (stated during a site visit with Ecology and MFA on April 28, 2015) the entire yard has been re-landscaped in the last ten years. The yard consists primarily of lawn, shrubs, and trees.	Yes	Not Received	Received
038	69368000	304 N 1ST AVE, RIDGEFIELD, 98642	8,164	1925	2013	HOUSE	05/21/2015	Front yard has been relatively undisturbed since owner purchased property in approximately 2005; northern side area is largely paved; some landscaping in front yard (e.g., roses, shrubs) and yard is primarily lawn. Backyard is likely partially disturbed, as it includes a large former garden bed area, paved patio with grill, and fire pit. In addition, a dog is present, prohibiting access.	Yes	Received	Received
039	69366000	305 N MAIN AVE, RIDGEFIELD, 98642	10,145	1940	2006	HOUSE	05/06/2015	Backyard largely disturbed because of mechanical digging/reworking of soil (according to tenant), woodpiles, lawn maintenance, and electrical equipment. Front yard is relatively undisturbed, according to tenant. Yard is primarily lawn. An RV and large blackberry patches are present in southwestern portion of front yard, and this area is inaccessible.	Yes	Not Received	Received
040	67992000	NO SITUS ADDRESS AVAILABLE	8,276	NA	2016	NO BUILDING	NA	NA	No	Not Received	Not Received
041	68002000	NO SITUS ADDRESS AVAILABLE	34,412	NA	2014	NO BUILDING	05/04/2016	This is an undeveloped lot, consisting primarily of grasses and ruderal vegetation. Some equipment is present and the lot slopes strongly towards the railroad at western extent.	Yes	Not Received	Received
042	68002000	NO SITUS ADDRESS AVAILABLE	34,412	NA	2014	NO BUILDING	NA	NA	No	Not Received	Not Received

**Appendix A**  
**Property Database**  
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**Ridgefield, Washington**



Property ID Number	Tax Lot Parcel Number	Property Address	Area (Sq. Ft.)	Year Built	Most Recent Sale	Property Type Description	Date Yard Survey Conducted	Yard Survey Comments	Collected Yard Sample?	Questionnaire Status	Access Agreement Status
043	69286000	6 MAPLE ST, RIDGEFIELD, 98642	14,996	1920	2004	HOUSE	01/25/2017	Large lot with multiple areas of disturbance. West one-third of lot had approximately 6-inches to 24-inches of soil excavated and moved to east one-third of lot. There is also a large gravel area and shop in the southwest corner of the lot where additional soil was moved to the northwest corner of the lot. Also in the northwest area of the lot, a large yard debris pile was present. These areas will not be included in the sample area. Middle one-third of the lot is undisturbed and one ISM sample will be collected from this area.	Yes	Received	Received
044	68326000	514 N MAIN AVE, RIDGEFIELD, 98642	6,534	1901	2013	HOUSE	01/09/2017	Northwest corner of lot had approximately two dump truck loads of fill material placed to raise the grade and alleviate flooding from the neighboring cross streets. Excess water flooding would reach the northwest corner of the house. There is a gravel parking area near the northeast corner of the lot and a soil mound to the southeast. The remainder of the lot is grass and sampling will focus on these areas. One ISM sample will be collected.	Yes	Received	Received
045	68326005	512 N MAIN AVE, RIDGEFIELD, 98642	5,227	2001	Unknown	HOUSE	04/13/2017	Several railroad ties are located south of the driveway at the southwest of property. This area is not suitable for sampling. The front and back yard are primarily lawn. One ISM sample will be collected in the lawn areas.	Yes	Received	Received
046	70390000	502 N MAIN AVE, RIDGEFIELD, 98642	6,519	1910	1998	HOUSE	05/26/2017	Several landscape beds are located along the house and sidewalks, on the west side of the house, with two undisturbed yard areas present. Several landscape beds and very little yard area is located along the north side of the house. A driveway, large trees, and a few smaller landscape beds are located along the south side of the house. There is some yard area present on the south side of the house. East of the house is a large undisturbed yard area, and is surrounded by some landscape beds. One ISM sample will be collected.	Yes	Received	Received
047	68326010	227 MAPLE ST, RIDGEFIELD, 98642	5,663	2001	Unknown	HOUSE	04/13/2017	NA	No	Received	Received
048	70380000	229 MAPLE ST, RIDGEFIELD, 98642	11,280	1918	Unknown	HOUSE	07/24/2017	Several landscape beds are located along the house, sidewalks, and along the west fence line. Lawn is located on all sides of the house. A large garden area is located on the south end of the lot. Large trees are located on all sides of the house. One ISM sample will be collected.	Yes	Received	Received
049	70400000	303 MAPLE ST, RIDGEFIELD, 98642	8,276	1923	2011	HOUSE	01/24/2017	The west property boundary and area west of garage/addition, is excavated for future utility line placement. The grass area south of the home and garage/addition was flooded by water from an off-property sewer line that backed up during heavy rain. These areas will be not be included in sampling area. An ISM sample will be collected from the undisturbed lawn to the west and north of the primary home structure.	Yes	Received	Received
050	70415000	307 MAPLE ST, RIDGEFIELD, 98642	4,166	2004	2011	HOUSE	NA	NA	No	Not Received	Not Received
051	70420000	315 MAPLE ST, RIDGEFIELD, 98642	4,160	1917	2008	HOUSE	01/24/2017	The northwest corner of the lot is a gravel parking area. A shed is located on the southwest corner of the lot. A patio and sidewalk is located on the west portion of the property. The east boundary of the property is fenced with a mulched bedding area. One ISM sample will be collected from the remaining lawn areas.	Yes	Received	Received



**Appendix A  
Property Database  
Former PWT Site  
Ridgefield, Washington**



Property ID Number	Tax Lot Parcel Number	Property Address	Area (Sq. Ft.)	Year Built	Most Recent Sale	Property Type Description	Date Yard Survey Conducted	Yard Survey Comments	Collected Yard Sample?	Questionnaire Status	Access Agreement Status
052	70440000	314 DIVISION ST, RIDGEFIELD, 98642	4,171	1920	2014	HOUSE	01/09/2017	A gravel parking area exists in the southwest corner of the property. The west side of the property has three raised beds constructed from soil on the property. The southwest corner of the property has a shed and deck. The area directly north of the house consists of a covered patio with brick floor, and a chicken coop. The northeast property corner has another raised bed that preexisted the current property owner. The east property boundary is a slim walkway consisting of gravel and soil. One ISM sample will be collected from undisturbed lawn areas west, north, and south of the house.	Yes	Received	Received
053	70430000	319 MAPLE ST, RIDGEFIELD, 98642	8,330	1928	Unknown	HOUSE	04/13/2017	NA	No	Not Received	Received
054	68328000	401 MAPLE ST, RIDGEFIELD, 98642	12,229	1940	2014	HOUSE	01/26/2016	A parking soil and gravel parking area exists on the south and southeast portion of the property. A shed is also present just north of the southeast corner parking area. The fire pit and burn area exists on the southwest corner of the property. An area on the east property boundary was also excavated to be a pond. The sampling will focus on the north, west, and southern undisturbed lawn areas near the house. One ISM sample will be collected.	Yes	Received	Received
055	68377000	405 MAPLE ST, RIDGEFIELD, 98642	40,075	1978	2003	HOUSE	NA	NA	No	Received	Received
056	68025000	414 N MAIN AVE, RIDGEFIELD, 98642	12,909	1921	Unknown	HOUSE	01/25/2017	East of house to property boundary is all hardscape, landscape, ponded, or gravel parking area. Sampling will focus in lawn areas north, south and west of house. One ISM sample will be collected.	Yes	Received	Received
057	67996000	411 N 3RD AVE, RIDGEFIELD, 98642	10,471	1964	Unknown	HOUSE	06/02/2017	Corner lot with established landscaping. One concrete driveway off of 3rd Avenue and one gravel driveway off Division Street. Two large cedars are located in the southeast corner of property. A large compost pile with grass clippings is located in southwest corner. Two wood patios extend off the east and west sides of the house. An outdoor brick fireplace is on the back patio. Treated wood is used around garden beds along the south side of the house and octagonal bark chips have been placed in planter beds. One ISM sample will be collected.	Yes	Not Received	Received
058	68024000	402 N MAIN AVE, RIDGEFIELD, 98642	11,992	1920	2005	HOUSE	NA	NA	No	Not Received	Not Received
059	67999000	405 N 3RD AVE, RIDGEFIELD, 98642	10,475	1964	11/24/2020	HOUSE	07/24/2017	A large lawn is located in the front of the house (east). A small walkway along the north property line is not suitable for sampling. There is a large swimming pool, concrete, and landscape area in the back of the house (west) and is also not suitable for sampling. One ISM sample will be collected.	Yes	Received	Received
060	68000000	330 N MAIN AVE, RIDGEFIELD, 98642	14,810	1947	2011	HOUSE	NA	NA	No	Not Received	Not Received
061	68211000	321 N 3RD AVE, RIDGEFIELD, 98642	8,712	Unknown	2011	HOUSE	01/25/2017	South of building is primarily walkway, patio, and landscape beds. A shed is located on the northwest corner of the property. The remainder of the property is undisturbed lawn. One ISM sample will be collected from the undisturbed lawn area.	Yes	Received	Received

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Property ID Number	Tax Lot Parcel Number	Property Address	Area (Sq. Ft.)	Year Built	Most Recent Sale	Property Type Description	Date Yard Survey Conducted	Yard Survey Comments	Collected Yard Sample?	Questionnaire Status	Access Agreement Status
062	71045031	301 N 3RD AVE	4,792	NA	NA	NO BUILDING	06/14/2017	Corner lot with established landscaping. One concrete driveway off of 3rd Avenue and one gravel driveway off Division Street. Two large cedars are located in the southeast corner of property. A large compost pile with grass clippings is located in southwest corner. Two wood patios extend off the east and west sides of the house. An outdoor brick fireplace is on the back patio. Treated wood is used around garden beds along the south side of the house and octagonal bark chips have been placed in planter beds. One ISM sample will be collected.	Yes	Not Received	Received
063	68015000	421 N 4TH AVE, RIDGEFIELD, 98642	23,328	1962	Unknown	HOUSE	05/26/2017	Undisturbed yard is present on most of the property; east, north and south of the house. A large garden area is located on the west end of the property. Approximately eight dump truck loads of soil from the excavation of the swimming pool on property 067 was placed in the garden area. Additionally, some compost has been placed in the garden area over the years by the homeowner. One ISM sample will be collected.	Yes	Received	Received
064	68208000	411 DIVISION ST, RIDGEFIELD, 98642	5,663	1932	2005	HOUSE	01/25/2017	Property east of house is paved and/or covered in topsoil fill material. There is a small yard area south of the house that includes a fire pit. Two gravel parking areas exist on the property; one in the southwest corner and one in the northeast corner of the property. A motorcycle was parked on the lawn next to the gravel parking area in the southwest corner. Sampling will focus on the lawn areas north of the motorcycle, and north of the house. One ISM sample will be collected.	Yes	Received	Received
065	68018000	402 N 3RD AVE, RIDGEFIELD, 98642	10,195	1991	2015	HOUSE	NA	NA	No	Not Received	Not Received
066	68017000	330 N 3RD AVE, RIDGEFIELD, 98642	9,583	1967	1994	HOUSE	01/25/2017	The areas north and south of the house are narrow walkways. The rest of the property west and east of the house, is lawn area. Sampling will focus on these large lawn areas. Triplicate ISM samples will be collected.	Yes	Not Received	Received
067	68029000	401 N 4TH AVE, RIDGEFIELD, 98642	22,993	1963	2003	HOUSE	01/10/2017	The south, west and north property areas are covered by mostly hardscape, a swimming pool, basketball court, and putting green. A small area of bare soil is located in the northwest corner and southwest corner of the property. The southeast corner of the property is a parking area and landscape beds. The front lawn, east of the house, is undisturbed lawn. Sampling will be completed in this lawn area. One ISM sample will be collected.	Yes	Received	Received
068	68210000	320 N 3RD AVE, RIDGEFIELD, 98642	11,326	1992	2012	HOUSE	04/13/2017	Utilities run along north side of lot. Bark mulch in planter bed in northeast corner of lot, as well planter beds around house. Sampling will focus in lawn areas east and west of house. One ISM sample will be collected.	Yes	Received	Received
069	68021000	313 N 4TH AVE, RIDGEFIELD, 98642	6,199	1945	2015	HOUSE	02/14/2017	NA	No	Received	Received
070	68020000	311 N 4TH AVE, RIDGEFIELD, 98642	5,300	1936	2008	HOUSE	04/20/2017	NA	No	Received	Received
071	71045025	310 N 3RD AVE, RIDGEFIELD, 98642	7,951	1978	2003	HOUSE	05/26/2017	Most of the property is undisturbed lawn. A shed and deck are located east of the house, and a concrete driveway is located west of the house. One ISM sample will be collected.	Yes	Received	Received

**Appendix A  
Property Database  
Former PWT Site  
Ridgefield, Washington**



Property ID Number	Tax Lot Parcel Number	Property Address	Area (Sq. Ft.)	Year Built	Most Recent Sale	Property Type Description	Date Yard Survey Conducted	Yard Survey Comments	Collected Yard Sample?	Questionnaire Status	Access Agreement Status
072	71045018	309 N 4TH AVE, RIDGEFIELD, 98642	5,547	1920	Unknown	HOUSE	01/24/2017	The area south of the house consists of a parking area and awning. A small section of bare dirt is in the southwest corner of the property. A covered deck and swimming pool are in the backyard area (west of the house). There is an area of lawn west and north of the pool sufficient for sampling. The front yard is primarily lawn. Sampling will take place in the lawn areas in the front and rear yards of the home. One ISM sample will be collected.	Yes	Received	Received
073	71045022	300 N 3RD AVE, RIDGEFIELD, 98642	4,995	1947	1995	HOUSE	04/13/2017	Property previously experienced flooding issues, especially around 1996. To mitigate flooding, soil was excavated around the perimeter of house for foundation work, approximately 5-feet wide. A wet well was also installed in northwest corner of lot. There is a fire pit located on eastern side of lot. A large tree was removed from southwest corner of lot, new soil brought in. One ISM sample will be collected.	Yes	Received	Received
074	71045017	310 MILL ST, RIDGEFIELD, 98642	9,998	1947	Unknown	HOUSE	NA	NA	No	Not Received	Not Received
075	71045032	229 MILL ST, RIDGEFIELD, 98642	5,663	Unknown	2012	HOUSE	04/13/2017	Most of the property is undisturbed lawn. A compost pile exists west of the house, inside the fenced area. There are several large coniferous trees on the property, one especially large cedar in the back yard. One ISM sample will be collected.	Yes	Received	Received
076	71045039	200 N 3RD AVE, RIDGEFIELD, 98642	5,563	1955	2002	HOUSE	02/07/2017	The property is heavily landscaped. The area west of the house consists of parking areas and landscaped beds. To the north and northeast multiple structures (shed and greenhouse) and landscaped beds are present. To the east there is a deck, landscaped areas, lawn, and a small firepit and dry pond. A graveled parking area is present to the southeast. Sampling will take place in the lawn area east of the home. One ISM sample will be collected.	Yes	Received	Received
077	70971000	304 SIMONS ST, RIDGEFIELD, 98642	5,227	Unknown	2016	HOUSE	01/25/2017	The home is positioned near the south and west property boundaries. There is inadequate space to collect a sample to the south and west of the home. Sampling will focus on the lawn areas to the east and north of the home. One ISM sample will be collected.	Yes	Received	Received
078	69284000	3 Elm St, Ridgefield, WA 98642	5,001	1910	Unknown	HOUSE	08/10/2017	Fire pit and a garage are located in the southwest corner of backyard. Compost/debris pile is located directly west of garage. These areas are not suitable for sampling. The front and back yard are primarily lawn, with a sidewalk around the house. One ISM sample will be collected in the lawn areas.	Yes	Received	Received
079	69281000	7 Elm Street, Ridgefield, WA 98642	6,201	1915	5/22/2007	HOUSE	08/13/2019	Two sheds are present on the southwest and southeast corners of the property. A patio is located on the southwest corner of the house. The property is landscaped. One ISM sample will be collected.	Yes	Received	Received
080	69280000	11 Elm Street, Ridgefield, WA 98642	5,000	1918	6/22/1995	HOUSE	08/13/2019	The west side of the property is used to store cars, an RV, and other miscellaneous debris. A shed is also present in the southeast corner of the property, along with bricks and a wood pile. A firepit and burn area exists in the middle of the southern portion of the property. The east boundary of the property is a slim walkway consisting of soil. Sampling will focus on the east portion of the property. One ISM sample will be collected.	Yes	Received	Received



**Appendix A  
Property Database  
Former PWT Site  
Ridgefield, Washington**



Property ID Number	Tax Lot Parcel Number	Property Address	Area (Sq. Ft.)	Year Built	Most Recent Sale	Property Type Description	Date Yard Survey Conducted	Yard Survey Comments	Collected Yard Sample?	Questionnaire Status	Access Agreement Status
081	69228000	4 Elm Street, Ridgefield, WA 98642	5,075	1920	4/12/2007	HOUSE	08/13/2019	The property is landscaped. The east side of the property is used to store cars and other miscellaneous debris. A shed is present in the northeast corner of the property, along with wood piles. Disturbed areas are present in the backyard area. The remainder of the property is undisturbed lawn. One ISM sample will be collected from the undisturbed lawn area.	Yes	Received	Received
082	69234000	8 Elm Street, Ridgefield, WA 98642	4,728	2000	5/28/2021	HOUSE	08/13/2019	The property is landscaped. The north side of the property has garden beds. The remainder of the property is primarily lawn. One ISM sample will be collected from the undisturbed lawn area.	Yes	Not Received	Not Received
083	69236000	12 Elm Street, Ridgefield, WA 98642	5,188	1901	1/20/2007	HOUSE	08/13/2019	The property is landscaped. The southwest side of the property is used to store an RV and other miscellaneous debris. There are garden pots located throughout the backyard. A shed is present in the northeast portion of the Property. One ISM sample will be collected from undisturbed lawn area.	Yes	Received	Received
084	69225000	7 Hall Street, Ridgefield, WA 98642	5,384	6/18/1905	8/17/2012	HOUSE	08/13/2019	The property is landscaped. A shed is located on the southwest corner of the property. Two raised garden beds are located on the south-central portion of the backyard. Flower beds are present along the north, east, and west borders of the home. A raised flower and vegetable bed is located along the eastern property boundary. The remainder of the property is primarily lawn. One ISM sample will be collected from the undisturbed lawn area.	Yes	Received	Received
085	69226000	5 Hall Street, Ridgefield, WA 98642	4,904	1995	12/23/2014	HOUSE	08/13/2019	The property is landscaped. A shed is located in the southeast corner of the property. A raised garden bed is located along the southwest corner of the house. The remainder of the property is undisturbed lawn. One ISM sample will be collected from the undisturbed lawn area.	Yes	Received	Received
086	69227000	3 Hall Street, Ridgefield, WA 98642	5,294	1995	2/22/2005	HOUSE	08/13/2019	This property is landscaped. A raised deck is being built on the north and west side of the home. A covered soil stockpile is located on the northwest portion of the property. A garage is being built on the south side of the home. The remainder of the property is primarily lawn and a gravel driveway. One ISM sample will be collected from the undisturbed lawn areas.	Yes	Received	Received
087	69290000	603 N 1st Ave, Ridgefield, WA 98642	5,002	3/29/1905	3/20/2014	HOUSE	01/29/2020	A shed is present on the northwest corner of the property. A concrete patio and wood porch are located on the east side of the property. Chemicals, including fertilizer and gasoline were stored on the wood porch. Cigarette butts were seen through the east portion of the property. The property is not landscaped other than a portion in the northeast corner that has wooden steps, cinder blocks, a dirt path, and landscape cloth. Sampling will focus on the southwest portion of the property. One ISM sample will be collected.	Yes	Received	Received
088	69288000	607 N 1st Ave, Ridgefield, WA 98642	5,003	1915	5/29/2002	HOUSE	02/17/2020	The west side of the property contains four raised garden beds and a trampoline. A raised deck is located on the west side of the home, which sits above a gravel area used for bike, kayak, camping chair, and toy storage. A shed is located on the southern property boundary. The area between the house and the property boundary on the south side is landscaped with shrubs and trees and is covered in mulch with concrete steppingstones. The front and side yards are landscaped. Sampling will focus on the western portion of the property. One ISM sample will be collected.	Yes	Received	Received

**Appendix A**  
**Property Database**  
**Former PWT Site**  
**Ridgefield, Washington**



Property ID Number	Tax Lot Parcel Number	Property Address	Area (Sq. Ft.)	Year Built	Most Recent Sale	Property Type Description	Date Yard Survey Conducted	Yard Survey Comments	Collected Yard Sample?	Questionnaire Status	Access Agreement Status
089	69276000	613 N 1st Ave, Ridgefield, WA 98642	8,801	1925	3/24/2014	HOUSE	01/29/2020	The south side of the property contains three raised garden beds, tree stumps surrounding a fire pit, and a pile of chopped wood under a tree. A raised deck is located on the west and south sides of the property with gravel and dirt underneath. Storage of a canoe, air conditioning unit, and garbage cans occur under the deck. The north side of the property has landscaping with stones around three trees. A concrete path on the east side of the property leads to the front door and continues around to the north and south portions of the property. Sampling will focus on the south portions of the property. One ISM sample will be collected.	Yes	Received	Received

# APPENDIX B

## PROPERTY QUESTIONNAIRE





STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000

711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

**PACIFIC WOOD TREATING NEIGHBORHOOD SOIL DIOXIN STUDY  
PROPERTY QUESTIONNAIRE**

Date:

Property Owner:

Parcel ID:

Property located at:

**1. Tenant Contact Information:**

a. Name: \_\_\_\_\_

b. Phone (work/home/cell [circle preferred contact number]): \_\_\_\_\_  
\_\_\_\_\_

c. Email: \_\_\_\_\_

d. Mailing Address: \_\_\_\_\_  
\_\_\_\_\_

**2. Owner Contact Information:**

a. Name: \_\_\_\_\_

b. Phone (work/home/cell [circle preferred contact number]): \_\_\_\_\_  
\_\_\_\_\_

c. Email: \_\_\_\_\_

d. Mailing Address: \_\_\_\_\_  
\_\_\_\_\_

**3. General House and Yard Information:**

a. About when was your house built?  
\_\_\_\_\_

b. About how long have you owned/lived at the property?

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c. Do you have a:

Front yard\_\_\_\_\_

Side yard\_\_\_\_\_

Back yard\_\_\_\_\_

d. When was the current lawn and landscaping installed (approximately)?

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#### 4. Yard Characteristics

a. Please describe the general state of the yard. (For example, is it mostly grasses, bare soil or gravel, are there flower/vegetable beds, etc.?)

b. Please describe any significant yard modifications since about 1993 (e.g., installation of sod, fill/soil material placement, construction).

c. Besides your house, what buildings do you have on your property (like a shed/deck etc.) and about when were they built?



f. Is there any treated lumber in the yard (e.g., planter boxes or foundation material)?

g. Is there any evidence of spills/staining in the yard?

## **6. Future yard use**

a. Do you have any plans to make any changes to the yard (landscaping, remove structures or trees, install deck or patio, etc.)?

## **7. General Comments**

a. Can you think of any other activities that may have influenced the soil quality in your yard (e.g. has there been treated wood in your yards that was removed, are you aware of active burning, wood preserving or pesticide use by a neighbor)?

Survey Date and Time:

Survey completed by:

# APPENDIX C

## SAMPLING ACCESS AGREEMENT





Date: \_\_\_\_\_

**CONSENT FOR ACCESS TO PROPERTY**

**Property Owner Name:** \_\_\_\_\_

**Tenant Name (if applicable):** \_\_\_\_\_

**Property located at:** \_\_\_\_\_  
Ridgefield, Washington

**Lot number:** \_\_\_\_\_

**Mailing Address:** \_\_\_\_\_

**Phone (work/home/cell):** \_\_\_\_\_

**Email:** \_\_\_\_\_

If you are an owner or tenant, we need to have your permission to enter the property to do our work. The purpose of this form is to show that we have received your permission and can have temporary access to the property to take soil samples. The following paragraphs explain what we will do while on site and what it may mean to you. Please contact the Washington Department of Ecology if you have any questions at:

Cam Penner-Ash  
Cleanup Project Manager  
(360) 999-9590  
[Cam.Penner-Ash@ecy.wa.gov](mailto:Cam.Penner-Ash@ecy.wa.gov)

Nancy Davis  
Community Involvement Coordinator  
(360) 489-4971  
[Nancy.Davis@ecy.wa.gov](mailto:Nancy.Davis@ecy.wa.gov)

Please send or e-mail the completed form to:

Maul Foster & Alongi, Inc.  
330 E Mill Plain Boulevard, Suite 405  
Vancouver, WA 98660  
[ridgefieldyardcleanup@maulfoster.com](mailto:ridgefieldyardcleanup@maulfoster.com)

**AGREEMENT**

By signing this agreement, you are saying the following:

I am the holder of either a legal or equitable interest, either as the owner or legal agent for the owner of the property identified above or as a tenant of the real property identified above, and I have legal authority to and hereby give either on behalf of all owners or on behalf of all tenants my permission for officers, employees, authorized representatives and those persons

acting at the request of the Washington Department of Ecology (Ecology) to temporarily enter the identified real property and take soil samples to be submitted for laboratory analysis.

I understand that the data collected from the property are subject to public disclosure under the Public Record Act or the Freedom of Information Act. I understand that the data collected will be part of a public database. Upon receipt of a public records request, the Port of Ridgefield and Department of Ecology is required by law to provide the data, which may include my name and address. I further understand that if I sell this property I may have to disclose data collected from my property on the Real Property Transfer Disclosure Statement required by Chapter 64.06 of the Revised Code of Washington unless a qualified statutory exemption makes that unnecessary.

I agree to hold harmless the employees, agents, and representatives of the Port of Ridgefield and their consultant Maul Foster & Alongi from any and all liability arising directly or indirectly from the sampling, testing, evaluation, and disclosure related to the subject property.

This written permission is given by me voluntarily with knowledge of my right to refuse. No one has made any promises or threats of any kind to induce me either to give my permission or to enter into this agreement.

Sampling will be performed by Maul Foster & Alongi, Inc. (MFA). Upon completion of sampling, all material and equipment will be removed by MFA, and the property will be restored (as nearly as practicable) to its original condition.

**Property Access (circle one):** Sample anytime / Schedule an appointment: \_\_\_\_\_

**Dogs:** Yes/No **Locked Gates:** Yes/No **Septic:** Yes/No **Underground Utilities:** Yes/No

**Safety Hazards:** Are there any unsafe areas we should stay away from? Please describe:

\_\_\_\_\_  
\_\_\_\_\_

### Access Authorization

\_\_\_\_\_  
Signature(s) of Owner/Co-Owners/Tenant

\_\_\_\_\_  
Printed Name(s)

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Date

# APPENDIX D

## SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN



# APPENDIX D – SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN

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D-1 2020 FINAL SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN

D-2 2023 FINAL SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN

# APPENDIX D-1

## 2020 FINAL SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN



**2020 FINAL SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN**  
**OFF-PROPERTY PORTION, FORMER PACIFIC WOOD TREATING CO. SITE**  
**FACILITY ID 1019, CLEANUP SITE ID 3020**  
**RIDGEFIELD, WASHINGTON**

**Introduction:** On behalf of the Port, MFA has prepared this final SSAP for the OPP of the former PWT site in Ridgefield, Washington. The Ecology-approved OPP SAP describes the general procedures for collection, preservation, and analysis of samples of soil for OPP properties.<sup>1</sup> The OPP properties identified for sampling are shown in Figure 1. Consistent with the SAP, sampling locations, sample types, and sample analyses are identified in this SSAP for AOIs for which access agreements were obtained. All work is conducted under the authority of Agreed Order No. DE 11057 between the Port and Ecology. This final SSAP summarizes the final procedures implemented at the OPP as part of Phase 1, Phase 2, and Phase 3 RI activities. Procedures were previously described in draft SSAPs that were provided to and approved by Ecology prior to sampling activities. Figure 2 shows all ROW locations at which samples were analyzed. Property sampling areas and locations are shown in the attached Property Figures. Final sample results are provided in the OPP RI/FS.

**Site Background:** PWT operated a wood-treating facility from 1964 to 1993 at the Port's Lake River Industrial Site; historical operations and other indeterminate sources may have resulted in impacts to soil on the OPP.

**Problem Statement:** The extent of dioxins in surface and subsurface soils in OPP residential properties and ROWs requires investigation. Data are needed to assist in the completion of the OPP RI, risk assessment, and a feasibility study evaluating options for remediation, if necessary.

**Plan Attachments:** Figure 1, Figure 2, and Property Figures.

**Project Manager:** Phil Wiescher **Email:** [pwiescher@maulfoster.com](mailto:pwiescher@maulfoster.com) **Phone:** 503-407-1036

**Field Task Manager:** Andrew Vidourek (Phase 1 and 2), Jackie McMaster (Phase 3) **Email:** [avidourek@maulfoster.com](mailto:avidourek@maulfoster.com); [jmcmaster@maulfoster.com](mailto:jmcmaster@maulfoster.com) **Phone:** 541-760-9692; 503-501-5246

Property	Address	Sample Type(s) and Number	Analysis		Comments
AOI-001	512 Railroad Avenue	COMP (1) ROW (0-0.5 foot bgs) (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The house was built in 1994. In 2004, the yard consisted of a well-maintained lawn and several evenly spaced small trees that appear to have been installed after home construction. The entire yard has since been heavily re-landscaped. Several feet of soil, mulch and/or pea gravel were placed on top of geosynthetic fabric that separates the former lawn and the landscaping. The owner placed 64,000 pounds of pea gravel throughout property. No lawn remains and there is no exposed soil.
AOI-002	5 Maple Street	ISM (1) DSBS (1) ROW (0)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The house was built in 1996. In 2000 the yard consisted of a well-maintained lawn and small shrubs. Current conditions are similar.
AOI-003	7 Maple Street	ISM (1) ROW (0)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The house was built in 1993. The property is flat, land to the east is elevated several feet, and a retaining wall is present along the eastern property boundary. This suggests that significant soil excavation was conducted to bring the property to level grade. In 2004 the yard consisted of a well-maintained lawn that appears to have been installed after construction. Current conditions are similar.
AOI-004	Intersection of North 1st Avenue and Maple Street	ISM (1) COMP (2) ROW (0-0.5 foot bgs) (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Undeveloped lot overgrown with up to 8 feet of blackberry bushes. Evidence of soil fill on the northwestern portion. Some wood debris present. Because of limited accessibility, a four-point composite surface sample (0 to 0.5 foot bgs) and a four-point composite subsurface sample (0.5 to 1 foot bgs) were initially identified for collection instead of ISM and DSBS samples. In 2017 the property was cleared and an ISM sample was collected.
AOI-005	4 Division Street	ISM (1) DSBS (1) DUP (1) ROW (0-0.5 foot bgs) (1) ROW (1.0-1.5 foot bgs) (Archive) ROW (1.5-2.0 foot bgs) (1) ROW (2.0-2.5 foot bgs) (Archive) ROW (2.5-3.0 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Water line trench in northern portion of yard, as well as several piles indicating soil disturbance; these areas are not included in sampling area. Former burn area identified in northwest portion of yard, approximately 6- to 8-foot-diameter. DSBS sample in front yard.
AOI-006	8 Division Street	ISM (1) DSBS (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Fire pit and recently constructed deck in northeastern portion of yard; these areas are not included in the sampling area. DSBS sample in front yard.
AOI-007	14 Division Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Eastern portion of yard heavily landscaped/disturbed; western portion driveway includes imported fill; areas along southern property boundary have lumber reinforcements. These areas are not included in the sampling area.
AOI-008	512 North 1st Avenue	ISM (1) ROW (0-0.5 foot bgs) (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Multiple areas of disturbance, treated-wood storage, burn areas, soil/tree excavations, etc. The northwestern portion of the front yard and the northeastern portion of the backyard are least disturbed.

<sup>1</sup> MFA. Off-property portion remedial investigation work plan. Prepared for Port of Ridgefield. Maul Foster & Alongi, Inc. April 2, 2015.

Property	Address	Sample Type(s) and Number	Analysis		Comments
AOI-009	515 North Main Avenue	ISM (1) ROW (0)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The house was built in 2004. In 2004 the yard consisted of a well-maintained lawn, and one large tree had been retained. Current conditions are similar.
AOI-010	511 North Main Avenue	ISM (1) ROW (0-0.5 foot bgs) (1) ROW (0.5-1.0 foot bgs) (Archive) ROW (1.0-1.5 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The house was built in 2000. A house was present on this property and the adjacent property 009 until at least 1996. In 2004 the yard consisted of a well-maintained lawn, and a large tree had been retained. Current conditions are similar.
AOI-011	100 Division Street	ISM (1) ROW (0-0.5 foot bgs) (1) ROW (0.5-1.0 foot bgs) (Archive) ROW (1.0-1.5 foot bgs) (1) ROW (1.5-2.0 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The southwestern portion of the property consists of imported gravel, and 2 to 3 inches of topsoil were removed/regraded in front and side yards in 2014; these areas are not included in the sampling area.
AOI-012	503 North Main Avenue	ISM (1) ROW (0-0.5 foot bgs) (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Significant soil disturbance in backyard for construction of boat port; additional soil work conducted in backyard near home; front yard lawn and lawn along western property boundary in backyard undisturbed. Constructed gravel driveway leading to boat port. Some pavers removed alongside yard and leading to front yard, adjacent to house.
AOI-013	5 Division Street	ISM (2) ROW (0-0.5 foot bgs) (1) ROW (1.0-1.5 foot bgs) (Archive) ROW (1.5-2.0 foot bgs) (1) ROW (2.0-2.5 foot bgs) (Archive) ROW (2.5-3.0 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Water line present in backyard; imported garden bed soils; treated lumber supports in parking area. These areas are not included in the sampling area. Evidence of debris/burning approximately 3 to 4 feet bgs, according to owner. Backyard physically separated from front by fencing and home. Two ISM sampling areas (1 backyard, 1 front yard). ROW sample along Railroad Avenue and Division Street intersection.
AOI-014	413 North 1st Avenue	ISM (1) ROW (0-0.5 foot bgs) (1) ROW (1.0-1.5 foot bgs) (Archive) ROW (1.5-2.0 foot bgs) (1) ROW (2.0-2.5 foot bgs) (Archive) ROW (2.5-3.0 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Mostly lawn, with flower beds along edges; oil tank was decommissioned, likely present in right-of-way along east side of property along North 1st Avenue; sewer line along southern property boundary.
AOI-015	410 Railroad Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	No significant known soil disturbance in lawn areas; some areas of disturbance along fence line.
AOI-016	409 North 1st Avenue	ISM (1) ROW (0-0.5 foot bgs) (1) ROW (1.0-1.5 foot bgs) (Archive) ROW (1.5-2.0 foot bgs) (1) ROW (2.0-2.5 foot bgs) (Archive) ROW (2.5-3.0 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Some minimal soil placement for reseeding grass; a former burn pit is present in southwestern portion of backyard; otherwise there are no known significant disturbances.
AOI-017	6 Ash Street	ISM (1) TRP (1) DSBS (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Significant soil disturbance in backyard: former asphalt driveway approximately 20 feet wide was removed; driveway installed along eastern property boundary. Front and side yards relatively undisturbed, except for some landscaped areas (mulched, imported soil in flower/garden beds) and a small area of new sod along eastern edge of home.
AOI-018	405 North 1st Avenue	ISM (2) TRP (1) DSBS (1) ROW (0-0.5 foot bgs) (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Soil disturbance/regrading along southeastern and northern portions of property; former burn pit to the south of home. These areas are not included in the sampling area. Large front yard and backyard; two ISM sampling areas (one backyard, one front yard). Triplicate samples in backyard sample area. DSBS sample in backyard.
AOI-019	412 North 1st Avenue	ISM (1) DSBS (1) ROW (0-0.5 foot bgs) (1) ROW (1.0-1.5 foot bgs) (1) ROW (1.5-2.0 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The two side yards are primarily lawn. A small backyard includes large shed and brush/dirt areas. Front yard includes large paved driveway and rock garden installed five years ago. Otherwise, yard is relatively undisturbed, according to owner.



Property	Address	Sample Type(s) and Number	Analysis		Comments
AOI-020B	411 North Main Avenue	ISM (1) DSBS (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Soil disturbance for tank removal/placement in two areas along home in northeastern property portion; significant soil disturbance along western property portion for septic work; some wood ash spread across side yard in northern property portion for gardening purposes; the front yard in the southeastern property portion is relatively undisturbed.
AOI-021	406 North 1st Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Most of the front yard and backyard were heavily disturbed as a bobcat was brought in to grade soil throughout much of the property; yard along the northwestern portion is most likely to be undisturbed, according to owner. This area is the former front yard of a house that was demolished in the 1980s.
AOI-022	403/405 North Main Avenue	ISM (1) ROW (0-0.5 foot bgs) (1) ROW (1.0-1.5 foot bgs) (1) ROW (1.5-2.0 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The yard is primarily lawn with two large trees present in the front yard. ROW samples adjacent to property 023 on Ash Street and on Main Avenue were previously collected.
AOI-023	5 Ash Street	ISM (1) ROW (0-0.5 foot bgs) (1) ROW (1.0-1.5 foot bgs) (Archive) ROW (1.5-2.0 foot bgs) (1) ROW (2.0-2.5 foot bgs) (Archive) ROW (2.5-3.0 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The property includes several structures (house and garages). The eastern portion of the yard was recently subject to significant soil disturbance: a long trench approximately 10 feet deep along the home was dug and soil appears to have been placed to the east of the trench in the side yard and in the eastern portion of the front yard; excavator track marks are present. These areas are not included in sampling area. ROW samples adjacent to property 022 on Ash Street were previously collected.
AOI-024	327 North 1st Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Heavily landscaped/garden area along southeastern portion of property; the front and side yards along the northeastern property boundary likely are undisturbed; the backyard has large burn pit, several buried pavers, and an area of mounded soil that was placed; creosote ties were removed from the garden area.
AOI-025	319 North 1st Avenue	ISM (1) ROW (0-0.5 foot bgs) (1) ROW (1.0-1.5 foot bgs) (1) ROW (1.5-2.0 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Undisturbed front yard lawn; side yard along north was excavated for stormwater diversion ditch; water pipe is present along southern portion of home; backyard is somewhat undisturbed, except for a burn pit in center of yard. Current owner noted that the previous resident had left various debris buried in yard.
AOI-026	314 Railroad Avenue	ISM (1) ROW (0-0.5 foot bgs) (1) ROW (0.5-1.0 foot bgs) (1) ROW (1.0-1.5 foot bgs) (1) ROW (1.5-2.0 foot bgs) (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Heavily disturbed yard; backyard soil was scraped and placed in front yard. A trench has been dug in front yard.
AOI-027	315 North 1st Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Heavily landscaped/disturbed front yard; backyard is primarily chicken coops/sheds, with some undisturbed soil/grass paths around the coops, according to owner.
AOI-028A	311 North 1st Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The house was built in 1998. Aerial imagery indicates undeveloped property with vegetation and several large trees on the southern portion before that date. The large trees were removed between 2010 and 2011. In 2004 the yard consisted of a lawn that appears to have been installed after construction. Current conditions are similar.
AOI-028B	311 North 1st Avenue	ISM (1) DSBS (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Front yard and backyard largely undisturbed; some landscaping along the property boundary.
AOI-029A	305 North 1st Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Vacant lot (primarily lawn/grasses) with some wood/debris piles along northeastern portion. Large bushes/trees in southwestern portion. Prior lot uses are not known, according to owner.
AOI-029B	305 North 1st Avenue	ISM (1) ROW (0-0.5 foot bgs) (1) ROW (1.0-1.5 foot bgs) (1) ROW (1.5-2.0 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Mostly lawn in front yard and backyard; no significant soil disturbance except for removal of five large trees, which had died. Some landscaping along property boundary and along home in backyard.
AOI-030	101 Ash Street	ISM (1) DUP (1) ROW (0-0.5 foot bgs) (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	No significant yard modifications in last two years, according to tenant; previous yard history unknown. A few sheds and a manhole are present along eastern property boundary, as well as an aboveground pool area in the southwest. Yard is primarily lawn.
AOI-031	105 Ash Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Imported soil in garden beds along home and perhaps in parking strip; these areas are not included in the sampling area. Small backyard and front yard areas are combined into one ISM sampling area.

Property	Address	Sample Type(s) and Number	Analysis		Comments
AOI-032	322 North 1st Avenue	ISM (1) DSBS (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Small lawn in front yard and backyard are undisturbed; tractor and other equipment in backyard along house.
AOI-034	318 North 1st Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The house was built between 1993 (according to the Clark County Maps Online) and 1995 (according to the property owner). In 2005 the yard consisted of a lawn that appears to have been installed after construction. According to the property owner, the current lawn and landscaping were installed two to five years ago, and a site visit confirmed that a well-maintained, evenly graded lawn is currently present.
AOI-035	313 North Main Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The house was built in 1993. A shed was installed in the backyard ten years ago. In 2004 the yard consisted of a lawn that appears to have been installed after construction. According to the owner, new sod was installed approximately four years ago, and a site visit confirmed that a well-maintained, evenly graded lawn is currently present.
AOI-036	314 North 1st Avenue	ISM (1) ROW (0-0.5 foot bgs) (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Edge landscaping in front yard, lawn area undisturbed; significant landscaping in backyard, lawn area near home undisturbed; some subsurface debris along northern property boundary, up to approximately 5 feet bgs.
AOI-037	309 North Main Avenue	ISM (1) DSBS (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	According to the owner (stated during a site visit with Ecology and MFA on April 28, 2015) the entire yard has been re-landscaped in the last ten years. The yard consists primarily of lawn, shrubs, and trees.
AOI-038	304 North 1st Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Front yard has been relatively undisturbed since owner purchased property in approximately 2005; northern side area is largely paved; some landscaping in front yard (e.g., roses, shrubs) and yard is primarily lawn. Backyard is likely partially disturbed, as it includes a large former garden bed area, paved patio with grill, and fire pit. In addition, a dog is present, prohibiting access.
AOI-039	305 North Main Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Backyard largely disturbed because of mechanical digging/reworking of soil (according to tenant), woodpiles, lawn maintenance, and electrical equipment. Front yard is relatively undisturbed, according to tenant. Yard is primarily lawn. An RV and large blackberry patches are present in southwestern portion of front yard, and this area is inaccessible.
AOI-041	South of Mill Street and Railroad Avenue	ISM (2) DSS (5, Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	This is an undeveloped lot (taxlot 68002000). Two ISM samples will be collected and analyzed, one each for the northern and southern portions of the 0.8 acre lot. Five discrete surface samples will be collected along a north-south transect and archived; the discrete samples may be released for analysis to further delineate impacts, in the event an ISM sample shows concentrations above the CUL.
ROW-RRW	Northwest of Railroad Avenue and Division Street	ROW (0-0.5 foot bgs) (1) ROW (0.5-1.0 foot bgs) (Archive) ROW (1.0-1.5 foot bgs) (Archive) ROW (1.5-2.0 foot bgs) (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	ROW northwest of Railroad Avenue and Division Street intersection.
ROW-002N	5 Maple Street	ROW (0-0.5 foot bgs) (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	ROW on north side of Maple Street, west of North 1st Avenue; across Maple Street from property 002.
ROW-010 East	511 North Main Avenue	ROW (0-0.5 foot bgs) (Archive) ROW (0.5-1.0 foot bgs) (Archive) ROW (1.0-1.5 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	This is a ROW sample across Main Avenue from property 010. The 0 to 0.5 foot bgs sample will be analyzed if the ROW-010 West surface sample (0 to 0.5 foot bgs) exceeds the CUL. The deeper samples will be analyzed if the shallower sample exceeds the CUL.
ROW-022 West	403 North Main Avenue	ROW (0-0.5 foot bgs) (1) ROW (0.5-1.0 foot bgs) (Archive) ROW (1.0-1.5 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	This is a ROW sample adjacent to property 022 on Main Avenue. The archive samples will be analyzed if the shallower sample exceeds the CUL.
ROW-022 East	403 North Main Avenue	ROW (0-0.5 foot bgs) (Archive) ROW (0.5-1.0 foot bgs) (Archive) ROW (1.0-1.5 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	This is a ROW sample across Main Avenue from property 022. The 0 to 0.5 foot bgs sample will be analyzed if the ROW-022 West surface sample (0 to 0.5 foot bgs) exceeds the CUL. The deeper samples will be analyzed if the shallower sample exceeds the CUL.
ROW-033 West	319 North Main Avenue	ROW (0-0.5 foot bgs) (1) ROW (0.5-1.0 foot bgs) (Archive) ROW (1.0-1.5 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	This is a ROW sample adjacent to property 033 on Main Avenue. The archive samples will be analyzed if the shallower sample exceeds the CUL.

Property	Address	Sample Type(s) and Number	Analysis		Comments
ROW-038 South	304 North 1st Avenue	ROW (0-0.5 foot bgs) (1) ROW (0.5-1.0 foot bgs) (Archive) ROW (1.0-1.5 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	This is a ROW sample across Mill Street from property 038. The archive samples will be analyzed if the shallower sample exceeds the CUL.
ROW-029B South	305 North 1st Avenue	ROW (0-0.5 foot bgs) (1) ROW (0.5-1.0 foot bgs) (Archive) ROW (1.0-1.5 foot bgs) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	This is a ROW sample across the Mill Street from property 029B. The archive samples will be analyzed if the shallower sample exceeds the CUL.
ROW-P2-001 through ROW-P2-006	Tier 1 Sample Area	DSS (0-0.5 foot bgs) (6) DSS (0-0.5 foot bgs) (1) (DUP)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Accessible ROW locations were selected.
ROW-P2-007 through ROW-P2-019	Tier 2 Sample Area	DSS (0-0.5 foot bgs) (13) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Accessible ROW locations were selected.
ROW-P2-020 through ROW-P2-035	Tier 3 Sample Area	DSS (0-0.5 foot bgs) (16) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Accessible ROW locations were selected.
AOI-043	6 Maple Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Large lot with multiple areas of disturbance. West one-third of lot had approximately 6-inches to 24-inches of soil excavated and moved to east one-third of lot. There is also a large gravel area and shop in the southwest corner of the lot where additional soil was moved to the northwest corner of the lot. Also in the northwest area of the lot, a large yard debris pile was present. These areas will not be included in the sample area. Middle one-third of the lot is undisturbed and one ISM sample will be collected from this area.
AOI-044	514 North Main Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Northwest corner of lot had approximately two dump truck loads of fill material placed to raise the grade and alleviate flooding from the neighboring cross streets. Excess water flooding would reach the northwest corner of the house. There is a gravel parking area near the northeast corner of the lot and a soil mound to the southeast. The remainder of the lot is grass and sampling will focus on these areas. One ISM sample will be collected.
AOI-045	512 N Main Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Several railroad ties are located south of the driveway at the southwest of property. This area is not suitable for sampling. The front and back yard are primarily lawn. One ISM sample will be collected in the lawn areas.
AOI-046	502 N Main Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Several landscape beds are located along the house and sidewalks, on the west side of the house, with two undisturbed yard areas present. Several landscape beds and very little yard area is located along the north side of the house. A driveway, large trees, and a few smaller landscape beds are located along the south side of the house. There is some yard area present on the south side of the house. East of the house is a large undisturbed yard area, and is surrounded by some landscape beds. One ISM sample will be collected.
AOI-048	229 Maple Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Several landscape beds are located along the house, sidewalks, and along the west fence line. Lawn is located on all sides of the house. A large garden area is located on the south end of the lot. Large trees are located on all sides of the house. One ISM sample will be collected.
AOI-049	303 Maple Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The west property boundary and area west of garage/addition, is excavated for future utility line placement. The grass area south of the home and garage/addition was flooded by water from an off-property sewer line that backed up during heavy rain. These areas will be not be included in sampling area. An ISM sample will be collected from the undisturbed lawn to the west and north of the primary home structure.
AOI-051	315 Maple Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The northwest corner of the lot is a gravel parking area. A shed is located on the southwest corner of the lot. A patio and sidewalk is located on the west portion of the property. The east boundary of the property is fenced with a mulched bedding area. One ISM sample will be collected from the remaining lawn areas.
AOI-052	314 Division Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	A gravel parking area exists in the southwest corner of the property. The west side of the property has three raised beds constructed from soil on the property. The southwest corner of the property has a shed and deck. The area directly north of the house consists of a covered patio with brick floor, and a chicken coop. The northeast property corner has another raised bed that preexisted the current property owner. The east property boundary is a slim walkway consisting of gravel and soil. One ISM sample will be collected from undisturbed lawn areas west, north, and south of the house.
AOI-054	401 Maple Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	A parking soil and gravel parking area exists on the south and southeast portion of the property. A shed is also present just north of the southeast corner parking area. The fire pit and burn area exists on the southwest corner of the property. An area on the east property boundary was also excavated to be a pond. The sampling will focus on the north, west, and southern undisturbed lawn areas near the house. One ISM sample will be collected.

Property	Address	Sample Type(s) and Number	Analysis		Comments
AOI-056	414 North Main Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	East of house to property boundary is all hardscape, landscape, ponded, or gravel parking area. Sampling will focus in lawn areas north, south and west of house. One ISM sample will be collected.
AOI-057	411 N 3 <sup>rd</sup> Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Corner lot with established landscaping. One concrete driveway off of 3 <sup>rd</sup> Avenue and one gravel driveway off Division Street. Two large cedars are located in the southeast corner of property. A large compost pile with grass clippings is located in southwest corner. Two wood patios extend off the east and west sides of the house. An outdoor brick fireplace is on the back patio. Treated wood is used around garden beds along the south side of the house and octagonal bark chips have been placed in planter beds. One ISM sample will be collected.
AOI-059	405 N 3 <sup>rd</sup> Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	A large lawn is located in the front of the house (east). A small walkway along the north property line is not suitable for sampling. There is a large swimming pool, concrete, and landscape area in the back of the house (west) and is also not suitable for sampling. One ISM sample will be collected.
AOI-061	321 North 3rd Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	South of building is primarily walkway, patio, and landscape beds. A shed is located on the northwest corner of the property. The remainder of the property is undisturbed lawn. One ISM sample will be collected from the undisturbed lawn area.
AOI-062	301 N 3 <sup>rd</sup> Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	City park that is mostly lawn, with some wood chipped areas, small concrete pads, small park structures, and large trees along the northern boundary. One ISM sample will be collected from the lawn areas.
AOI-063	421 N 4 <sup>th</sup> Avenue	ISM (1) TRP (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Undisturbed yard is present on most of the property; east, north and south of the house. A large garden area is located on the west end of the property. Approximately eight dump truck loads of soil from the excavation of the swimming pool on property 067 was placed in the garden area. Additionally, some compost has been placed in the garden area over the years by the homeowner. One ISM sample will be collected.
AOI-064	411 Division Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Property east of house is paved and/or covered in topsoil fill material. There is a small yard area south of the house that includes a fire pit. Two gravel parking areas exist on the property; one in the southwest corner and one in the northeast corner of the property. A motorcycle was parked on the lawn next to the gravel parking area in the southwest corner. Sampling will focus on the lawn areas north of the motorcycle, and north of the house. One ISM sample will be collected.
AOI-066	330 North 3rd Avenue	ISM (1) TRP (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The areas north and south of the house are narrow walkways. The rest of the property west and east of the house, is lawn area. Sampling will focus on these large lawn areas. Triplicate ISM samples will be collected.
AOI-067	401 North 4th Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The south, west and north property areas are covered by mostly hardscape, a swimming pool, basketball court, and putting green. A small area of bare soil is located in the northwest corner and southwest corner of the property. The southeast corner of the property is a parking area and landscape beds. The front lawn, east of the house, is undisturbed lawn. Sampling will be completed in this lawn area. One ISM sample will be collected.
AOI-068	320 N 3 <sup>rd</sup> Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Utilities run along north side of lot. Bark mulch in planter bed in northeast corner of lot, as well planter beds around house. Sampling will focus in lawn areas east and west of house. One ISM sample will be collected.
AOI-071	310 N 3 <sup>rd</sup> Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Most of the property is undisturbed lawn. A shed and deck are located east of the house, and a concrete driveway is located west of the house. One ISM sample will be collected.
AOI-072	309 North 4th Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The area south of the house consists of a parking area and awning. A small section of bare dirt is in the southwest corner of the property. A covered deck and swimming pool are in the backyard area (west of the house). There is an area of lawn west and north of the pool sufficient for sampling. The front yard is primarily lawn. Sampling will take place in the lawn areas in the front and rear yards of the home. One ISM sample will be collected.
AOI-073	300 N 3 <sup>rd</sup> Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Property previously experienced flooding issues, especially around 1996. To mitigate flooding, soil was excavated around the perimeter of house for foundation work, approximately 5-feet wide. A wet well was also installed in northwest corner of lot. There is a fire pit located on eastern side of lot. A large tree was removed from southwest corner of lot, new soil brought in. One ISM sample will be collected.
AOI-075	229 Mill Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Most of the property is undisturbed lawn. A compost pile exists west of the house, inside the fenced area. There are several large coniferous trees on the property, one especially large cedar in the back yard. One ISM sample will be collected.
AOI-076	200 North 3 <sup>rd</sup> Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The property is heavily landscaped. The area west of the house consists of parking areas and landscaped beds. To the north and northeast multiple structures (shed and greenhouse) and landscaped beds are present. To the east there is a deck, landscaped areas, lawn, and a small firepit and dry pond. A graveled parking area is present to the southeast. Sampling will take place in the lawn area east of the home. One ISM sample will be collected.

Property	Address	Sample Type(s) and Number	Analysis		Comments
AOI-077	304 Simmons Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The home is positioned near the south and west property boundaries. There is inadequate space to collect a sample to the south and west of the home. Sampling will focus on the lawn areas to the east and north of the home. One ISM sample will be collected.
AOI-078	3 Elm Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Fire pit and a garage are located in the southwest corner of backyard. Compost/debris pile is located directly west of garage. These areas are not suitable for sampling. The front and back yard are primarily lawn, with a sidewalk around the house. One ISM sample will be collected in the lawn areas.
AOI-079	7 Elm Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	Two sheds are present on the southwest and southeast corners of the property. A patio is located on the southwest corner of the house. The property is landscaped. One ISM sample will be collected.
AOI-080	11 Elm Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The west side of the property is used to store cars, an RV, and other miscellaneous debris. A shed is also present in the southeast corner of the property, along with bricks and a wood pile. A firepit and burn area exists in the middle of the southern portion of the property. The east boundary of the property is a slim walkway consisting of soil. Sampling will focus on the east portion of the property. One ISM sample will be collected.
AOI-081	4 Elm Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The property is landscaped. The east side of the property is used to store cars and other miscellaneous debris. A shed is present in the northeast corner of the property, along with wood piles. Disturbed areas are present in the backyard area. The remainder of the property is undisturbed lawn. One ISM sample will be collected from the undisturbed lawn area.
AOI-082	8 Elm Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The property is landscaped. The north side of the property has garden beds. The remainder of the property is primarily lawn. One ISM sample will be collected from the undisturbed lawn area.
AOI-083	12 Elm Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The property is landscaped. The southwest side of the property is used to store an RV and other miscellaneous debris. There are garden pots located throughout the backyard. A shed is present in the northeast portion of the Property. One ISM sample will be collected from undisturbed lawn area.
AOI-084	7 Hall Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The property is landscaped. A shed is located on the southwest corner of the property. Two raised garden beds are located on the south-central portion of the backyard. Flower beds are present along the north, east, and west borders of the home. A raised flower and vegetable bed is located along the eastern property boundary. The remainder of the property is primarily lawn. One ISM sample will be collected from the undisturbed lawn area.
AOI-085	5 Hall Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The property is landscaped. A shed is located in the southeast corner of the property. A raised garden bed is located along the southwest corner of the house. The remainder of the property is undisturbed lawn. One ISM sample will be collected from the undisturbed lawn area.
AOI-086	3 Hall Street	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	This property is landscaped. A raised deck is being built on the north and west side of the home. A covered soil stockpile is located on the northwest portion of the property. A garage is being built on the south side of the home. The remainder of the property is primarily lawn and a gravel driveway. One ISM sample will be collected from the undisturbed lawn areas.
AOI-087	603 N 1 <sup>st</sup> Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	A shed is present on the northwest corner of the property. A concrete patio and wood porch are located on the east side of the property. Chemicals, including fertilizer and gasoline were stored on the wood porch. Cigarette butts were seen through the east portion of the property. The property is not landscaped other than a portion in the northeast corner that has wooden steps, cinder blocks, a dirt path, and landscape cloth. Sampling will focus on the southwest portion of the property. One ISM sample will be collected.
AOI-088	607 N 1 <sup>st</sup> Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The west side of the property contains four raised garden beds and a trampoline. A raised deck is located on the west side of the home, which sits above a gravel area used for bike, kayak, camping chair, and toy storage. A shed is located on the southern property boundary. The area between the house and the property boundary on the south side is landscaped with shrubs and trees and is covered in mulch with concrete steppingstones. The front and side yards are landscaped. Sampling will focus on the western portion of the property. One ISM sample will be collected.
AOI-089	613 N 1 <sup>st</sup> Avenue	ISM (1)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	The south side of the property contains three raised garden beds, tree stumps surrounding a fire pit, and a pile of chopped wood under a tree. A raised deck is located on the west and south sides of the property with gravel and dirt underneath. Storage of a canoe, air conditioning unit, and garbage cans occur under the deck. The north side of the property has landscaping with stones around three trees. A concrete path on the east side of the property leads to the front door and continues around to the north and south portions of the property. Sampling will focus on the south portions of the property. One ISM sample will be collected.
ROW-090E-1	Elm Street right-of-way	Discrete (1) (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	A discrete sample for archive was collected on the north side of Elm Street east of and near the intersection with North 1 <sup>st</sup> Avenue to define the eastern extent of impacts for the Phase 3 area.

Property	Address	Sample Type(s) and Number	Analysis		Comments
ROW-090E-2	Elm Street right-of-way	Discrete (Archive)	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	A discrete sample for archive was collected on the north side of Elm Street and west of and near the intersection with North Main Avenue. The sample will be released for analysis in determination with Ecology (e.g., if sample ROW-090E-1 exceeds the dioxin MTCA cleanup level).
ROW-078N	Northwest portion of Elm Street	ROW (1) 0-0.5 foot Sample ID: SS-ROW078N-0.5	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	This was a discrete sample that was submitted for immediate analysis.
ROW-078NE	Northeast portion of Elm Street	ROW (1) 0-0.5 foot (1) Sample ID: SS-ROW078NE-0.5	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	This sample was initially archived and was subsequently submitted for analysis.
ROW-078NW	East side Railroad Avenue	ROW (1) 0-0.5 foot (1) Sample ID: SS-ROW078NW-0.5	Dioxins by USEPA 1613B	Total organic carbon by PSEP/SM 5310B	This sample was initially archived and was subsequently submitted for analysis.

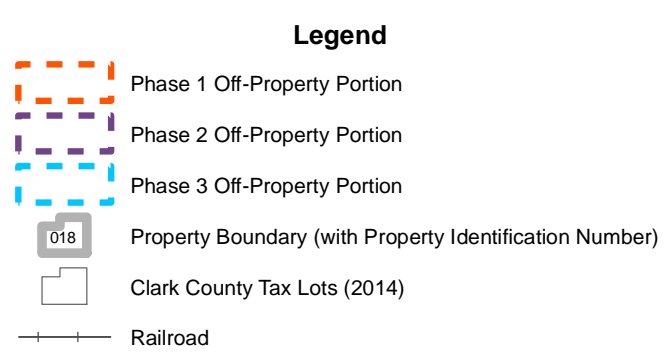
Field Quality Control Samples		
Type	Frequency	Analysis
Equipment Rinsate Blanks	One per every 20 samples	Dioxins by USEPA 1613B
ISM Triplicates	Four total	Dioxins by USEPA 1613B, Total organic carbon by PSEP/SM 5310B
ISM Field Duplicate Sample	One total	Dioxins by USEPA 1613B, Total organic carbon by PSEP/SM 5310B
Field Discrete Duplicate Samples	Two total	Dioxins by USEPA 1613B, Total organic carbon by PSEP/SM 5310B

Notes:  
 This SSAP was designed to be used in conjunction with the SAP.  
 AOI = area of investigation.  
 bgs = below ground surface.  
 CUL = cleanup level.  
 DSBS = discrete subsurface sample.  
 DSS = discrete surface sample.  
 DUP = duplicate sample.  
 Ecology = Washington State Department of Ecology.  
 ISM = incremental sampling methodology.  
 MFA = Maul Foster & Alongi, Inc.  
 MTCA = Model Toxics Control Act.  
 NA = not applicable.  
 OPP = off-property portion.  
 Port = Port of Ridgefield.  
 PSEP = Puget Sound Estuary Program.  
 PWT = Pacific Wood Treating Co.  
 RI = remedial investigation.  
 ROW = right-of-way sample.  
 SAP = Final Off-Property Portion Sampling and Analysis Plan, Former Pacific Wood Treating Co. Site, Facility ID 1019, Cleanup Site ID 3020. Prepared for the Port of Ridgefield. Maul Foster & Alongi, Inc., Vancouver, Washington. April 2, 2015.  
 SM = standard method.  
 SSAP = site-specific sampling and analysis plan.  
 TRP = ISM triplicate sample.  
 USEPA = U.S. Environmental Protection Agency.



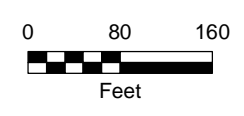


Source: Aerial photograph obtained from MapBox.  
 Tax lots obtained from Clark County GIS.



**Figure 1**  
**Property and Tax Lot**  
**Boundaries (with Property**  
**Identification Number)**

Former PWT Site  
 Ridgfield, Washington







Source: Aerial photograph (2014) and tax lots obtained from Clark County GIS.

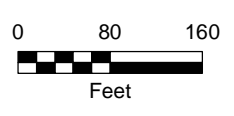
Note:  
1. ROW = right-of-way.

**Legend**

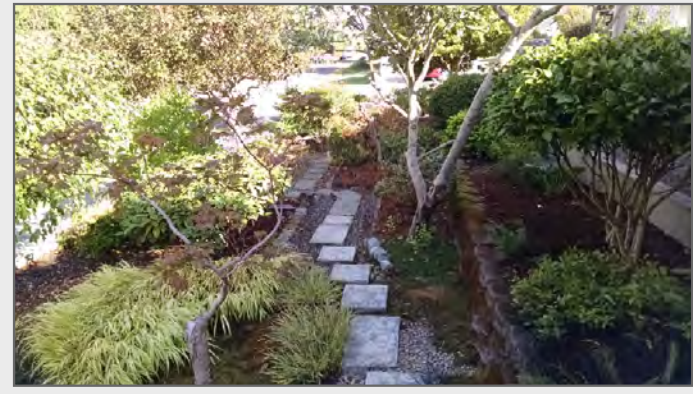
- ROW Soil Sample Location
- Phase 1 Off-Property Portion
- Phase 2 Off-Property Portion
- Phase 3 Off-Property Portion
- Clark County Tax Lots (2014)
- Railroad

**Figure 2**  
**ROW Soil Sample Locations**

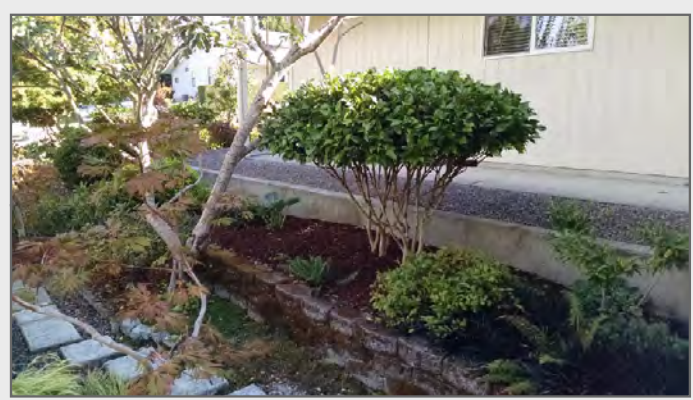
Former PWT Site  
Ridgfield, Washington



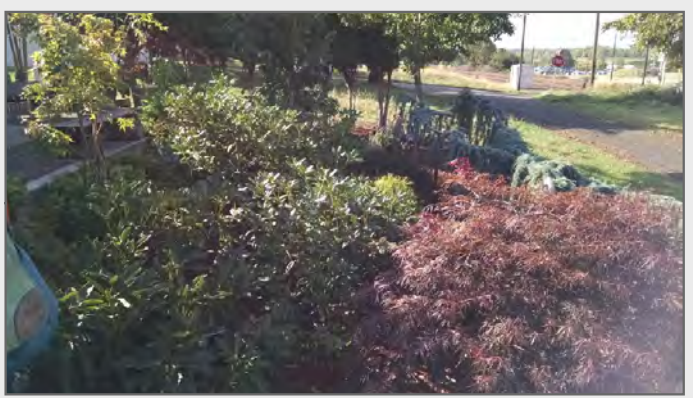




2 Front yard - looking north



3 Front yard - looking northeast



4 Front yard - looking south



1 Front yard - landscaping



5 Front yard - looking northeast



N RAILROAD AVE

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



Notes:  
1. ISM = incremental sampling methodology.

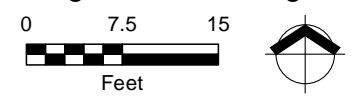
Legend

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- Composite Sample Location

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Figure AOI-001

512 North Railroad Avenue  
Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



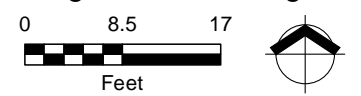
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI002)

**Figure AOI-002**

5 Maple Street  
Ridgefield, Washington



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Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



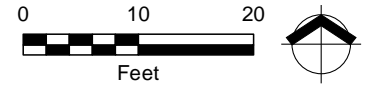
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI003)

**Figure AOI-003**

7 Maple Street  
Ridgefield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





1 From the northwest corner, facing southeast.



2 From the northwest corner, facing southeast.



3 Blackberries, facing southwest



4 Blackberries, facing west

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 7/28/2015.

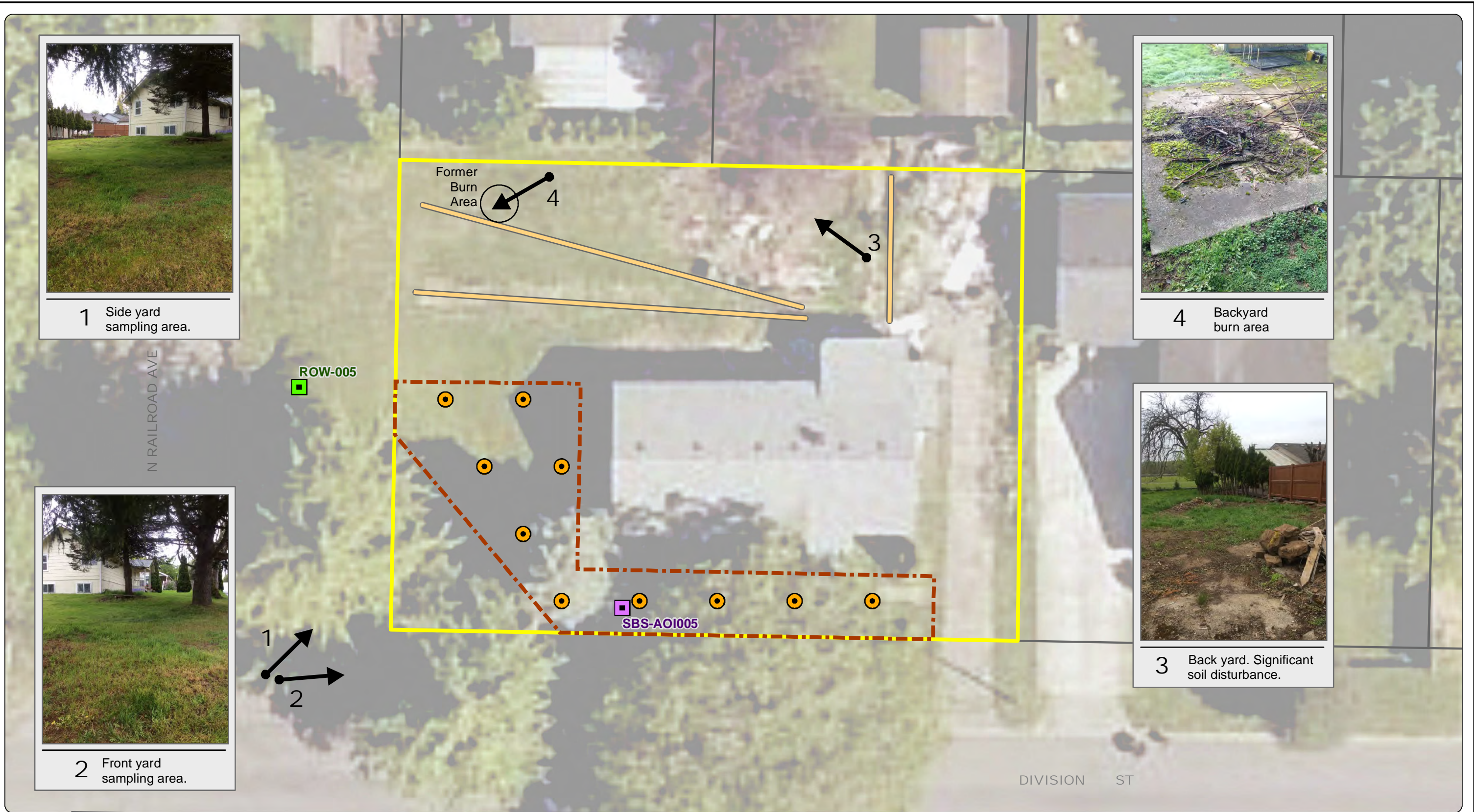


This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

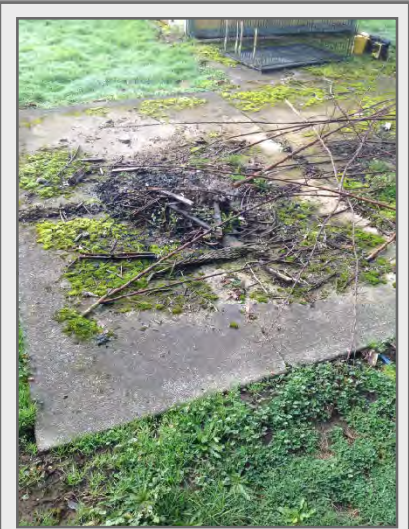
- Legend**
- Sampling Area Extent
  - Property Boundary
  - Clark County Tax Lot Boundary
  - Photo Location and Direction
  - Proposed Increment Sampling Location
  - 2015 Composite Sample Location

**Figure AOI-004**  
N 1st Avenue and Maple Street  
Ridgefield, Washington





1 Side yard sampling area.



4 Backyard burn area



3 Back yard. Significant soil disturbance.



2 Front yard sampling area.

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 2/13/2015 and 4/13/2015.



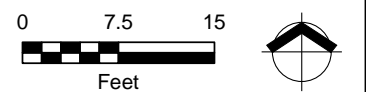
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

Notes:  
 1. ISM = incremental sampling methodology.  
 2. ROW = right of way.

- Legend**
- Sampling Area Extent
  - Property Boundary
  - Clark County Tax Lot Boundary
  - Photo Location and Direction
  - Water / Sewer Line, Recently Installed / Repaired
  - ISM Sample (AOI005)
  - Discrete ROW Sample
  - Discrete Subsurface Sample

**Figure AOI-005**

4 Division Street  
 Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 2/13/2015 and 4/13/2015.

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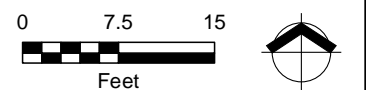
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI006)
- Discrete Subsurface Sample

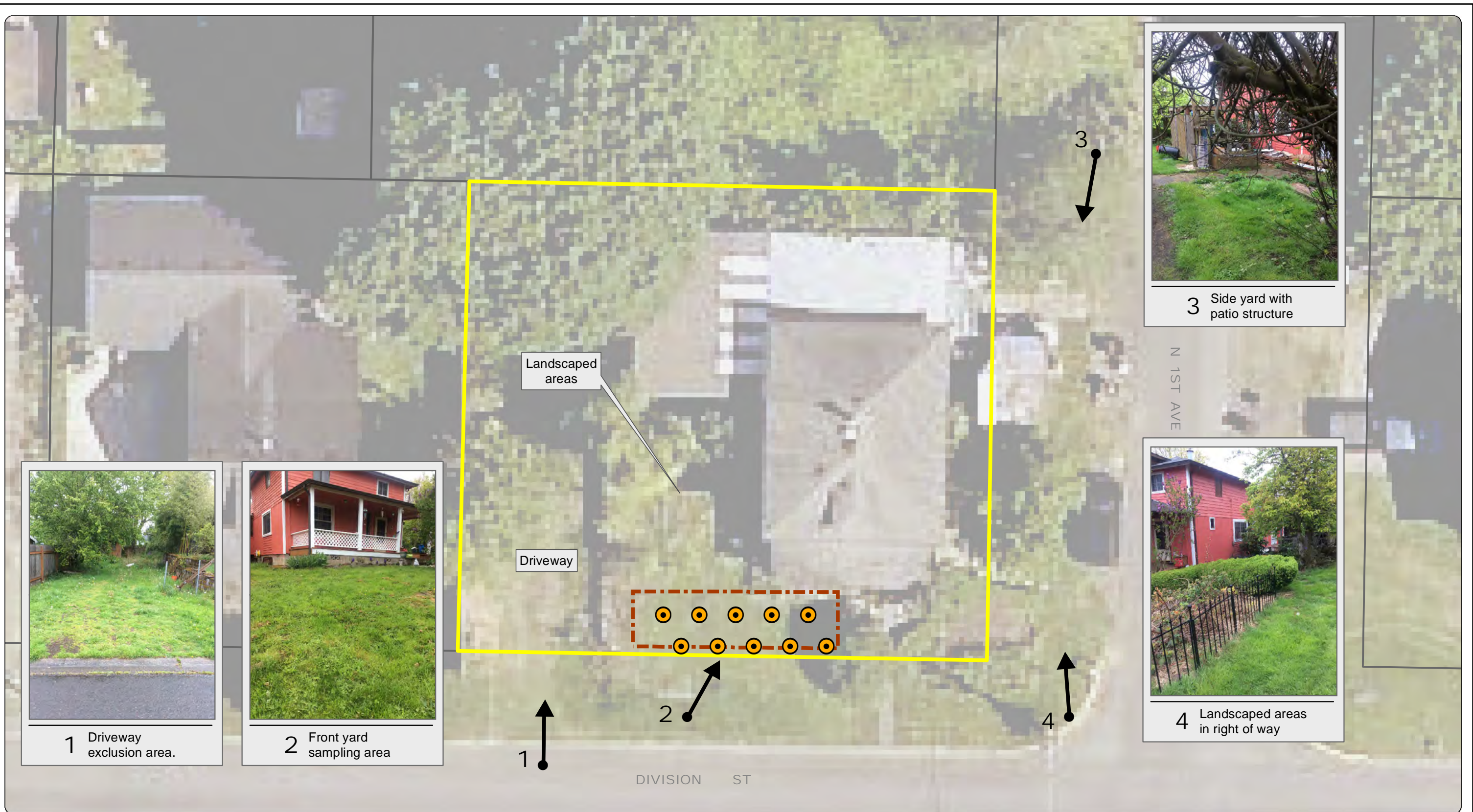
**Figure AOI-006**

8 Division Street  
Ridgefield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 2/13/2015 and 4/13/2015.

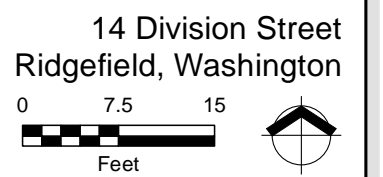


Notes:  
1. ISM = incremental sampling methodology.

This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

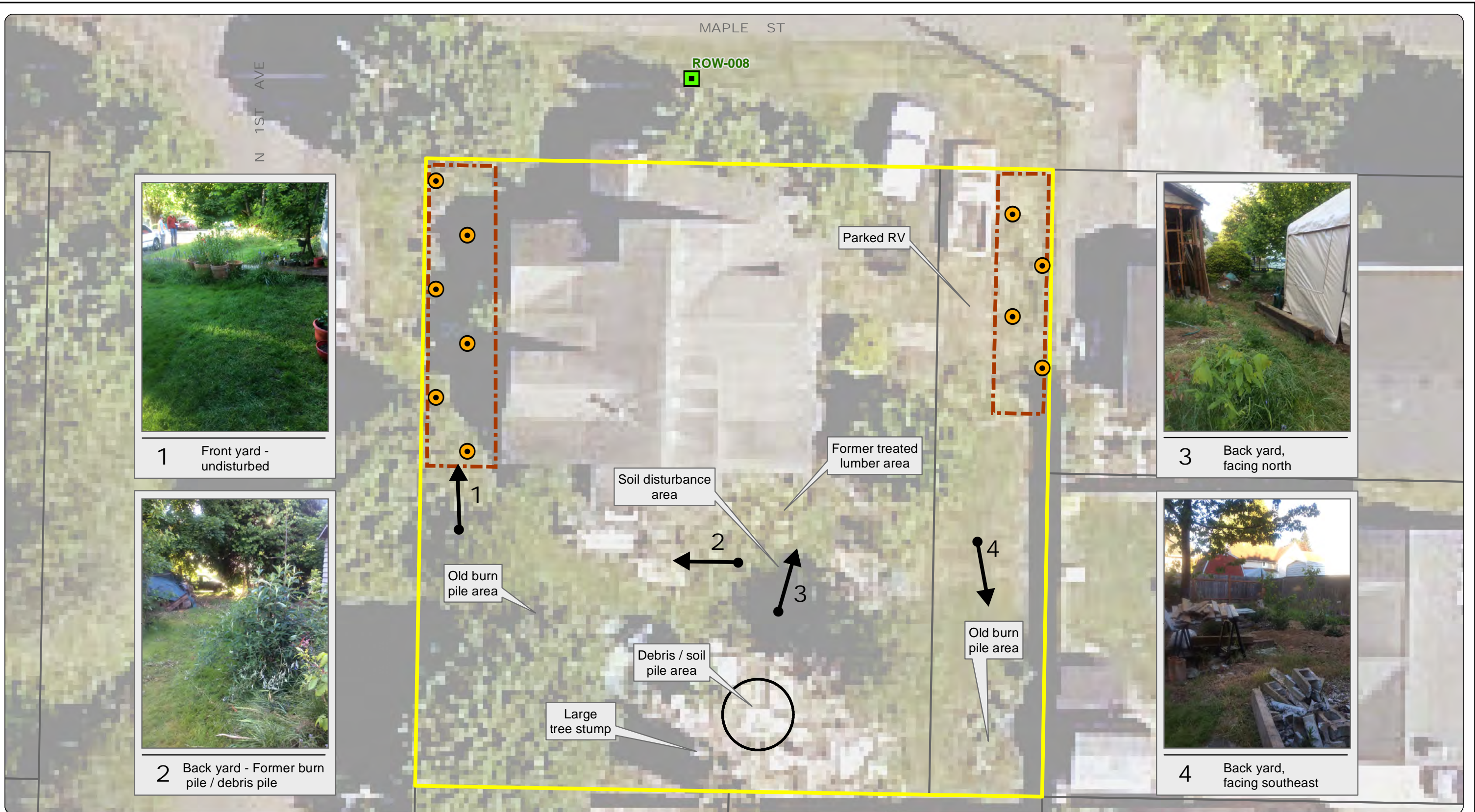
- Legend**
- Sampling Area Extent
  - Property Boundary
  - Clark County Tax Lot Boundary
  - ISM Sample (AOI007)
  - Photo Location and Direction

**Figure AOI-007**





Path: X:\9003.01 Port of Ridgefield\39\01-Property Yard Sampling\Projects\SSAP 5\Fig\_AOI-008\_512 N 1st Ave.mxd  
Print Date: 5/19/2015  
Approved By: mnovak  
Produced By: apadilla  
Project: 9003.01.39









Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 5/5/2015.

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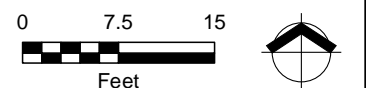
Notes:  
1. ISM = incremental sampling methodology.  
2. ROW = right of way.

### Legend

-  Sampling Area
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI008)
-  Discrete ROW Sample

**Figure AOI-008**

512 North 1st Avenue  
Ridgefield, Washington





Path: X:\9003.01 Port of Ridgefield\390\Property Yard Sampling\Projects\SSA P 11\Fig\_AOI-009\_515 N Main Ave.mxd  
Print Date: 11/12/2015  
Approved By: mmovak  
Produced By: apadilla  
Project: 9003.01.39








1 Front yard - facing southwest

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



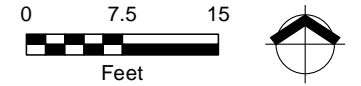
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI009)

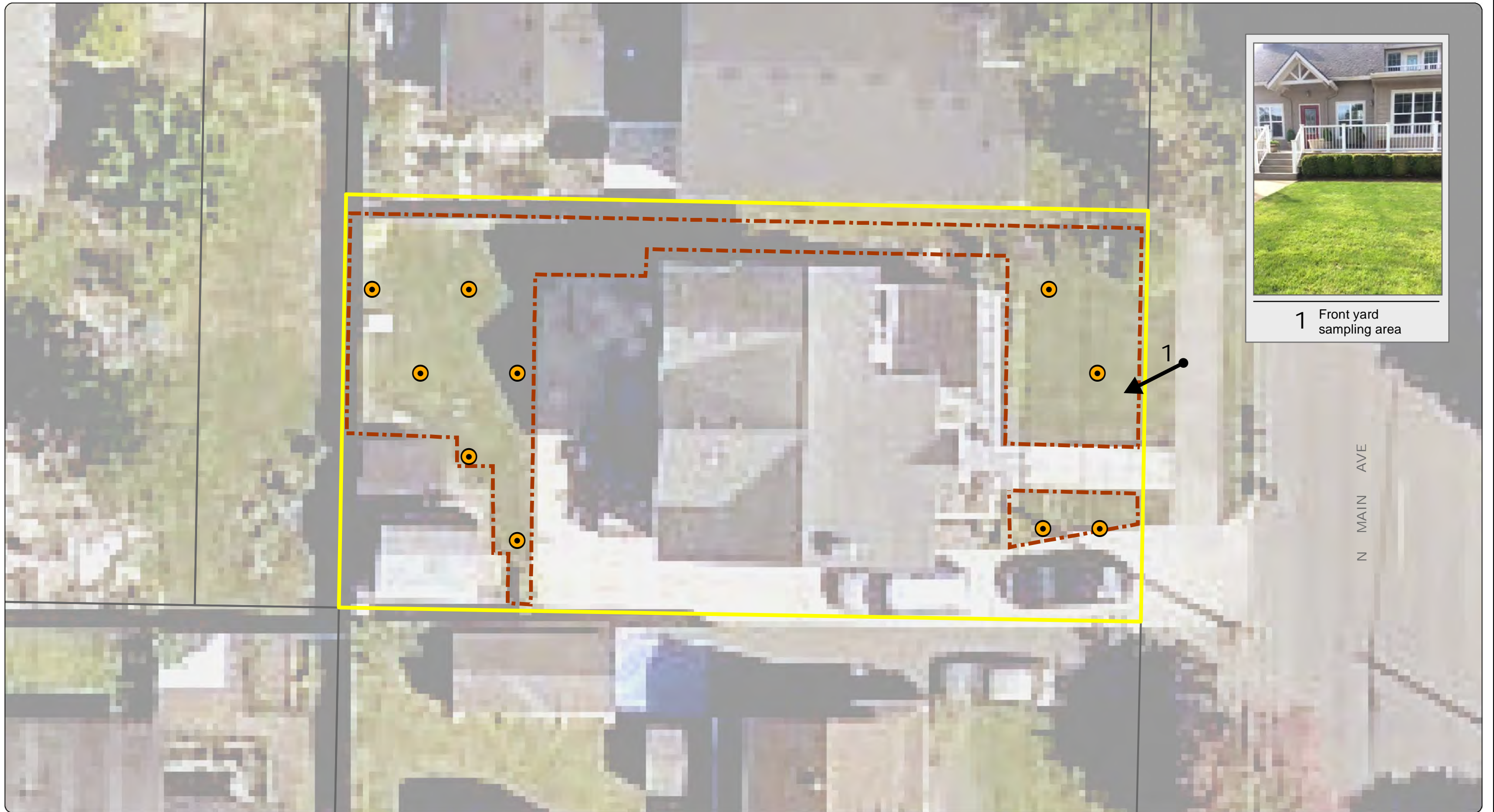
**Figure AOI-009**

515 North Main Avenue  
Ridgefield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.










Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.


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**Notes:**  
 1. ISM = incremental sampling methodology.

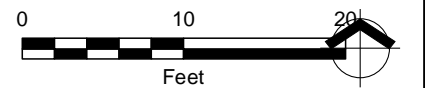
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

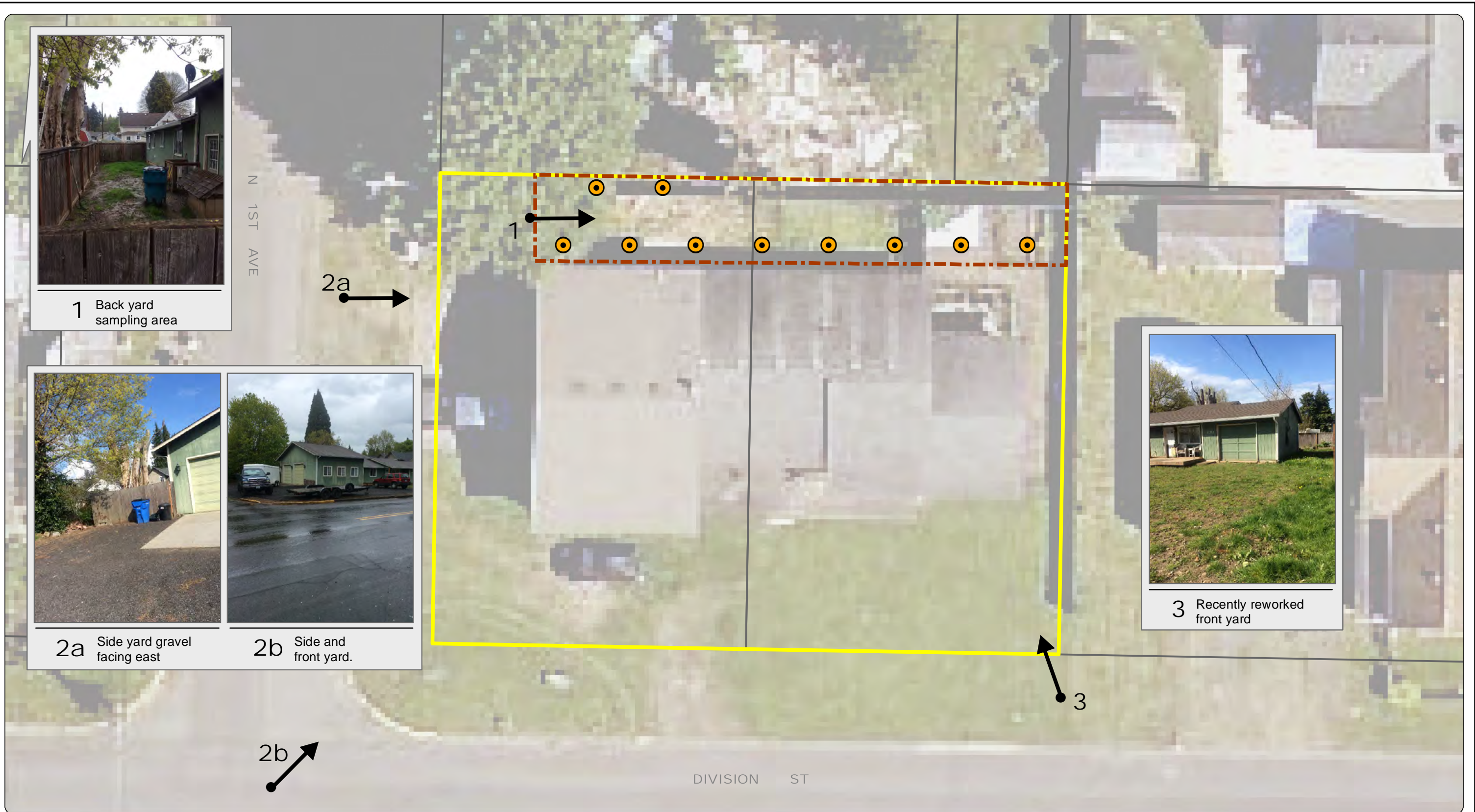
-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI010)

**Figure AOI-010**

511 North Main Avenue  
Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 2/13/2015 and 4/13/2015.



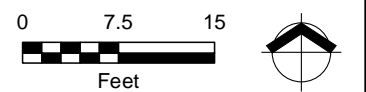
Notes:  
 1. ISM = incremental sampling methodology.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI011)

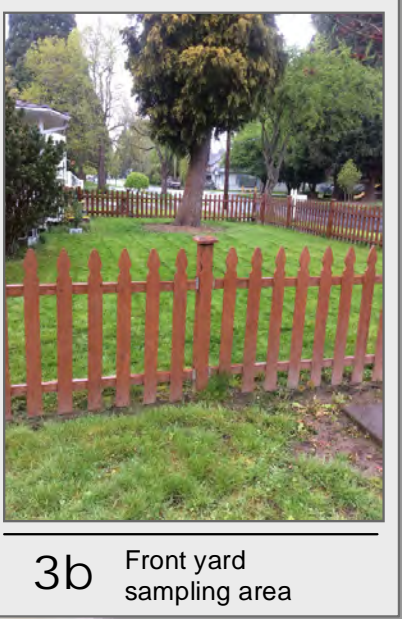
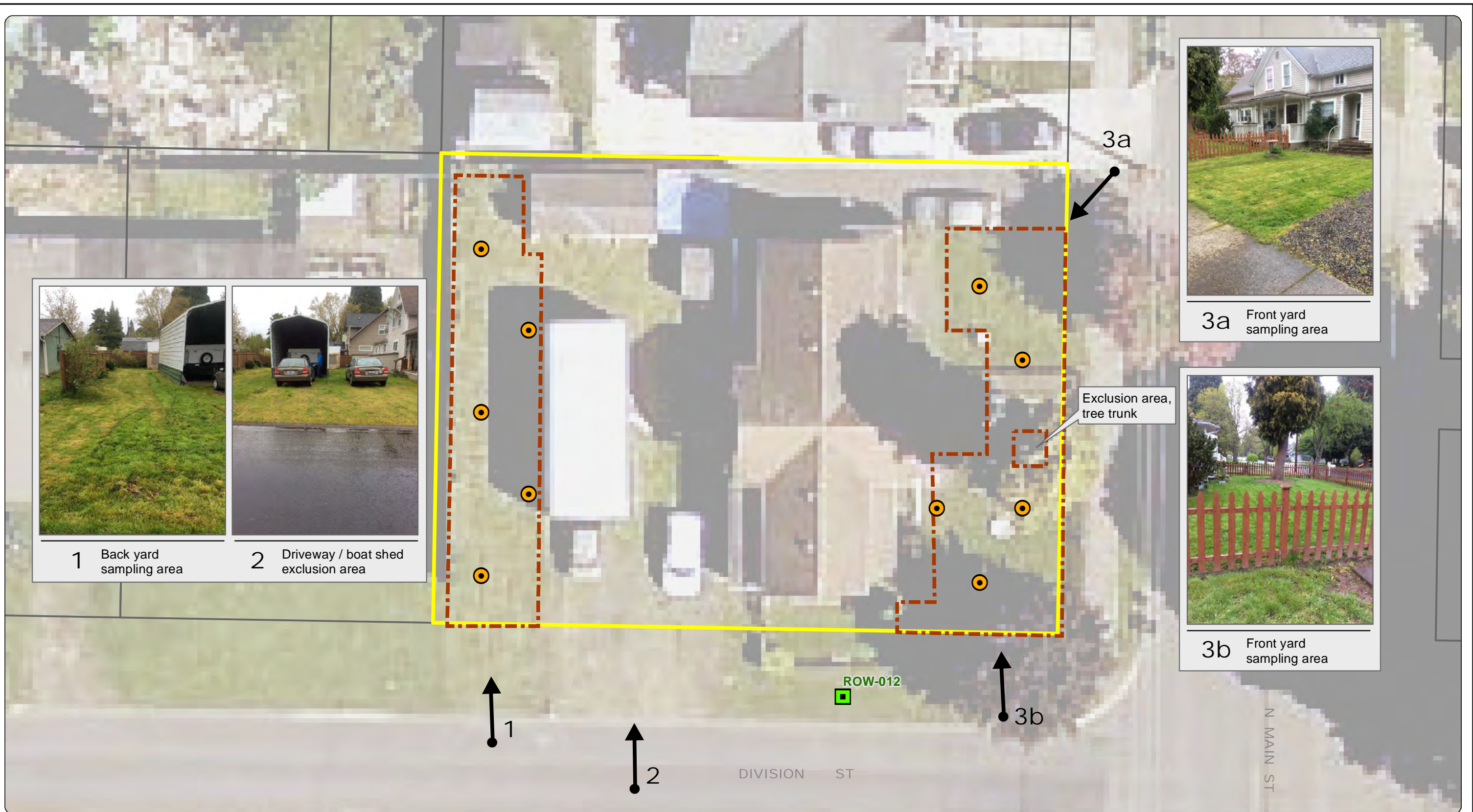
**Figure AOI-011**

100 Division Street  
 Ridgefield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/13/2015.



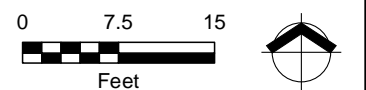
Notes:  
 1. ISM = incremental sampling methodology.  
 2. ROW = right of way.

**Legend**

- Sampling Area Extent (2)
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI012)
- Discrete ROW Sample

**Figure AOI-012**

503 & 505 North Main Avenue  
 Ridgfield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





1a Front yard facing south

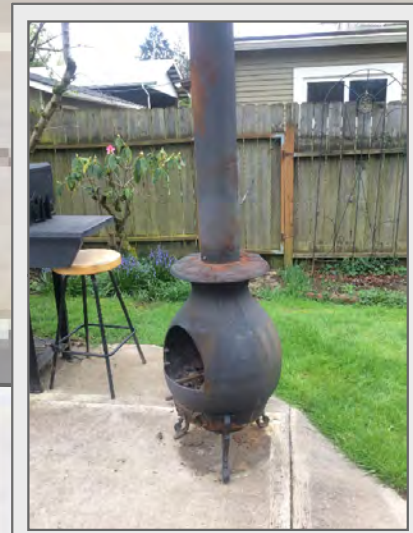


1b Front yard facing east

ROW-013

N RAILROAD AVE

DIVISION ST



2 Concrete patio with wood burning stove



3 Back yard sampling area

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 2/13/2015 and 4/13/2015.



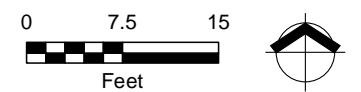
Notes:  
1. ISM = incremental sampling methodology.  
2. ROW = right of way.

Legend

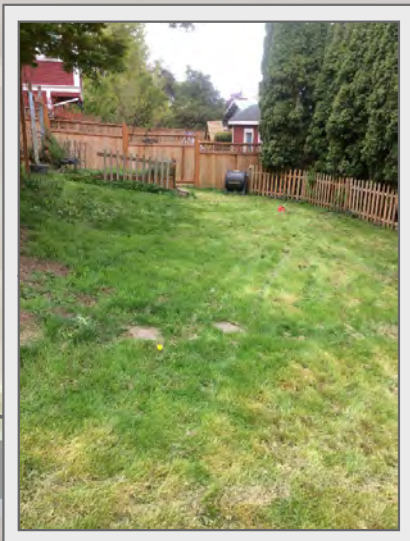
- Underground Pipe
- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- ISM Sample (AOI013)
- Discrete ROW Sample
- Photo Location and Direction

Figure AOI-013

5 Division Street  
Ridgefield, Washington







1 Back yard sampling area



2a Front / side yard sampling area, facing west



2b Front / side yard sampling area, facing south

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/13/2015.



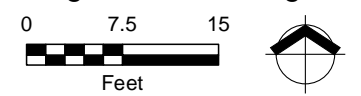
Notes:  
1. ISM = incremental sampling methodology.  
2. ROW = right of way.

**Legend**

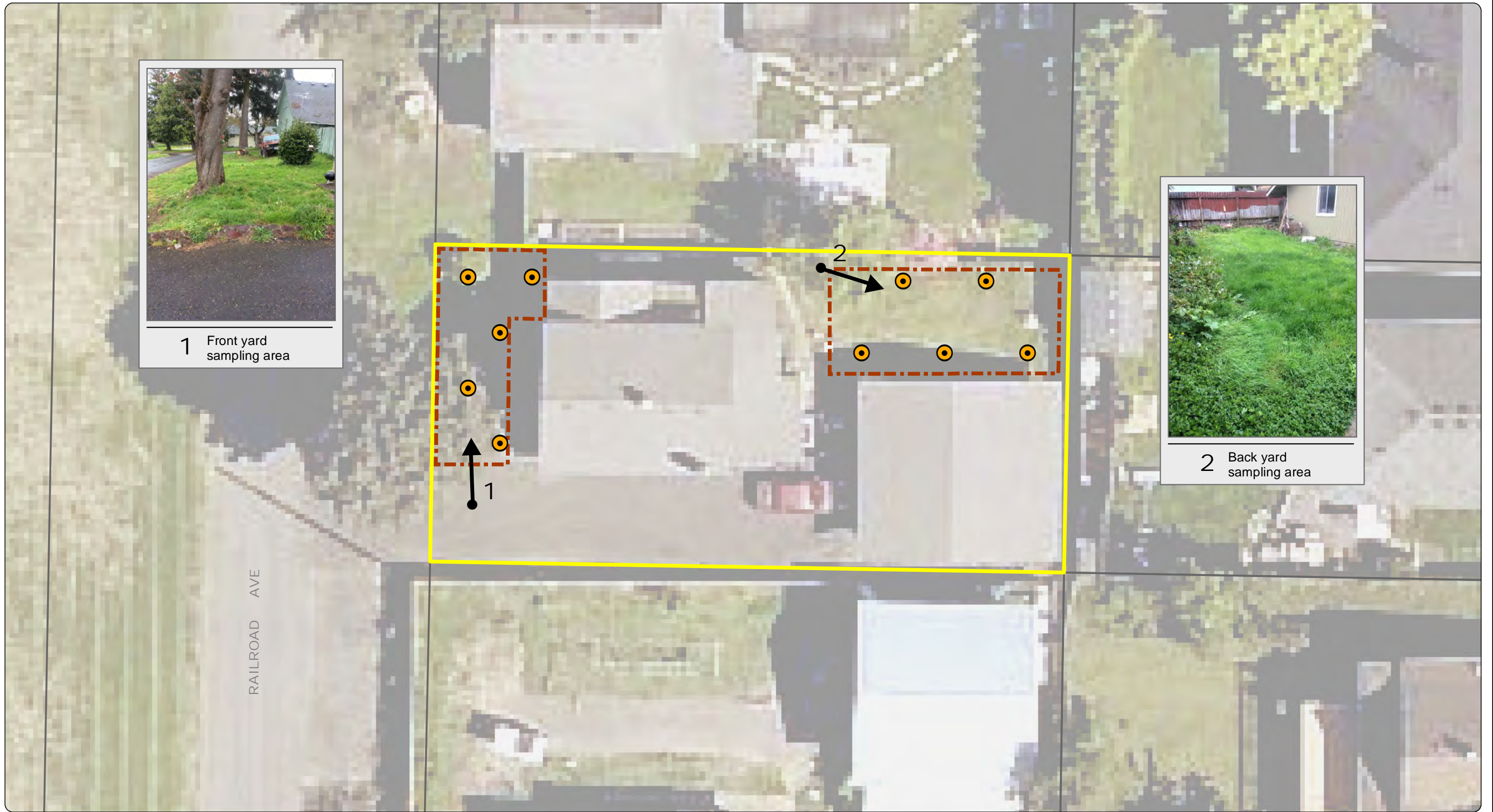
- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Sewer Line
- ISM Sample (AOI014)
- Discrete ROW Sample
- Photo Location and Direction

**Figure AOI-014**

413 North 1st Avenue  
Ridgefield, Washington












Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/13/2015.



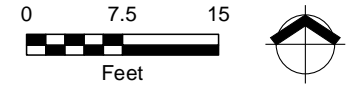
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI015)

**Figure AOI-015**

410 Railroad Avenue  
Ridgefield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/28/2015.

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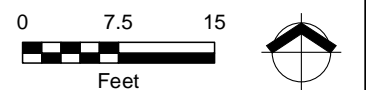
Notes:  
1. ISM = incremental sampling methodology.  
2. ROW = right of way.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI016)
- Discrete ROW Sample

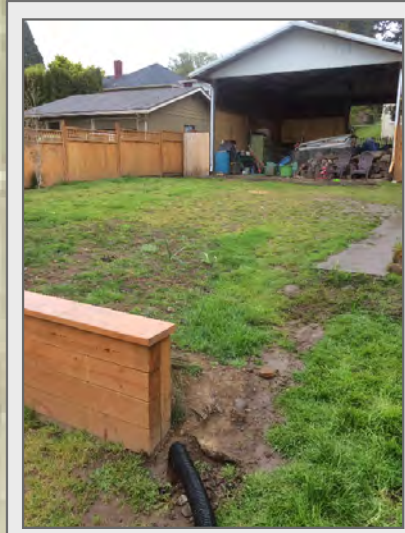
**Figure AOI-016**

409 North 1st Avenue  
Ridgefield, Washington

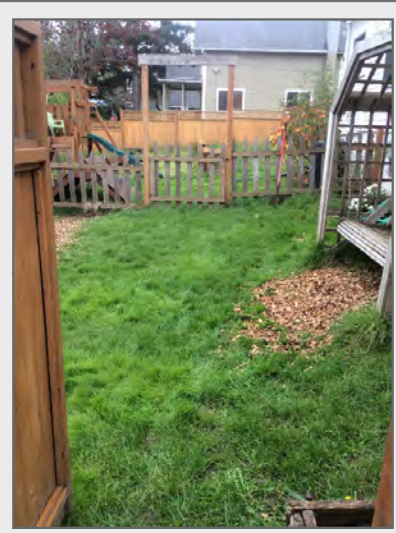


This product is for informational purposes and may not have been prepared for, or be suitable for, legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

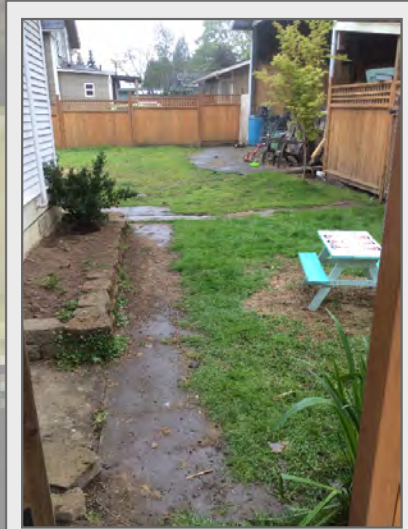




1 Former blacktop driveway exclusion area



2a Side yard sampling area



3b Side yard sampling area



3a Side / front yard sampling area



2b Front yard sampling area, facing north



2c Front yard sampling area, facing west



Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/13/2015.



Notes:  
1. ISM = incremental sampling methodology.  
2. ROW = right of way.

- Sampling Area
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction

**Legend**

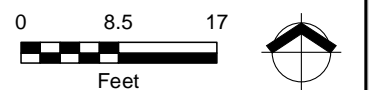
- Discrete ROW Sample
- Discrete Subsurface Sample

**ISM Sample (AOI017)**

- ISM Sample (A)
- ISM Sample (B)
- ISM Sample (C)

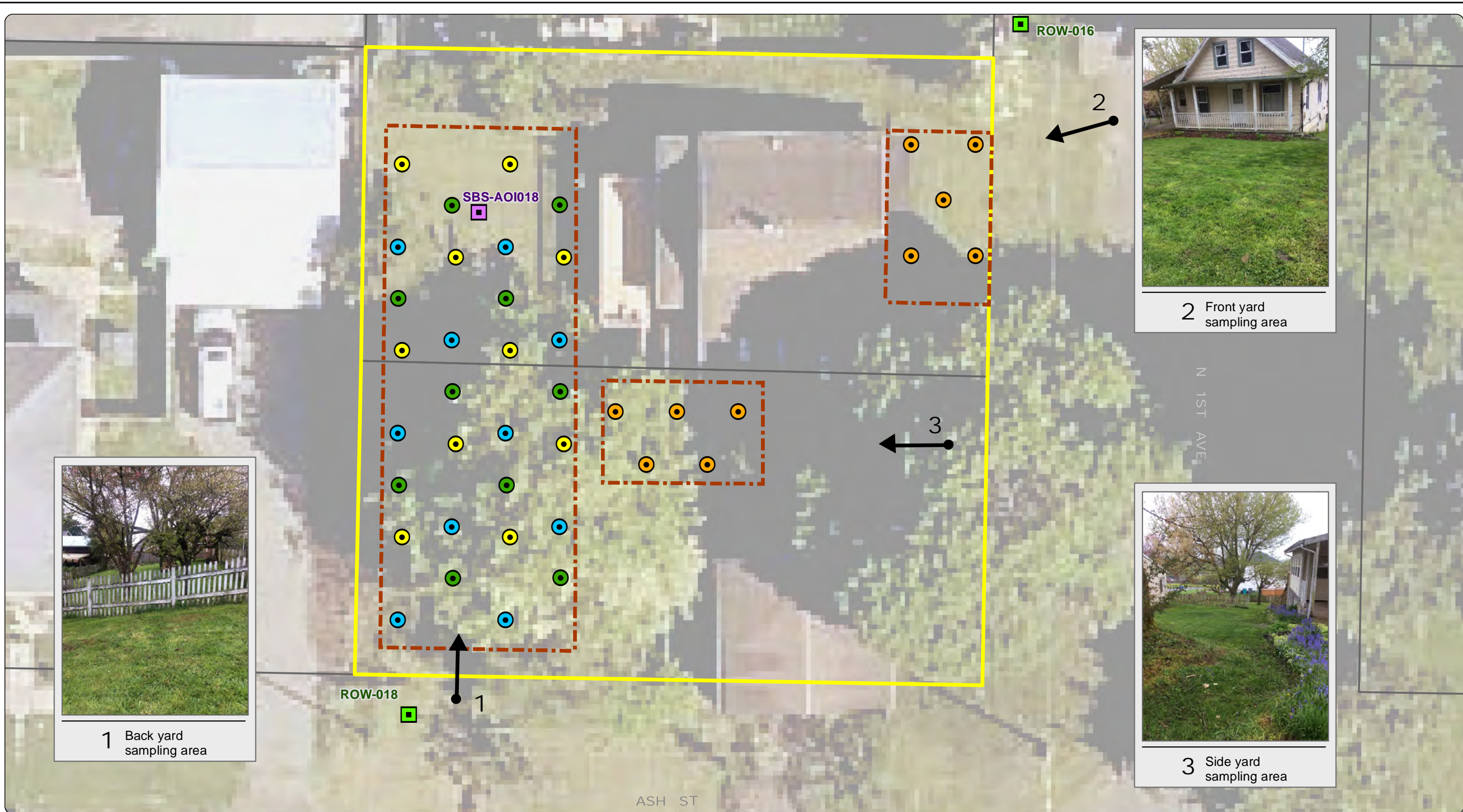
**Figure AOI-017**

6 Ash Street  
Ridgefield, Washington



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1 Back yard sampling area



2 Front yard sampling area



3 Side yard sampling area

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 2/13/2015.

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Notes:  
1. ISM = incremental sampling methodology.  
2. ROW = right of way.

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction

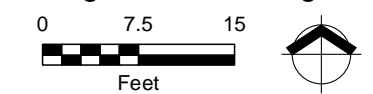
**Legend**

- Discrete ROW Sample
- Discrete Subsurface Sample
- ISM Sample (AOI018) (Front and Side Yard)**
- ISM Sample

- ISM Sample (AOI018) (Back Yard)**
- ISM Sample (A)
- ISM Sample (B)
- ISM Sample (C)

**Figure AOI-018**

405 North 1st Avenue  
Ridgefield, Washington







1 Front yard - north side, facing east



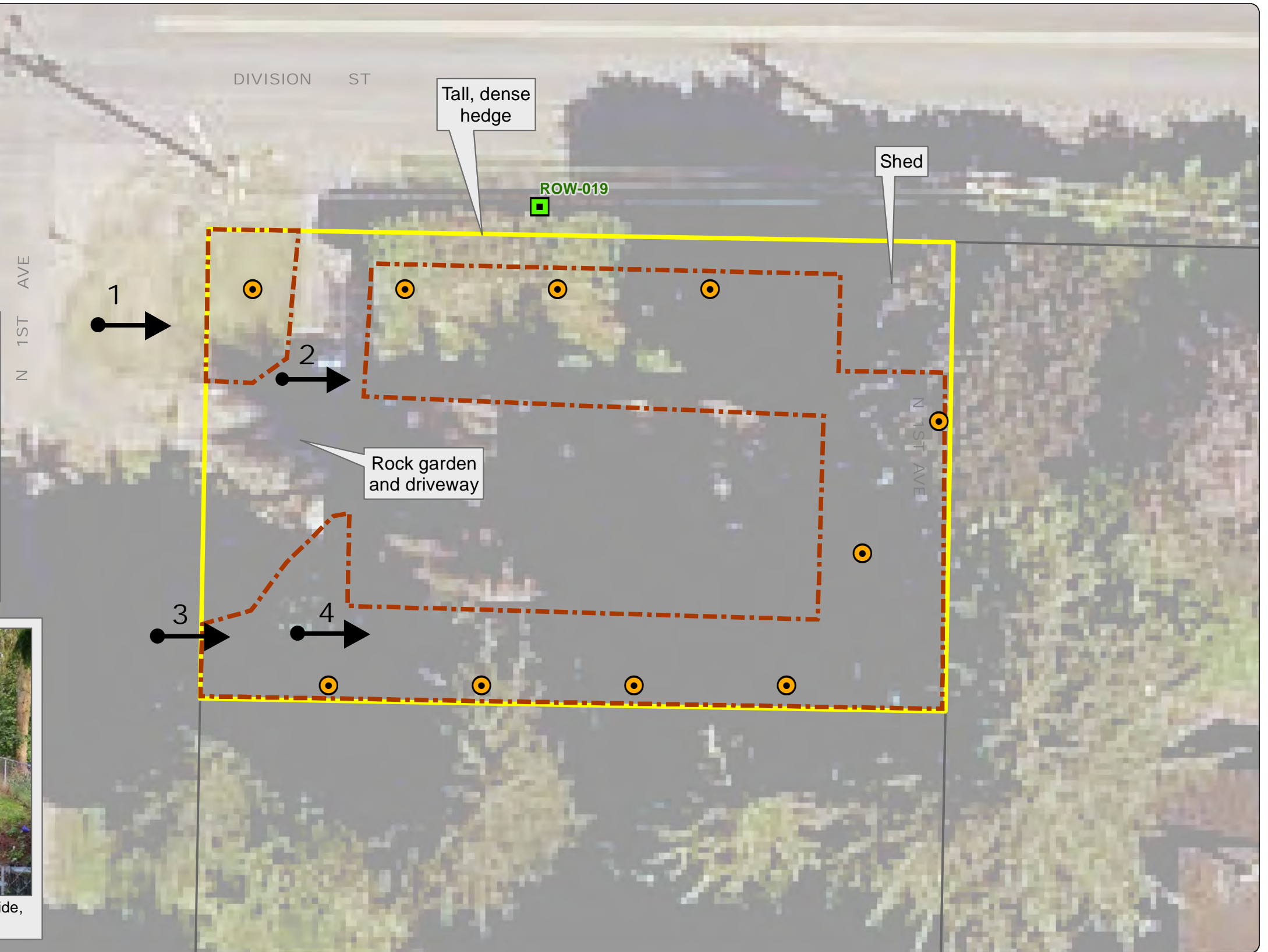
2 Back yard - north side, facing east



3 Front yard - south side, facing east.



4 Back yard - south side, facing east



Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 5/21/2015 and 5/29/2015.



Notes:  
1. ISM = incremental sampling methodology.  
2. ROW = right of way.

Legend

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI019)
- Discrete ROW Sample

Figure AOI-019

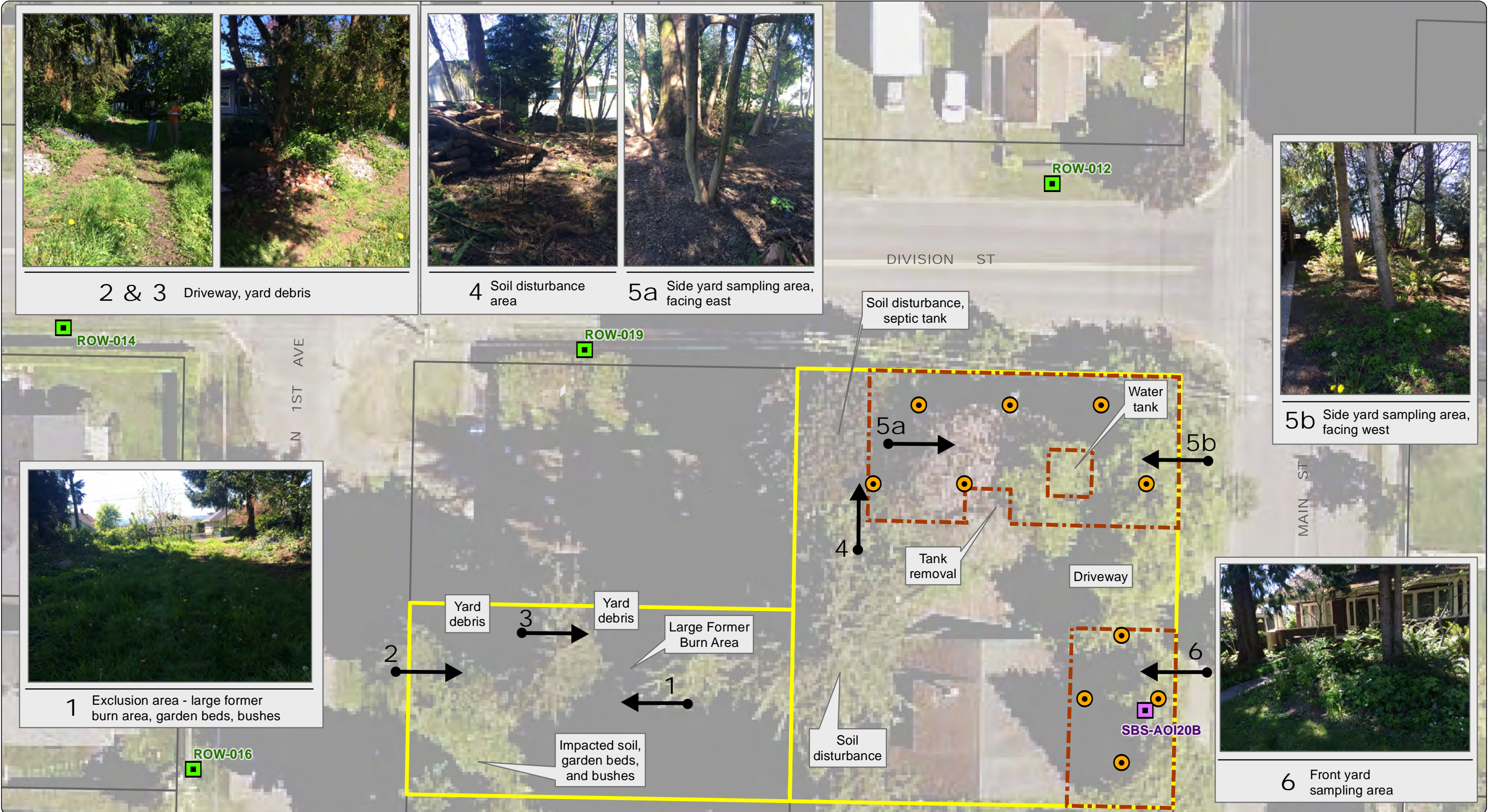
402 North 1st Avenue  
Ridgefield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.



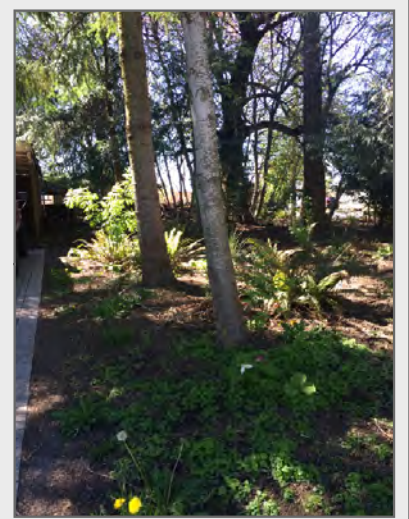
Path: X:\9003.01 Port of Ridgefield\39\01\Property Yard Sampling\Projects\SSAP\3\Fig\_AOI-020\_411\_Main St.rxd  
 Print Date: 7/10/2015  
 Approved By: mrvak  
 Produced By: apadilla  
 Project: 9003.01.39



2 & 3 Driveway, yard debris



4 Soil disturbance area 5a Side yard sampling area, facing east



5b Side yard sampling area, facing west



1 Exclusion area - large former burn area, garden beds, bushes



6 Front yard sampling area

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/21/2015.



Notes:  
 1. ISM = incremental sampling methodology.  
 2. ROW = right of way.

**Legend**

- Sampling Area
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI020B)
- Discrete ROW Sample
- Discrete Subsurface Sample

**Figure AOI-020 (A & B)**

411 Main Street  
 Ridgefield, Washington



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Path: X:\9003.01 Port of Ridgefield\3901-Property Yard Sampling\Projects\SSAP 3\Fig\_AOI-021\_406 N 1st Ave.mxd  
Print Date: 7/10/2015  
Approved By: mmovak  
Produced By: apadilla  
Project: 9003.01.39



1 Former house front yard sampling area



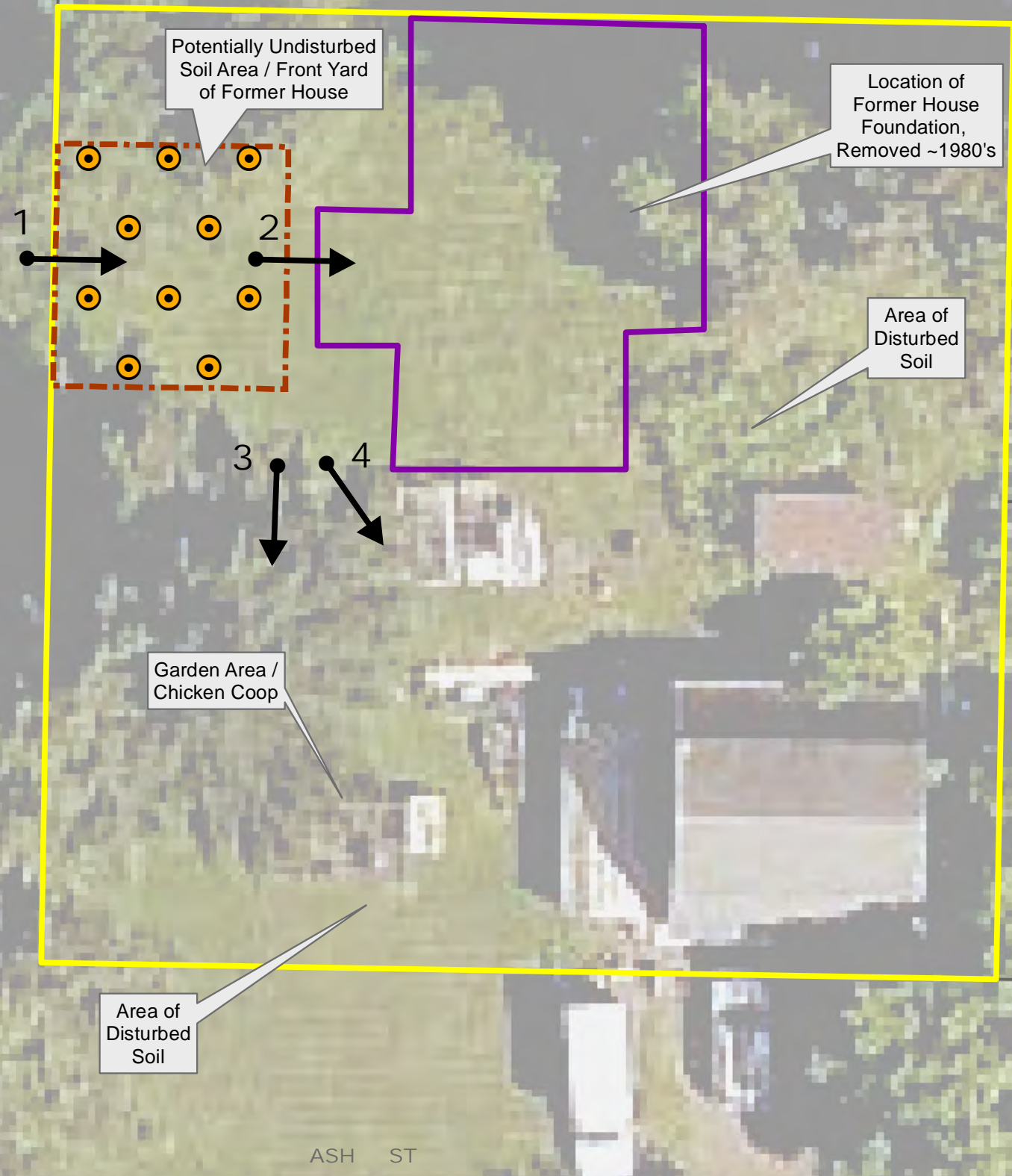
2 Former house foundation, chicken / duck coop



3 Exclusion area - garden, chicken coop



4 Exclusion area - disturbed soil



Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/21/2015.



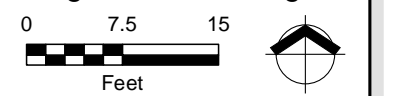
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI021)

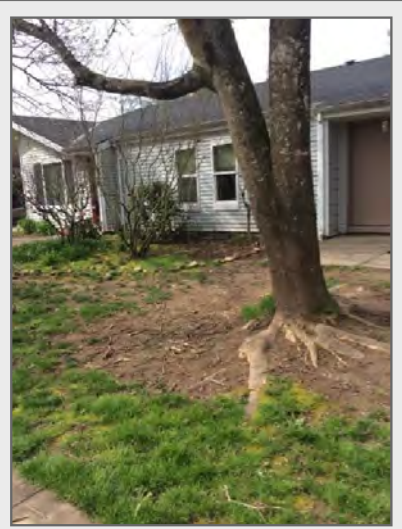
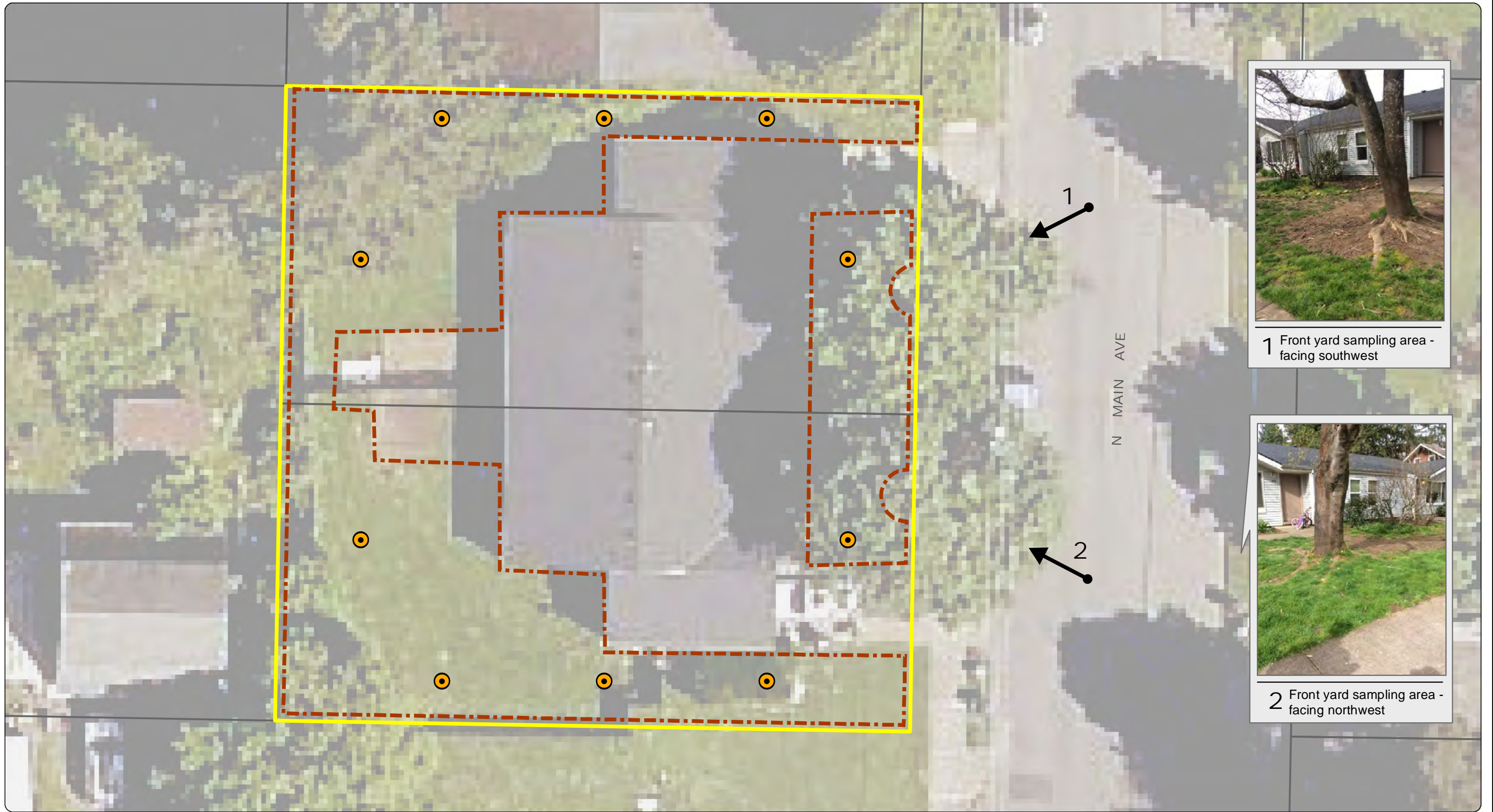
**Figure AOI-021**

406 North 1st Avenue  
Ridgefield, Washington

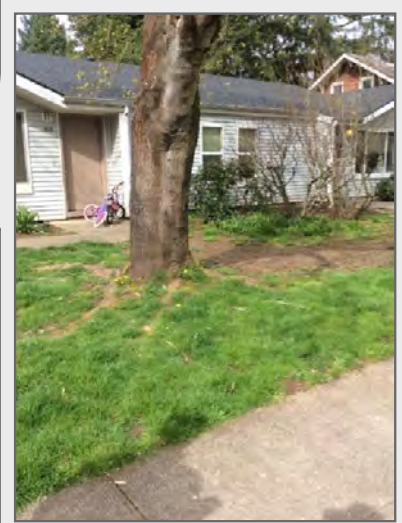


This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





1 Front yard sampling area - facing southwest








2 Front yard sampling area - facing northwest

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



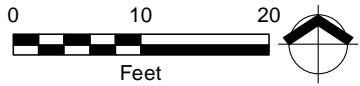
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI022)

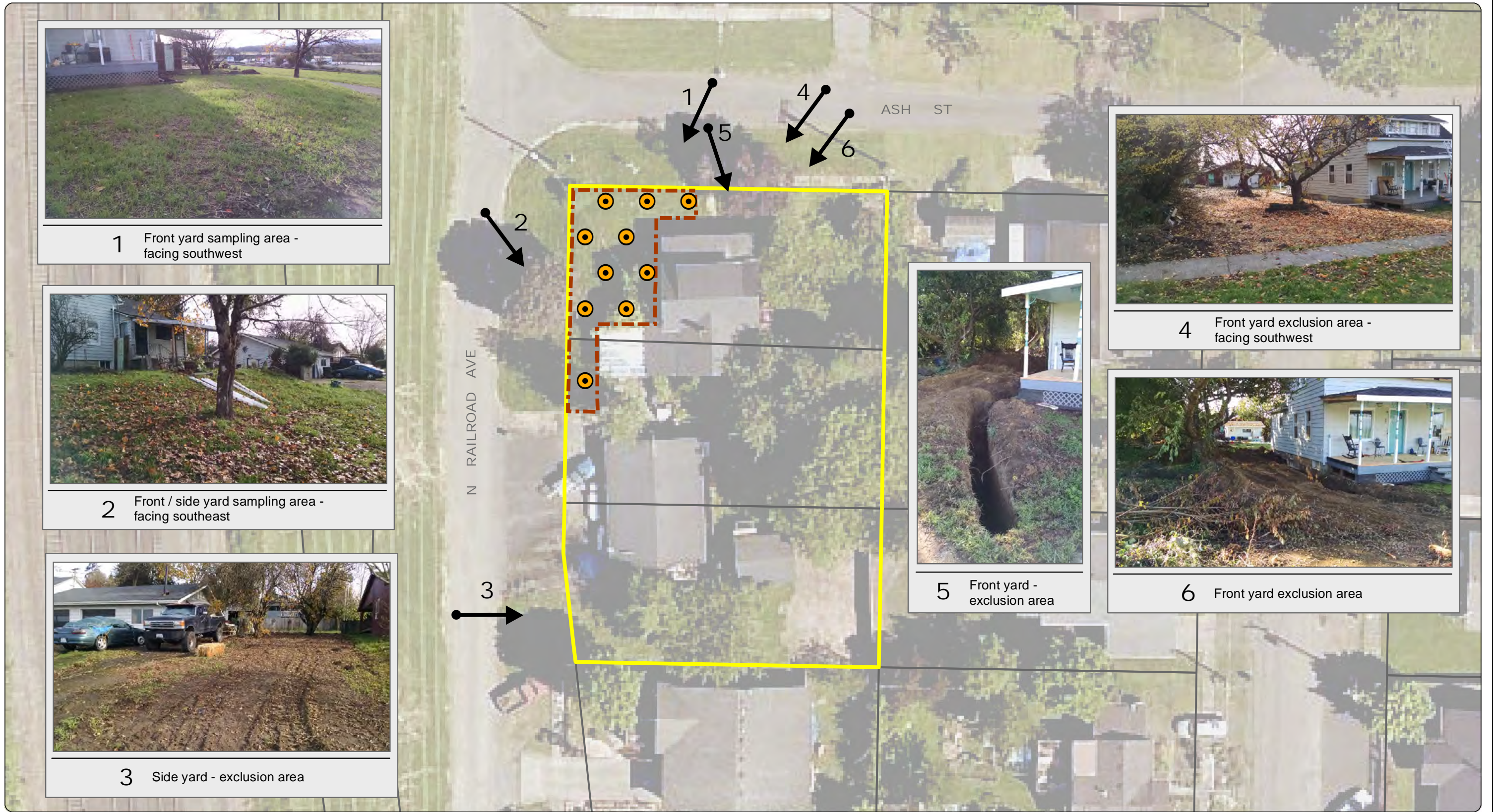
**Figure AOI-022**

403 North Main Avenue  
Ridgefield, Washington

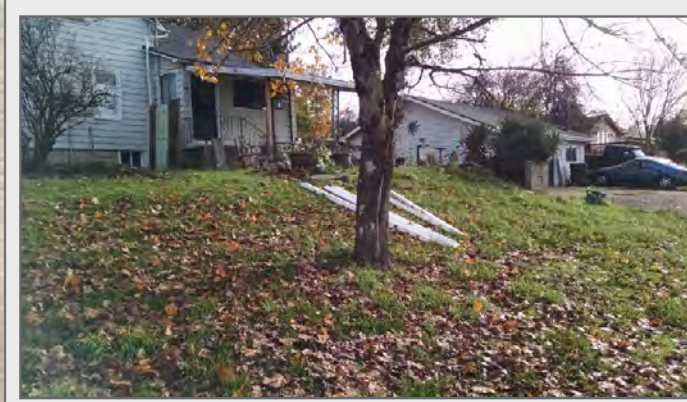


This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

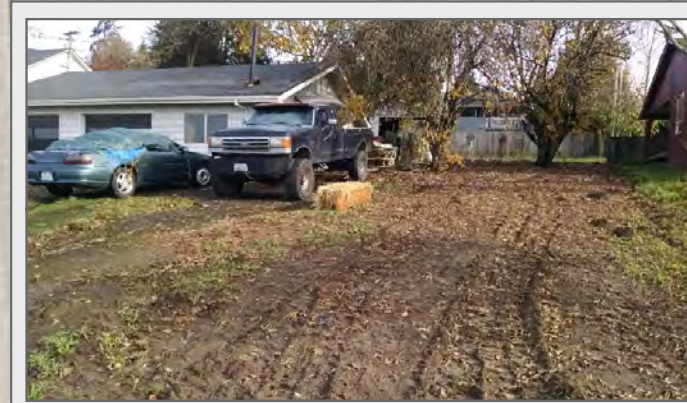




1 Front yard sampling area - facing southwest



2 Front / side yard sampling area - facing southeast



3 Side yard - exclusion area



4 Front yard exclusion area - facing southwest



5 Front yard - exclusion area



6 Front yard exclusion area

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.

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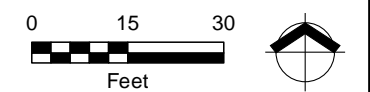
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI023)

**Figure AOI-023**

5 North Ash Street  
Ridgefield, Washington



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1 Exclusion area - gravel



2 Back yard sampling area, facing north



3 Exclusion area - large fire pit



4 Exclusion area - creosote ties, garden beds



5a Side yard sampling area, facing east



5b Back yard sampling area, facing north

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/21/2015.



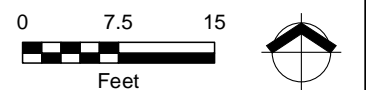
Notes:  
1. ISM = incremental sampling methodology.  
2. ROW = right of way.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI024)
- Discrete ROW Sample

**Figure AOI-024**

327 North 1st Avenue  
Ridgefield, Washington





Path: X:\9003.01 Port of Ridgefield\3901-Property Yard Sampling\Projects\SSAP 3\Fig\_AOI-025\_319 N 1st Ave.mxd  
 Print Date: 7/10/2015  
 Approved By: mmovak  
 Produced By: apadilla  
 Project: 9003.01.39



Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/21/2015.



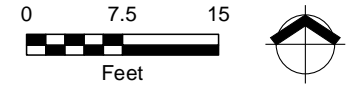
Notes:  
 1. ISM = incremental sampling methodology.  
 2. ROW = right of way.

**Legend**

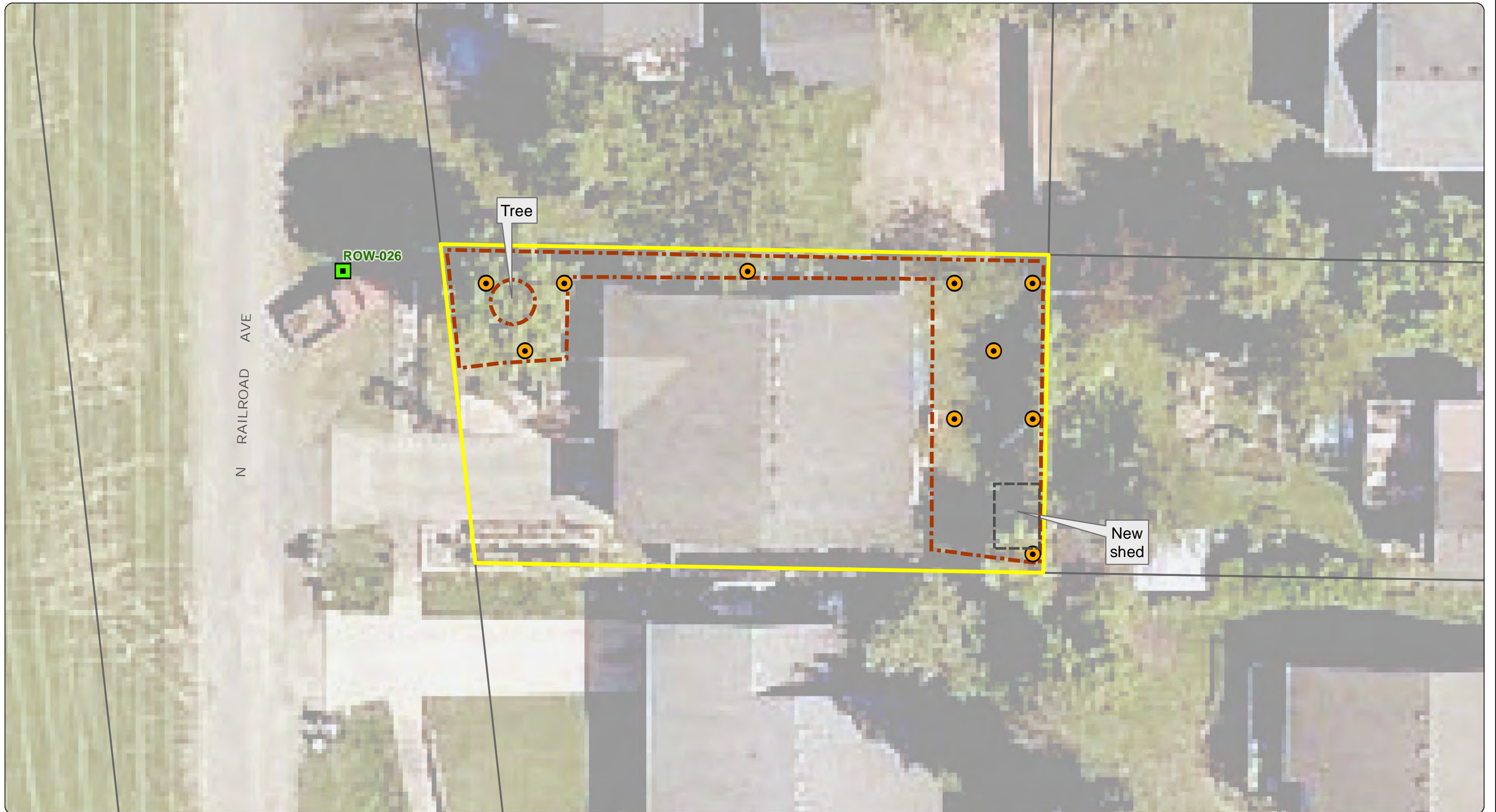
- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- Sewer/Water Line
- ISM Sample (AOI025)
- Discrete ROW Sample

**Figure AOI-025**

319 North 1st Avenue  
 Ridgefield, Washington












Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.


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Notes:

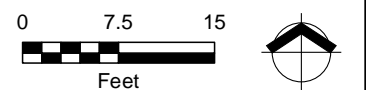
1. ISM = incremental sampling methodology.
2. ROW = right of way.

**Legend**

-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Proposed ISM Sample (AOI026)
-  Discrete ROW Sample

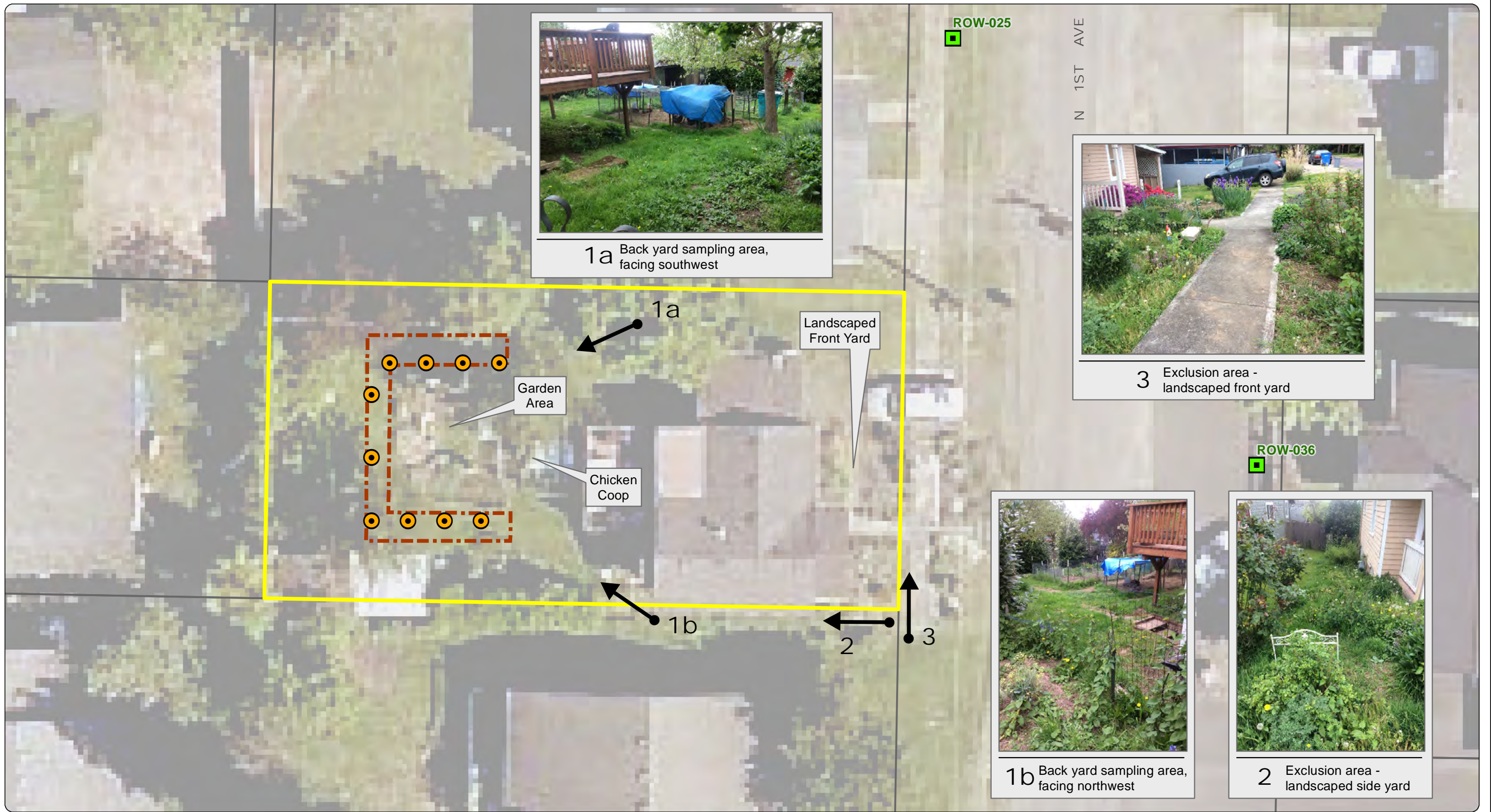
**Figure AOI-026**

314 North Railroad Avenue  
Ridgefield, Washington



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Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/21/2015.



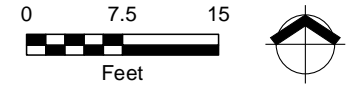
Notes:  
 1. ISM = incremental sampling methodology.  
 2. ROW = right of way.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI027)
- Discrete ROW Sample

**Figure AOI-027**

315 North 1st Avenue  
 Ridgefield, Washington



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1 Front yard sampling area - facing northwest



2 Side and backyard sampling area - facing north






Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.

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Notes:  
1. ISM = incremental sampling methodology.

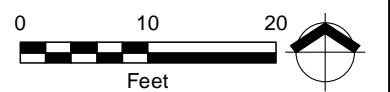
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI028A)

**Figure AOI-028A**

311 North 1st Street  
Ridgefield, Washington












Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



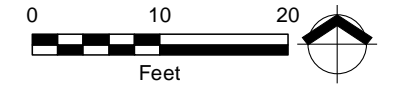
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI028B)

**Figure AOI-028B**

311 North 1st Street  
Ridgefield, Washington



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Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/21/2015.



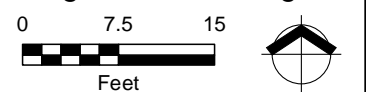
Notes:  
 1. ISM = incremental sampling methodology.  
 2. ROW = right of way.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI029A)
- Discrete ROW Sample

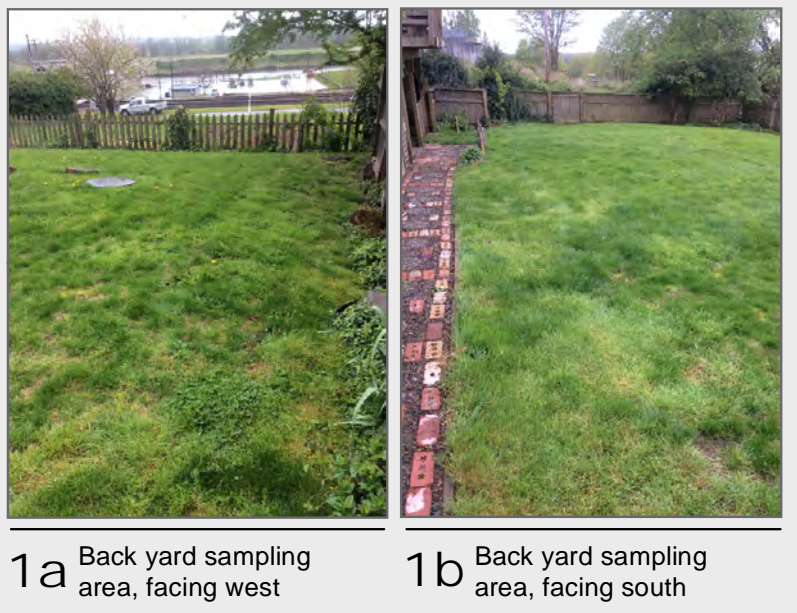
**Figure AOI-029A**

305 North 1st Avenue  
 Ridgefield, Washington



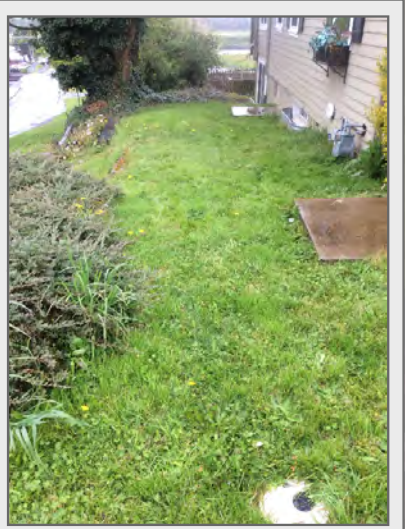
This product is for informational purposes and may not have been prepared for, or be suitable for, legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





1a Back yard sampling area, facing west

1b Back yard sampling area, facing south



2 Side yard /ROW

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/13/2015.



Notes:  
1. ISM = incremental sampling methodology.  
2. ROW = right of way.

Legend

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI029B)
- Discrete ROW Sample

Figure AOI-029B

305 North 1st Ave  
Ridgefield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/21/2015.

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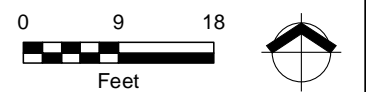
Notes:  
 1. ISM = incremental sampling methodology.  
 2. ROW = right of way.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI030)
- Discrete ROW Sample

**Figure AOI-030**

101 Ash Street  
 Ridgefield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 2/13/2015.



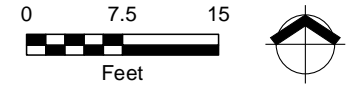
Notes:  
 1. ISM = incremental sampling methodology.  
 2. ROW = right of way.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI031)
- Discrete ROW Sample

**Figure AOI-031**

105 Ash Street  
 Ridgefield, Washington



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Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/13/2015.

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Notes:  
 1. ISM = incremental sampling methodology.

**Legend**

-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI032)
-  Discrete Subsurface Sample

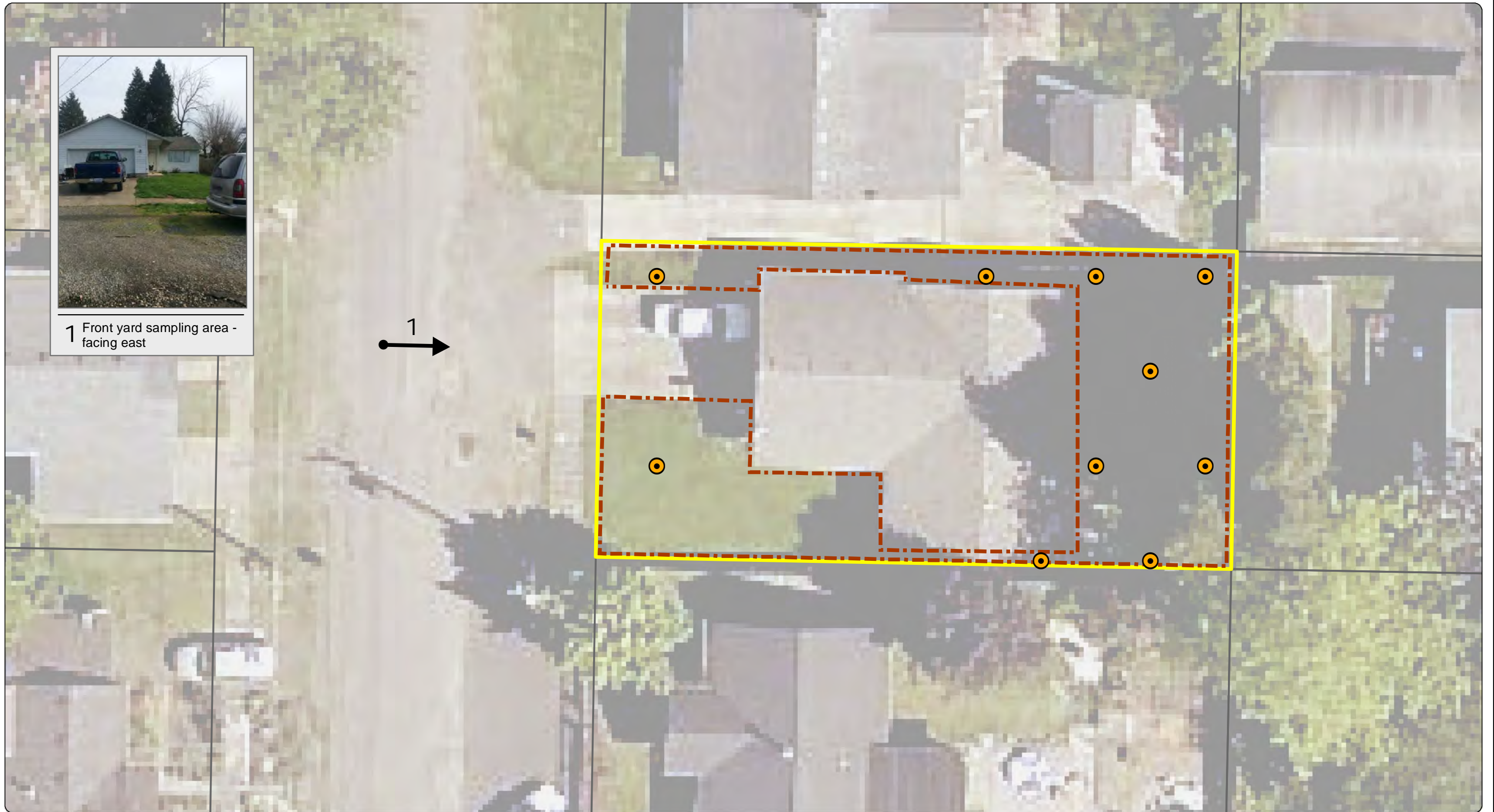
**Figure AOI-032**

322 North 1st Avenue  
 Ridgefield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.










Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



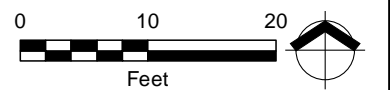
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI034)

**Figure  
AOI-034**

318 North 1st Street  
Ridgfield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.










Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.

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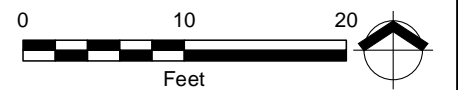
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI035)

**Figure  
AOI-035**

313 North Main Avenue  
Ridgefield, Washington



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/13/2015.



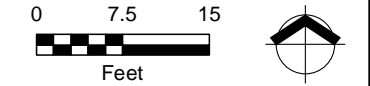
Notes:  
 1. ISM = incremental sampling methodology.  
 2. ROW = right of way.

**Legend**

- Sampling Area Extent
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI036)
- Discrete ROW Sample

**Figure AOI-036**

314 North 1st Avenue  
 Ridgefield, Washington

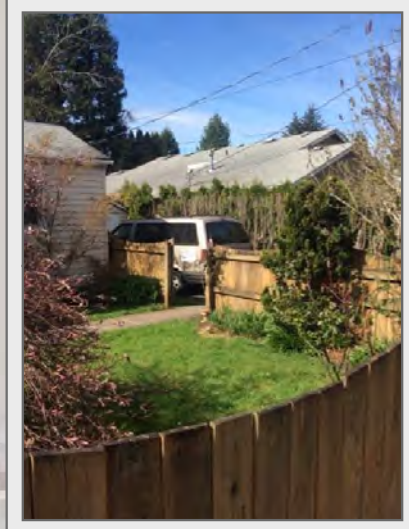


This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

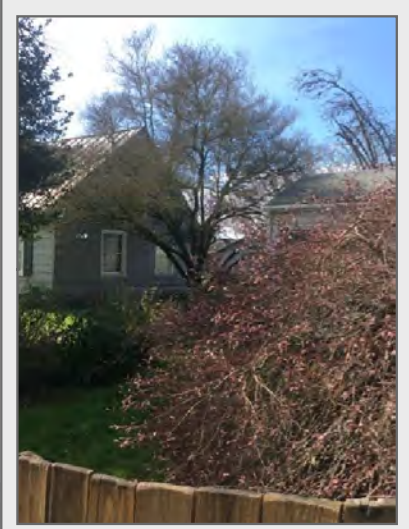




1 Back yard sampling area



2 Front yard - facing northwest








3 Front yard - facing southwest

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



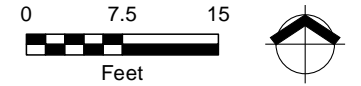
Notes:  
1. ISM = incremental sampling methodology.

**Legend**

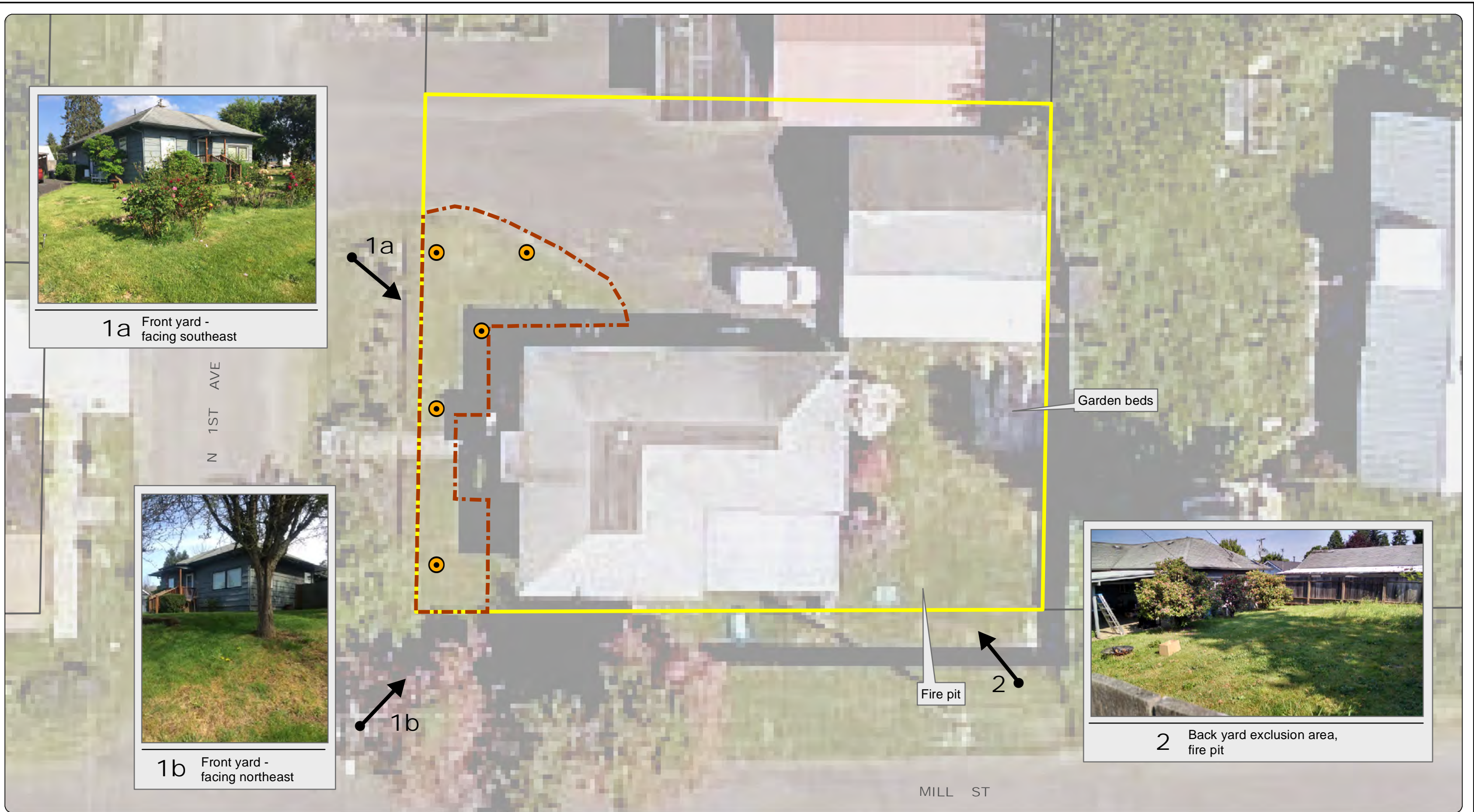
-  Sampling Area Extent
-  Property Boundary
-  Clark County Tax Lot Boundary
-  Photo Location and Direction
-  ISM Sample (AOI037)

**Figure AOI-037**

309 North Main Avenue  
Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 5/21/2015 and 5/29/2015.

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Notes:  
 1. ISM = incremental sampling methodology.

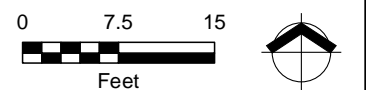
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

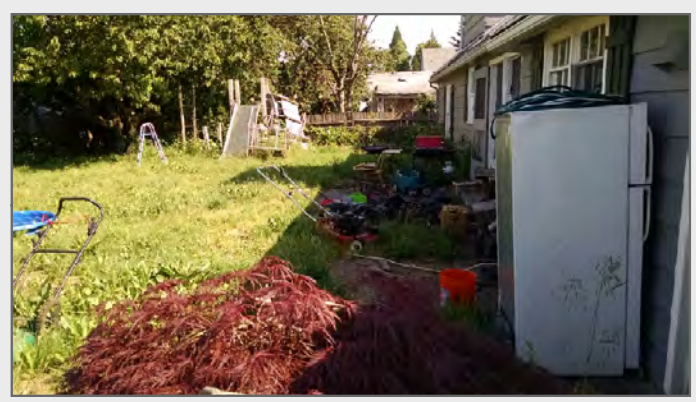
- Sampling Area
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI038)

**Figure AOI-038**

304 North 1st Avenue  
 Ridgefield, Washington







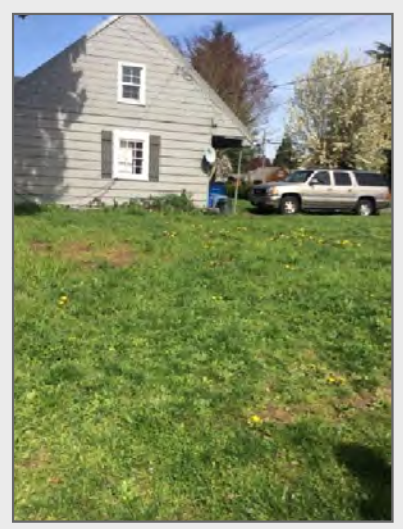
1a Back yard exclusion area, facing north



3 Front yard sampling area, facing south



1b Back yard exclusion area, facing northwest



2 Side yard sampling area, facing north

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 5/7/2015.

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Notes:  
1. ISM = incremental sampling methodology.

This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Sampling Area
- Property Boundary
- Clark County Tax Lot Boundary
- Photo Location and Direction
- ISM Sample (AOI039)

**Figure AOI-039**

305 N Main Street  
Ridgefield, Washington







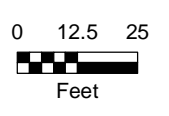
Source: Aerial photograph obtained from Esri ArcGIS Online; tax lots dataset obtained from Clark County GIS.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

- Legend**
- ISM Samples (A)
  - ISM Samples (B)
  - Discrete Sample Location
  - AOI-041 Sampling Boundary
  - Tax Lot

**Figure  
Sampling Plan  
AOI-041**  
Former PWT Site  
Ridgefield, Washington







1 From the north, facing east.



3 From the southeast, facing north.



2 From the northwest, facing south.



4 From the southwest, facing north.

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



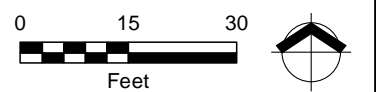
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

Legend

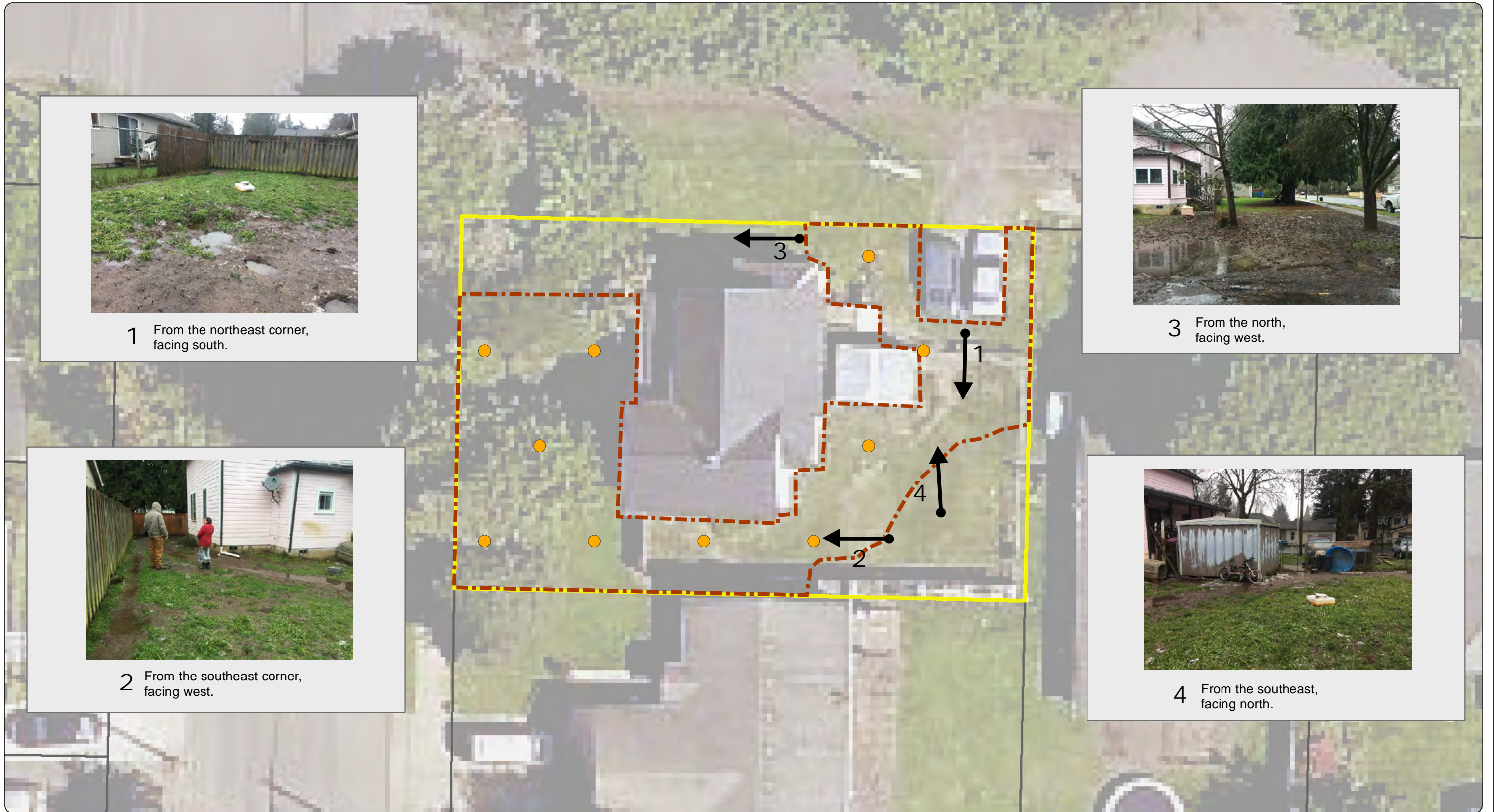
- Sampling Location
- Sampling Area Extent
- Proposed Yard Sampling Area
- Clark County Tax Lot Boundary
- Photo Location and Direction

Figure AOI-043

6 Maple Street Ridgefield, Washington







1 From the northeast corner, facing south.



3 From the north, facing west.



2 From the southeast corner, facing west.



4 From the southeast, facing north.

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



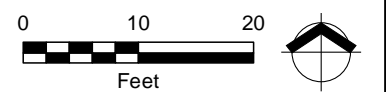
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Sampling Location
- Proposed Yard Sampling Area
- Sampling Area Extent
- Clark County Tax Lot Boundary
- Photo Location and Direction

**Figure  
AOI-044**

514 N Main Street  
Ridgfield, Washington







1 Front yard, facing southeast.



2 Front yard, facing east.








3 North side yard, facing east.



4 Back yard, facing north.



**Legend**

-  Proposed Yard Sampling Area
-  Sampling Area Extent
-  Clark County Tax Lot Boundary
-  Sampling Location
-  Photo Location and Direction

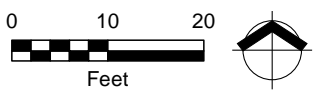
Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/13/2017.



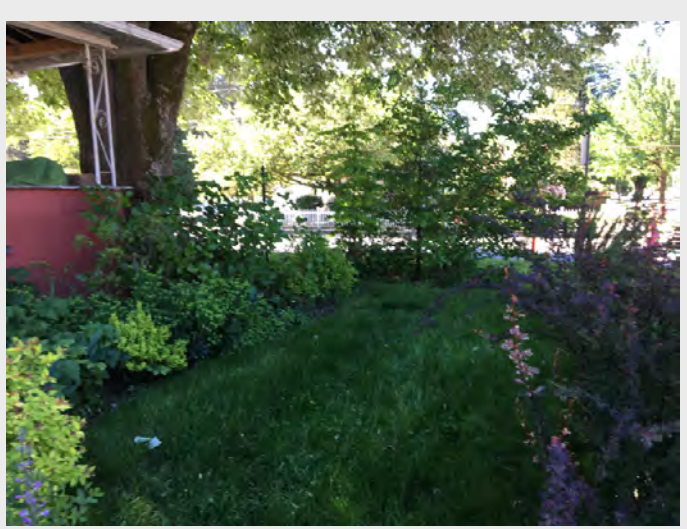
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Figure  
AOI-045**

512 N Main Ave  
Ridgefield, Washington







1 West side of yard, facing southeast.



3 East side of yard, facing west.



2 Southern property boundary, facing northeast.



4 South property boundary, facing west.

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 5/26/2017.



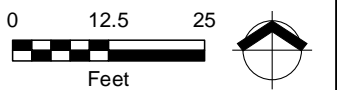
This product is for informational purposes and may not have been prepared for, or be suitable for, legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

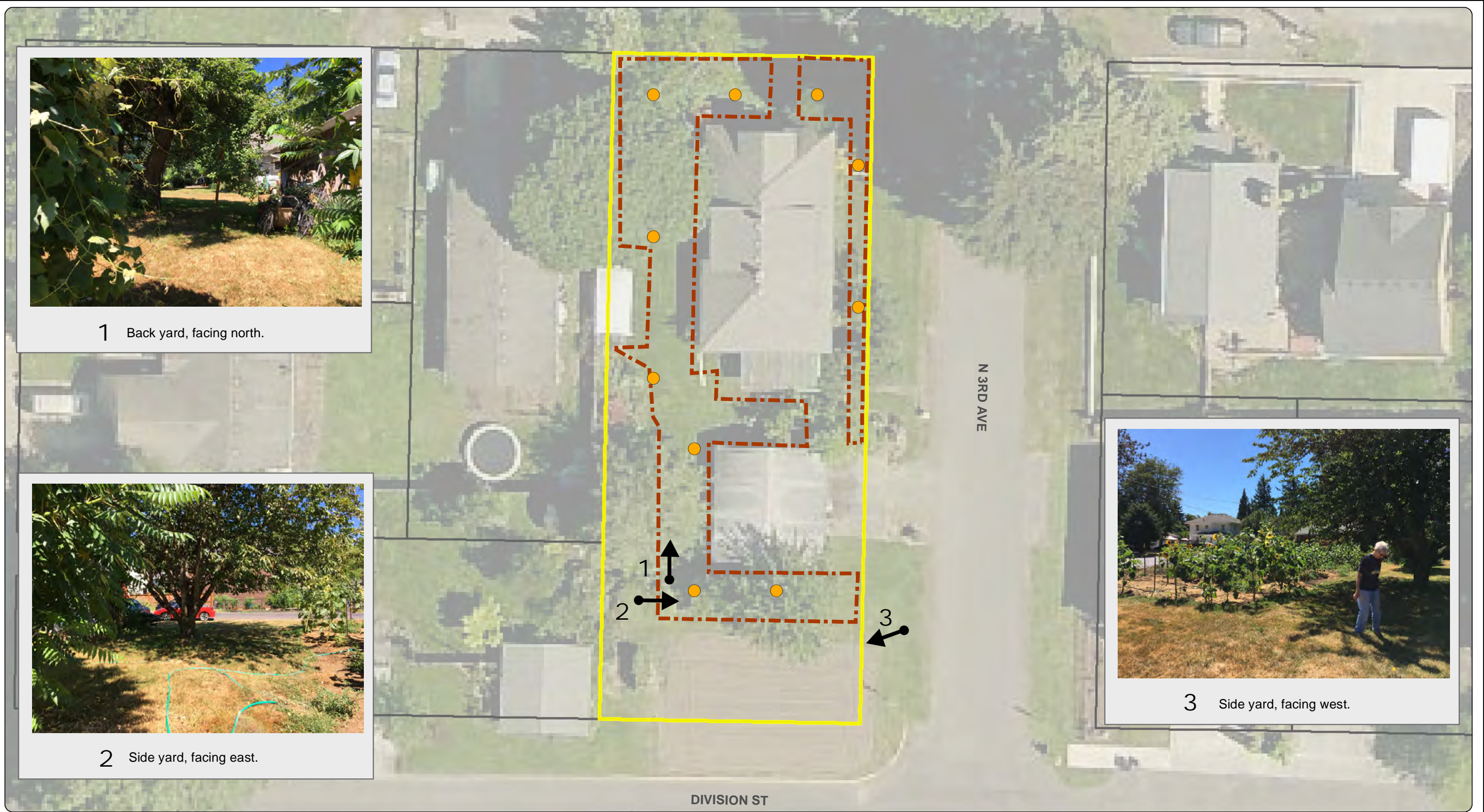
- Sampling Location
- Sampling Area Extent
- Proposed Yard Sampling Area
- Clark County Tax Lot Boundary
- ➔ Photo Location and Direction

**Figure AOI-046**

502 N Main St  
Ridgefield, Washington







1 Back yard, facing north.



2 Side yard, facing east.



3 Side yard, facing west.

**Legend**

- Proposed Yard Sampling Area
- Sampling Area Extent
- Clark County Tax Lot Boundary
- Sampling Location
- ➔ Photo Location and Direction

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 7/24/2017.



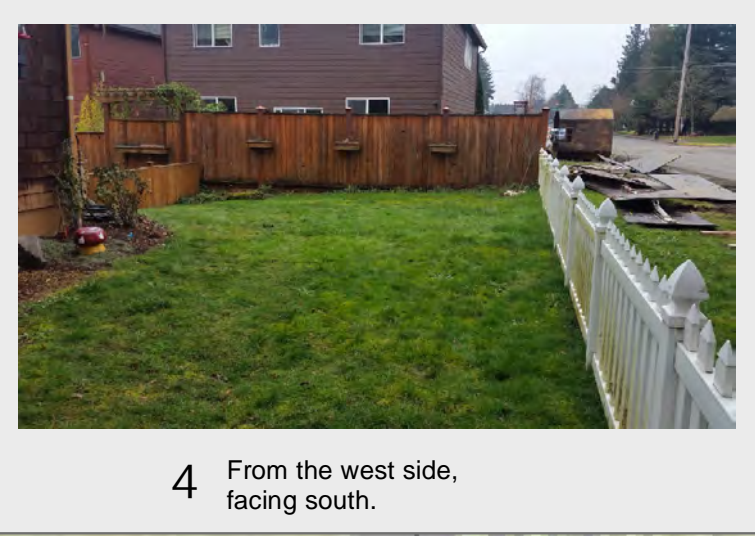
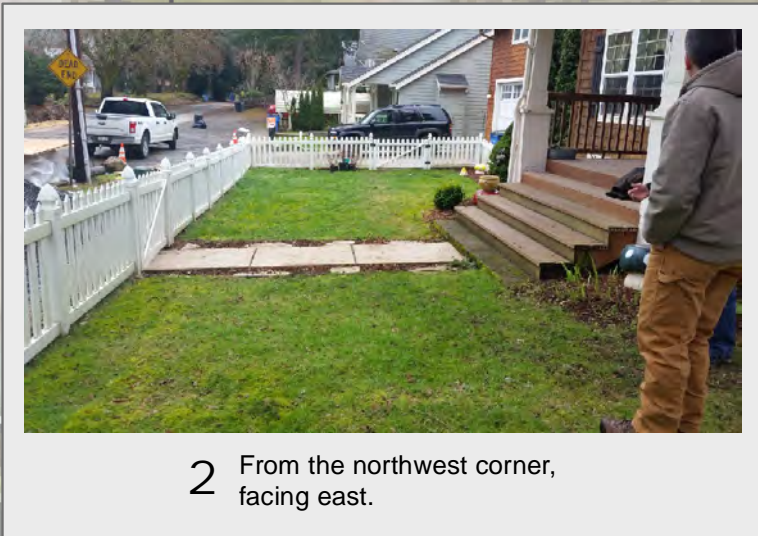
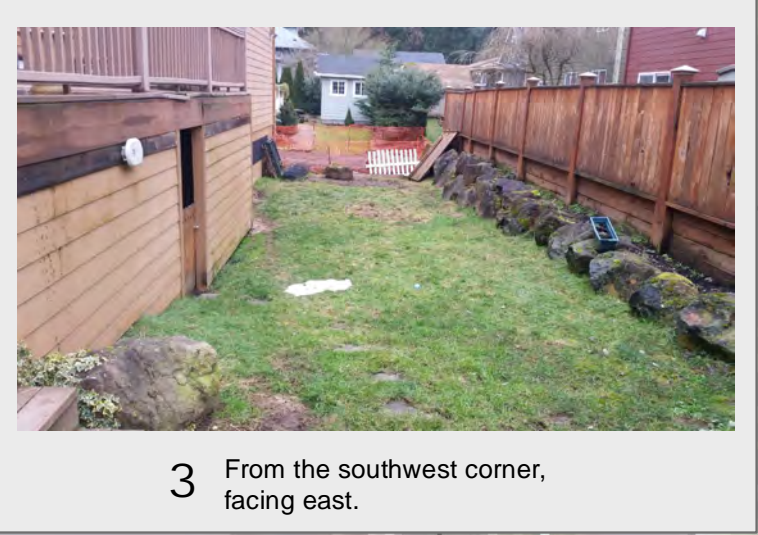
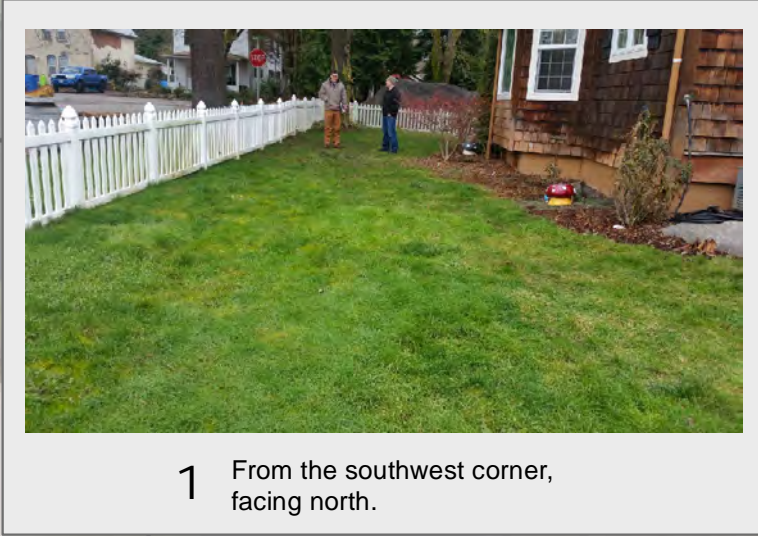
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Figure  
AOI-048**

229 Maple St  
Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



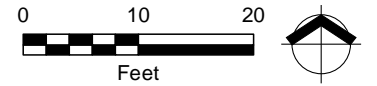
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Sampling Location
- Proposed Yard Sampling Area
- Sampling Area Extent
- Clark County Tax Lot Boundary
- City of Ridgefield Sewer Excavation Area
- Photo Location and Direction

**Figure AOI-049**

303 Maple Street  
Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



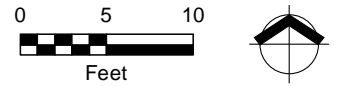
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Sampling Location
- Proposed Yard Sampling Area
- Sampling Area Extent
- Clark County Tax Lot Boundary
- ➔ Photo Location and Direction

**Figure AOI-051**

315 Maple Street  
Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



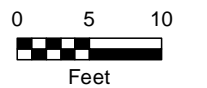
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Sampling Location
- Proposed Yard Sampling Area
- Sampling Area Extent
- Clark County Tax Lot Boundary
- ➔ Photo Location and Direction

**Figure  
AOI-052**

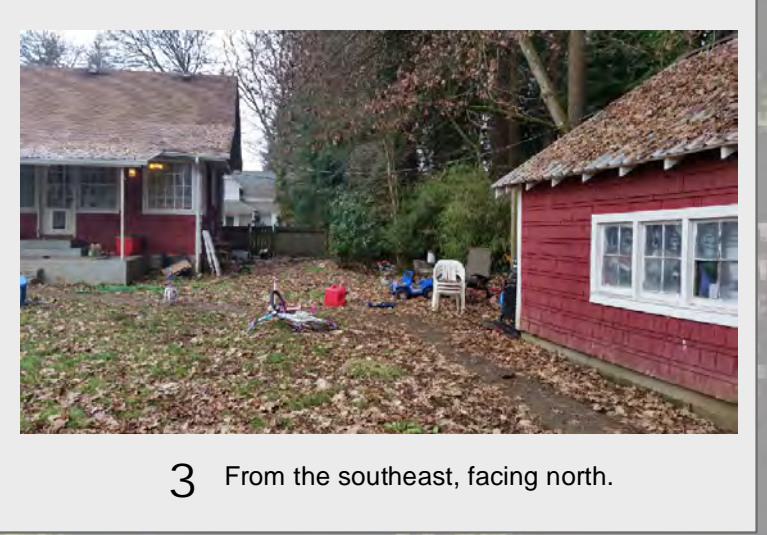
314 Division Street  
Ridgfield, Washington



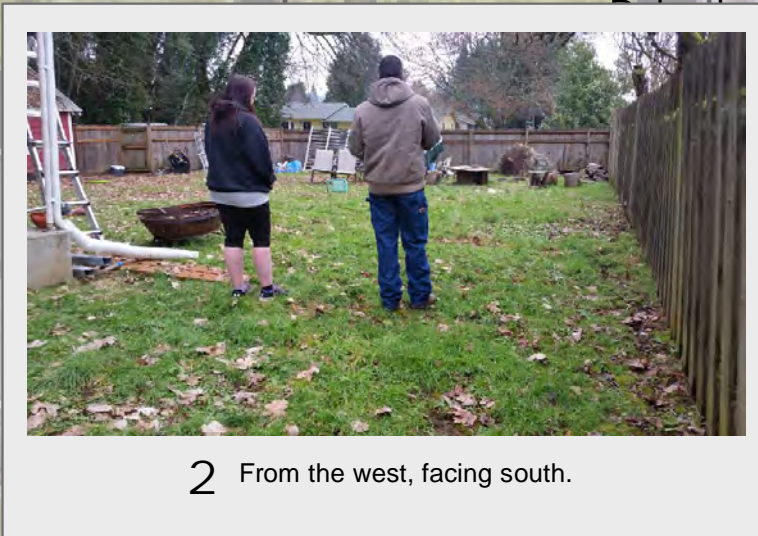




1 From the northwest, facing south.



3 From the southeast, facing north.



2 From the west, facing south.



4 From the southwest, facing northeast.

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

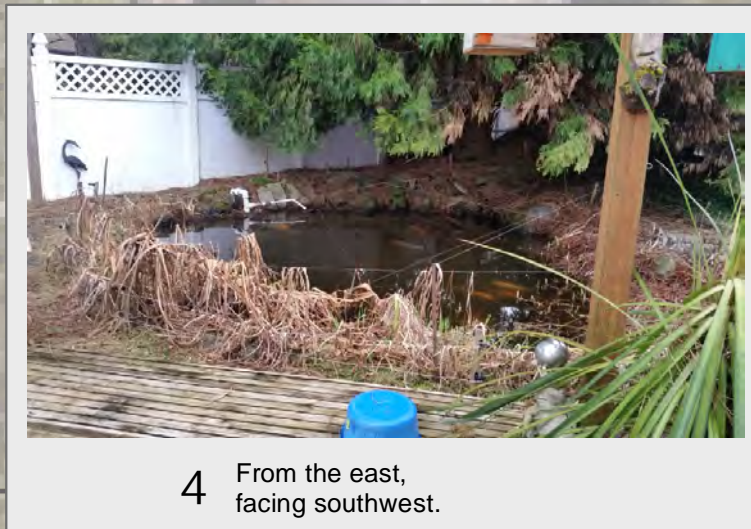
- Sampling Location
- Proposed Yard Sampling Area
- Photo Location and Direction
- Sampling Area Extent
- Clark County Tax Lot Boundary

**Figure AOI-054**

401 Maple Street  
Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Sampling Location
- Proposed Yard Sampling Area
- Sampling Area Extent
- Clark County Tax Lot Boundary
- ➔ Photo Location and Direction

**Figure AOI-056**

414 N Main Ave  
Ridgefield, Washington





Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 6/2/2017.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Sampling Location
- ▭ Proposed Yard Sampling Area
- ➔ Photo Location and Direction
- ▭ Sampling Area Extent
- ▭ Clark County Tax Lot Boundary

**Figure AOI-057**  
411 N 3rd Ave  
Ridgefield, Washington

0 10 20  
Feet





Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 7/24/2017.



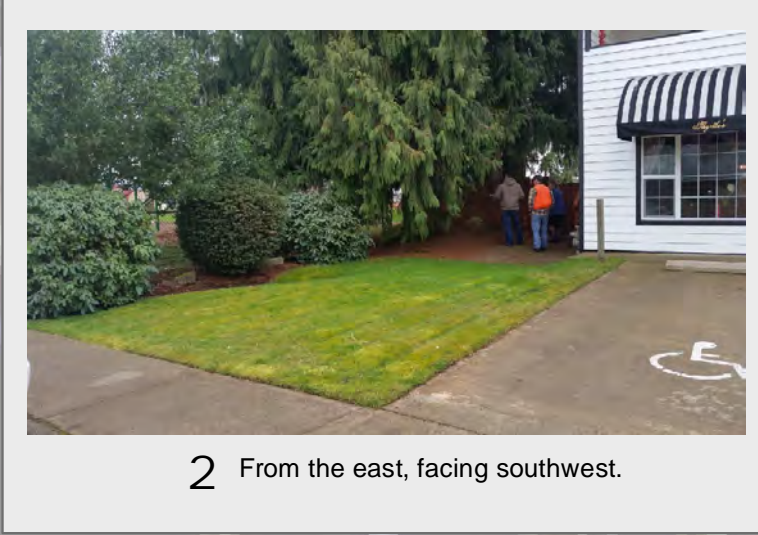
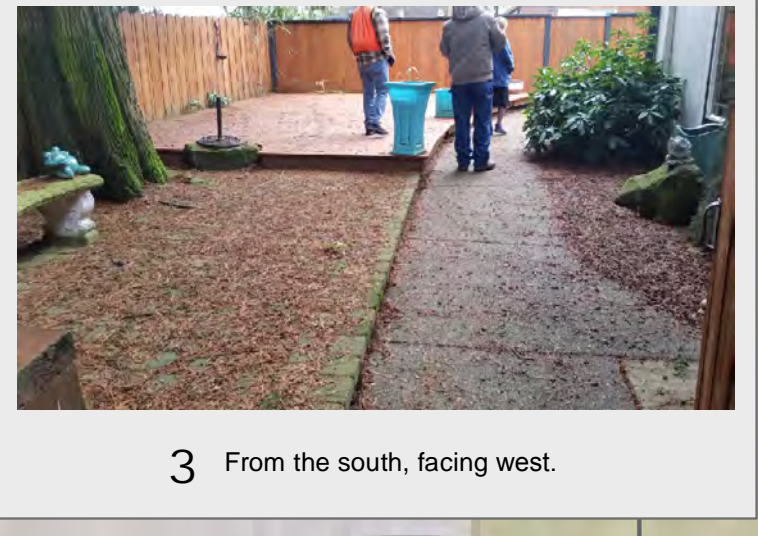
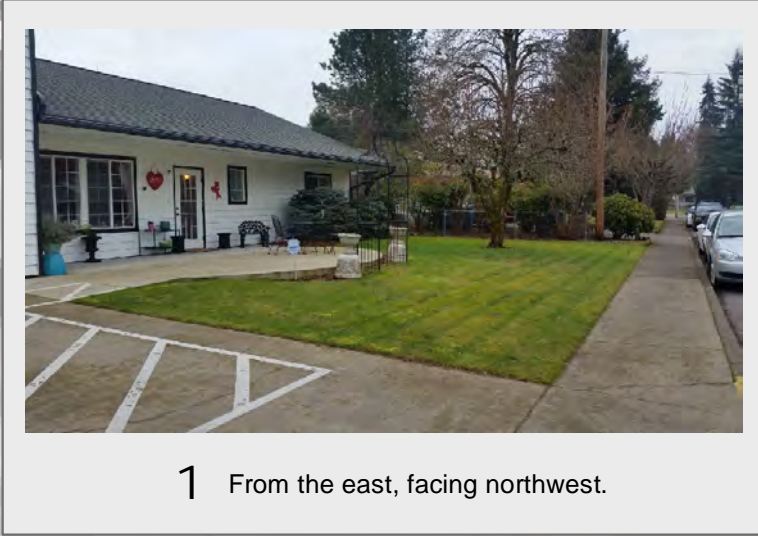
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Proposed Yard Sampling Area
- Sampling Area Extent
- Clark County Tax Lot Boundary
- Sampling Location
- Photo Location and Direction

**Figure AOI-059**  
405 N 3rd Ave  
Ridgefield, Washington





Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



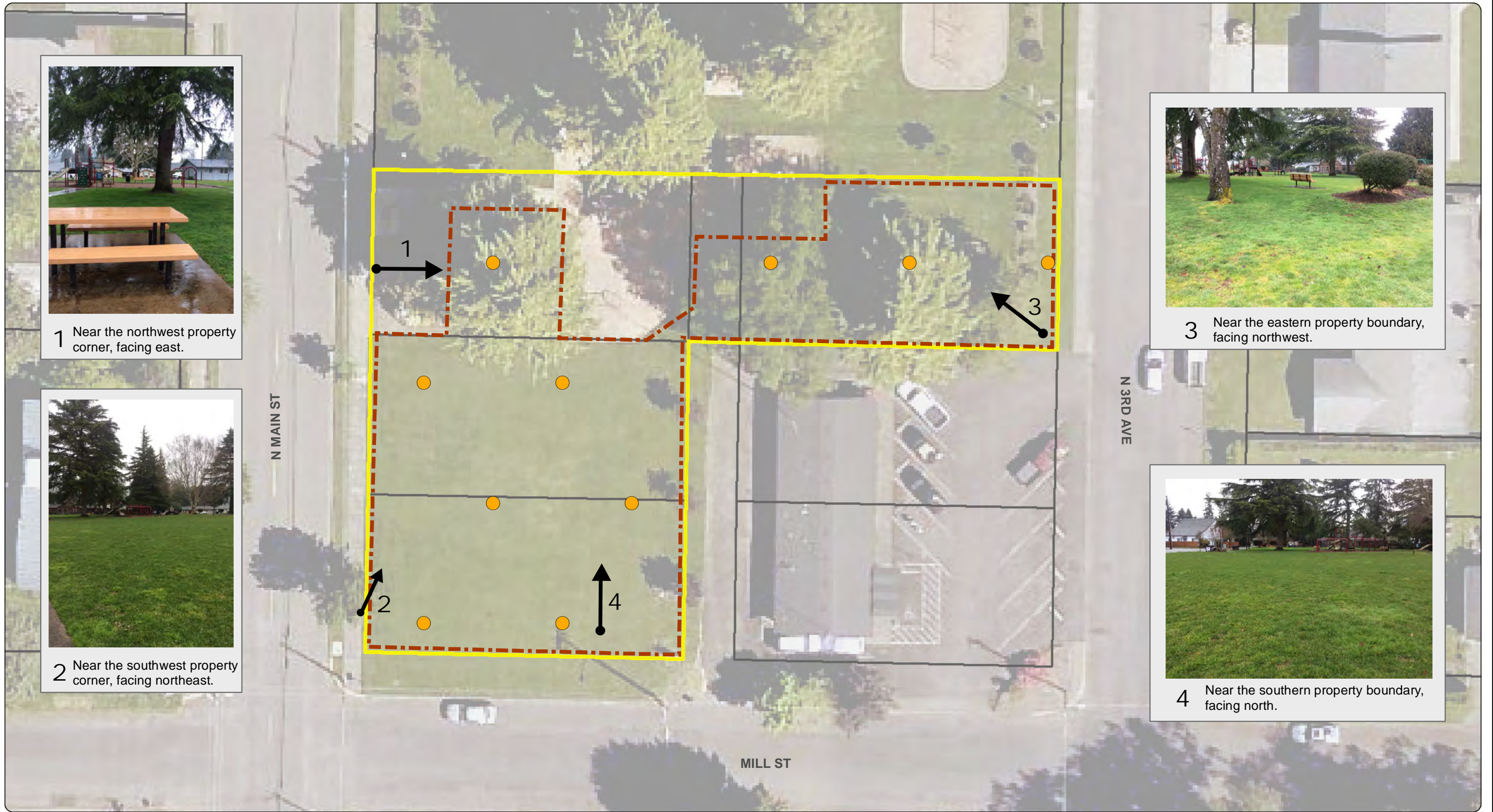
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Sampling Location
- Sampling Area Extent
- Proposed Yard Sampling Area
- Clark County Tax Lot Boundary
- Photo Location and Direction

**Figure AOI-061**  
 321 N 3rd Ave  
 Ridgefield, Washington





Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 3/9/2017.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

- Legend**
- Sampling Location
  - ▭ Proposed Yard Sampling Area
  - ➔ Photo Location and Direction
  - ▭ Sampling Area Extent
  - ▭ Clark County Tax Lot Boundary

**Figure AOI-062**  
N 3rd Avenue  
Ridgefield, Washington

0 15 30  
Feet





1 From center of yard, facing northwest.



2 From center of yard, facing southwest.



3 North side of property, facing east.



4 Northeast property corner, facing south.

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 5/26/2017.



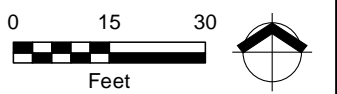
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Proposed Yard Sampling Area
- Sampling Area Extent
- Clark County Tax Lot Boundary
- Group A
- Group B
- Group C
- Photo Location and Direction

**Figure AOI-063**

421 N 4th Ave  
Ridgefield, Washington







1 From the northwest, facing east.



2 From the northwest, facing south.



3 From the southeast, facing north.



4 From the northeast, facing south.

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



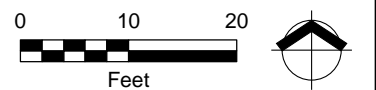
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Sampling Location
- ▭ Sampling Area Extent
- ▭ Proposed Yard Sampling Area
- ▭ Clark County Tax Lot Boundary
- ➔ Photo Location and Direction

**Figure AOI-064**

411 Division Street  
Ridgefield, Washington





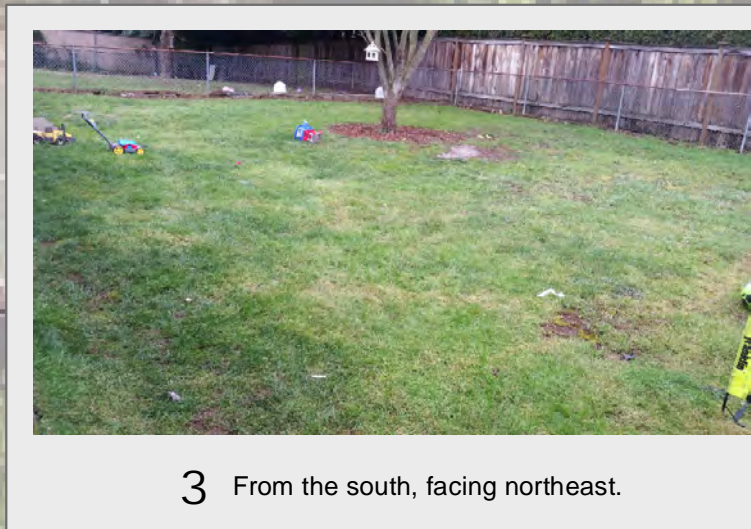
Path: X:\9003.01\_Plot of Ridgefield\391\Property Yard Sampling\Projects\Phase 2\SSAP Phase 2\Fig. AOI\_066.mxd  
Print Date: 2/16/2017  
Approved By: avidourek  
Produced By: apadilla  
Project: 9003.01.39



1 From the southwest, facing northeast.



2 From the east, facing northwest.



3 From the south, facing northeast.

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



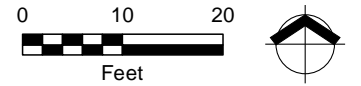
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

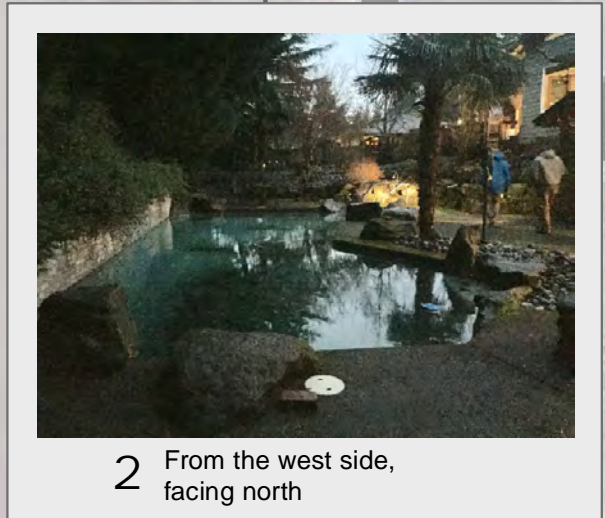
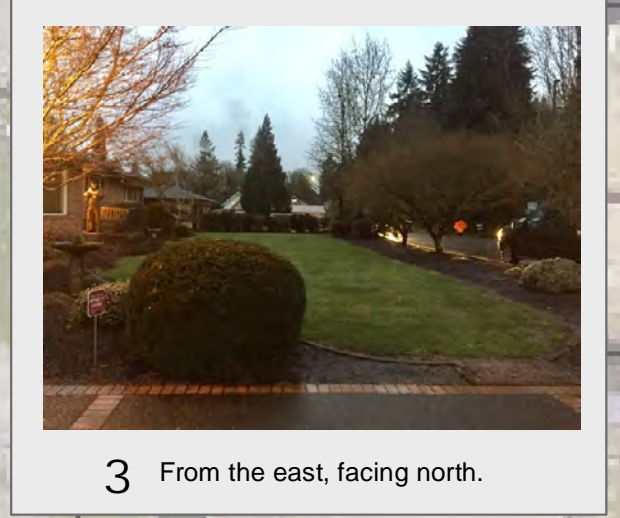
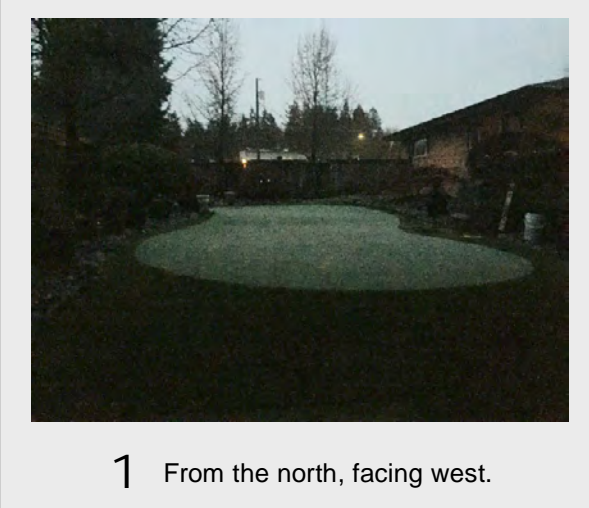
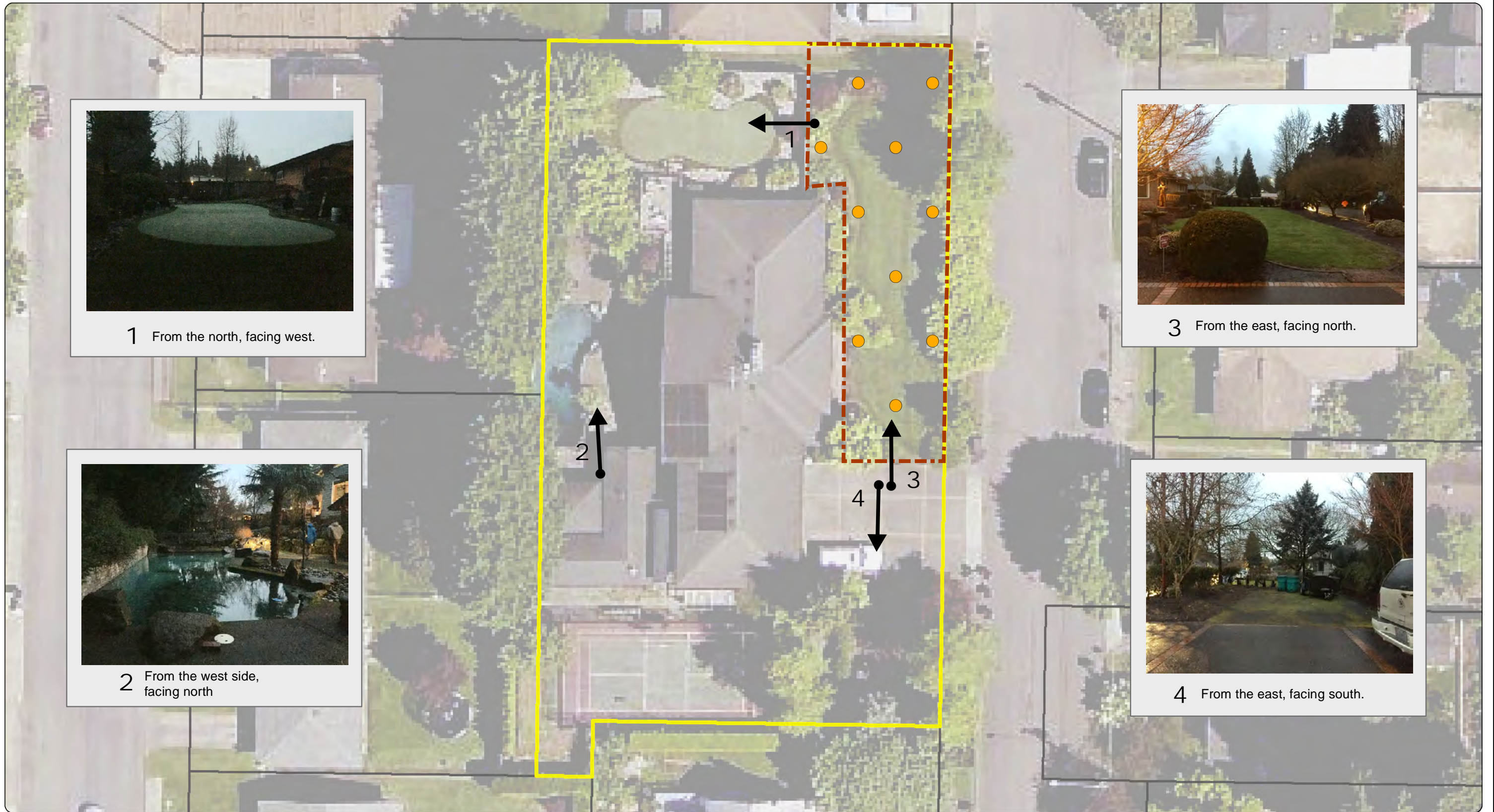
- Proposed Yard Sampling Area
- Sampling Area Extent
- Photo Location and Direction
- Group A
- Group B
- Group C
- Clark County Tax Lot Boundary
- Sampling Location**

**Figure AOI-066**

332 N 3rd Ave  
Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



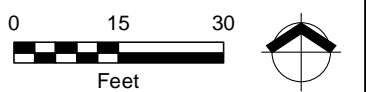
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

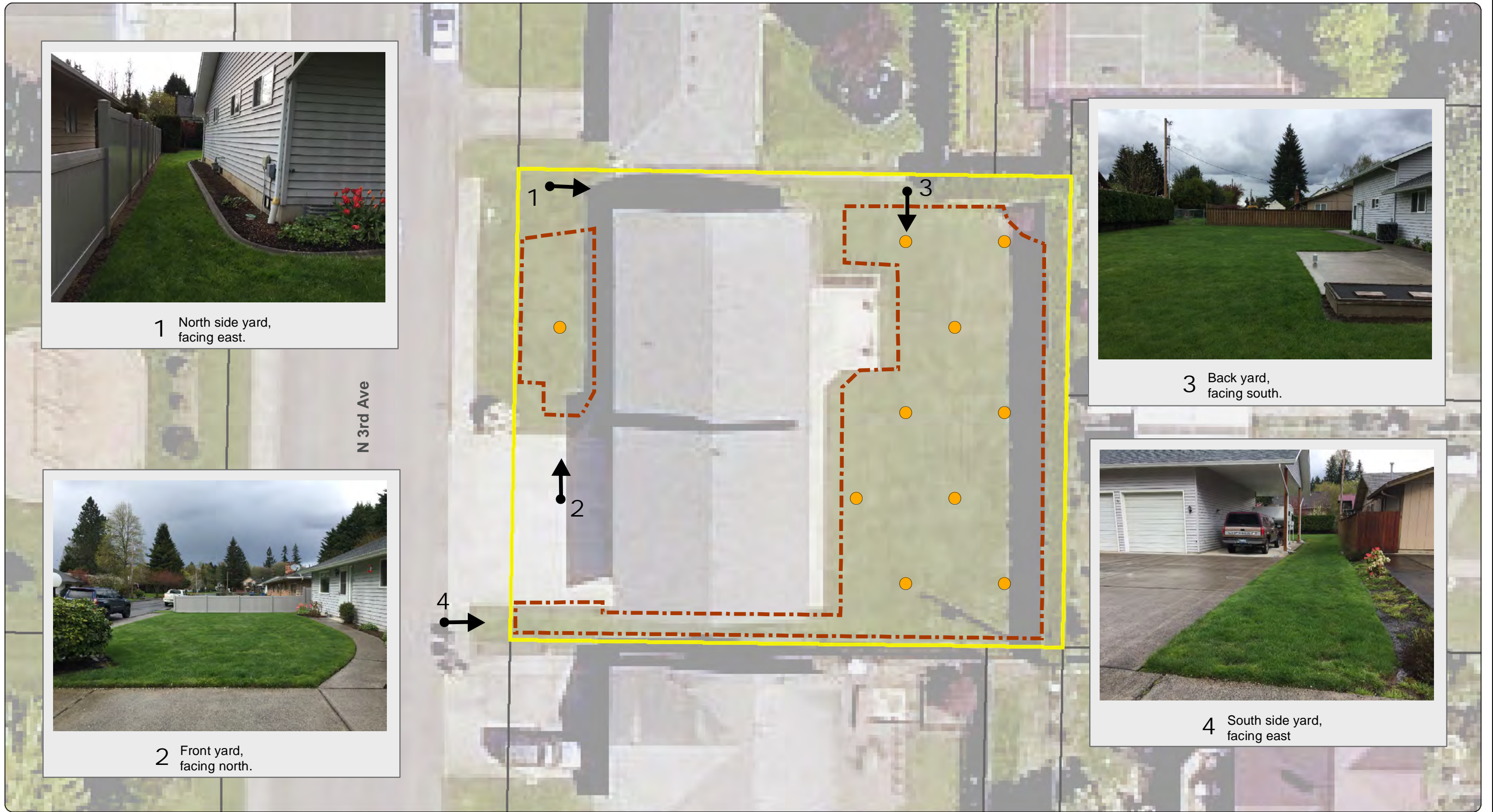
- Sampling Location
- Sampling Area Extent
- Proposed Yard Sampling Area
- Clark County Tax Lot Boundary
- Photo Location and Direction

**Figure  
AOI-067**

401 N 4th Ave  
Ridgefield, Washington







1 North side yard, facing east.



3 Back yard, facing south.



2 Front yard, facing north.



4 South side yard, facing east

N 3rd Ave

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/13/2017.



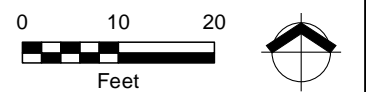
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Sampling Location
- Sampling Area Extent
- Proposed Yard Sampling Area
- Clark County Tax Lot Boundary
- ➔ Photo Location and Direction

**Figure AOI-068**

320 N 3rd Ave  
Ridgefield, Washington







1 Southwest property corner, facing northeast.



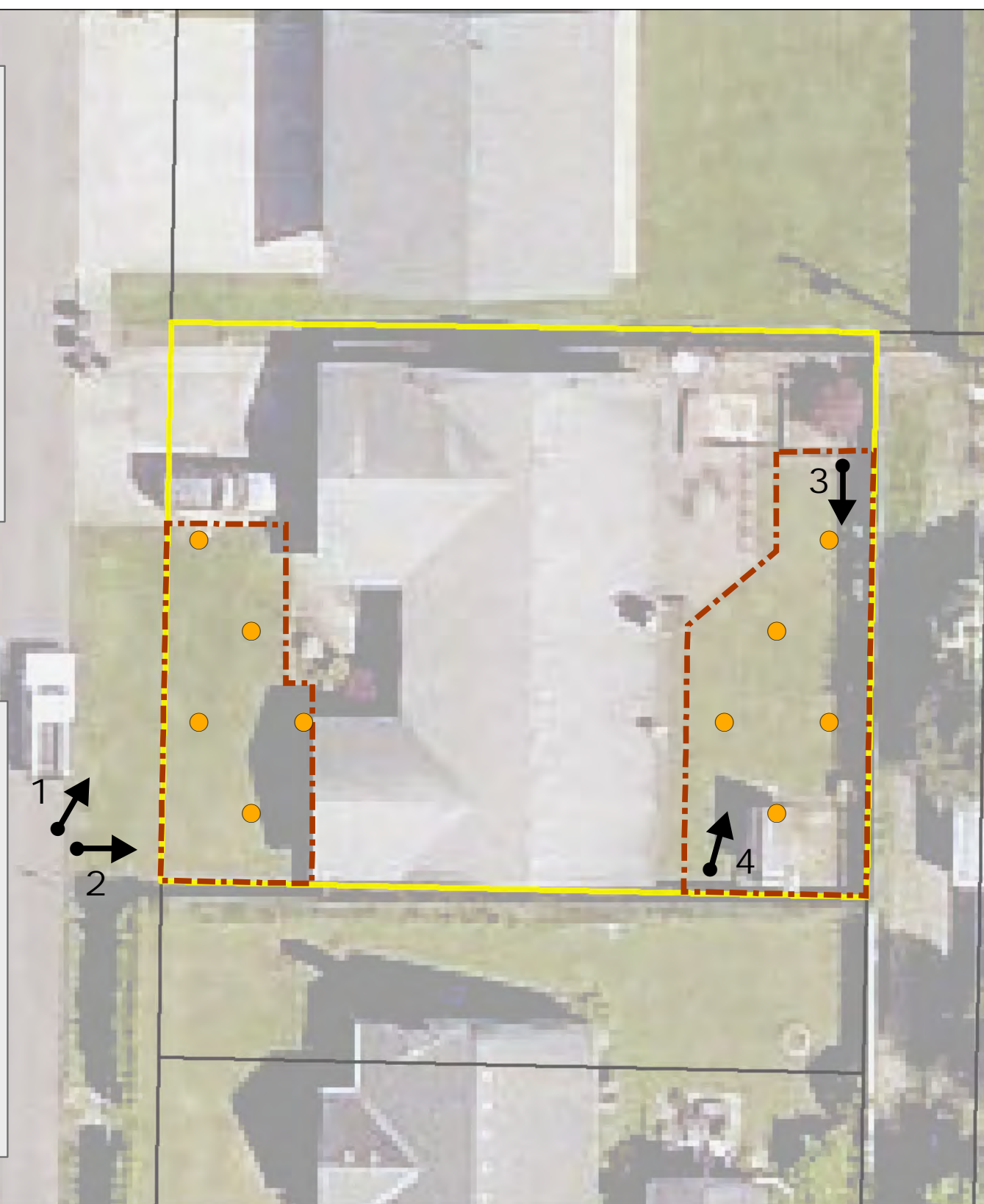
3 Northeastern property corner, facing south.



2 Southwest property corner, facing east.



4 Southeastern portion of property, facing northeast.



N 3RD AVE

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 5/26/2017.



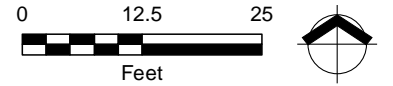
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

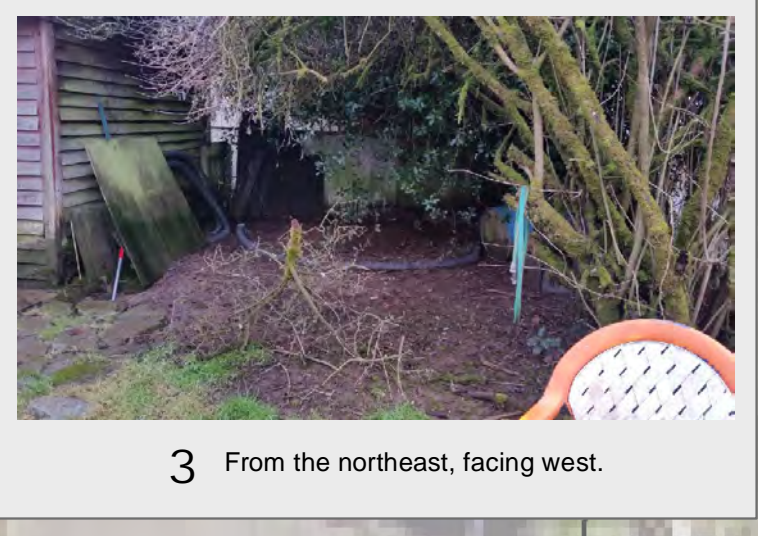
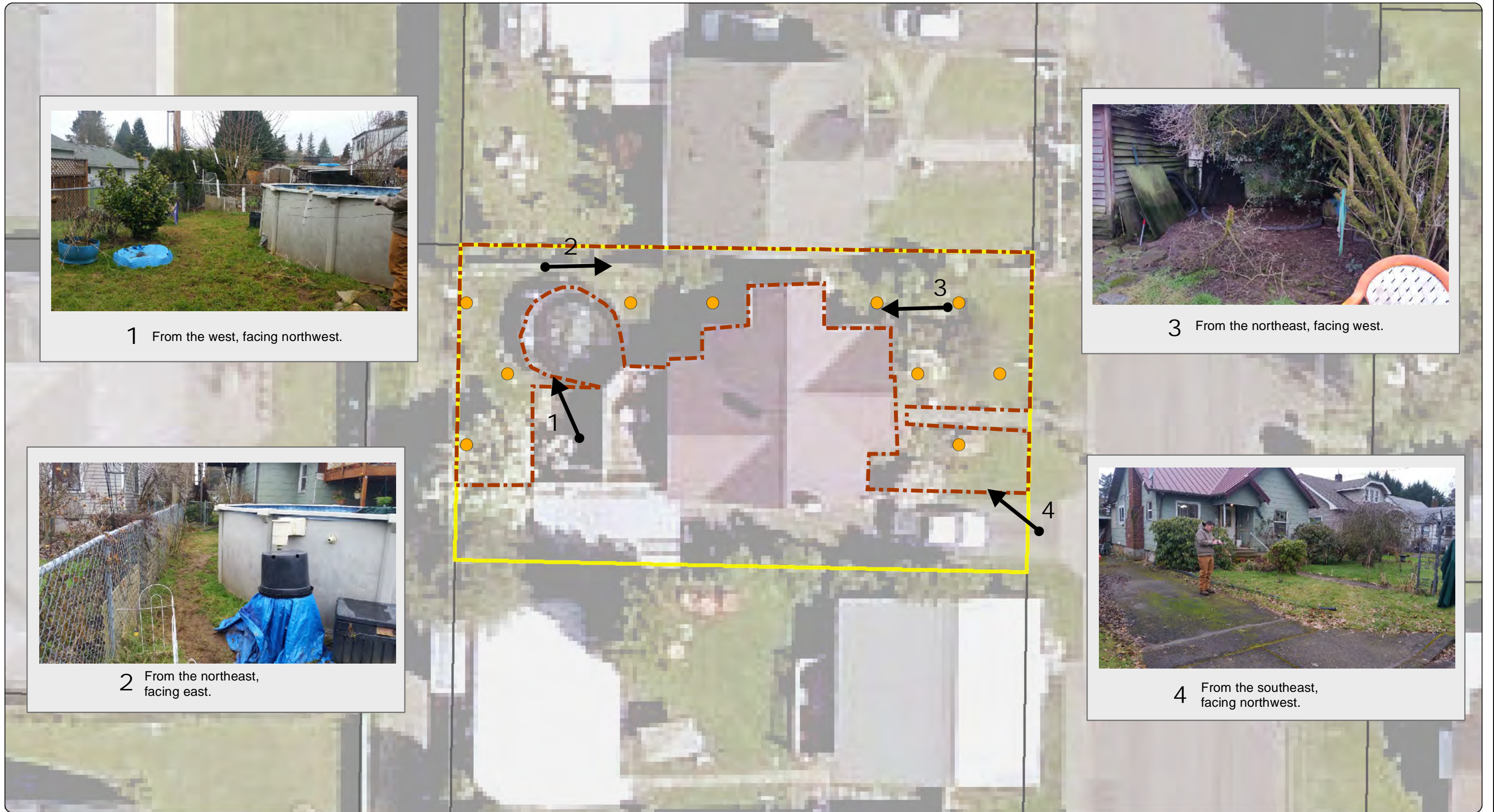
- Sampling Location
- Sampling Area Extent
- Proposed Yard Sampling Area
- Clark County Tax Lot Boundary
- Photo Location and Direction

**Figure AOI-071**

310 N 3rd Ave  
Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

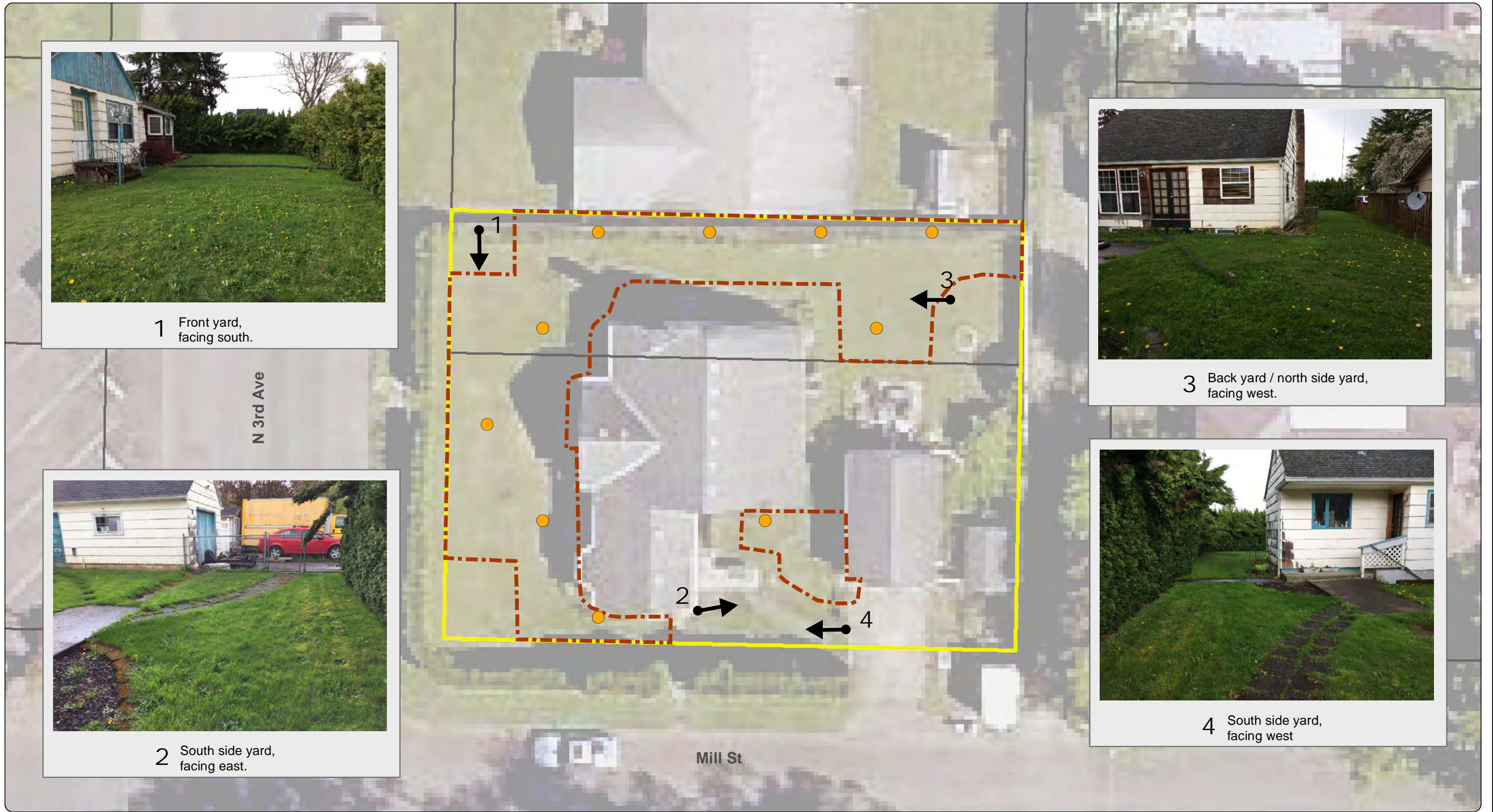
**Legend**

- Sampling Location
- Proposed Yard Sampling Area
- Sampling Area Extent
- Clark County Tax Lot Boundary
- Photo Location and Direction

**Figure  
AOI-072**

309 N 4th Ave  
Ridgefield, Washington





1 Front yard, facing south.



3 Back yard / north side yard, facing west.



2 South side yard, facing east.



4 South side yard, facing west

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/13/2017.



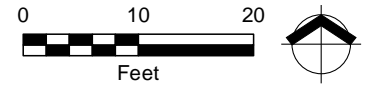
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

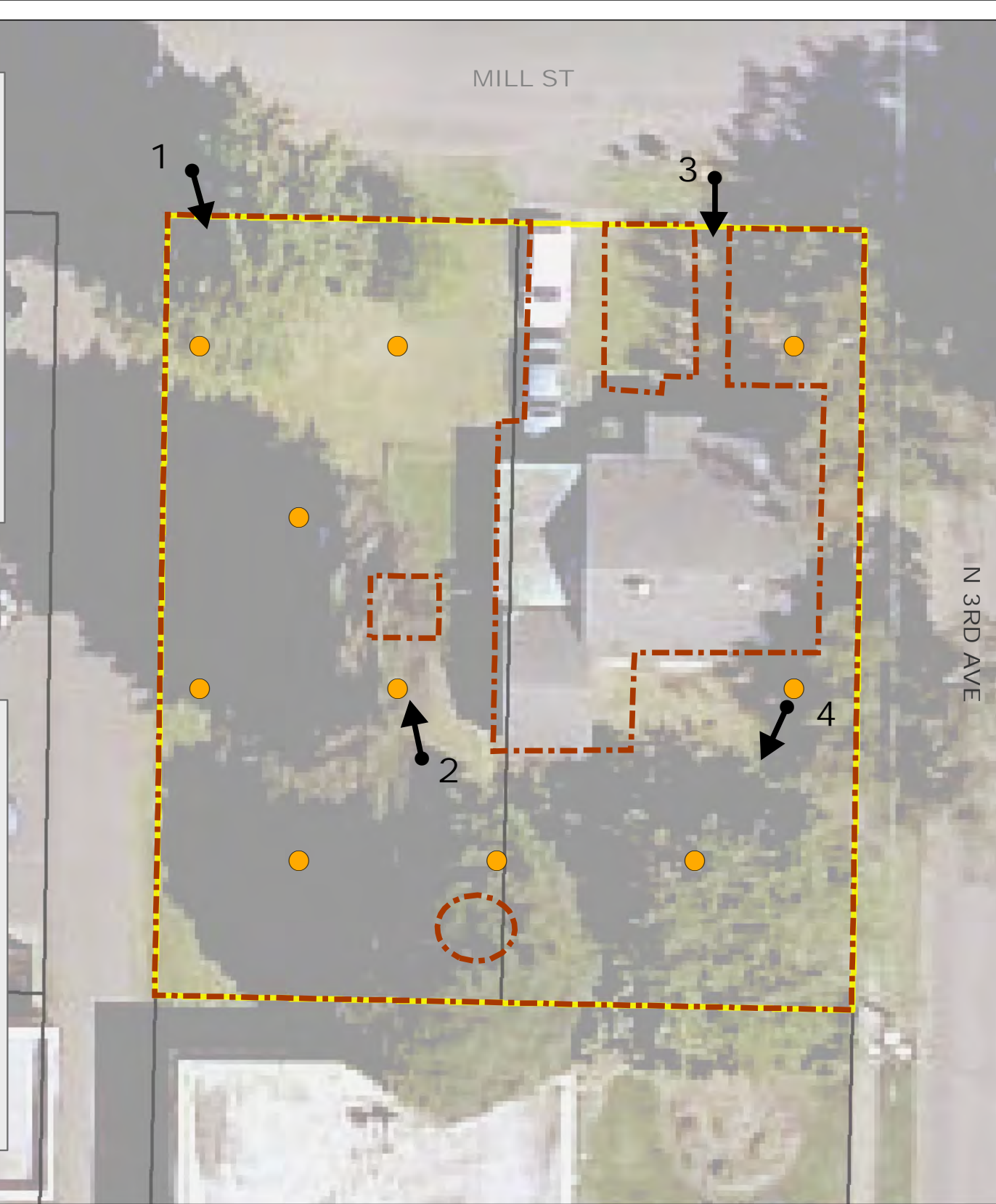
- Sampling Location
- Sampling Area Extent
- Proposed Yard Sampling Area
- Clark County Tax Lot Boundary
- ➔ Photo Location and Direction

**Figure AOI-073**



300 N 3rd Ave  
Ridgefield, Washington







**Legend**

-  Sampling Location
-  Sampling Area Extent
-  Proposed Yard Sampling Area
-  Clark County Tax Lot Boundary
-  Photo Location and Direction

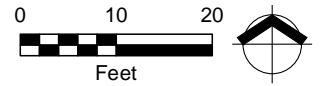
Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 4/13/2017.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Figure AOI-075**

229 Mill St  
Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



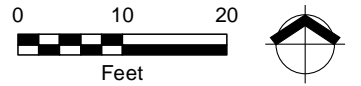
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

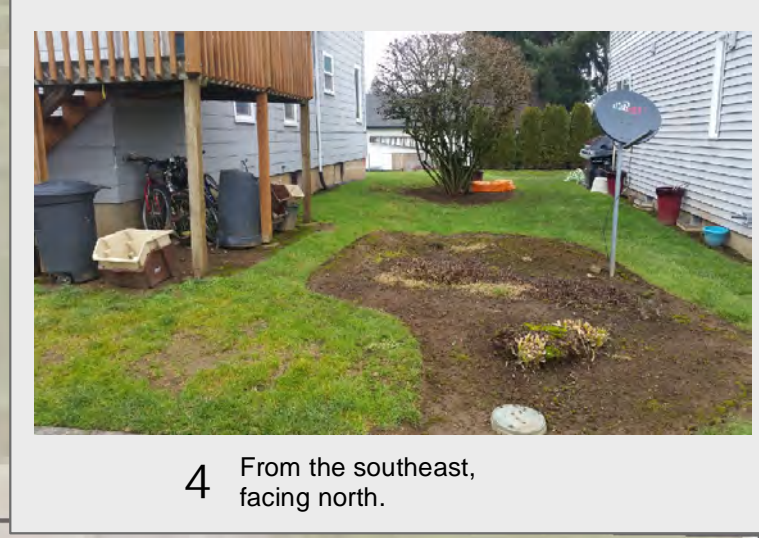
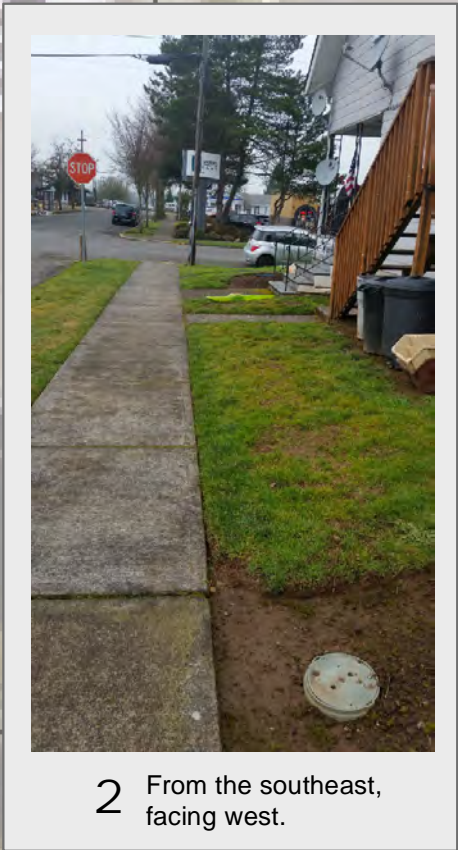
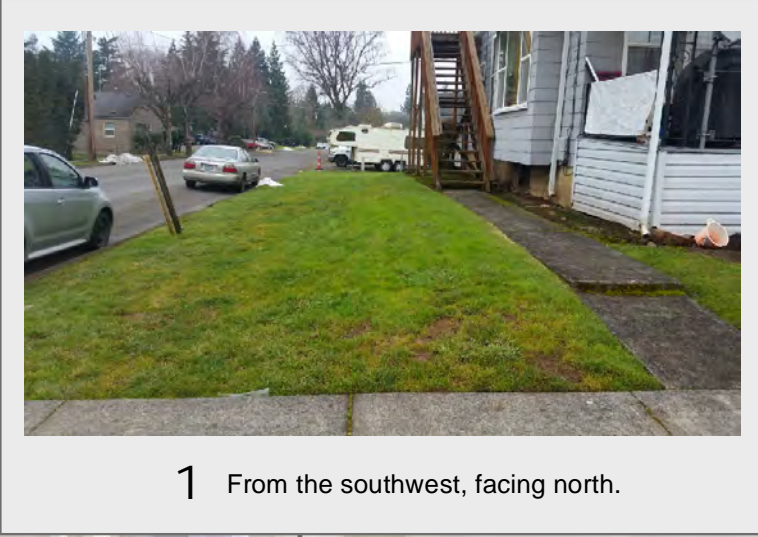
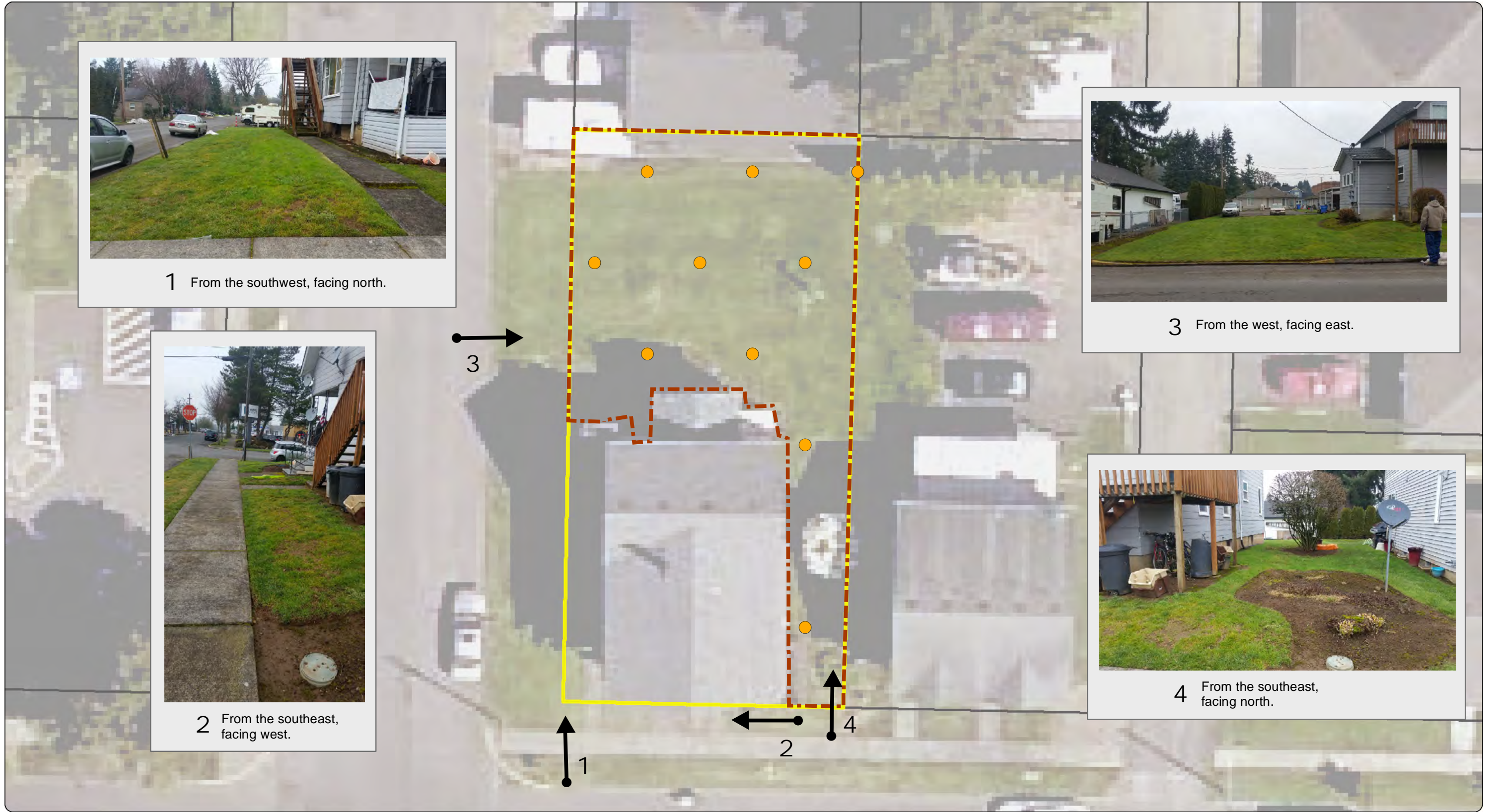
- Sampling Location
- Sampling Area Extent
- Proposed Yard Sampling Area
- Clark County Tax Lot Boundary
- Photo Location and Direction

**Figure AOI-076**

200 N 3rd Ave  
Ridgefield, Washington







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



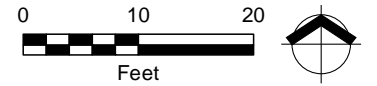
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Sampling Location
- Sampling Area Extent
- Proposed Yard Sampling Area
- Clark County Tax Lot Boundary
- Photo Location and Direction

**Figure  
AOI-077**

304 Simons Street  
Ridgefield, Washington







2 Back yard, facing north.








3 Back yard, facing west.



1 Front yard, facing south.

**Legend**

-  Proposed Yard Sampling Area
-  Sampling Area Extent
-  Clark County Tax Lot Boundary
-  Sampling Location
-  Photo Location and Direction

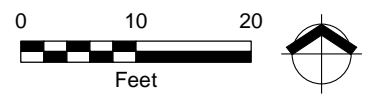
Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 8/10/2017.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Figure AOI-078**

3 Elm Street  
Ridgefield, Washington







1 From northwest corner looking east.



3 From southwest yard looking southeast.



2 From southwest corner looking north.



4 From southeast corner looking west.

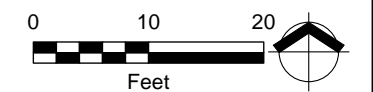
- Legend**
- Photo Location and Direction
  - Sampling Points
  - Sampling Area
  - Proposed Yard Sampling
  - Clark County Tax Lot Boundary

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.

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**Figure AOI-079**  
7 Elm Street  
Ridgefield, Washington 98642







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken on 6/19/2019.

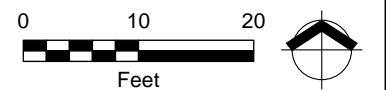


This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

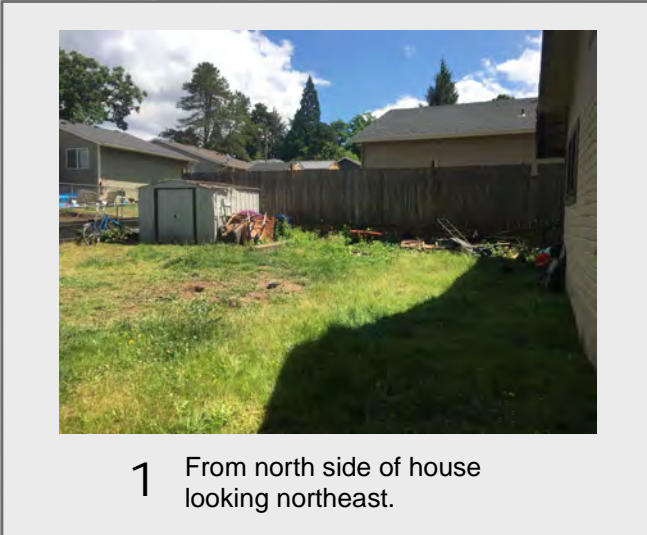
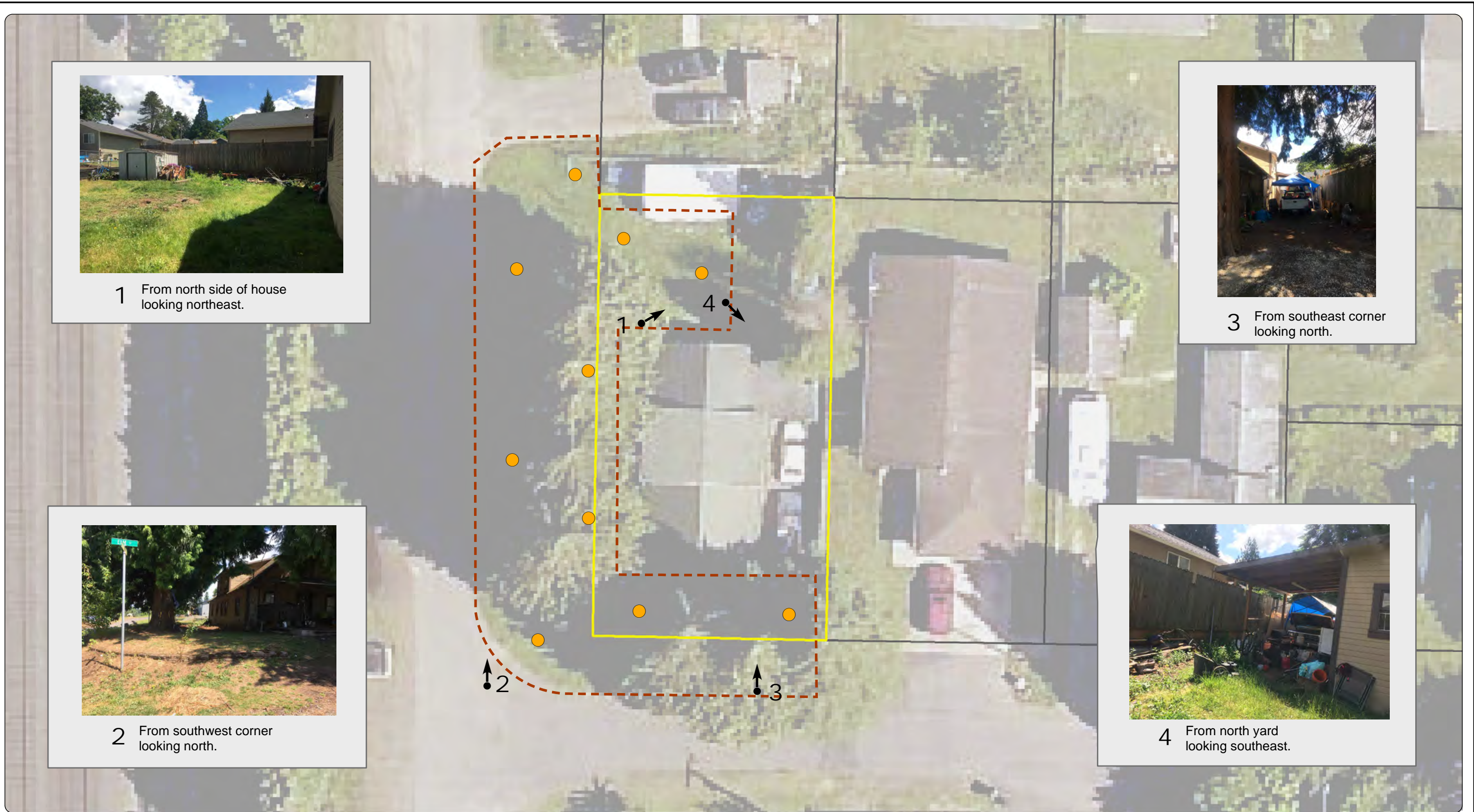
**Legend**

- Sample Location
- Sampling Area Extent
- Proposed Yard Sampling
- Clark County Tax Lot Boundary
- ➔ Photo Location and Direction

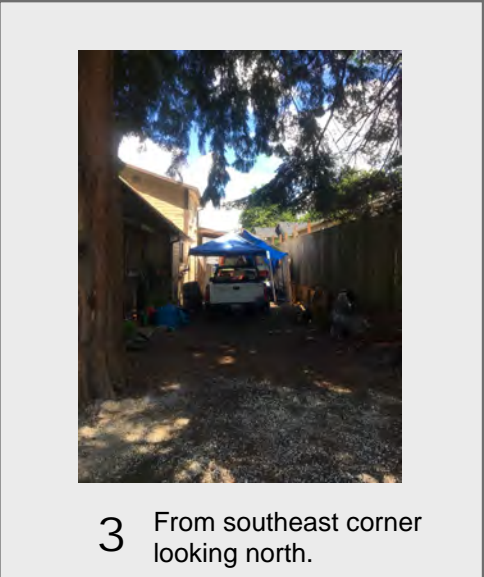
**Figure AOI-080**  
11 Elm Street  
Ridgefield, Washington 98642



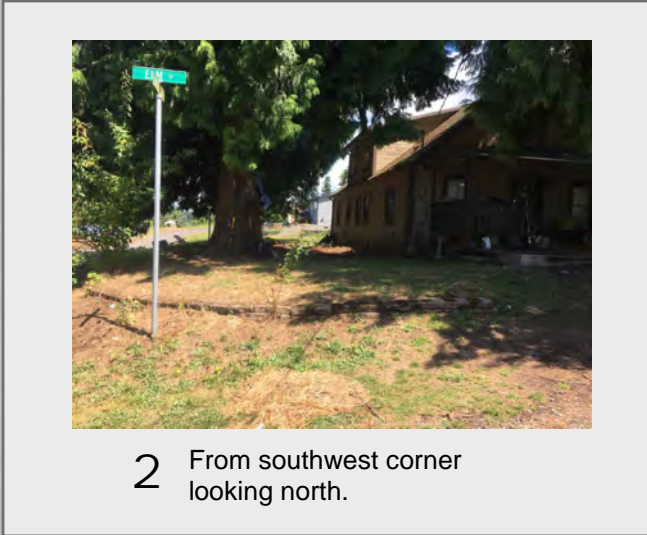




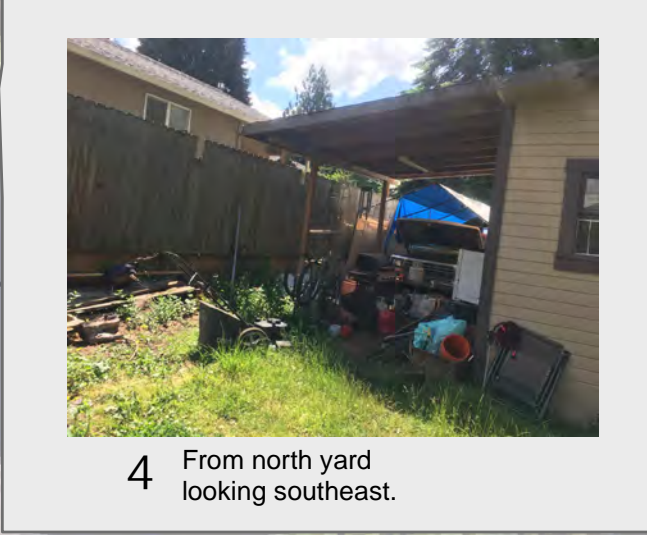
1 From north side of house looking northeast.



3 From southeast corner looking north.



2 From southwest corner looking north.



4 From north yard looking southeast.

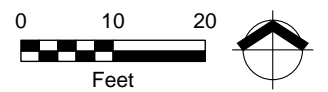
- Legend**
- Photo Location and Direction
  - Sampling Points
  - Sampling Area
  - Proposed Yard Sampling
  - Clark County Tax Lot Boundary

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Figure AOI-081**  
4 Elm Street  
Ridgefield, WA 98642







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.

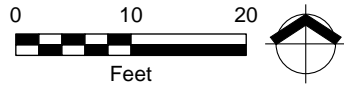


This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

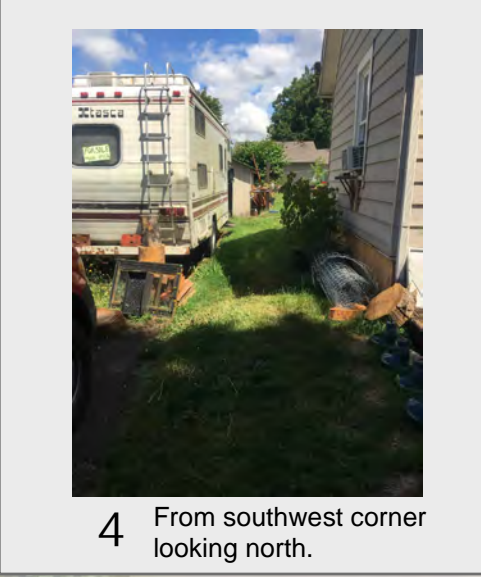
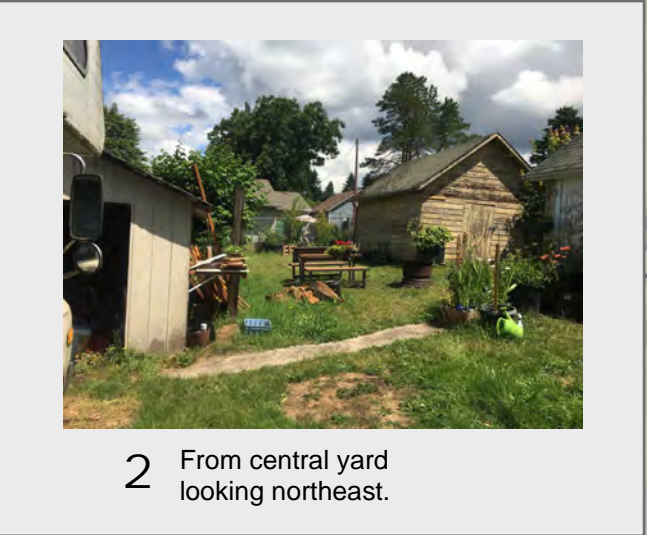
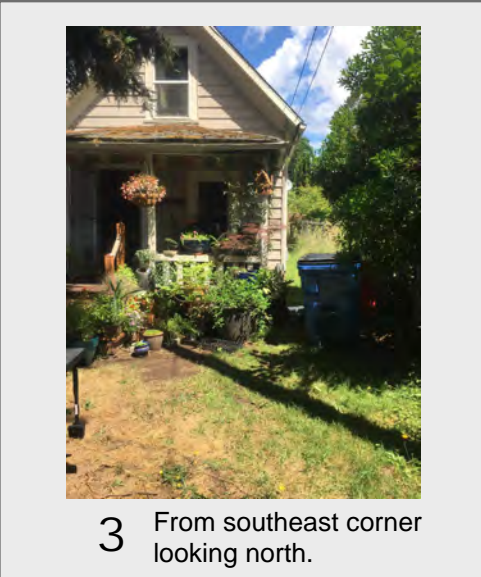
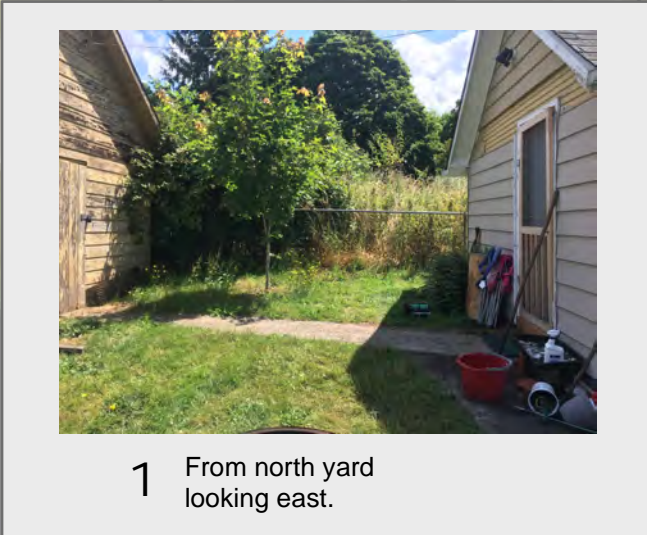
**Legend**

- Sample Location
- Sampling Area Extent
- Proposed Yard Sampling Area
- Clark County Tax Lot Boundary
- Photo Location and Direction

**Figure  
AOI-082**  
8 Elm Street  
Ridgefield, WA 98642







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.

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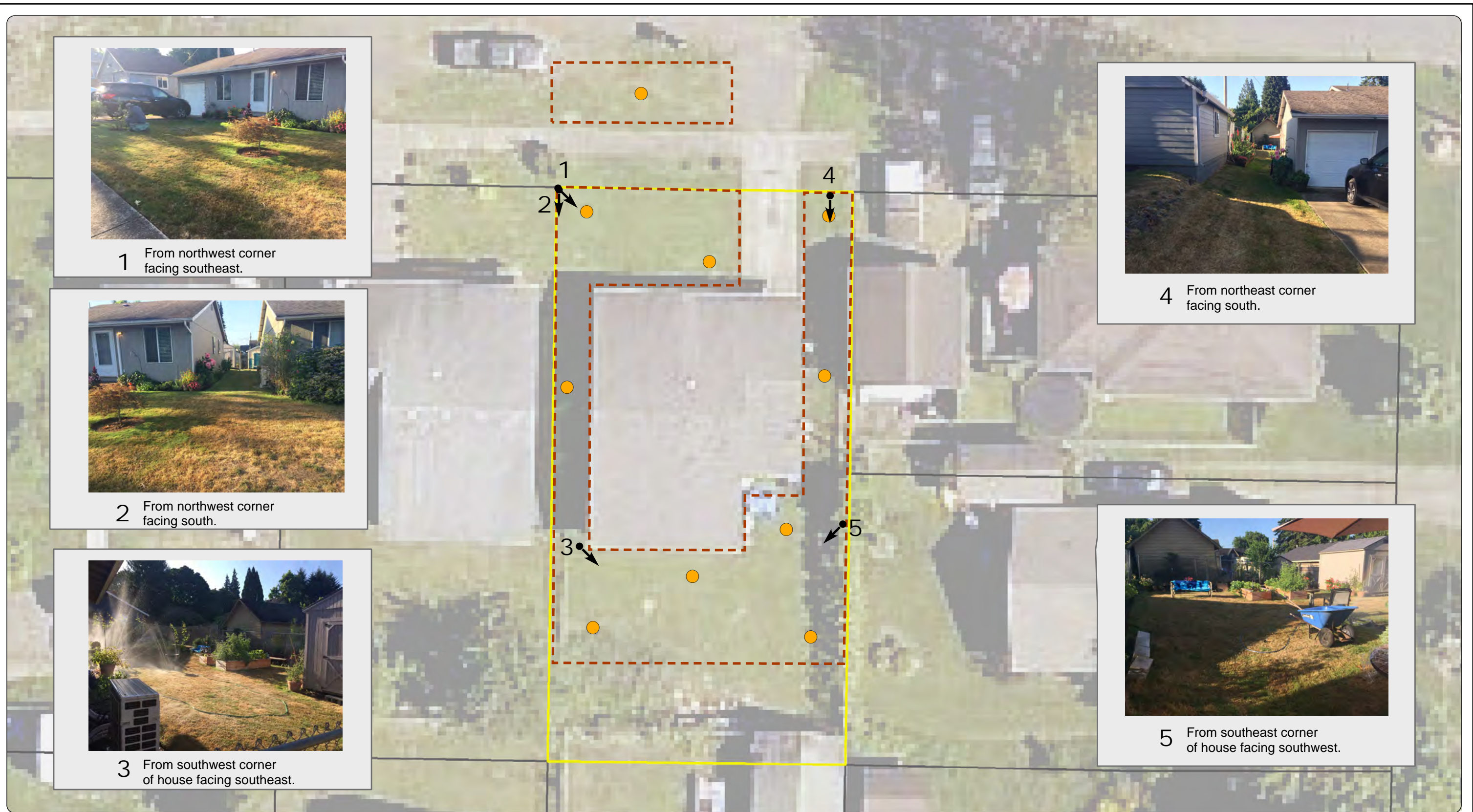
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

- Legend**
- Photo Location and Direction
  - Sampling Points
  - Sampling Area
  - Proposed Yard Sampling
  - Clark County Tax Lot Boundary

**Figure AOI-083**  
 12 Elm Street  
 Ridgfield, WA 98642

0 10 20  
 Feet





1 From northwest corner facing southeast.



2 From northwest corner facing south.



3 From southwest corner of house facing southeast.



4 From northeast corner facing south.



5 From southeast corner of house facing southwest.

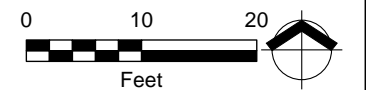
- Legend**
- Photo Location and Direction
  - Sampling Points
  - Sampling Area
  - Proposed Yard Sampling
  - Clark County Tax Lot Boundary

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.

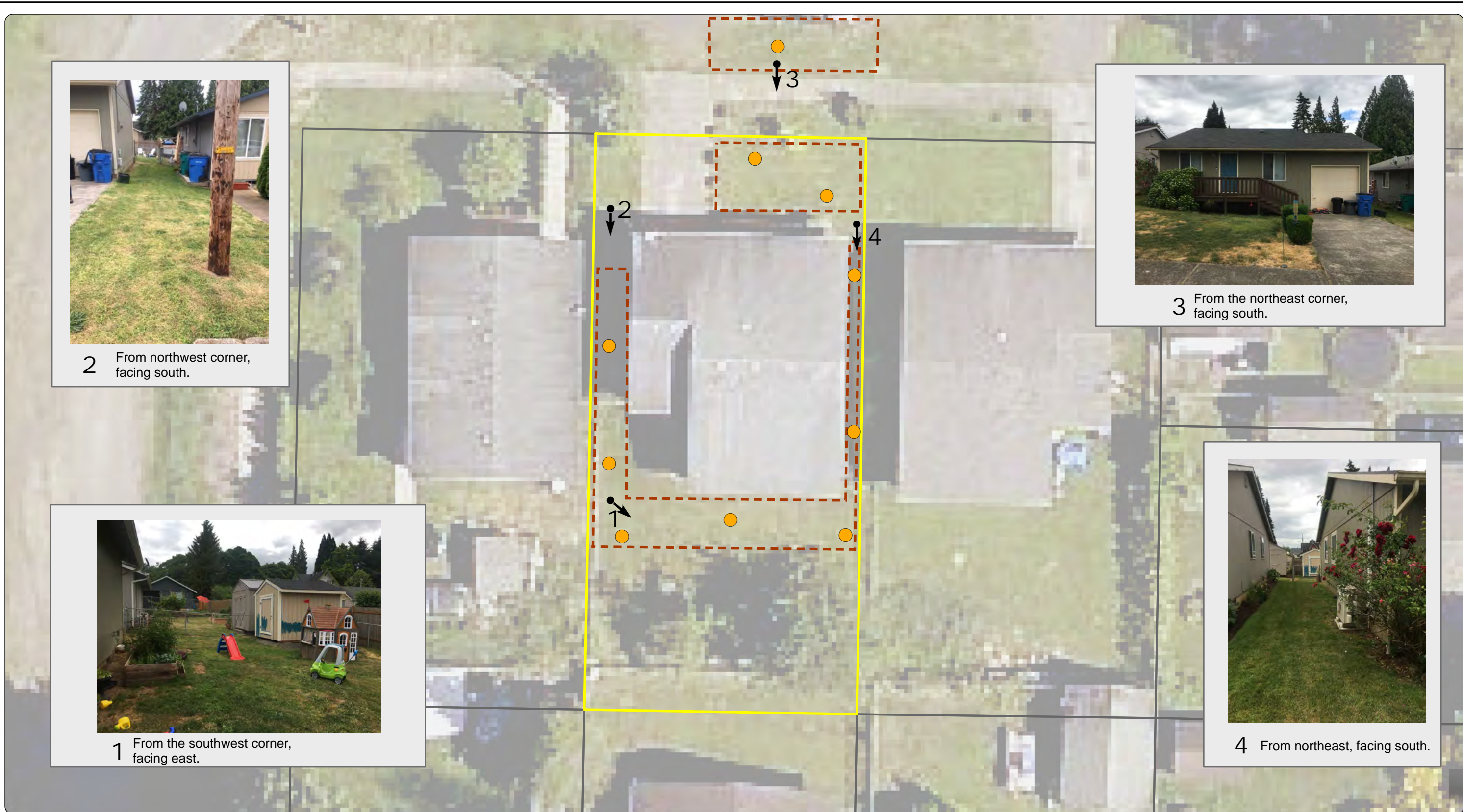


This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Figure AOI-084**  
7 Hall Street  
Ridgefield, Washington 98642












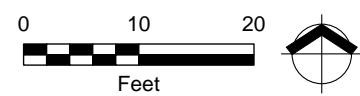
Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.


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- Legend**
-  Photo Location & Direction
  -  Sample Location
  -  Sampling Area Extent
  -  Proposed Yard Sampling Area
  -  Clark County Tax Lot Boundary

**Figure**  
**AOI-085**  
 5 Hall Street  
 Ridgefield, Washington 98642







1 From northeast corner facing southwest.



2 From northwest yard facing south.








3 From northwest corner facing south.



4 From southwest corner facing east.



5 From southwest corner of house facing north.

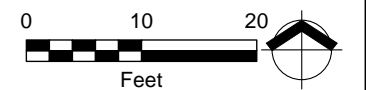
- Legend**
-  Photo Location and Direction
  -  Sampling Points
  -  Sampling Area
  -  Proposed Yard Sampling
  -  Clark County Tax Lot Boundary

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.

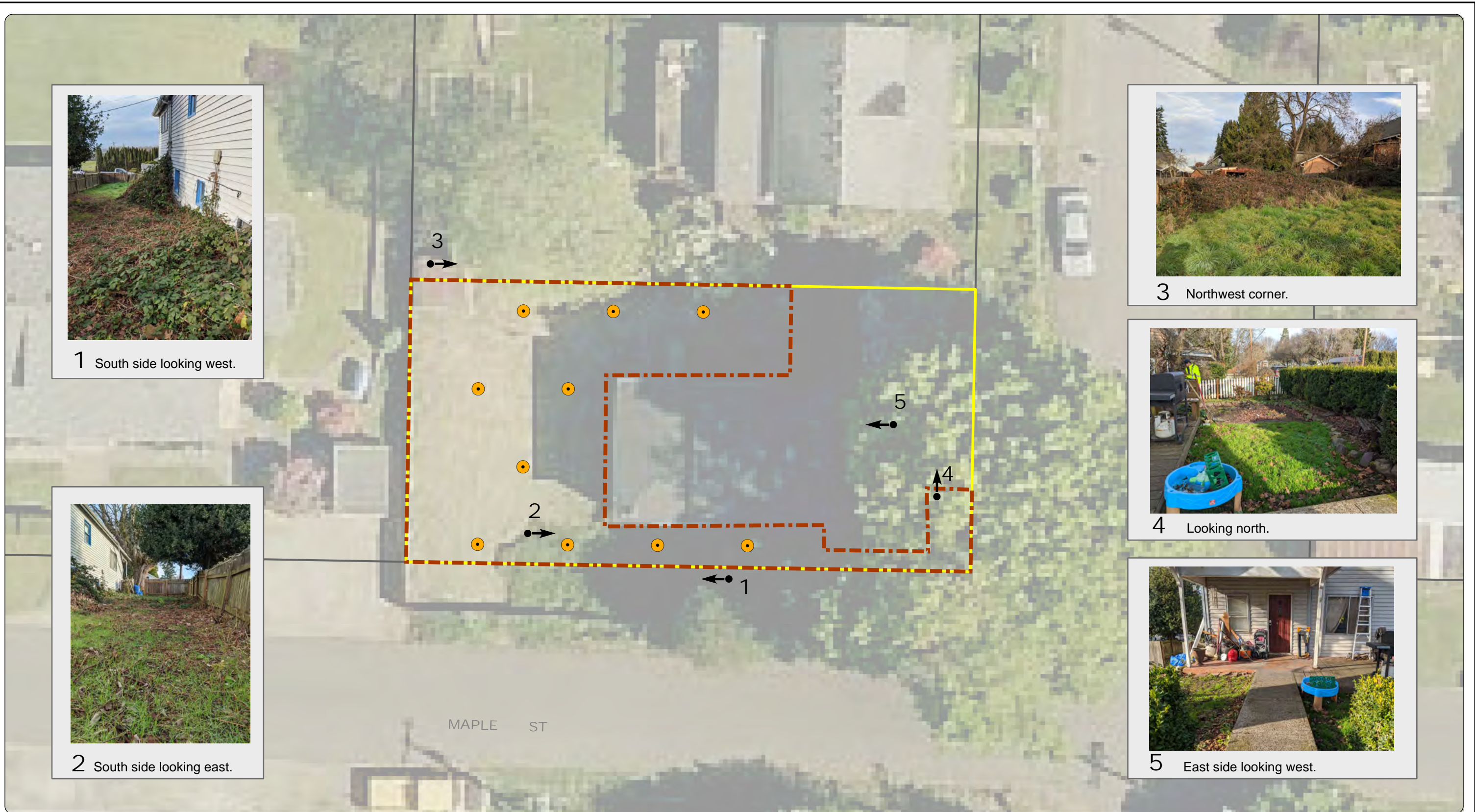


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**Figure AOI-086**  
3 Hall Street  
Ridgefield, Washington 98642







1 South side looking west.

2 South side looking east.

3 Northwest corner.

4 Looking north.

5 East side looking west.

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

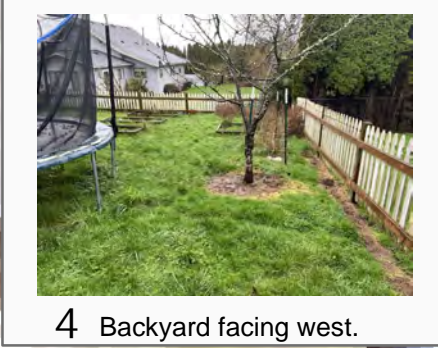
**Legend**

- Photo Location and Direction
- Sampling Location
- Sampling Area
- Proposed Yard Sampling
- Clark County Tax Lot Boundary

**Figure  
Property 087**  
603 N 1st Avenue  
Ridgefield, Washington 98642







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



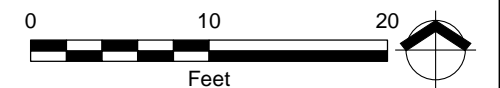
This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

**Legend**

- Photo Location and Direction
- Sampling Location
- ▭ Sampling Area
- ▭ Proposed Yard Sampling
- ▭ Clark County Tax Lot Boundary

**Figure Property 088**

607 N 1st Avenue  
Ridgefield, Washington 98642







Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

### Legend

- Soil Sampling Location
- Photo Location and Direction
- Sampling Area
- Proposed Yard Sampling
- Clark County Tax Lot Boundary

**Figure  
Property 089**  
613 N 1st Ave  
Ridgefield, Washington 98642





# APPENDIX D-2

## 2023 FINAL SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN





**2023 FINAL SITE-SPECIFIC SAMPLING AND ANALYSIS PLAN  
OFF-PROPERTY PORTION, FORMER PACIFIC WOOD TREATING CO. SITE  
FACILITY ID 1019, CLEANUP SITE ID 3020  
RIDGEFIELD, WASHINGTON**

**Introduction:** On behalf of the Port of Ridgefield (the Port), Maul Foster & Alongi, Inc. (MFA) has prepared this site-specific sampling and analysis plan (SSAP) for fifteen areas of investigation (AOI)-043, -046, -056, -057, -059, -061, -066, -078, -079, -080, -081, -082, -083, -087, and -089 within the off-property portion (OPP) of the former Pacific Wood Treating Co. (PWT) site in Ridgefield, Washington (see Figure 1). The Washington State Department of Ecology (Ecology)-approved OPP sampling and analysis plan (SAP) describes the general procedures for collection, preservation, and analysis of samples of soil for OPP properties.<sup>1</sup> The OPP properties identified for sampling are known as AOIs. All work is conducted under the authority of Agreed Order No. DE 11057 between the Port and Ecology. This SSAP 2023-1 summarizes the procedures to be implemented within the OPP and are being provided to Ecology prior to sampling activities for approval.

**Site Background:** PWT operated a wood-treating facility from 1964 to 1993 at the Port's Lake River Industrial Site; historical operations and other indeterminate sources may have resulted in impacts to soil on the OPP.

**Problem Statement:** The vertical extent of dioxins in subsurface soils in OPP properties requires investigation. Pre-design soil sample data are needed to complete engineering design reports for the OPP properties prior to remedy implementation.

**SSAP Objectives:** The SAP describes methods that will be used for sampling soil. It includes procedures for collecting, analyzing, evaluating, and reporting the data. Access agreements were previously obtained for most properties and will be verified prior to sample collection. Access agreements were previously obtained for AOI-059, AOI-078, and AOI-082, however, according to the Clark County Assessor MapsOnline<sup>2</sup> the property owners have since changed. MFA will work to obtain a new access agreement with the owners of AOI-059, AOI-078, and AOI-082, prior to sampling activities.

A stainless-steel hand auger will be used to collect discrete samples from 1.0 to 1.5 feet below ground surface (bgs) and from 1.5 to 2.0 feet bgs. Initially, the sample collected from 1.0 to 1.5 feet bgs will be submitted for laboratory analysis and the deeper sample will be submitted on hold. In addition, one rinsate blank per every twenty samples will be collected for quality assurance. Previous sample locations and the proposed discrete sample locations are provided on the attached AOI figures.

**Plan Attachments:** Figure 1 and AOI Figures.

**Project Manager:** Meaghan Pollock **Email:** [mpollock@maulfoster.com](mailto:mpollock@maulfoster.com) **Phone:** 360-947-2206

Property	Address	Access Agreement Status	Sample Type(s) and Number	Analysis	Property Description	Comments
AOI-043	6 Maple Street	Executed December 30, 2016	Discrete soil 1.0 to 1.5 foot bgs (1) Discrete soil 1.5 to 2.0 feet bgs (1)	Dioxins/Furans by U.S. Environmental Protection Agency (EPA) Method 8290A	Large lot with multiple areas of disturbance. West one-third of lot had approximately 6-inches to 24-inches of soil excavated and moved to east one-third of lot. There is also a large gravel area and shop in the southwest corner of the lot where additional soil was moved to the northwest corner of the lot. Also in the northwest area of the lot, a large yard debris pile was present. These areas will not be included in the sample area. The middle one-third of the lot is undisturbed. The discrete samples will be collected from this area.	Discrete samples intended to be representative of AOI-043.
AOI-046	502 N Main Avenue	Executed April 19, 2017	Discrete soil 1.0 to 1.5 foot bgs (1) Discrete soil 1.5 to 2.0 feet bgs (1)	Dioxins/Furans by EPA Method 8290A	Several landscape beds are located along the house and sidewalks, on the west side of the house, with two undisturbed yard areas present. Several landscape beds and very little yard area is located along the north side of the house. A driveway, large trees, and a few smaller landscape beds are located along the south side of the house. There is some yard area present on the south side of the house. East of the house is a large undisturbed yard area, and is surrounded by some landscape beds. The discrete samples will be collected from this area.	Discrete samples intended to be representative of AOI-046.
AOI-056	414 N Main Avenue	Executed December 27, 2016	Discrete soil 1.0 to 1.5 foot bgs (1) Discrete soil 1.5 to 2.0 feet bgs (1)	Dioxins/Furans by EPA Method 8290A	East of the house to the property boundary is all hardscape, landscape, ponded, or gravel parking area. The discrete samples will be collected from the lawn areas on the southwest portion of the property.	Discrete samples intended to be representative of AOI-056.
AOI-057	411 N 3rd Avenue	Executed January 17, 2017	Discrete soil 1.0 to 1.5 foot bgs (1) Discrete soil 1.5 to 2.0 feet bgs (1)	Dioxins/Furans by EPA Method 8290A	Corner lot with established landscaping. One concrete driveway off of 3rd Avenue and one gravel driveway off Division Street. Two large cedars are located in the southeast corner of property. A large compost pile with grass clippings is located in the southwest corner. Two wood patios extend off the east and west sides of the house. An outdoor brick fireplace is on the back patio. Treated wood is used around garden beds along the south side of the house and octagonal bark chips have been placed in planter beds. The discrete samples will be collected from the southern portion of the property, adjacent to AOI-059.	Discrete samples intended to be representative of AOI-057 and AOI-059.
AOI-059	405 N 3rd Avenue	None	N/A	N/A	A large lawn is located in the front of the house (east). A small walkway along the north property line is not suitable for sampling. There is a large swimming pool, concrete, and landscape area in the back of the house (west) and is also not suitable for sampling.	The discrete samples collected from AOI-057 and AOI-061, both adjacent to AOI-059, are intended to also be representative of AOI-059.

<sup>1</sup> MFA. 2023. 2023 Final Off-Property Portion Sampling and Analysis Plan, Former Pacific Wood Treating Co. Site, Facility ID 1019, Cleanup Site ID 3020. Prepared for the Port of Ridgefield. Maul Foster & Alongi, Inc., Vancouver, Washington. October 26.

<sup>2</sup> Clark County. N.D. <https://gis.clark.wa.gov/maponline/index.cfm>. Accessed September 18, 2023.

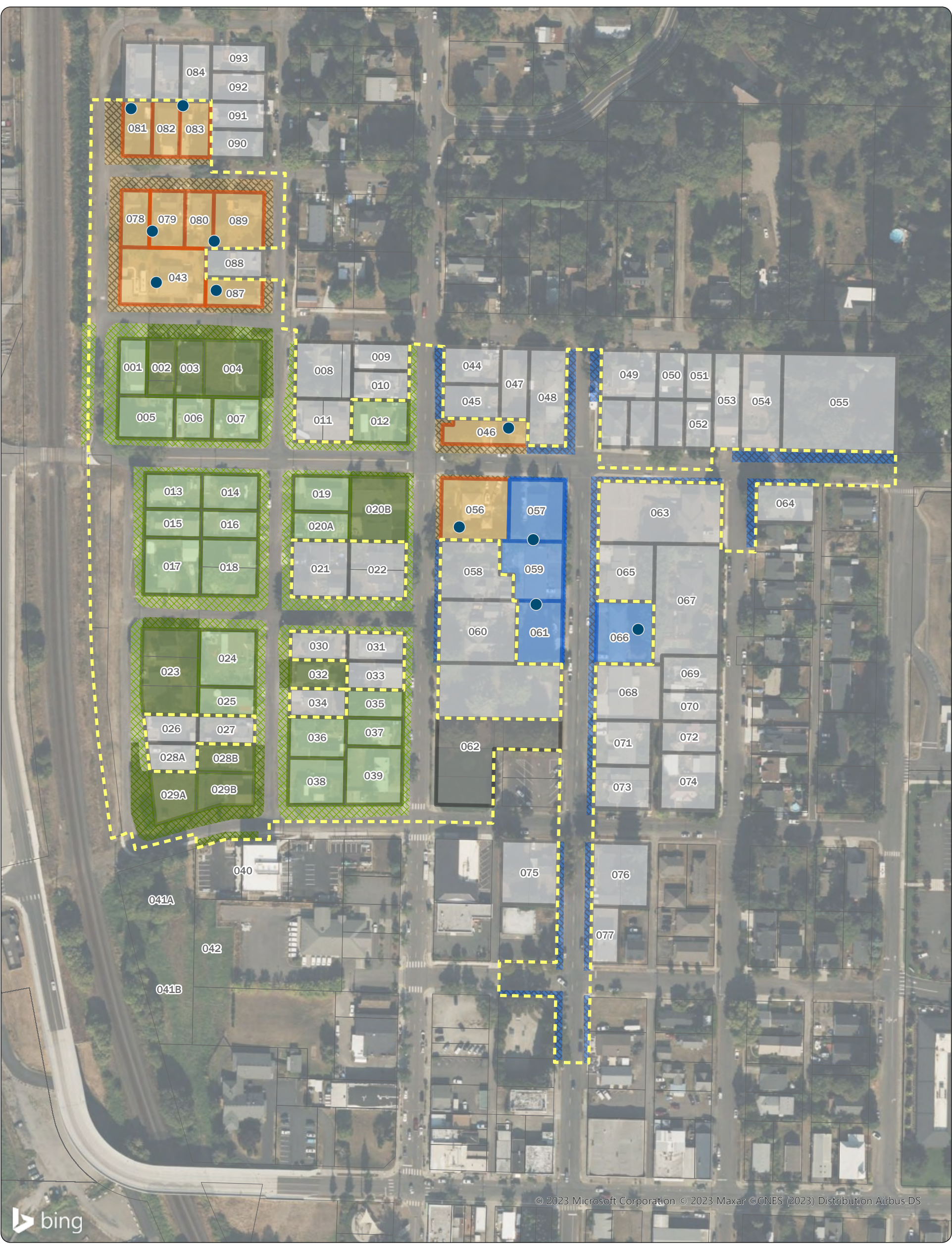
Property	Address	Access Agreement Status	Sample Type(s) and Number	Analysis	Property Description	Comments
AOI-061	321 N 3rd Avenue	Executed December 30, 2016	Discrete soil 1.0 to 1.5 foot bgs (1) Discrete soil 1.5 to 2.0 feet bgs (1)	Dioxins/Furans by EPA Method 8290A	South of building is primarily walkway, patio, and landscape beds. A shed is located on the northwest corner of the property. The remainder of the property is undisturbed lawn. The discrete samples will be collected from the northern portion of the property, adjacent to AOI-059.	Discrete samples intended to be representative of AOI-061 and AOI-059.
AOI-066	330 and 332 N 3rd Avenue	Executed January 4, 2017	Discrete soil 1.0 to 1.5 foot bgs (1) Discrete soil 1.5 to 2.0 feet bgs (1)	Dioxins/Furans by EPA Method 8290A	The areas north and south of the house are narrow walkways. The rest of the property west and east of the house, is lawn area. The discrete samples will be collected from the lawn area on the eastern portion of the property.	Discrete samples intended to be representative of AOI-066 only.
AOI-078	3 Elm Street	None	N/A	N/A	Fire pit and a garage are located in the southwest corner of backyard. Compost/debris pile is located directly west of garage. These areas are not suitable for sampling. The front and back yard are primarily lawn, with a sidewalk around the house. One ISM sample will be collected in the lawn areas.	The discrete samples collected from AOI-079, adjacent to AOI-078, are intended to also be representative of AOI-079.
AOI-079	7 Elm Street	Executed May 17, 2019	Discrete soil 1.0 to 1.5 foot bgs (1) Discrete soil 1.5 to 2.0 feet bgs (1)	Dioxins/Furans by EPA Method 8290A	Two sheds are present on the southwest and southeast corners of the property. A patio is located on the southwest corner of the house. The property is landscaped. The discrete samples will be collected from the southwest portion of the property, adjacent to AOI-078.	Discrete samples intended to be representative of AOI-079 and AOI-078.
AOI-080	11 Elm Street	Executed May 20, 2019	N/A	N/A	The west side of the property is used to store cars, an RV, and other miscellaneous debris. A shed is also present in the southeast corner of the property, along with bricks and a wood pile. A firepit and burn area exists in the middle of the southern portion of the property. The east boundary of the property is a slim walkway consisting of soil.	The discrete samples collected from AOI-089, adjacent to AOI-080, are intended to be representative of AOI-080.
AOI-081	4 Elm Street	Executed May 25, 2019	Discrete soil 1.0 to 1.5 foot bgs (1) Discrete soil 1.5 to 2.0 feet bgs (1)	Dioxins/Furans by EPA Method 8290A	The property is landscaped. The east side of the property is used to store cars and other miscellaneous debris. A shed is present in the northeast corner of the property, along with wood piles. Disturbed areas are present in the backyard area. The remainder of the property is undisturbed lawn. The discrete samples will be collected from the northern portion of the property.	Discrete samples intended to be representative of AOI-081.
AOI-082	8 Elm Street	None	N/A	N/A	The property is landscaped. The north side of the property has garden beds. The remainder of the property is primarily lawn. One ISM sample will be collected from the undisturbed lawn area.	The discrete samples collected from AOI-083, adjacent to AOI-082, are intended to also be representative of AOI-082.
AOI-083	12 Elm Street	Executed May 24, 2019	Discrete soil 1.0 to 1.5 foot bgs (1) Discrete soil 1.5 to 2.0 feet bgs (1)	Dioxins/Furans by EPA Method 8290A	The property is landscaped. The southwest side of the property is used to store an RV and other miscellaneous debris. There are garden pots located throughout the backyard. A shed is present in the northeast portion of the Property. The discrete samples will be collected from the northwest portion of the property, adjacent to AOI-082.	Discrete samples intended to be representative of AOI-083 and AOI-082.
AOI-087	603 N 1st Avenue	Executed November 12, 2019	Discrete soil 1.0 to 1.5 foot bgs (1) Discrete soil 1.5 to 2.0 feet bgs (1)	Dioxins/Furans by EPA Method 8290A	A shed is present on the northwest corner of the property. A concrete patio and wood porch are located on the east side of the property. Chemicals, including fertilizer and gasoline were stored on the wood porch. Cigarette butts were seen through the east portion of the property. The property is not landscaped other than a portion in the northeast corner that has wooden steps, cinder blocks, a dirt path, and landscape cloth. The discrete samples will be collected from the western portion of the property.	Discrete samples intended to be representative of AOI-087.
AOI-089	613 N 1st Avenue	Executed November 10, 2019	Discrete soil 1.0 to 1.5 foot bgs (1) Discrete soil 1.5 to 2.0 feet bgs (1)	Dioxins/Furans by EPA Method 8290A	The south side of the property contains three raised garden beds, tree stumps surrounding a fire pit, and a pile of chopped wood under a tree. A raised deck is located on the west and south sides of the property with gravel and dirt underneath. Storage of a canoe, air conditioning unit, and garbage cans occur under the deck. The north side of the property has landscaping with stones around three trees. A concrete path on the east side of the property leads to the front door and continues around to the north and south portions of the property. The discrete samples will be collected from the southwest portion of the property, adjacent to AOI-080.	Discrete samples intended to be representative of AOI-089 and AOI-080.



Field Quality Control Samples		
Type	Frequency	Analysis
Equipment Rinsate Blanks	One per every 20 samples	Dioxins by EPA 8290A

Notes:  
 This SSAP was designed to be used in conjunction with the SAP.  
 AOI = area of investigation.  
 bgs = below ground surface.  
 Ecology = Washington State Department of Ecology.  
 EPA = U.S. Environmental Protection Agency.  
 MFA = Maul Foster & Alongi, Inc.  
 OPP = off-property portion.  
 Port = Port of Ridgefield.  
 PWT = Pacific Wood Treating Co.  
 SAP = 2023 Final Off-Property Portion Sampling and Analysis Plan, Former Pacific Wood Treating Co. Site, Facility ID 1019, Cleanup Site ID 3020. Prepared for the Port of Ridgefield. Maul Foster & Alongi, Inc., Vancouver, Washington. October 26.  
 SSAP = site-specific sampling and analysis plan.





**Data Sources**  
Aerial photograph obtained from MapBox; parcels obtained from Clark County.

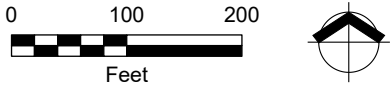
**Note**  
PWT = Pacific Wood Treating.  
ROW = right-of-way.

- |  |                                     |  |  |  |  |
|--|-------------------------------------|--|--|--|--|
|  | Subsurface Sample Location          |  | Phase 1 Cleanup Properties (Not Completed) |  | 2016 ROW Cleanup Area (Completed)        |
|  | Off-Property Portion Site           |  | Phase 2 Cleanup Properties (Not Completed) |  | 2017 ROW Cleanup Area (Completed)        |
|  | Parcel                              |  | Implement Institutional Controls           |  | Phase 1 ROW Cleanup Area (Not Completed) |
|  | 2016 Cleanup Properties (Completed) |  | No Cleanup Needed                          |  | Phase 2 ROW Cleanup Area (Not Completed) |
|  | 2017 Cleanup Properties (Completed) |  |  |  |  |

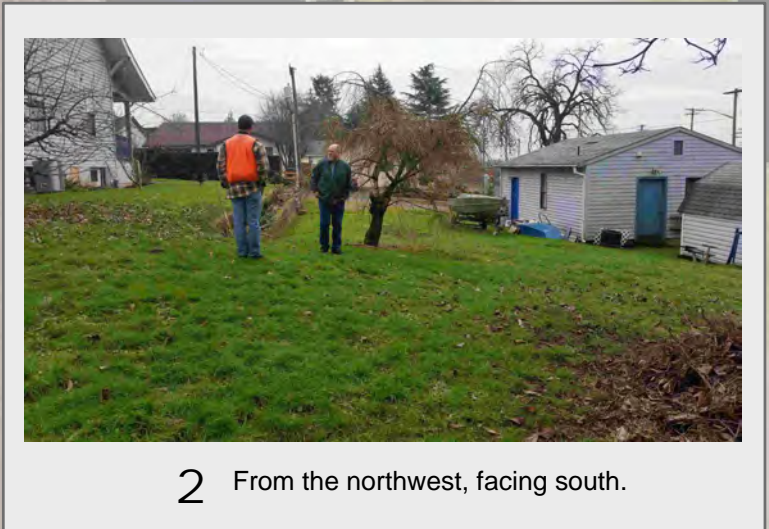
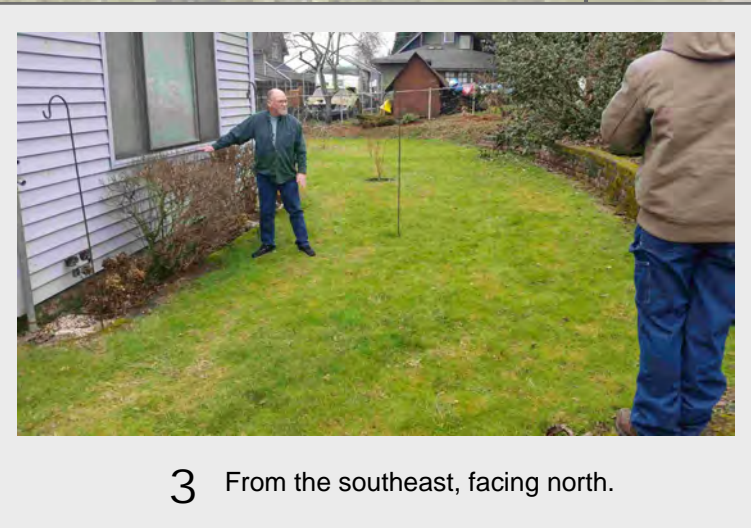
**Figure 1**  
**Cleanup Status and Subsurface Sample Locations**  
Former PWT Site  
Ridgefield, WA

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**Data Sources**

Aerial photograph and tax lots data obtained from Clark County GIS. Site photos taken 1/24/2017.

**Note**

AOI = area of interest.



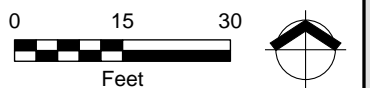
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**Legend**

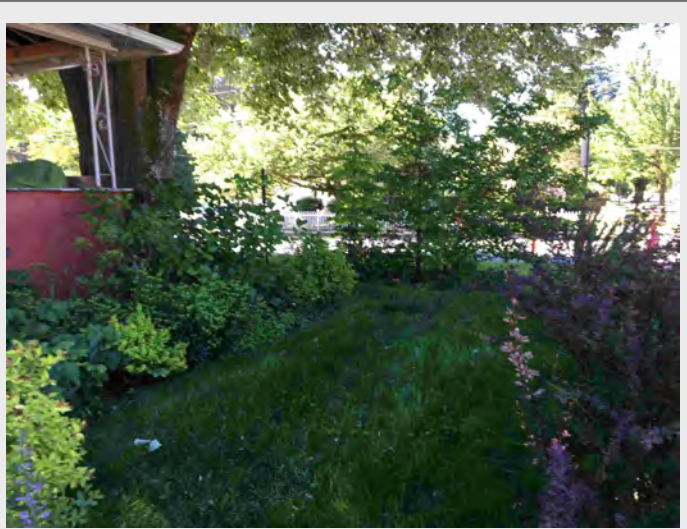
- Subsurface Sample Location
- Prior Surface Sample Location
- Sampling Area Extent
- AOI-043 Property Boundary
- Parcel
- Photo Location and Direction

**Figure AOI-043**

6 Maple Street  
Ridgefield, WA 98642



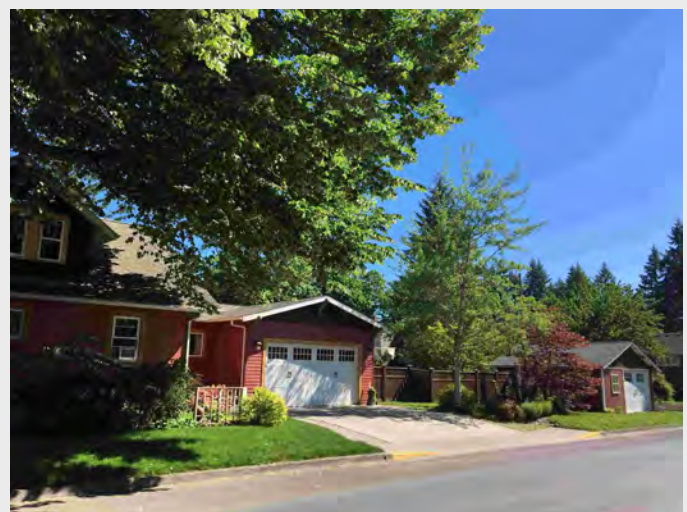




1 West side of yard, facing southeast.



3 East side of yard, facing west.



2 Southern property boundary, facing northeast.



4 South property boundary, facing west.

**Data Sources**

Aerial photograph and tax lots data obtained from Clark County GIS. Site photos taken 1/24/2017.

**Note**

AOI = area of interest.

**Legend**

- Subsurface Sample Location
- Prior Surface Sample Location
- Sampling Area Extent
- AOI-046 Property Boundary
- Parcel
- Photo Location and Direction



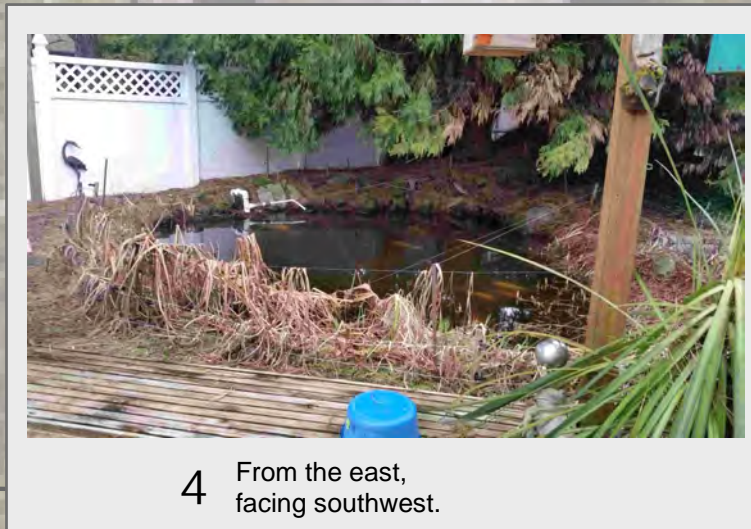
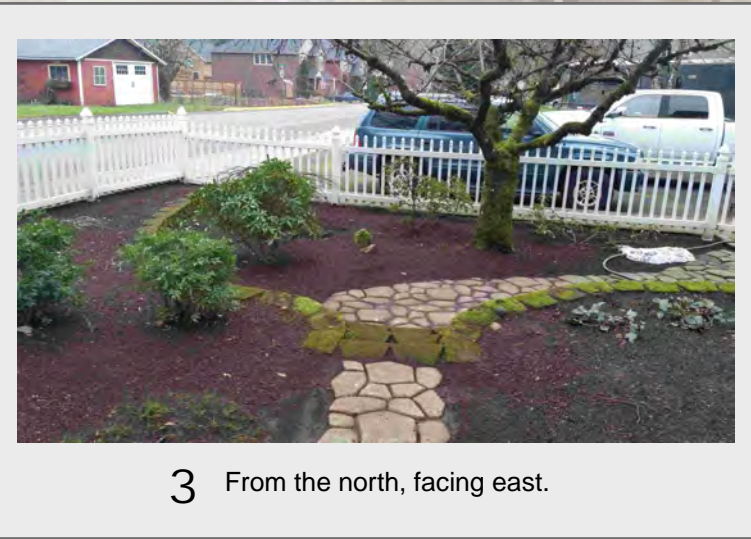
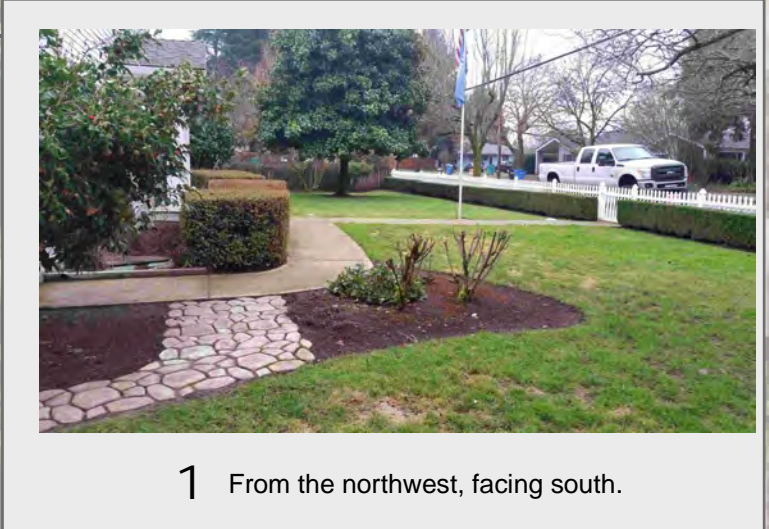
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**Figure AOI-046**

502 N Main Street  
Ridgefield, WA 98642







**Data Sources**  
Aerial photograph and tax lots data obtained from Clark County GIS. Site photos taken 1/24/2017.

**Note**  
AOI = area of interest.

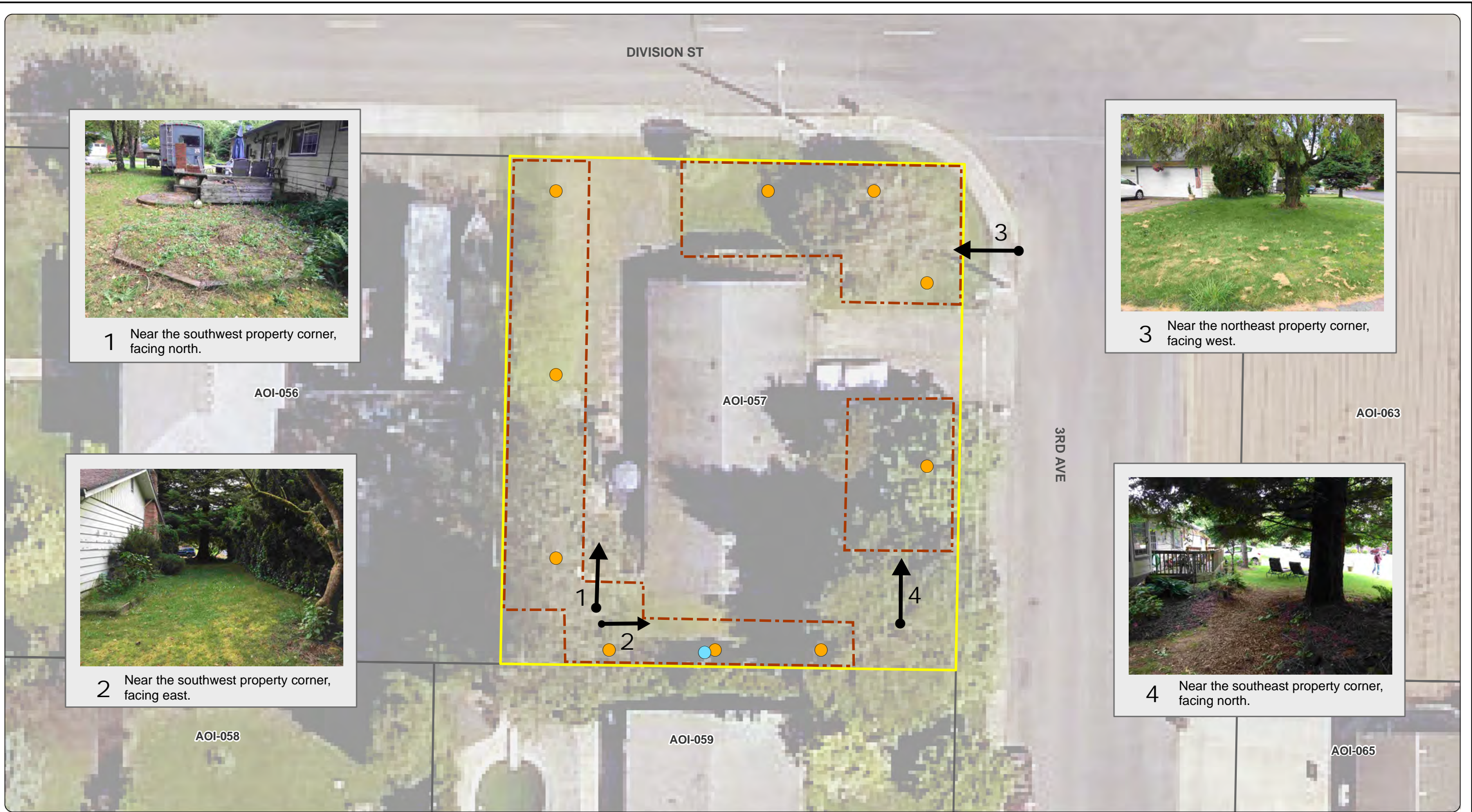


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- Legend**
- Subsurface Sample Location
  - Prior Surface Sample Location
  - Sampling Area Extent
  - AOI-056 Property Boundary
  - Parcel
  - Photo Location and Direction

**Figure AOI-056**  
414 N Main Avenue  
Ridgefield, WA 98642





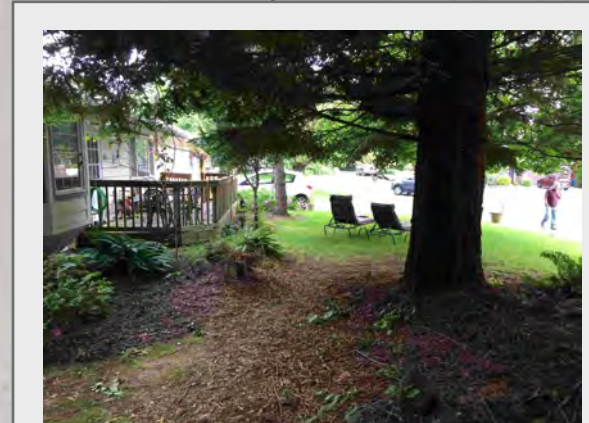
1 Near the southwest property corner, facing north.



2 Near the southwest property corner, facing east.



3 Near the northeast property corner, facing west.



4 Near the southeast property corner, facing north.

**Data Sources**  
Aerial photograph and tax lots data obtained from Clark County GIS. Site photos taken 1/24/2017.

**Note**  
AOI = area of interest.



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**Legend**

- Subsurface Sample Location
- Prior Surface Sample Location
- Sampling Area Extent
- AOI-057 Property Boundary
- Parcel
- ➔ Photo Location and Direction

**Figure AOI-057**

411 N 3rd Avenue  
Ridgefield, WA 98462



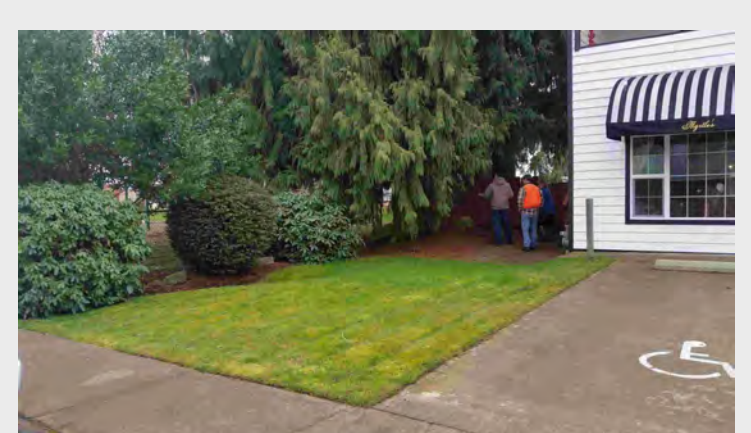




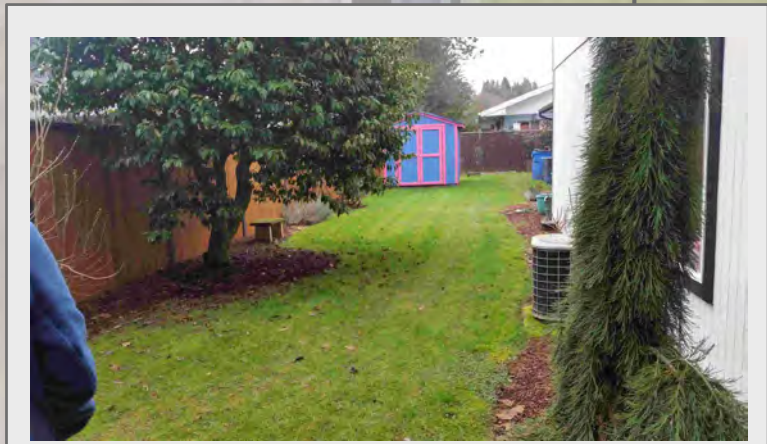
1 From the east, facing northwest.



3 From the south, facing east.



2 From the east, facing southwest.



4 From the southwest, facing north.

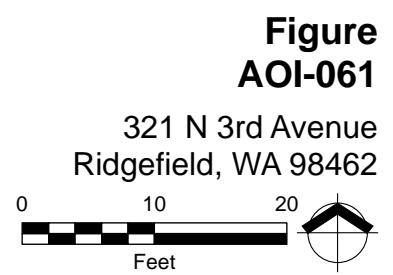
**Data Sources**  
Aerial photograph and tax lots data obtained from Clark County GIS. Site photos taken 1/24/2017.

**Note**  
AOI = area of interest.



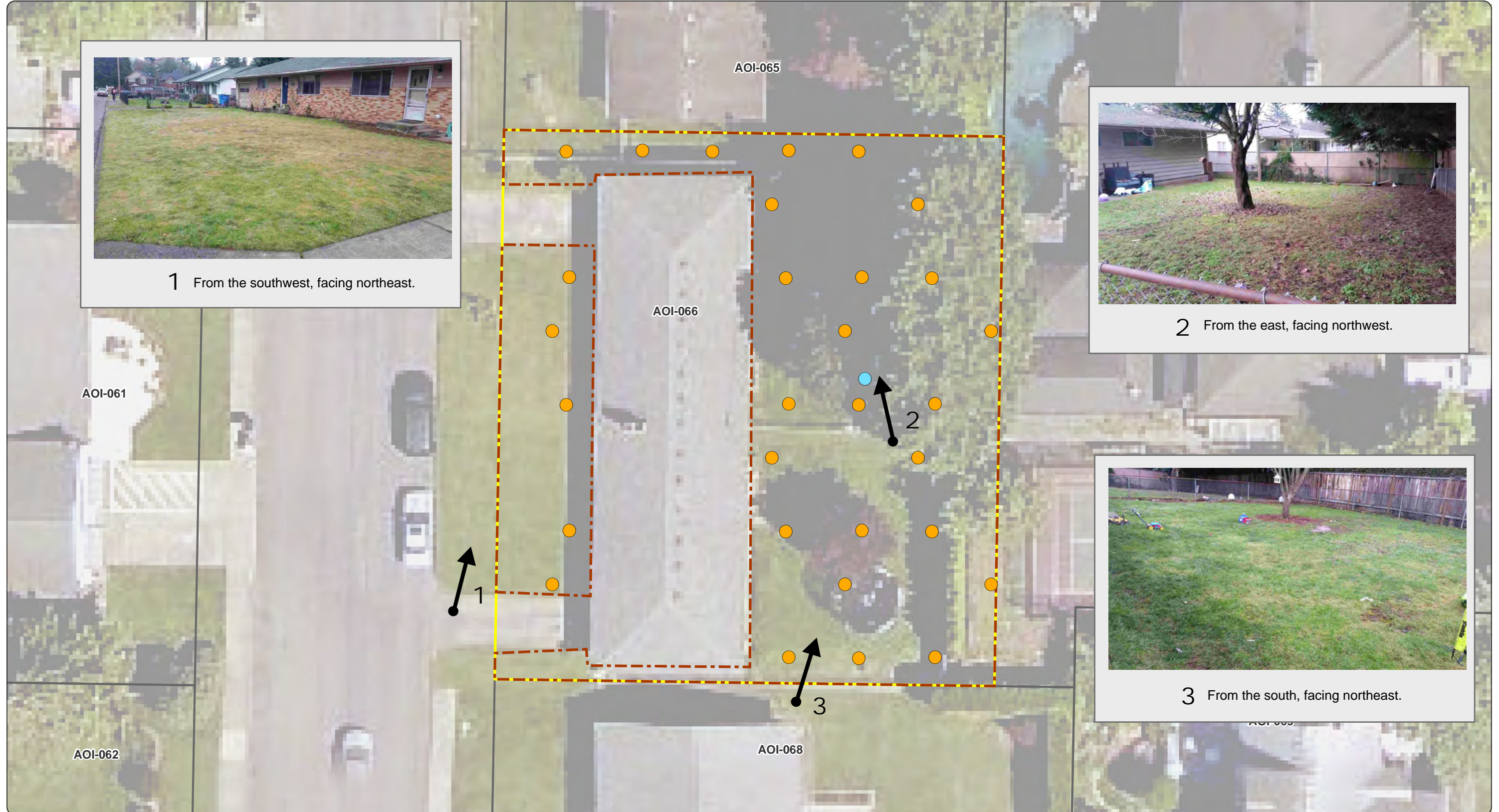
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- Legend**
- Subsurface Sample Location
  - Prior Surface Sample Location
  - Sampling Area Extent
  - AOI-061 Property Boundary
  - Parcel
  - Photo Location and Direction





Path: X:\180003.01\_Portal\Ridgfield\111\Projects\111\_AOI\_066.mxd  
Print Date: 10/27/2023  
Reviewed By: mpollack  
Produced By: jroberts  
Project: M09003.01\_061



**Data Sources**  
Aerial photograph and tax lots data obtained from Clark County GIS. Site photos taken 1/24/2017.

**Note**  
AOI = area of interest.

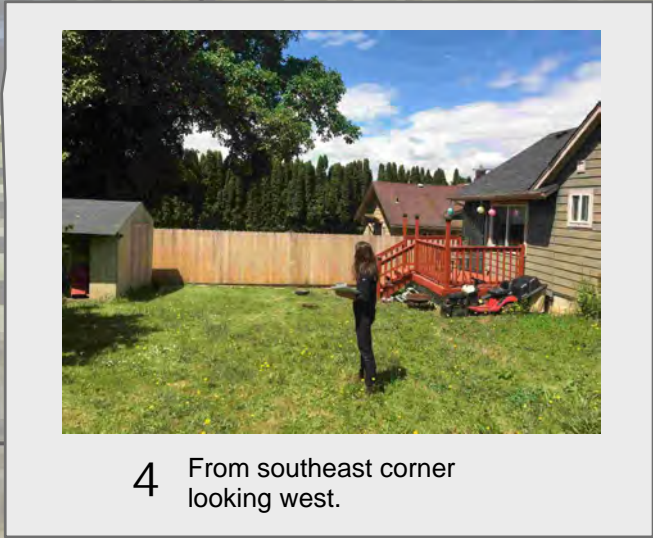
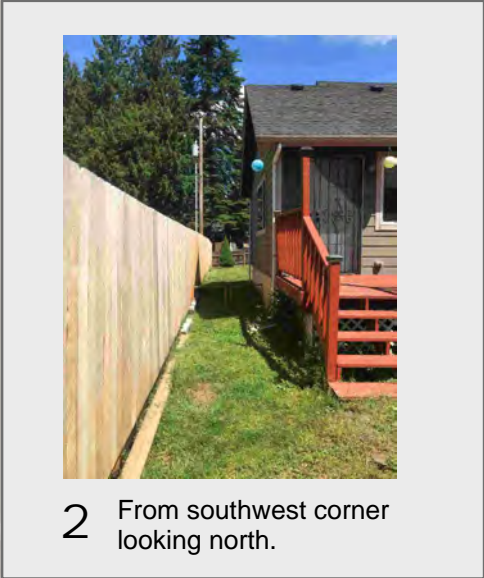
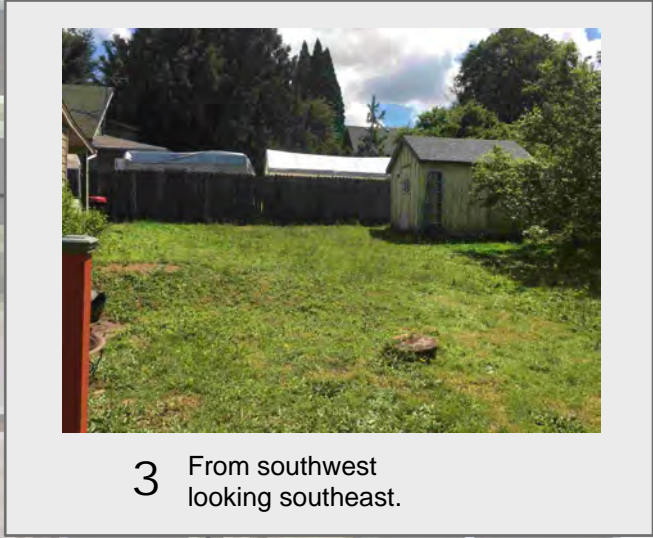
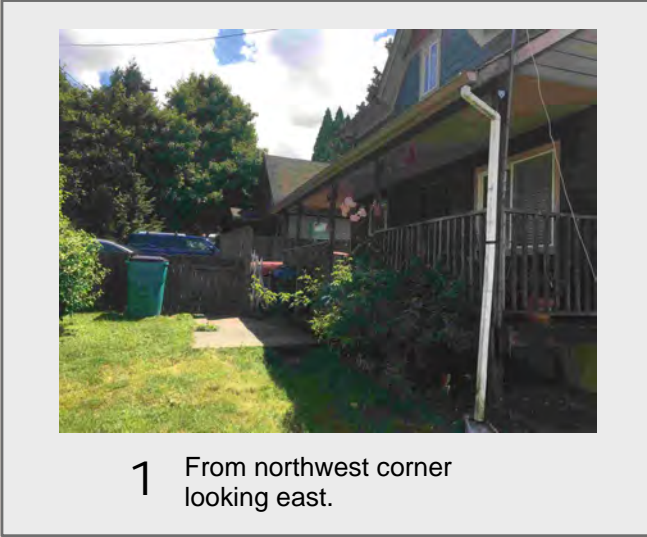


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- Legend**
- Subsurface Sample Location
  - Prior Surface Sample Location
  - ▭ AOI-066 Property Boundary
  - ▭ Parcel
  - ▭ Sampling Area Extent
  - ➔ Photo Location and Direction

**Figure AOI-066**  
330 and 332 N 3rd Avenue  
Ridgfield, WA 98462





**Data Sources**  
Aerial photograph and tax lots data obtained from Clark County GIS. Site photos taken 1/24/2017.

**Note**  
AOI = area of interest.



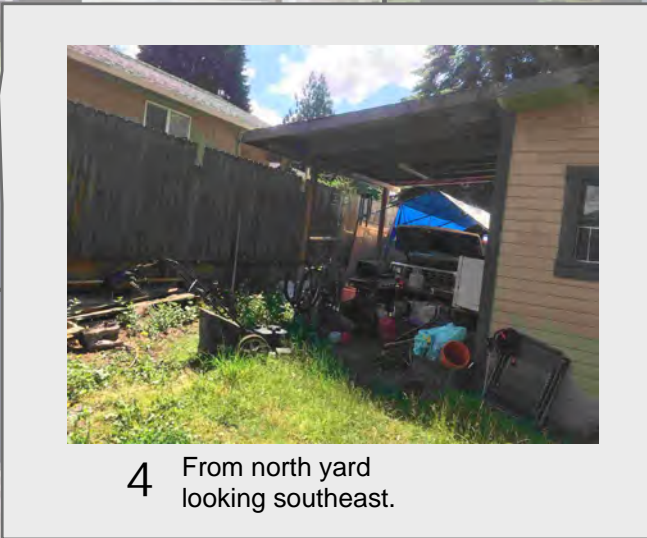
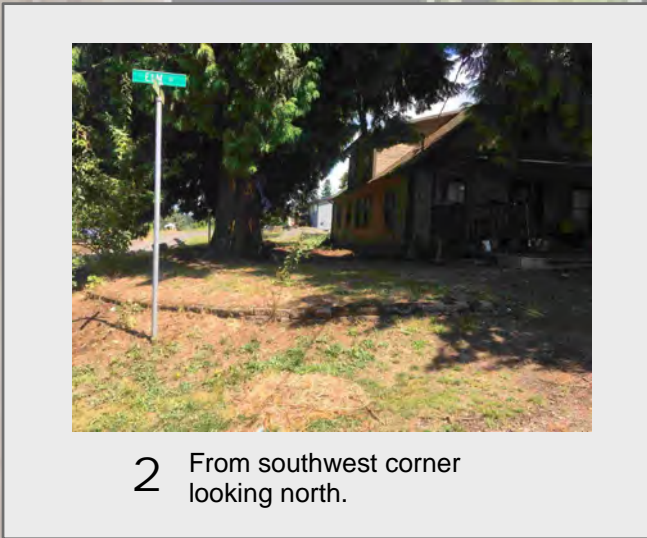
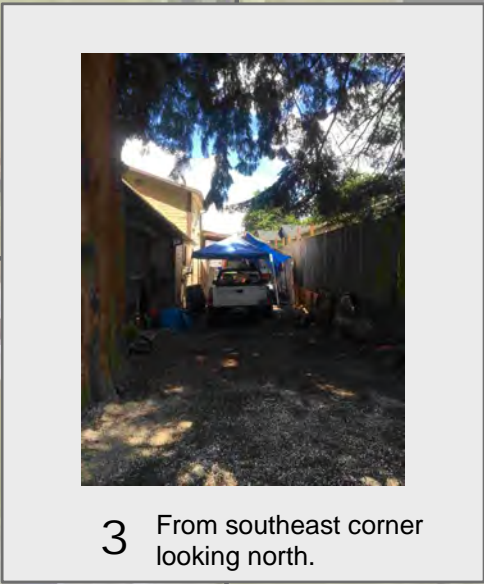
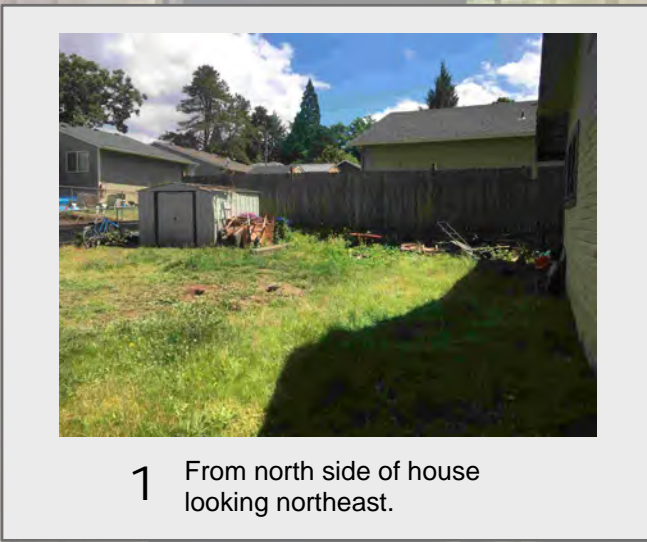
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- Legend**
- Subsurface Sample Location
  - Prior Surface Sample Location
  - Sampling Area Extent
  - AOI-079 Property Boundary
  - Parcel
  - ➔ Photo Location and Direction

**Figure**  
**AOI-079**  
7 Elm Street  
Ridgefield, WA 98642



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Print Date: 10/27/2023  
Reviewed By: mpollack  
Produced By: jroberts  
Project: M0003.01.061



**Data Sources**  
Aerial photograph and tax lots data obtained from Clark County GIS. Site photos taken 1/24/2017.

**Note**  
AOI = area of interest.



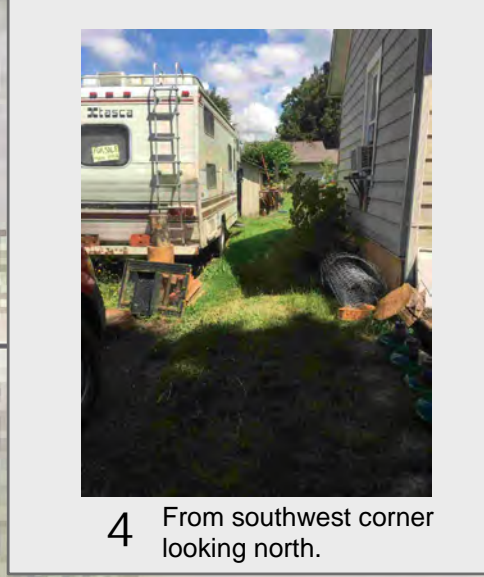
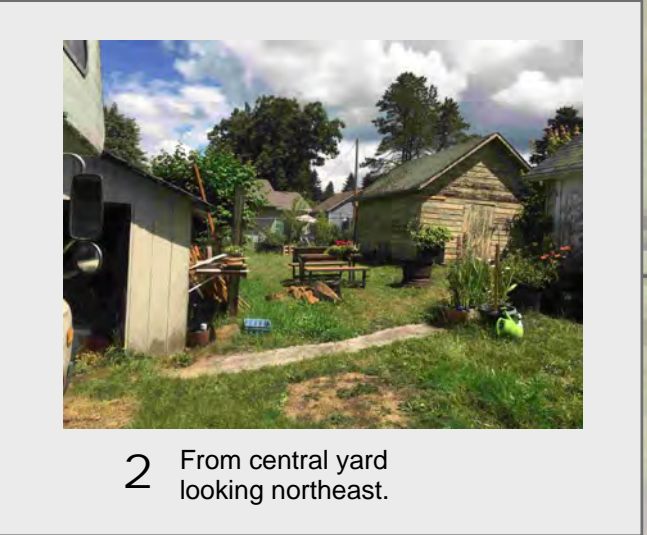
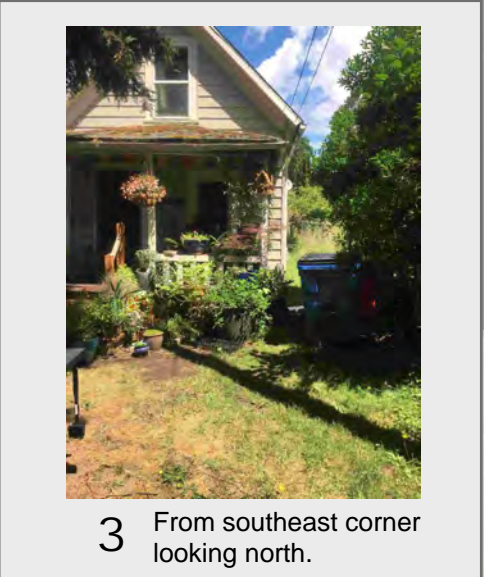
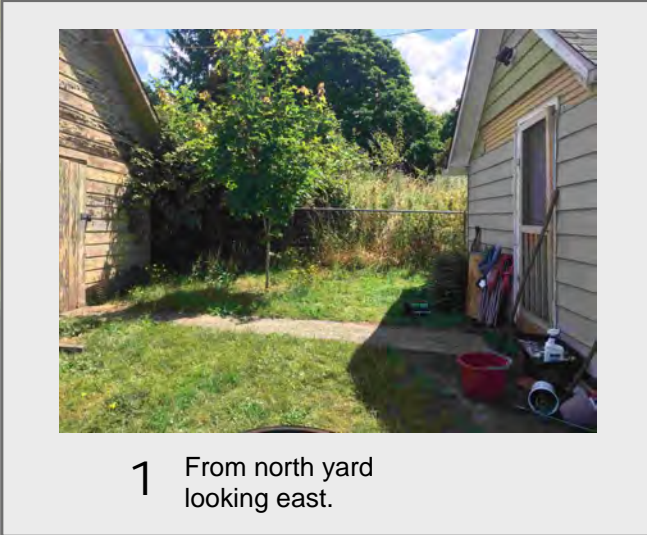
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- Legend**
- Subsurface Sample Location
  - Prior Surface Sample Location
  - ▭ AOI-081 Property Boundary
  - ▭ Parcel
  - ▭ Sampling Area Extent
  - ➔ Photo Location and Direction

**Figure AOI-081**  
4 Elm Street  
Ridgefield, WA 98642

0 10 20  
Feet





**Data Sources**  
Aerial photograph and tax lots data obtained from Clark County GIS. Site photos taken 1/24/2017.

**Note**  
AOI = area of interest.

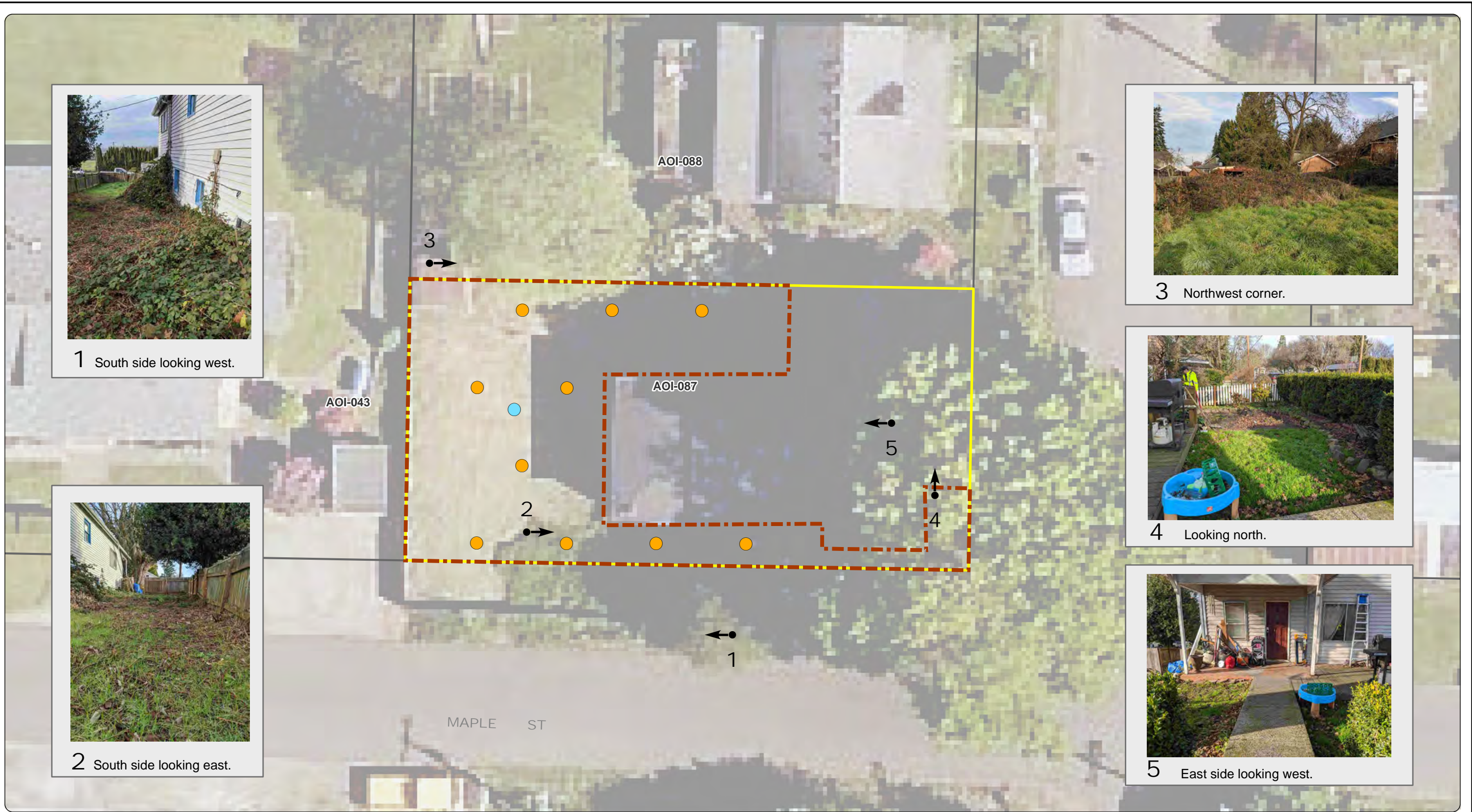


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- Legend**
- Subsurface Sample Location
  - Prior Surface Sample Location
  - Sampling Area Extent
  - AOI-083 Property Boundary
  - Parcel
  - ➔ Photo Location and Direction

**Figure AOI-083**  
12 Elm Street  
Ridgefield, WA 98642





**Data Sources**

Aerial photograph and tax lots data obtained from Clark County GIS. Site photos taken 1/24/2017.

**Note**

AOI = area of interest.

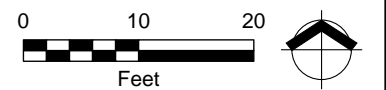
**Legend**

- Subsurface Sample Location
- Prior Surface Sample Location
- Sampling Area Extent
- AOI-087 Property Boundary
- Parcel
- ➔ Photo Location and Direction

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**Figure AOI-087**  
 603 N 1st Avenue  
 Ridgefield, WA 98642







**Data Sources**

Aerial photograph and tax lots data obtained from Clark County GIS. Site photos taken 1/24/2017.

**Note**

AOI = area of interest.

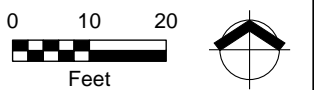
**Legend**

- Subsurface Sample Location
- Prior Surface Sample Location
- Sampling Area Extent
- AOI-089 Property Boundary
- Parcel
- ➔ Photo Location and Direction



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**Figure AOI-089**  
 613 N 1st Avenue  
 Ridgefield, WA 98642





# APPENDIX E

## FIELD DOCUMENTATION





**Appendix E-1  
Property Sample Description  
Former PWT Site  
Ridgefield, Washington**



Location	Area	Sample ID	Date Collected	Sample Type	Start Depth (ft bgs)	End Depth (ft bgs)	X Coordinate	Y Coordinate	Physical Description
Property 001	Phase 1 OPP	COMP-AOI001-0.5	11/20/2015	Composite	0	0.5	1067269.447	185378.908	Silt with clay; moist; grey
Property 002	Phase 1 OPP	ISM-AOI002-0.5	11/20/2015	ISM	0	0.5	1067319.361	185378.075	Sandy silt; moist
Property 002	Phase 1 OPP	SBS-AOI002-1.5	03/22/2016	Discrete	1	1.5	1067331.222	185358.539	Sandy silt; moist
Property 002	Phase 1 OPP	SBS-AOI002-2.0	03/22/2016	Discrete Archive	1.5	2	1067331.222	185358.539	Sandy silt; moist
Property 003	Phase 1 OPP	ISM-AOI003-0.5	02/09/2016	ISM	0	0.5	1067369.451	185377.057	Sandy silt; moist
Property 004	Phase 1 OPP	COMP-AOI004-0.5	07/28/2015	Composite	0	0.5	1067444.470	185375.891	Sand with silt; tan in color; dry
Property 004	Phase 1 OPP	COMP-AOI004-1.0	07/28/2015	Composite archive	0.5	1	1067444.470	185375.891	Sand with silt; tan in color; dry
Property 004	Phase 1 OPP	ISM-AOI004-0.5	07/12/2017	ISM	0	0.5	1067444.470	185375.891	Sand with silt; tan in color; dry
Property 005	Phase 1 OPP	ISM-AOI005-0.5	04/16/2015	ISM	0	0.5	1067292.815	185290.977	Sand with silt; tan in color
Property 005	Phase 1 OPP	SBS-AOI005-1.0	04/16/2015	Discrete	0.5	1	1067279.170	185257.850	Sand with silt; tan in color
Property 005	Phase 1 OPP	SBS-AOI005-1.0-DUP	04/16/2015	Discrete Duplicate	0.5	1	1067279.170	185257.850	Sand with silt; tan in color
Property 006	Phase 1 OPP	ISM-AOI006-0.5	04/16/2015	ISM	0	0.5	1067375.690	185289.642	Sand with silt; dry; tan in color
Property 006	Phase 1 OPP	SBS-AOI006-1.0	04/16/2015	Discrete	0.5	1	1067391.457	185257.116	Sand with silt; dry; tan in color
Property 007	Phase 1 OPP	ISM-AOI007-0.5	04/16/2015	ISM	0	0.5	1067450.779	185288.189	Gravelly sand
Property 008	Phase 1 OPP	ISM-AOI008-0.5	05/21/2015	ISM	0	0.5	1067604.367	185373.058	Sand with silt
Property 009	Phase 1 OPP	ISM-AOI009-0.5	11/20/2015	ISM	0	0.5	1067704.864	185397.002	Sandy silt; moist
Property 010	Phase 1 OPP	ISM-AOI010-0.5	12/02/2015	ISM	0	0.5	1067703.892	185347.017	Sand with silt; moist; yellowish brown in color; compact
Property 011	Phase 1 OPP	ISM-AOI011-0.5	04/16/2015	ISM	0	0.5	1067602.840	185285.571	Gravelly sand; tan in color
Property 012	Phase 1 OPP	ISM-AOI012-0.5	04/23/2015	ISM	0	0.5	1067702.752	185283.832	Sandy silt
Property 013	Phase 1 OPP	ISM-AOI013-0.5-B	04/16/2015	ISM	0	0.5	1067340.592	185161.152	Sand with silt; moist; tan in color
Property 013	Phase 1 OPP	ISM-AOI013-0.5-F	04/16/2015	ISM	0	0.5	1067340.592	185161.152	Sand with silt; moist; tan in color
Property 014	Phase 1 OPP	ISM-AOI014-0.5	04/23/2015	ISM	0	0.5	1067440.563	185159.391	Sandy silt
Property 015	Phase 1 OPP	ISM-AOI015-0.5	04/23/2015	ISM	0	0.5	1067339.625	185104.656	Sandy silt
Property 016	Phase 1 OPP	ISM-AOI016-0.5	05/07/2015	ISM	0	0.5	1067439.565	185102.903	Sand with silt; tan in color
Property 017	Phase 1 OPP	ISM-AOI017-0.5-A	04/23/2015	ISM Triplicate	0	0.5	1067338.315	185029.672	Sandy silt; color change from dark brown to yellowish/greyish brown
Property 017	Phase 1 OPP	ISM-AOI017-0.5-B	04/23/2015	ISM Triplicate	0	0.5	1067338.315	185029.672	Sandy silt
Property 017	Phase 1 OPP	ISM-AOI017-0.5-C	04/23/2015	ISM Triplicate	0	0.5	1067338.315	185029.672	Sandy silt
Property 017	Phase 1 OPP	SBS-AOI017-1.0	04/23/2015	Discrete	0.5	1	1067308.482	184986.070	Sandy silt
Property 018	Phase 1 OPP	ISM-AOI018-0.5-B-A	04/16/2015	ISM Triplicate	0	0.5	1067438.279	185027.914	Sand with silt; tan in color
Property 018	Phase 1 OPP	ISM-AOI018-0.5-B-B	04/16/2015	ISM Triplicate	0	0.5	1067438.279	185027.914	Sand with silt; tan in color
Property 018	Phase 1 OPP	ISM-AOI018-0.5-B-C	04/16/2015	ISM Triplicate	0	0.5	1067438.279	185027.914	Sand with silt; tan in color
Property 018	Phase 1 OPP	ISM-AOI018-0.5-F	04/16/2015	ISM	0	0.5	1067438.279	185027.914	Sand with silt; tan in color
Property 018	Phase 1 OPP	SBS-AOI018-1.0	04/16/2015	Discrete	0.5	1	1067407.149	185052.486	Sand with silt; tan in color
Property 019	Phase 1 OPP	ISM-AOI019-0.5	06/22/2015	ISM	0	0.5	1067600.564	185156.590	Silty sand; dry; tan in color
Property 019	Phase 1 OPP	SBS-AOI019-1.5	03/25/2016	Discrete	1	1.5	1067584.493	185175.468	Silty sand; dry; tan in color
Property 020B	Phase 1 OPP	ISM-AOI020B-0.5	04/30/2015	ISM	0	0.5	1067700.119	185129.840	Sand with silt
Property 020B	Phase 1 OPP	SBS-AOI020B-1.0	04/30/2015	Discrete	0	0.5	1067741.886	185097.869	Sand with silt
Property 021	Phase 1 OPP	ISM-AOI021-0.5	04/30/2015	ISM	0	0.5	1067598.249	185025.105	Sand with silt



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Location	Area	Sample ID	Date Collected	Sample Type	Start Depth (ft bgs)	End Depth (ft bgs)	X Coordinate	Y Coordinate	Physical Description
Property 022	Phase 1 OPP	ISM-AOI022-0.5	12/02/2015	ISM	0	0.5	1067698.252	185023.351	Sandy silt; moist; loose
Property 023	Phase 1 OPP	ISM-AOI023-0.5	06/15/2016	ISM	0	0.5	1067378.626	184932.221	Sand with silt
Property 024	Phase 1 OPP	ISM-AOI024-0.5	04/30/2015	ISM	0	0.5	1067435.501	184867.942	Sand with silt and gravel; medium brown in color
Property 025	Phase 1 OPP	ISM-AOI025-0.5	04/30/2015	ISM	0	0.5	1067434.180	184792.950	Sandy silt
Property 026	Phase 1 OPP	ISM-AOI026-0.5	09/21/2015	ISM	0	0.5	1067337.083	184744.928	Sand with silt
Property 027	Phase 1 OPP	ISM-AOI027-0.5	04/30/2015	ISM	0	0.5	1067433.312	184742.953	Sandy silt
Property 028A	Phase 1 OPP	ISM-AOI028A-0.5	12/02/2015	ISM	0	0.5	1067339.388	184694.907	Sand with silt
Property 028B	Phase 1 OPP	ISM-AOI028B-0.5	12/02/2015	ISM	0	0.5	1067432.440	184692.965	Sand with silt
Property 028B	Phase 1 OPP	SBS-A01028B-1.5	03/22/2016	Discrete	1	1.5	1067396.604	184677.874	Sand with silt
Property 029A	Phase 1 OPP	ISM-AOI029A-0.5	04/30/2015	ISM	0	0.5	1067340.841	184629.116	Sandy silt
Property 029B	Phase 1 OPP	ISM-AOI029B-0.5	04/23/2015	ISM	0	0.5	1067429.608	184638.053	Sandy silt
Property 030	Phase 1 OPP	ISM-AOI030-0.5	04/30/2015	ISM	0	0.5	1067595.919	184890.106	Sand with silt
Property 030	Phase 1 OPP	ISM-AOI030-0.5	05/21/2015	ISM Duplicate	0	0.5	1067595.919	184890.106	Sand with silt
Property 031	Phase 1 OPP	ISM-AOI031-0.5	04/16/2015	ISM	0	0.5	1067695.937	184888.375	Sand with silt; tan in color
Property 032	Phase 1 OPP	ISM-AOI032-0.5	04/23/2015	ISM	0	0.5	1067595.041	184840.094	Sand with silt; tan in color
Property 032	Phase 1 OPP	SBS-AOI032-1.0	04/23/2015	Discrete	0.5	1	1067550.533	184843.301	Sand with silt; tan in color
Property 034	Phase 1 OPP	ISM-AOI034-0.5	12/02/2015	ISM	0	0.5	1067594.235	184790.171	Sand with silt
Property 035	Phase 1 OPP	ISM-AOI035-0.5	12/23/2015	ISM	0	0.5	1067694.122	184788.379	Sand with silt
Property 036	Phase 1 OPP	ISM-AOI036-0.5	04/23/2015	ISM	0	0.5	1067593.030	184729.264	Sandy silt
Property 037	Phase 1 OPP	ISM-AOI037-0.5	11/20/2015	ISM	0	0.5	1067693.218	184738.386	Sand with silt
Property 037	Phase 1 OPP	SBS-A01037-1.5	03/22/2016	Discrete	1	1.5	1067658.822	184724.674	Sand with silt
Property 038	Phase 1 OPP	ISM-AOI038-0.5	05/29/2015	ISM	0	0.5	1067591.521	184652.412	Sand with silt; dry; tan in color
Property 039	Phase 1 OPP	ISM-AOI039-0.5	05/29/2015	ISM	0	0.5	1067691.689	184662.688	Sand with silt; dry; tan in color
Property 041A	Phase 2 OPP	ISM-AOI041A-0.5	05/04/2016	ISM	0	0.5	1067319.143	184444.020	Sand with silt; tan in color
Property 041B	Phase 2 OPP	ISM-AOI041B-0.5	05/04/2016	ISM	0	0.5	1067332.791	184288.016	Sand with silt; tan in color
Property 043	Phase 2 OPP	ISM-AOI043-0.5	03/08/2017	ISM	0	0.5	1067322.255	185538.035	Sandy silt
Property 043	Phase 2 OPP	AOI-043-1.0-1.5	12/06/2023	Discrete	1	1.5	1067310.668	185527.513	Silty sand, trace organics
Property 043	Phase 2 OPP	AOI-043-1.5-2.0	12/06/2023	Discrete	1.5	2	1067310.668	185527.513	Silty sand, trace organics
Property 044	Phase 2 OPP	ISM-AOI044-0.5	03/08/2017	ISM	0	0.5	1067864.596	185381.362	Sandy silt
Property 045	Phase 2 OPP	ISM-AOI045-0.5	08/07/2017	ISM	0	0.5	1067863.278	185318.725	Sandy silt
Property 046	Phase 2 OPP	ISM-AOI046-0.5	06/14/2017	ISM	0	0.5	1067889.422	185264.972	Sandy silt
Property 046	Phase 2 OPP	AOI-046-1.0-1.5	12/06/2023	Discrete	1	1.5	1067928.315	185272.175	Silty sand
Property 048	Phase 2 OPP	ISM-AOI048-0.5	08/07/2017	ISM	0	0.5	1067996.546	185325.914	Sandy silt
Property 049	Phase 2 OPP	ISM-AOI049-0.5	03/08/2017	ISM	0	0.5	1068139.939	185365.967	Sandy silt
Property 051	Phase 2 OPP	ISM-AOI051-0.5	03/08/2017	ISM	0	0.5	1068262.904	185363.721	Sandy silt
Property 052	Phase 2 OPP	ISM-AOI052-0.5	03/08/2017	ISM	0	0.5	1068261.344	185278.736	Sandy silt
Property 054	Phase 2 OPP	ISM-AOI054-0.5	03/08/2017	ISM	0	0.5	1068371.595	185319.279	Sandy silt
Property 056	Phase 2 OPP	ISM-AOI056-0.5	03/08/2017	ISM	0	0.5	1067869.578	185129.090	Sandy silt



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Location	Area	Sample ID	Date Collected	Sample Type	Start Depth (ft bgs)	End Depth (ft bgs)	X Coordinate	Y Coordinate	Physical Description
Property 056	Phase 2 OPP	AOI-056-1.0-1.5	12/06/2023	Discrete	1	1.5	1067841.913	185098.624	Silty sand
Property 057	Phase 2 OPP	ISM-AOI057-0.5	06/14/2017	ISM	0	0.5	1067977.563	185127.357	Sandy silt
Property 057	Phase 2 OPP	AOI057-1.0-1.5	12/15/2023	Discrete	1	1.5	1067971.636	185076.469	Silty sand
Property 059	Phase 2 OPP	ISM-AOI059-0.5	08/07/2017	ISM	0	0.5	1067973.247	185024.447	Sandy silt
Property 061	Phase 2 OPP	ISM-AOI061-0.5	03/08/2017	ISM	0	0.5	1067982.376	184913.777	Sandy silt
Property 061	Phase 2 OPP	AOI-061-1.0-1.5	12/06/2023	Discrete	1	1.5	1067976.598	184962.822	Sand with silt
Property 062	Phase 2 OPP	ISM-AOI062-0.5	06/14/2017	ISM	0	0.5	1067855.656	184686.817	Sandy silt
Property 063	Phase 2 OPP	ISM-AOI063-0.5-1	06/14/2017	ISM Triplicate	0	0.5	1068193.844	185123.434	Sandy silt
Property 063	Phase 2 OPP	ISM-AOI063-0.5-2	06/14/2017	ISM Triplicate	0	0.5	1068193.844	185123.434	Sandy silt
Property 063	Phase 2 OPP	ISM-AOI063-0.5-3	06/14/2017	ISM Triplicate	0	0.5	1068193.844	185123.434	Sandy silt
Property 064	Phase 2 OPP	ISM-AOI064-0.5	03/08/2017	ISM	0	0.5	1068413.784	185139.932	Sandy silt
Property 066	Phase 2 OPP	ISM-AOI066-0.5-1	03/09/2017	ISM Triplicate	0	0.5	1068132.314	184913.238	Sandy silt
Property 066	Phase 2 OPP	ISM-AOI066-0.5-2	03/09/2017	ISM Triplicate	0	0.5	1068132.314	184913.238	Sandy silt
Property 066	Phase 2 OPP	ISM-AOI066-0.5-3	03/09/2017	ISM Triplicate	0	0.5	1068132.314	184913.238	Sandy silt
Property 066	Phase 2 OPP	AOI-066-1.0-1.5	12/06/2023	Discrete	1	1.5	1068155.499	184919.068	Silty sand
Property 067	Phase 2 OPP	ISM-AOI067-0.5	03/09/2017	ISM	0	0.5	1068240.741	184969.570	Sandy silt
Property 068	Phase 2 OPP	ISM-AOI068-0.5	05/23/2017	ISM	0	0.5	1068138.484	184808.640	Sandy silt
Property 071	Phase 2 OPP	ISM-AOI071-0.5	06/14/2017	ISM	0	0.5	1068129.022	184719.485	Sandy silt
Property 072	Phase 2 OPP	ISM-AOI072-0.5	03/09/2017	ISM	0	0.5	1068245.260	184729.943	Sandy silt
Property 073	Phase 2 OPP	ISM-AOI073-0.5	05/23/2017	ISM	0	0.5	1068127.594	184642.235	Sandy silt
Property 075	Phase 2 OPP	ISM-AOI075-0.5	05/23/2017	ISM	0	0.5	1067964.933	184492.164	Sandy silt
Property 076	Phase 2 OPP	ISM-AOI076-0.5	03/09/2017	ISM	0	0.5	1068124.853	184488.687	Sandy silt
Property 077	Phase 2 OPP	ISM-AOI077-0.5	03/09/2017	ISM	0	0.5	1068097.785	184383.386	Sandy silt
Property 078	Phase 2 OPP	ISM-AOI078-0.5	08/18/2017	ISM	0	0.5	1067274.000	185638.883	Sandy silt
Property 079	Phase 3 OPP	ISM-AOI079-0.5	08/13/2019	ISM	0	0.5	1067330.000	185637.912	Sandy silt
Property 079	Phase 3 OPP	AOI079-1.0-1.5	12/15/2023	Discrete	1	1.5	1067303.723	185617.404	Silty sand
Property 079	Phase 3 OPP	AOI-079-1.5-2.0	12/15/2023	Discrete	1.5	2	1067303.723	185617.404	Silty sand
Property 080	Phase 3 OPP	ISM-AOI080-0.5	08/13/2019	ISM	0	0.5	1067386.000	185636.933	Sandy silt
Property 081	Phase 3 OPP	ISM-AOI081-0.5	08/13/2019	ISM	0	0.5	1067277.723	185797.851	Sandy silt
Property 081	Phase 3 OPP	AOI081-1.0-1.5	12/15/2023	Discrete	1	1.5	1067266.393	185832.287	Silty sand
Property 081	Phase 3 OPP	COMP-AOI081-0.5	06/21/2024	Composite	0	0.5	1067296.210	185787.760	Silty sand
Property 082	Phase 3 OPP	ISM-AOI082-0.5	08/13/2019	ISM	0	0.5	1067327.750	185796.969	Sandy silt
Property 083	Phase 3 OPP	ISM-AOI083-0.5	08/13/2019	ISM	0	0.5	1067378.321	185796.144	Sandy silt
Property 083	Phase 3 OPP	AOI-083-1.0-1.5	12/06/2023	Discrete	1	1.5	1067357.324	185837.426	Silty sand
Property 083	Phase 3 OPP	AOI-083-1.5-2.0	12/06/2023	Discrete	1.5	2	1067357.324	185837.426	Silty sand
Property 084	Phase 3 OPP	ISM-AOI084-0.5	08/13/2019	ISM	0	0.5	1067379.970	185896.093	Sandy silt
Property 085	Phase 3 OPP	ISM-AOI085-0.5	08/13/2019	ISM	0	0.5	1067329.530	185896.887	Sandy silt
Property 086	Phase 3 OPP	ISM-AOI086-0.5	08/13/2019	ISM	0	0.5	1067279.561	185897.809	Sandy silt



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Property Sample Description  
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Location	Area	Sample ID	Date Collected	Sample Type	Start Depth (ft bgs)	End Depth (ft bgs)	X Coordinate	Y Coordinate	Physical Description
Property 087	Phase 3 OPP	ISM-AOI87-0.5	01/29/2020	ISM	0	0.5	1067446.807	185510.840	Sandy silt
Property 087	Phase 3 OPP	AOI-087-1.0-1.5	12/06/2023	Discrete	1	1.5	1067415.763	185513.503	Silty sand
Property 088	Phase 3 OPP	ISM-AOI88-0.6	02/17/2020	ISM	0	0.5	1067447.655	185560.839	Sandy silt
Property 089	Phase 3 OPP	ISM-AOI89-0.5	01/29/2020	ISM	0	0.5	1067455.000	185635.713	Sandy silt
Property 089	Phase 3 OPP	AOI-089-1.0-1.5	12/06/2023	Discrete	1	1.5	1067412.244	185599.929	Silty sand
Property 089	Phase 3 OPP	AOI-089-1.5-2.0	12/06/2023	Discrete	1.5	2	1067412.244	185599.929	Silty sand
<p><b>Notes</b>  Coordinates are in Washington State Plane South NAD 83.  bgs = below ground surface.  ft = feet.  OPP = off property portion  PWT = Pacific Wood Treating Co.</p>									



**Appendix E-2**  
**ROW Sample Description**  
**Former PWT Site**  
**Ridgefield, Washington**



Location	Area	Sample ID	Date Collected	Sample Type	Start Depth (ft bgs)	End Depth (ft bgs)	X Coordinate	Y Coordinate	Physical Description
ROW001	Phase 1 OPP	SS-ROW001-0.5	05/04/2016	Discrete archive	0	0.5	1067269.810	185448.413	Sandy silt
ROW002N	Phase 2 OPP	ROW-002N-0.5	8/11/2016	Discrete	0	0.5	1067799.122	185042.295	Sand with silt
ROW004	Phase 1 OPP	SS-ROW004-0.5	05/07/2015	Discrete	0	0.5	1067422.000	185436.700	Medium sand; gray in color
		SS-ROW004-1.0	05/07/2015	Discrete archive	0.5	1	1067422.000	185436.700	Medium sand; gray in color
ROW005	Phase 1 OPP	SS-ROW005-0.5	06/08/2015	Discrete	0	0.5	1067228.000	185293.100	Sand with silt; tan in color
		SS-ROW005-1.0	06/08/2015	Discrete	0.5	1	1067228.000	185293.100	Sand with silt; tan in color
		SBS-ROW005-2.0	08/26/2015	Discrete	1.5	2	1067228.000	185293.100	Sand with silt; tan in color
ROW008	Phase 1 OPP	SS-ROW008-0.5	05/07/2015	Discrete	0	0.5	1067598.000	185436.700	Sand with silt; moist; tan in color
		SS-ROW008-1.0	05/07/2015	Discrete archive	0.5	1	1067598.000	185436.700	Sand with silt; moist; tan in color
ROW010W	Phase 1 OPP	SS-ROW010W-0.5	11/02/2015	Discrete	0	0.5	1067762.837	185355.490	Sand with silt; orangish brown in color; trace fine gravel; moist
		SS-ROW010W-1.0	11/02/2015	Discrete archive	0.5	1	1067762.837	185355.490	Sand with silt; orangish brown in color; trace fine gravel; moist
		SS-ROW010W-1.5	11/02/2015	Discrete	1	1.5	1067762.837	185355.490	Sand with silt; orangish brown in color; trace fine gravel; moist
ROW010E	Phase 2 OPP	SS-ROW010E-0.5	11/02/2015	Discrete archive	0	0.5	1067808.670	185355.490	Sandy silt with gravel; light brown in color; dry
		SS-ROW010E-1.0	11/02/2015	Discrete archive	0.5	1	1067808.670	185355.490	Sandy silt with gravel; light brown in color; dry
		SS-ROW010E-1.5	11/02/2015	Discrete archive	1	1.5	1067808.670	185355.490	Sandy silt with gravel; light brown in color; moist
ROW011	Phase 1 OPP	SS-ROW011-0.5	03/22/2016	Discrete	0	0.5	1067614.087	185241.539	Sandy silt; reddish brown in color
		SS-ROW011-1.0	03/22/2016	Discrete archive	0.5	1	1067614.087	185241.539	Sandy silt; reddish brown in color
		SS-ROW011-1.5	03/22/2016	Discrete	1	1.5	1067614.087	185241.539	Sandy silt; reddish brown in color
		SS-ROW011-2.0	03/22/2016	Discrete archive	1.5	2	1067614.087	185241.539	Sandy silt; reddish brown in color
ROW012	Phase 1 OPP	SS-ROW012-0.5	04/23/2015	Discrete	0	0.5	1067718.000	185235.400	Sandy silt
		SS-ROW012-1.0	04/23/2015	Discrete archive	0.5	1	1067718.000	185235.400	Sandy silt
ROW013	Phase 1 OPP	SS-ROW013-0.5	06/08/2015	Discrete	0	0.5	1067272.000	185183.500	Sand with silt; moist; tan in color
		SS-ROW013-1.0	06/08/2015	Discrete	0.5	1	1067272.000	185183.500	Sand with silt; moist; tan in color
		SBS-ROW013-2.0	9/1/2015	Discrete	1.5	2	1067272.000	185183.500	Sand with silt; moist; tan in color
ROW014	Phase 1 OPP	SS-ROW014-0.5	04/23/2015	Discrete	0	0.5	1067460.000	185197.800	Sandy silt
		SS-ROW014-1.0	04/23/2015	Discrete	0.5	1	1067460.000	185197.800	Sandy silt
		SBS-ROW014-2.0	8/26/2015	Discrete	1.5	2	1067460.000	185197.800	Sandy silt
ROW016	Phase 1 OPP	SS-ROW016-0.5	06/08/2015	Discrete	0	0.5	1067494.000	185082.500	Sand with silt; tan in color
		SS-ROW016-1.0	06/08/2015	Discrete	0.5	1	1067494.000	185082.500	Sand with silt; tan in color
		SBS-ROW016-2.0	9/1/2015	Discrete	1.5	2	1067494.000	185082.500	Sand with silt; tan in color
ROW018	Phase 1 OPP	SS-ROW018-0.5	06/08/2015	Discrete	0	0.5	1067396.000	184972.400	Sand with silt; tan in color
		SS-ROW018-1.0	06/08/2015	Discrete	0.5	1	1067396.000	184972.400	Sand with silt; tan in color
ROW019	Phase 1 OPP	SS-ROW019-0.5	06/08/2015	Discrete	0	0.5	1067596.000	185192.000	Silty sand; dry; tan in color
		SS-ROW019-1.0	06/08/2015	Discrete	0.5	1	1067596.000	185192.000	Silty sand; dry; tan in color
		SBS-ROW019-1.5	8/26/2015	Discrete	1	1.5	1067596.000	185192.000	Silty sand; dry; tan in color
		SBS-ROW019-2.0	9/1/2015	Discrete	1.5	2	1067596.000	185192.000	Silty sand; dry; tan in color
ROW022	Phase 1 OPP	SS-ROW022-0.5	06/08/2015	Discrete	0	0.5	1067679.000	184965.600	Sand with silt
		SS-ROW022-1.0	06/08/2015	Discrete	0.5	1	1067679.000	184965.600	Sand with silt
		SBS-ROW022-1.5	8/26/2015	Discrete	1	1.5	1067679.000	184965.600	Sand with silt



**Appendix E-2  
ROW Sample Description  
Former PWT Site  
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Location	Area	Sample ID	Date Collected	Sample Type	Start Depth (ft bgs)	End Depth (ft bgs)	X Coordinate	Y Coordinate	Physical Description
ROW022E	Phase 2 OPP	SS-ROW022E-0.5	11/02/2015	Discrete archive	0	0.5	1067799.122	185042.295	Sandy silt; brown in color; moist
		SS-ROW022E-0.5-DUP	11/02/2015	Discrete archive du	0	0.5	1067799.122	185042.295	Sandy silt; brown in color; moist
		SS-ROW022E-1.0	11/02/2015	Discrete archive	0.5	1	1067799.122	185042.295	Sandy silt; brown in color; moist
		SS-ROW022E-1.5	11/02/2015	Discrete archive	1	1.5	1067799.122	185042.295	Sandy silt; brown in color; moist
ROW022W	Phase 1 OPP	SS-ROW022W-0.5	11/02/2015	Discrete	0	0.5	1067758.063	185042.295	Sandy silt; brown in color; moist
		SS-ROW022W-1.0	11/02/2015	Discrete archive	0.5	1	1067758.063	185042.295	Sandy silt; brown in color; moist
		SS-ROW022W-1.5	11/02/2015	Discrete	1	1.5	1067758.063	185042.295	Sandy silt; brown in color; moist
ROW023	Phase 1 OPP	SS-ROW023-0.5	06/08/2015	Discrete	0	0.5	1067379.000	184932.200	Sand with silt
		SS-ROW023-1.0	06/08/2015	Discrete	0.5	1	1067379.000	184932.200	Sand with silt
		SBS-ROW023-1.5	9/1/2015	Discrete	1	1.5	1067379.000	184932.200	Sand with silt
		SBS-ROW023-2.0	9/1/2015	Discrete	1.5	2	1067379.000	184932.200	Sand with silt
ROW025	Phase 1 OPP	SS-ROW025-0.5	06/08/2015	Discrete	0	0.5	1067491.000	184807.200	Sandy silt
		SS-ROW025-1.0	06/08/2015	Discrete	0.5	1	1067491.000	184807.200	Sandy silt
		SBS-ROW025-1.5	8/26/2015	Discrete	1	1.5	1067491.000	184807.200	Sandy silt
ROW026	Phase 1 OPP	SS-ROW026-0.5	05/21/2015	Discrete	0	0.5	1067273.000	184766.300	Sand with silt and some gravel
		SS-ROW026-1.0	05/21/2015	Discrete	0.5	1	1067273.000	184766.300	Sand with silt and some gravel
		SBS-ROW026-1.5	8/26/2015	Discrete	1	1.5	1067273.000	184766.300	Sand with silt and some gravel
		SBS-ROW026-2.0	8/26/2015	Discrete	1.5	2	1067273.000	184766.300	Sand with silt and some gravel
ROW029B	Phase 1 OPP	SS-ROW029B-0.5	06/08/2015	Discrete	0	0.5	1067396.000	184592.200	Sandy silt
		SS-ROW029B-1.0	06/08/2015	Discrete	0.5	1	1067396.000	184592.200	Sandy silt
		SBS-ROW029B-1.5	8/26/2015	Discrete	1	1.5	1067396.000	184592.200	Sandy silt
ROW029BS	Phase 2 OPP	SS-ROW029BS-0.5	11/02/2015	Discrete	0	0.5	1067398.080	184542.903	Sandy silt; orangish brown in color; moist
		SS-ROW029BS-1.0	11/02/2015	Discrete archive	0.5	1	1067398.080	184542.903	Sandy silt; orangish brown in color; moist
		SS-ROW029BS-1.5	11/02/2015	Discrete	1	1.5	1067398.080	184542.903	Sandy silt; orangish brown in color; moist
ROW030	Phase 1 OPP	SS-ROW030-0.5	04/30/2015	Discrete	0	0.5	1067620.000	184929.400	Sandy silt
		SS-ROW030-1.0	04/30/2015	Discrete	0.5	1	1067620.000	184929.400	Sandy silt
ROW033W	Phase 1 OPP	SS-ROW033W-0.5	11/02/2015	Discrete	0	0.5	1067756.153	184823.632	Gravel with silt; dark brown; moist
		SS-ROW033W-1.0	11/02/2015	Discrete archive	0.5	1	1067756.153	184823.632	Gravel with silt; dark brown; moist
		SS-ROW033W-1.5	11/02/2015	Discrete	1	1.5	1067756.153	184823.632	Sandy silt with gravel; brown; moist
ROW036	Phase 1 OPP	SS-ROW036-0.5	04/23/2015	Discrete	0	0.5	1067539.000	184739.800	Sandy silt
		SS-ROW036-1.0	04/23/2015	Discrete	0.5	1	1067539.000	184739.800	Sandy silt
ROW038S	Phase 2 OPP	SS-ROW038S-0.5	11/02/2015	Discrete	0	0.5	1067547.038	184553.407	Sandy silt; orangish brown in color; moist
		SS-ROW038S-1.0	11/02/2015	Discrete archive	0.5	1	1067547.038	184553.407	Sandy silt; orangish brown in color; moist
		SS-ROW038S-1.5	11/02/2015	Discrete archive	1	1.5	1067547.038	184553.407	Sandy silt; orangish brown in color; moist
ROWRRW	Phase 1 OPP	SS-ROWRRW-0.5	03/22/2016	Discrete	0	0.5	1067184.628	185382.627	Sand with gravel and cobbles
		SS-ROWRRW-1.0	03/22/2016	Discrete archive	0.5	1	1067184.628	185382.627	Sand with gravel and cobbles
		SS-ROWRRW-1.5	03/22/2016	Discrete	1	1.5	1067184.628	185382.627	Sand with gravel and cobbles
ROW-P2-001	Phase 2 OPP	ROW-P2-001-0.5	4/15/2016	Discrete	0	0.5	1068053.465	185308.018	Sandy silt
ROW-P2-002	Phase 2 OPP	ROW-P2-002-0.5	4/15/2016	Discrete	0	0.5	1067916.063	185226.953	Sandy silt
		ROW-P2-002-0.5-DUP	4/15/2016	Discrete	0	0.5	1067916.063	185226.953	Sandy silt



**Appendix E-2  
ROW Sample Description  
Former PWT Site  
Ridgefield, Washington**



Location	Area	Sample ID	Date Collected	Sample Type	Start Depth (ft bgs)	End Depth (ft bgs)	X Coordinate	Y Coordinate	Physical Description
ROW-P2-003	Phase 2 OPP	ROW-P2-003-0.5	4/15/2016	Discrete	0	0.5	1067915.965	185184.581	Sandy silt
ROW-P2-004	Phase 2 OPP	ROW-P2-004-0.5	4/15/2016	Discrete	0	0.5	1068032.697	185079.508	Sandy silt
ROW-P2-005	Phase 2 OPP	ROW-P2-005-0.5	4/15/2016	Discrete	0	0.5	1068028.465	184858.018	Sandy silt
ROW-P2-006	Phase 2 OPP	ROW-P2-006-0.5	4/15/2016	Discrete	0	0.5	1067861.277	184601.768	Sandy silt
ROW-P2-007	Phase 2 OPP	ROW-P2-007-0.5	4/15/2016	Discrete	0	0.5	1068183.152	185223.643	Sandy silt
ROW-P2-008	Phase 2 OPP	ROW-P2-008-0.5	4/15/2016	Discrete	0	0.5	1068181.589	185184.581	Sandy silt
ROW-P2-009	Phase 2 OPP	ROW-P2-009-0.5	4/15/2016	Discrete	0	0.5	1068330.027	185215.831	Sandy silt
ROW-P2-010	Phase 2 OPP	ROW-P2-010-0.5	4/15/2016	Discrete	0	0.5	1068305.027	184881.456	Sandy silt
ROW-P2-011A	Phase 2 OPP	ROW-P2-011A-0.5	4/15/2016	Discrete	0	0.5	1068078.657	184934.716	Sandy silt
ROW-P2-011B	Phase 2 OPP	ROW-P2-011B-0.5	4/15/2016	Discrete	0	0.5	1068069.090	184659.581	Sandy silt
ROW-P2-012	Phase 2 OPP	ROW-P2-012-0.5	4/15/2016	Discrete	0	0.5	1068151.902	184593.956	Sandy silt
ROW-P2-013	Phase 2 OPP	ROW-P2-013-0.5	4/15/2016	Discrete	0	0.5	1068300.458	184598.868	Sandy silt
ROW-P2-014	Phase 2 OPP	ROW-P2-014-0.5	4/15/2016	Discrete	0	0.5	1068240.965	184544.737	Sandy silt
ROW-P2-015	Phase 2 OPP	ROW-P2-015-0.5	4/15/2016	Discrete	0	0.5	1067951.902	184556.456	Sandy silt
ROW-P2-016	Phase 2 OPP	ROW-P2-016-0.5	4/15/2016	Discrete	0	0.5	1068023.777	184432.237	Sandy silt
ROW-P2-017	Phase 2 OPP	ROW-P2-017-0.5	4/15/2016	Discrete	0	0.5	1068062.840	184435.362	Sandy silt
ROW-P2-018	Phase 2 OPP	ROW-P2-018-0.5	4/20/2016	Discrete	0	0.5	1068298.777	184432.237	Sandy silt
ROW-P2-019	Phase 2 OPP	ROW-P2-019-0.5	4/20/2016	Discrete	0	0.5	1068167.527	184325.987	Sandy silt
ROW-P2-020	Phase 2 OPP	ROW-P2-020-0.5	4/20/2016	Discrete	0	0.5	1068578.465	185204.893	Sandy silt
ROW-P2-021	Phase 2 OPP	ROW-P2-021-0.5	4/20/2016	Discrete	0	0.5	1068348.777	185158.018	Sandy silt
ROW-P2-022	Phase 2 OPP	ROW-P2-022-0.5	4/20/2016	Discrete	0	0.5	1068584.715	185156.456	Sandy silt
ROW-P2-033	Phase 2 OPP	ROW-P2-033-0.5	4/20/2016	Discrete	0	0.5	1068065.965	184227.550	Sandy silt
ROW-P2-034	Phase 2 OPP	ROW-P2-034-0.5	4/20/2016	Discrete	0	0.5	1067964.402	184285.362	Sandy silt
ROW078N	Phase 3 OPP	ROW-078N	11/22/2017	Discrete	0	0.5	1067302.184	185731.802	Sandy silt
ROW078NE	Phase 3 OPP	ROW-078NE	11/22/2017	Discrete	0	0.5	1067402.408	185731.802	Sandy silt
ROW078NW	Phase 3 OPP	ROW-078NW	11/22/2017	Discrete	0	0.5	1067243.872	185846.604	Sandy silt
<b>Notes</b> Coordinates are in Washington State Plane South NAD 83. bgs = below ground surface. ft = feet. OPP = off-property portion. PWT = Pacific Wood Treating Co. ROW = right-of-way.									



# APPENDIX F

DATA QUALITY MEMORANDA AND LABORATORY  
REPORTS





# DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9003.01.39 | JANUARY 22, 2016 | PORT OF RIDGEFIELD –  
REMEDIAL INVESTIGATION PHASE I

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of analytical results for the Port of Ridgefield Off-Property Remedial Investigation. The samples were collected during multiple sampling events conducted in 2015 and 2016.

Maxxam and Apex Laboratories (Apex) performed the analyses. Maxxam report numbers B546521, B576705, B583474, B585895, B5C4634, B5F3520, B5A5395, B5A4222, B5B1038, B594651, B592755, B5B3319, B5D4823, B5C7784, B5B5514, B5I1779, B5K5043, B5M6002, B5J7321, B5P4765, B5P4731, B5P4754, B501368, and B577816 were reviewed as well as Apex report numbers A5D0781, A5G0852, A5D0549, A5I0106, A5K0059, A5I0609, A5D0913, A5D0913 Amended, A5D0784 Amended, A5E0713, A5E0255, A5F0658, A5F0015, A5F0363, A5K0831, A5L0163, and A5D0784. Incremental sampling methodology (ISM) samples were processed by Apex. Maxxam conducted the dibenzo-p-dioxins and dibenzofurans (dioxins/furans) analysis and Apex performed total organic carbon (TOC) analyses. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Dioxins/Furans	USEPA Method 1613B modified
2,3,7,8- TCDF Confirmation*	USEPA Method 8290A modified
TOC	PSEP/SM 5310B

PSEP = Puget Sound Estuary Protocols.

SM = Standard Methods for the Examination of Water and Wastewater.

USEPA = U.S. Environmental Protection Agency.

\*Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B columns; therefore, any detections are confirmed and quantified using USEPA Method 8290A.

Report	Sample ID
B546521	RNSATE-SA
B576705/A5D0549	ISM-AOI007-0.5
B576705/A5D0549	ISM-AOI011-0.5
B576705/A5D0549	ISM-AOI031-0.5
B576705/A5D0549	ISM-AOI018-0.5-B-A
B576705/A5D0549	ISM-AOI018-0.5-B-B
B576705/A5D0549	ISM-AOI018-0.5-B-C
B576705/A5D0549	ISM-AOI006-0.5
B576705/A5D0549	ISM-AOI013-0.5-F
B576705/A5D0549	ISM-AOI018-0.5-F
B576705/A5D0549	ISM-AOI005-0.5
B576705/A5D0549	ISM-AOI013-0.5-B
B576705/A5D0549	SBS-AOI018-1.0
B576705/A5D0549	SBS-AOI006-1.0
B576705/A5D0549	SBS-AOI005-1.0-Dup
B576705/A5D0549	SBS-AOI005-1.0



Report	Sample ID
B577816/A5D0784	SS-ROW036-0.5
B577816/A5D0784	SBS-AOI032-1.0
B577816/A5D0784	SS-ROW012-0.5
B577816/A5D0784	SS-ROW014-0.5
B577816/A5D0784	SBS-AOI017-1.0
B583474/A5D0781	ISM-AOI017-0.5-A
B583474/A5D0781	ISM-AOI017-0.5-B
B583474/A5D0781	ISM-AOI017-0.5-C
B583474/A5D0781	ISM-AOI012-0.5
B583474/A5D0781	ISM-AOI029B-0.5
B583474/A5D0781	ISM-AOI014-0.5
B583474/A5D0781	ISM-AOI036-0.5
B583474/A5D0781	ISM-AOI032-0.5
B583474/A5D0781	ISM-AOI015-0.5
B585895/A5D0913	ISM-AOI020B-0.5
B585895/A5D0913	ISM-AOI021-0.5
B585895/A5D0913	ISM-AOI030-0.5
B585895/A5D0913	ISM-AOI024-0.5
B585895/A5D0913	ISM-AOI025-0.5
B585895/A5D0913	ISM-AOI027-0.5
B585895/A5D0913	ISM-AOI029A-0.5
B585895/A5D0913	SS-ROW030-0.5
B585895/A5D0913	SS-AOI020B-1.0
B592755/A5E0255	SS-ROW004-0.5
B592755/A5E0255	SS-ROW008-0.5
B592755/A5E0255	ISM-AOI016-0.5
A5D0913 Amended	SS-ROW030-1.0
B5B1038	SS-ROW030-1.0
B5A4222/A5E0713	ISM-AOI008-0.5
B5A4222/A5E0713	ISM-AOI030-0.5
B5A4222/A5E0713	SS-ROW026-0.5
B5B3319/A5F0015	ISM-AOI038-0.5
B5B3319/A5F0015	ISM-AOI039-0.5
B5B5514/A5F0363	SS-ROW013-0.5
B5B5514/A5F0363	SS-ROW005-0.5
B5B5514/A5F0363	SS-ROW019-0.5
B5B5514/A5F0363	SS-ROW022-0.5
B5B5514/A5F0363	SS-ROW016-0.5
B5B5514/A5F0363	SS-ROW025-0.5
B5B5514/A5F0363	SS-ROW029B-0.5
B5B5514/A5F0363	SS-ROW023-0.5
B5B5514/A5F0363	SS-ROW018-0.5
B5D4823/A5F0363	SBS-ROW013-1.0
B5D4823/A5F0363	SBS-ROW005-1.0
B5D4823/A5F0363	SBS-ROW022-1.0
B5D4823/A5F0363	SBS-ROW016-1.0
B5D4823/A5F0363	SBS-ROW025-1.0
B5D4823/A5F0363	SBS-ROW029B-1.0
B5D4823/A5F0363	SBS-ROW029B-1.0
B5D4823/A5F0363	SBS-ROW023-1.0
B5D4823/A5F0363	SBS-ROW018-1.0
B594651	SS-ROW036-1.0
B594651	SS-ROW014-1.0
A5D0784 Amended	SS-ROW036-1.0
A5D0784 Amended	SS-ROW014-1.0



Report	Sample ID
A5F0658/B5C4634	ISM-AOI019-0.5
B5C7784/A5E0713	SBS-ROW026-1.0
B5F3520/A5G0852	Comp-AOI4-0.5
B5I1779/A5I0106	SBS-ROW005-2.0
B5I1779/A5I0106	SBS-ROW013-2.0
B5I1779/A5I0106	SBS-ROW014-2.0
B5I1779/A5I0106	SBS-ROW016-2.0
B5I1779/A5I0106	SBS-ROW019-1.5
B5I1779/A5I0106	SBS-ROW022-1.5
B5I1779/A5I0106	SBS-ROW023-2.0
B5I1779/A5I0106	SBS-ROW025-1.5
B5I1779/A5I0106	SBS-ROW026-1.5
B5I1779/A5I0106	SBS-ROW029B-1.5
B5J7321/A5I0609	ISM-AOI026-0.5
B5K5043	SBS-ROW026-2.0
B5K5043	SBS-ROW019-2.0
B5K5043	SBS-ROW023-1.5
B5M6002/A5K0059	SS-ROW038S-0.5
B5M6002/A5K0059	SS-ROW029BS-0.5
B5M6002/A5K0059	SS-ROW010W-0.5
B5M6002/A5K0059	SS-ROW022W-0.5
B5M6002/A5K0059	SS-ROW033W-0.5
A5L0163/B5P4765	ISM-AOI034-0.5
A5L0163/B5P4765	ISM-AOI028B-0.5
A5L0163/B5P4765	ISM-AOI028A-0.5
A5L0163/B5P4765	ISM-AOI022-0.5
A5L0163/B5P4765	ISM-AOI010-0.5
A5K0831/B5P7454	ISM-AOI037-0.5
A5K0831/B5P7454	ISM-AOI009-0.5
A5K0831/B5P7454	ISM-AOI002-0.5
A5K0831/B5P7454	COMP-AOI001-0.5
B501368	RINSATE-SA-3
B5P4731	SBS-ROW029BS-1.5
B5P4731	SBS-ROW010W-1.5
B5P4731	SS-ROW010E-0.5
B5P4731	SBS-ROW022W-1.5
B5P4731	SS-ROW022E-0.5
B5P4731	SS-ROW022E-0.5-DUP
B5P4731	SS-ROW033W-1.5

## DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2010, 2011) and appropriate laboratory and method-specific guidelines (Apex 2015; Maxxam, 2015; USEPA, 1986).

USEPA Method 1613B and 8290A detections between the method reporting limit (MRL) and the estimated detection limit (EDL) were qualified as estimates (J) by the reviewer.

Selected USEPA Method 1613B results were slightly outside required retention times used for positive analyte identification. Results that exceeded retention times were qualified by the laboratory as not detected at or above the EDL, with an elevated detection limit assigned.



Selected USEPA Method 1613B results flagged by the laboratory were assigned a “U” (non-detect) qualifier because of diphenylether interference. The qualifications resulted in an elevated EDL.

Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B columns; therefore, any detections are confirmed and quantified using USEPA Method 8290A. Selected 2,3,7,8-TCDF confirmation results were subject to diphenylether interference and the laboratory indicated that the results are “non-detect” with an elevated detection limit. The associated 1613B 2,3,7,8-TCDF result was also qualified “U” as non-detect in these cases.

USEPA Method 1613B detected results that were below the MRL and reported as an estimated maximum potential concentration (EMPC) were assigned a “U” (non-detect) qualifier by the laboratory at the reported EMPC value. The qualifications resulted in elevated EDLs. Results above the MRL reported by the laboratory as EMPCs were assigned a “U” qualifier by reviewer (non-detect) at the EMPC value as listed below:

Report	Sample	Reason	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
B576705	ISM-AOI031-0.5	EMPC	1,2,3,7,8,9-Hexa CDD	11.8	11.8 U
B576705	ISM-AOI031-0.5	EMPC	1,2,3,4,7,8-Hexa CDF	6.15	6.15 U
B576705	ISM-AOI018-0.5-B-C	EMPC	1,2,3,7,8,9-Hexa CDD	13.0	13.0 U
B576705	ISM-AOI018-0.5-B-C	EMPC	1,2,3,4,7,8-Hexa CDF	6.73	6.73 U
B576705	ISM-AOI018-0.5-B-B	EMPC	1,2,3,7,8,9-Hexa CDD	14.8	14.8 U
B576705	ISM-AOI018-0.5-B-B	EMPC	1,2,3,4,7,8-Hexa CDF	7.66	7.66 U
B576705	SBS-AOI018-1.0	EMPC	1,2,3,7,8,9-Hexa CDD	2.03	2.03 U
B576705	SBS-AOI018-1.0	EMPC	1,2,3,4,7,8-Hexa CDF	1.16	1.16 U
B5D4823	SBS-ROW016-1.0	EMPC	1,2,3,7,8-Penta CDD	4.90	4.90 U
B5D4823	SBS-ROW005-1.0	EMPC	2,3,7,8-Tetra CDF (Confirmation)	1.60	1.60 U

pg/g = picograms per gram.



In report B5P4754, the USEPA Method 1613B Octa CDD result for COMP-AOI001-0.5 was reported at above the reporting limit at 2,130 pg/g. The result was qualified “J” as estimated as follows:

Report	Sample	Reason	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
B5P4754	COMP-AOI001-0.5	Result exceeds calibration range	Octa CDD	2130	2130 J

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

## HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

### Holding Times

Extractions and analyses were performed within the recommended holding time criteria. Archived samples were frozen at -18 degrees Celsius in order to extend holding times.

### Preservation and Sample Storage

The samples were preserved and stored appropriately.

## BLANKS

### Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. Where an analyte was detected in a sample and in the associated method blank, the sample result was qualified if the sample concentration was less than five times the method blank concentration. MRLs/EDLs were elevated to the concentration detected in the samples, qualified “U,” and assigned as the sample result. The following results were qualified:

Sample ID	Analyte	Blank Result (pg/g)	Original Result (pg/g)	Qualified Result (pg/g)
SS-ROW008-0.5	1,2,3,7,8,9-Hexa CDF	0.0980	0.184 J	0.184 UJ
SS-ROW004-0.5	1,2,3,7,8,9-Hexa CDF	0.0980	0.143	0.143 U
ISM-AOI039-0.5	1,2,3,7,8,9-Hexa CDF	0.152	0.231	0.231 U
ISM-AOI038-0.5	1,2,3,7,8,9-Hexa CDF	0.152	0.283	0.283 U
SS-ROW036-1.0	1,2,3,7,8,9-Hexa CDF	0.0991	0.0983 J	0.0983 UJ

### Trip Blanks

Trip blanks were not required for this sampling event.

## Equipment Rinsate Blanks

Three equipment rinsate blanks (RINSATE-SA, RINSATE-SA-2, and RINSATE-SA-3) were collected during the sampling events. All rinsate blank results were non-detect; therefore, no sample results were qualified.

## LABELED ANALOG STANDARD RECOVERY RESULTS

All USEPA Method 1613B and 8290A samples were spiked with C13 labeled analog standards (surrogates) to evaluate and document data quality.

The laboratory appropriately documented and qualified surrogate outliers. Associated batch quality assurance and quality control for samples with surrogate outliers were within acceptance limits. Results were not qualified based on minor outliers. All remaining surrogate recoveries were within acceptance limits.

## MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. MS/MSD samples were extracted and analyzed as sample volume allowed. Minor MS/MSD recovery exceedances were not qualified by the reviewer when the relative percent differences (RPDs) met acceptance criteria and other batch quality control met acceptance criteria.

All recoveries were within acceptance limits for percent recovery and RPDs.

## LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency.

Maxxam noted various duplicate results that marginally exceeded RPD acceptance limits due to sample heterogeneity or other factors. No actions were taken by the reviewer, as all associated samples exhibited labeled analogue results within acceptance criteria.

Some TOC duplicate RPDs slightly exceeded acceptance criteria. No qualifications were made.

All other RPDs were within acceptance limits.

## LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) (sometimes called a spiked blank) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

Maxxam noted LCS percent recoveries slightly outside acceptance criteria. No actions were taken by the reviewer, as all associated samples exhibited labeled analogue recoveries within acceptance criteria, therefore demonstrating precision and accuracy on a sample-specific basis.



All other LCS/LCSD analytes were within acceptance limits for percent recovery.

## FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. Multiple field duplicate pairs were submitted for analysis (SBS-AOI005-1.0/SBS-AOI005-1.0-Dup, ISM-AOI030-0.5/ISM-AOI030-0.5-Dup, and SS-ROW022E-0.5/SS-ROW022E-0.5-Dup). MFA uses acceptance criteria of 100 percent RPD for results that are less than five times the MRL, or 50 percent RPD for results that are greater than five times the MRL. Non-detect data are not used in the evaluation of field duplicate results. All analytes were within the acceptance criteria.

## ISM REPLICATE EVALUATION

Triplicate composite samples were collected and submitted to Maxxam. There were multiple ISM replicate sets, including samples ISM-AOI018-0.5-B-A, ISM-AOI018-0.5-B-B, and ISM-AOI018-0.5-B-C, as well as samples ISM-AOI017-0.5-A, ISM-AOI017-0.5-B, and ISM-AOI017-0.5-C. All ISM replicate samples sets were submitted for dioxin/furan and TOC analysis. The relative standard deviations (RSDs) of the replicate sets of dioxin/furan congener results were calculated.

RSDs range from 3.49 percent to 39.46 percent for dioxin/furan congeners, and the calculated mammal toxicity equivalency quotient RSD ranged from 7 to 20 percent. Associated results were qualified as estimated (J) if the RSD exceeded 35 percent. ISM replicate results were qualified as estimates when a RSD exceeded 35 percent. A summary of exceedances and qualifications is shown below:

Sample ID	Analyte	Percent RSD	Original Result (pg/g)	Qualified Result (pg/g)
ISM-AOI018-0.5-B-A	2,3,7,8-TCDF	39.46	1.78	1.78 J
ISM-AOI018-0.5-B-B	2,3,7,8-TCDF	39.46	2.28	2.28 J
ISM-AOI018-0.5-B-C	2,3,7,8-TCDF	39.46	0.969	0.969 J

## REPORTING LIMITS

Maxxam and Apex used routine MRLs and EDLs for non-detect results. MRLs and EDLs were adjusted for samples requiring dilutions because of high analyte concentrations, matrix interferences, or ratio criteria exceedances (resulting in EMPCs).

## DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies. None was found.

## REFERENCES

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- Apex. 2014. Quality systems manual. Apex Laboratories, LLC, Tigard, Oregon. March 1.
- Maxxam. 2015. QA/QC Interpretation Guide. Maxxam Analytics. Mississauga, Ontario.
- USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846 Update V. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 1, July 2014).
- USEPA. 2010. USEPA contract laboratory program national functional guidelines for inorganic superfund data review. EPA 540/R-10/011. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.
- USEPA. 2011. USEPA contract laboratory program national functional guidelines for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) data review. EPA-540-R-11-016. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. September.



# DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9003.01.39 | MARCH 18, 2016 | PORT OF RIDGEFIELD –  
REMEDIAL INVESTIGATION PHASE I

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of additional analytical results for the Port of Ridgefield Off-Property Remedial Investigation. The samples were collected during multiple sampling events conducted in 2015 and 2016.

Maxxam and Apex Laboratories (Apex) performed the analyses. Maxxam report numbers B603252 and B632779 were reviewed as well as Apex report numbers A5L0948 and A6B0380. Incremental sampling methodology (ISM) samples were processed by Apex. Maxxam conducted the dibenzo-p-dioxins and dibenzofurans (dioxins/furans) analysis and Apex performed total organic carbon (TOC) analyses. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Dioxins/Furans	USEPA Method 1613B modified
2,3,7,8- TCDF Confirmation*	USEPA Method 8290A modified
TOC	PSEP/SM 5310B

PSEP = Puget Sound Estuary Protocols.

SM = Standard Methods for the Examination of Water and Wastewater.

USEPA = U.S. Environmental Protection Agency.

\*Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B columns; therefore, any detections are confirmed and quantified using USEPA Method 8290A.

Report	Sample ID
A5L0948/B603252	ISM-AOI035-0.5
A6B0380/B632779	ISM-AOI003-0.5

## DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2010, 2011) and appropriate laboratory and method-specific guidelines (Apex 2015; Maxxam, 2015; USEPA, 1986).

USEPA Method 1613B and 8290A detections between the method reporting limit (MRL) and the estimated detection limit (EDL) were qualified as estimates (J) by the reviewer.

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

## HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

### Holding Times

Extractions and analyses were performed within the recommended holding time criteria. Archived samples were frozen at -18 degrees Celsius in order to extend holding times.

### Preservation and Sample Storage

The samples were preserved and stored appropriately.

## BLANKS

### Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. All method blanks met acceptance criteria.

### Trip Blanks

Trip blanks were not required for this sampling event.

## LABELED ANALOG STANDARD RECOVERY RESULTS

All USEPA Method 1613B and 8290A samples were spiked with C13 labeled analog standards (surrogates) to evaluate and document data quality.

The laboratory appropriately documented and qualified surrogate outliers. All surrogate recoveries were within acceptance limits.

## LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency.

All RPDs were within acceptance limits.

## LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) (sometimes called a spiked blank) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

All LCS/LCSD analytes were within acceptance limits for percent recovery.

## REPORTING LIMITS

Maxxam and Apex used routine MRLs and EDLs for non-detect results. MRLs and EDLs were adjusted for samples requiring dilutions because of high analyte concentrations, matrix interferences, or ratio criteria exceedances (resulting in EMPCs).



## DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies. None was found.

## REFERENCES

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- Apex. 2014. Quality systems manual. Apex Laboratories, LLC, Tigard, Oregon. March 1.
- Maxxam. 2015. QA/QC Interpretation Guide. Maxxam Analytics. Mississauga, Ontario.
- USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846 Update V. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 1, July 2014).
- USEPA. 2010. USEPA contract laboratory program national functional guidelines for inorganic superfund data review. EPA 540/R-10/011. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.
- USEPA. 2011. USEPA contract laboratory program national functional guidelines for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) data review. EPA-540-R-11-016. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. September.



# DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9003.01.39 | JULY 18, 2016 | PORT OF RIDGEFIELD –  
REMEDIAL INVESTIGATION PHASE I

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of analytical results for the Port of Ridgefield Off-Property Remedial Investigation. One sample was collected for incremental sampling methodology (ISM) laboratory processing. The sample was comprised of increments composited using ISM procedures by the laboratory, as described in the Oregon Department of Environmental Quality–approved incremental sampling plan (MFA, 2012). The sample was collected on June 15, 2016.

Maxxam and Apex Laboratories (Apex) performed the analyses. Maxxam report number B6C8672V1 was reviewed as well as Apex report number A6F0523. Incremental sampling methodology (ISM) samples were processed by Apex. Maxxam conducted the dibenzo-p-dioxins and dibenzofurans (dioxins/furans) analysis and Apex performed total organic carbon (TOC) analyses. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Dioxins/Furans	USEPA Method 1613B modified
2,3,7,8- TCDF Confirmation*	USEPA Method 8290A modified
TOC	PSEP/SM 5310B modified

PSEP = Puget Sound Estuary Protocols.

SM = Standard Methods for the Examination of Water and Wastewater.

USEPA = U.S. Environmental Protection Agency.

\*Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B columns; therefore, any detections are confirmed and quantified using USEPA Method 8290A.

Report	Sample ID
A6F0523/B6C8672V1	ISM-AOI023-0.5-After Processing

## DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2010, 2011) and appropriate laboratory and method-specific guidelines (Apex 2014; Maxxam, 2015; USEPA, 1986).

USEPA Method 1613B and 8290A detections between the method reporting limit (MRL) and the estimated detection limit (EDL) were qualified as estimates (J) by the reviewer.

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

## HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

### Holding Times

Extractions and analyses were performed within the recommended holding time criteria.

### Preservation and Sample Storage

The samples were preserved and stored appropriately.

## BLANKS

### Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. All method blanks met acceptance criteria.

The USEPA Method 1613B method blank had a detection of Octa CDF between the EDL and the MRL, at 0.116 pg/g. The associated sample result was greater than five times the method blank concentration; thus, no results were qualified.

### Trip Blanks

Trip blanks were not required for this sampling event.

## LABELED ANALOG STANDARD RECOVERY RESULTS

All USEPA Method 1613B and 8290A samples were spiked with C13 labeled analog standards (surrogates) to evaluate and document data quality.

All surrogate recoveries were within acceptance limits.

## LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency.

All RPDs were within acceptance limits.

## LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) (sometimes called a spiked blank) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

All LCS/LCSD analytes were within acceptance limits for percent recovery.

## REPORTING LIMITS

Maxxam and Apex used routine MRLs and EDLs for non-detect results.



## DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies. None was found.

## REFERENCES

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- Apex. 2014. Quality systems manual. Apex Laboratories, LLC, Tigard, Oregon. March 1
- Maxxam. 2015. QA/QC Interpretation Guide. Maxxam Analytics. Mississauga, Ontario.
- USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846 Update V. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 1, July 2014).
- USEPA. 2010. USEPA contract laboratory program national functional guidelines for inorganic superfund data review. EPA 540/R-10/011. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.
- USEPA. 2011. USEPA contract laboratory program national functional guidelines for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) data review. EPA-540-R-11-016. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. September.



# DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9003.01.39 | JUNE 21, 2016 | PORT OF RIDGEFIELD

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of additional analytical results for the Port of Ridgefield Off-Property Remedial Investigation. The samples were collected in 2016.

Maxxam and Apex Laboratories (Apex) performed the analyses. Maxxam report numbers B659963 and B661539 were reviewed as well as Apex report numbers A6C0884 and A6C0990. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Dioxins/Furans	USEPA Method 1613B modified
2,3,7,8- TCDF Confirmation*	USEPA Method 8290A modified
TOC	PSEP/SM 5310B

PSEP = Puget Sound Estuary Protocols.

SM = Standard Methods for the Examination of Water and Wastewater.

USEPA = U.S. Environmental Protection Agency.

\*Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B columns; therefore, any detections are confirmed and quantified using USEPA Method 8290A.

Report	Sample ID
A6C0884/B659963	SBS-ROWRRW-0.5
A6C0884/B659963	SBS-ROWRRW-1.5
A6C0884/B659963	SBS-AOI002-1.5
A6C0884/B659963	SS-ROW011-0.5
A6C0884/B659963	SBS-ROW011-1.5
A6C0884/B659963	SBS-AOI037-1.5
A6C0884/B659963	SBS-AOI028B-1.5
A6C0990/B661539	SBS-AOI019-1.5

## DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2010, 2011) and appropriate laboratory and method-specific guidelines (Apex 2015; Maxxam, 2015; USEPA, 1986).

USEPA Method 1613B and 8290A detections between the method reporting limit (MRL) and the estimated detection limit (EDL) were qualified as estimates (J) by the reviewer.

The laboratory noted selected USEPA Method 1613B results that did not meet ratio criteria as being estimated maximum potential concentrations (EMPC). These results were qualified

by the laboratory as not detected at or above the EDL, with an elevated detection limit assigned.

Selected USEPA Method 1613B results were slightly outside required retention times used for positive analyte identification. Results that exceeded retention times were qualified by the laboratory as not detected at or above the EDL, with an elevated detection limit assigned.

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

## HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

### Holding Times

Extractions and analyses were performed within the recommended holding time criteria. Archived samples were frozen at -18 degrees Celsius in order to extend holding times.

### Preservation and Sample Storage

The samples were preserved and stored appropriately.

## BLANKS

### Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. Where an analyte was detected in a sample and in the associated method blank, the sample result was qualified if the sample concentration was less than five times the method blank concentration. MRLs/EDLs were elevated to the concentration detected in the samples, qualified "U," and assigned as the sample result. The following results were qualified based on detections in the method blank above the EDL:

Report	Sample ID	Analyte	Blank Result (pg/g)	Original Result (pg/g)	Qualified Result (pg/g)
B659963	SS-ROWRRW-0.5	1,2,3,7,8,9-HxCDF	0.193	0.447 J	0.447 UJ
	SS-ROWRRW-1.5	1,2,3,7,8,9-HxCDF	0.193	0.386 J	0.386 UJ
		1,2,3,7,8-PeCDD	0.152	0.658 J	0.658 UJ
		1,2,3,7,8-PeCDF	0.196	0.642 J	0.642 UJ
		2,3,4,7,8-PeCDF	0.185	0.818 J	0.818 UJ
	SBS-AOI002-1.5	1,2,3,7,8,9-HxCDF	0.199	0.146 J	0.146 UJ
		1,2,3,7,8-PeCDF	0.196	0.621 J	0.621 UJ
		2,3,4,7,8-PeCDF	0.185	0.774	0.774 UJ
	SS-ROW011-0.5	1,2,3,7,8,9-HxCDF	0.193	0.658 J	0.658 UJ
	SBS-AOI037-1.5	1,2,3,4,7,8,9-HpCDF	0.185	0.311 J	0.311 UJ
		1,2,3,4,7,8-HxCDD	0.201	0.364 J	0.364 UJ
		1,2,3,4,7,8-HxCDF	0.189	0.528 J	0.528 UJ
		1,2,3,6,7,8-HxCDD	0.197	0.963 J	0.963 UJ
		1,2,3,7,8,9-HxCDD	0.199	0.906 J	0.906 UJ



Report	Sample ID	Analyte	Blank Result (pg/g)	Original Result (pg/g)	Qualified Result (pg/g)
		1,2,3,7,8,9-HxCDF	0.193	0.165 J	0.165 UJ
		1,2,3,7,8-PeCDD	0.152	0.245 J	0.245 UJ
		1,2,3,7,8-PeCDF	0.196	0.216 J	0.216 UJ
		2,3,4,6,7,8-HxCDF	0.182	0.236 J	0.236 UJ
		2,3,4,7,8-PeCDF	0.185	0.225 J	0.225 UJ
		Total PeCDDs	0.152	0.35 J	0.35 UJ
	SBS-AOI028B-1.5	1,2,3,7,8,9-HxCDF	0.193	0.339 J	0.339 UJ

### Equipment Rinsate Blanks

An equipment rinsate blank was submitted for analysis by USEPA Method 1613B. The equipment rinsate blank was non-detect for all target analytes.

### Trip Blanks

Trip blanks were not required for this sampling event.

### LABELED ANALOG STANDARD RECOVERY RESULTS

All USEPA Method 1613B and 8290A samples were spiked with C13 labeled analog standards (surrogates) to evaluate and document data quality.

The laboratory appropriately documented and qualified surrogate outliers. All surrogate recoveries were within acceptance limits.

### MATRIX SPIKE RESULTS

MS results are used to evaluate laboratory precision and accuracy. All MS samples were extracted and analyzed at the required frequency. The laboratory noted some MS results that exceeded acceptance criteria due to matrix effects.

The OCDD MS result prepared with sample SBS-AOI002-1.5 exceeds the upper percent recovery limit. The associated OCDD sample result from the parent sample was qualified J as estimated.

All other associated quality control results met acceptance criteria, including sample and analyte specific-labeled analog standards.

### LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency.

A duplicate sample associated with report A6C0884 and A6C0990 analyzed for total organic carbon slightly exceeded the relative percent difference acceptance criteria at 23%. No actions were taken by the reviewer as the exceedance was minor and all other batch quality control met acceptance limits.

All remaining RPDs were within acceptance limits.

## LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) (sometimes called a spiked blank) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

All LCS/LCSD analytes were within acceptance limits for percent recovery.

## FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. A field duplicate was not submitted for analysis.

## REPORTING LIMITS

Maxxam and Apex used routine MRLs and EDLs for non-detect results. MRLs and EDLs were adjusted for samples requiring dilutions because of high analyte concentrations, matrix interferences, or ratio criteria exceedances (resulting in EMPCs).

## DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies. The laboratory reported samples IDs beginning with AOI as beginning with AO1. A revised report was obtained from the laboratory with update sample IDs. Results have been reported with the proper sample name in analytical results tables.

No other anomalies were found.



## REFERENCES

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- Apex. 2014. Quality systems manual. Apex Laboratories, LLC, Tigard, Oregon. March 1.
- Maxxam. 2015. QA/QC Interpretation Guide. Maxxam Analytics. Mississauga, Ontario.
- USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846 Update V. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 1, July 2014).
- USEPA. 2010. USEPA contract laboratory program national functional guidelines for inorganic superfund data review. EPA 540/R-10/011. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.
- USEPA. 2011. USEPA contract laboratory program national functional guidelines for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) data review. EPA-540-R-11-016. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. September.

# DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9003.01.39 | JUNE 23, 2017 | PORT OF RIDGEFIELD –  
REMEDIAL INVESTIGATION PHASE II

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of analytical results for the Port of Ridgefield Off-Property Remedial Investigation. The soil samples were collected in April and May, 2016; and in March, May, June, July, and August 2017.

Maxxam, Cape Fear Analytical, LLC (CFA), Ceres Analytical Laboratory, Inc. (CAL), and Apex Laboratories (Apex) performed the analyses. The following reports were reviewed: Maxxam reports B681136V1, B683145V1, B6A8212V1, B6H7368V1, B6H4471V1, and B6A8214V2; Apex reports A6D0673, A6D0774, A6H0510, A7C0432, A7E0757, A7F0429, A7G0292, A7H0225, and A7H0584; CAL report 11527; and CFA reports WO10575, WO10849, WO10955, WO11203, and WO11257. Incremental sampling methodology (ISM) samples were processed by Apex. Maxxam, CAL, and CFA conducted the dibenzo-p-dioxins and dibenzofurans (dioxins/furans) analysis and Apex performed the total organic carbon (TOC) analysis. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Dioxins/Furans	USEPA Method 1613B modified
2,3,7,8- TCDF Confirmation*	USEPA Method 8290A modified
Total Organic Carbon (TOC)	PSEP/SM 5310B modified

PSEP = Puget Sound Estuary Protocols.

SM = Standard Methods for the Examination of Water and Wastewater.

USEPA = U.S. Environmental Protection Agency.

\*Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B columns; therefore, any detections above the reporting limit are confirmed and quantified using a secondary column or method.

Report	Sample ID
A6D0673/B681136V1/ B6A8214V2R/B6C5685V1	Row-P2-006-0.5
	Row-P2-003-0.5
	Row-P2-002-0.5
	Row-P2-002-0.5-DUP
	Row-P2-001-0.5
	Row-P2-005-0.5
	Row-P2-004-0.5
	Row-P2-007-0.5
	Row-P2-008-0.5
	Row-P2-009-0.5
	Row-P2-010-0.5
	Row-P2-001-0.5
	Row-P2-011A
	Row-P2-011B
	Row-P2-012
Row-P2-013	



Report	Sample ID
	Row-P2-014
	Row-P2-015
	Row-P2-016
	Row-P2-017
A6D0774/B683145V1	Row-P2-EB
A6D0774/B6A8212V1/ B6C5686V1/B6H7368V1	Row-P2-018-0.5
	Row-P2-019-0.5
	Row-P2-020-0.5
	Row-P2-021-0.5
	Row-P2-022-0.5
	Row-P2-033-0.5
A6E0248/B6A1069/B6C489 4V1	Row-P2-034-0.5
	SS-ROW001-0.5
	ISM-AOI041A-0.5
A7C0432/WO10575	ISM-AOI041B-0.5
	ISM-AOI056-0.5
	ISM-AOI061-0.5
	ISM-AOI043-0.5
	ISM-AOI049-0.5
	ISM-AOI064-0.5
	ISM-AOI054-0.5
	ISM-AOI044-0.5
	ISM-AOI051-0.5
	ISM-AOI077-0.5
	ISM-AOI072-0.5
	ISM-AOI066-0.5-1
	ISM-AOI066-0.5-2
	ISM-AOI066-0.5-3
	ISM-AOI076-0.5
	ISM-AOI052-0.5
ISM-AOI067-0.5	
A6H0510/B6H4471V1	ROW-002N
A7E0757/WO10849	RB
	ISM-AOI073-0.5
	ISM-AOI075-0.5
	ISM-AOI068-0.5
A7F0429/WO10955	ISM-AOI062-0.5
	ISM-AOI071-0.5
	ISM-AOI046-0.5
	ISM-AOI057-0.5
	ISM-AOI063-0.5-1
	ISM-AOI063-0.5-2
ISM-AOI063-0.5-3	
A7G0292/11527	ISM-AOI004-0.5
A7H0225/WO11203	ISM-AOI045-0.5
	ISM-AOI048-0.5
	ISM-AOI059-0.5
A7H0584/WO11257	ISM-AOI078-0.5

## DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2010, 2011) and appropriate laboratory and method-specific guidelines (Apex, 2016; CFA, 2016; Maxxam, 2015; USEPA, 1986).

USEPA Method 1613B and 8290A detections between the method reporting limit (MRL) and the estimated detection limit (EDL) were qualified as estimates (J) by the laboratory. Some USEPA Method 1613B non-detect results had EDLs greater than the MRL due to sample matrix; the EDL result was reported as the result of record.

Some 2,3,7,8-TCDF confirmation results were subject to diphenyl ether interference and the laboratory indicated that the results are “non-detect” with an elevated detection limit. The associated 1613B 2,3,7,8-TCDF result was also qualified “U” as non-detect in these cases.

In reports WO10575 and WO11203, some USEPA Method 1613B 1,2,3,4,6,7,8,9-OCDD (OCDD) results were flagged by the laboratory due to results that exceeded the calibration range. The reviewer confirmed with the lab that OCDD calibration range exceedances do not require dilution per the USEPA guidance (USEPA, 2011). Results were qualified by the reviewer with “J” as estimated.

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
WO10575	ISM-AOI056-0.5	OCDD	4640 E	4640 J
	ISM-AOI061-0.5		10700 E	10700 J
	ISM-AOI066-0.5-1		3880 E	3880 J
	ISM-AOI066-0.5-2		12500 E	12500 J
	ISM-AOI066-0.5-3		5200 E	5200 J
WO11203	ISM-AOI059-0.5		11400 E	11400 J

Notes:  
 E = result exceeds instrument calibration.  
 J = result is an estimated value.  
 pg/g = picograms per gram.

In report WO11203, the USEPA Method 1613B total HpCDD result for sample ISM-AOI059-0.5 exceeded the instrument calibration range. The result was qualified by the reviewer with “J” as estimated.

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
WO11203	ISM-AOI059-0.5	Total HpCDD	2750 E	2750 J

Notes:  
 E = result exceeds instrument calibration.  
 J = result is an estimated value.  
 pg/g = picograms per gram.

The laboratory identified some USEPA Method 1613B results as estimated maximum potential concentrations (EMPC). Some EMPC results were qualified by the laboratory as not detected at or above the EDL, with an elevated detection limit assigned. EMPC results not already qualified by the laboratory were qualified by the reviewer as not detected (U) at the reported value in the following table. EMPC results flagged due to diphenyl ether interference were also qualified by the reviewer as not detected at the reported value.



Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
A7C0432/ WO10575	ISM-AOI056-0.5	2,3,7,8-TCDD	0.472 K	0.472 U
		1,2,3,7,8,9-HxCDD	12.0 K	12.0 U
		Total TeCDD	3.42 K	3.42 U
		Total PeCDD	16.7 K	16.7 U
		Total HxCDD	137 K	137 U
		Total TeCDF	12.0 K	12.0 U
		Total HpCDF	294 K	294 U
	ISM-AOI061-0.5	2,3,7,8-TCDF	1.16 K	1.16 U
		Total TeCDD	2.12 K	2.12 U
		Total PeCDD	11.3 K	11.3 U
		Total TeCDF	5.25 K	5.25 U
		Total PeCDF	54.1 K	54.1 U
	ISM-AOI043-0.5	2,3,7,8-TCDF (confirmation)	1.10 K	1.10 U
		2,3,7,8-TCDD	0.469 K	0.469 U
		1,2,3,7,8-PeCDF	1.35 JK	1.35 UJ
		Total TeCDD	4.61 K	4.61 U
		Total TeCDF	38.8 KP	38.8 UJ
		Total PeCDF	154 KP	154 UJ
	ISM-AOI049-0.5	Total HxCDF	138 KP	138 UJ
		1,2,3,4,7,8-HxCDD	0.809 JK	0.809 UJ
		2,3,7,8-TCDF	0.383 K	0.383 U
		Total TeCDD	1.76 K	1.76 U
		Total HxCDD	23.2 K	23.2 U
		Total TeCDF	4.21 K	4.21 U
		Total PeCDF	13.7 K	13.7 U
	ISM-AOI064-0.5	Total HxCDF	23.2 K	23.2 U
		1,2,3,4,7,8-HxCDD	1.73 JK	1.73 UJ
		1,2,3,6,7,8-HxCDD	6.74 K	6.74 U
		1,2,3,7,8,9-HxCDD	2.98 K	2.98 U
		1,2,3,7,8-PeCDF	0.813 JK	0.813 UJ
		Total TeCDD	5.82 K	5.82 U
		Total HxCDD	37.4 KP	37.4 UJ
		Total TeCDF	22.8 KP	22.8 UJ
		Total PeCDF	109 KP	109 UJ
	ISM-AOI054-0.5	Total HxCDF	89.1 KP	89.1 UJ
		1,2,3,4,7,8-HxCDD	0.750 JK	0.750 UJ
		1,2,3,4,7,8-HxCDF	1.16 JK	1.16 UJ
		1,2,3,6,7,8-HxCDF	0.684 JK	0.684 UJ
		2,3,4,6,7,8-HxCDF	0.739JK	0.739JU
		Total TeCDD	2.22 K	2.22 U
Total PeCDD		4.51 K	4.51 U	
Total HxCDD		17.0 K	17.0 U	
Total TeCDF		4.25 K	4.25 U	
ISM-AOI044-0.5	Total HxCDF	13.8 K	13.8 U	
	1,2,3,7,8-PeCDD	1.36 JK	1.36 UJ	

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
		1,2,3,7,8,9-HxCDD	4.23 K	4.23 U
		2,3,7,8-TCDF	0.713 K	0.713 U
		Total TeCDD	3.69 K	3.69 U
		Total PeCDD	10.1 K	10.1 U
		Total HxCDD	48.0 K	48.0 U
		Total TeCDF	10.5 K	10.5 U
		Total PeCDF	30.5 K	30.5 U
	ISM-AOI051-0.5	1,2,3,6,7,8-HxCDF	1.48 JK	1.48 UJ
		Total TeCDD	2.69 K	2.69 U
		Total TeCDF	5.16 K	5.16 U
		Total PeCDF	22.9 K	22.9 U
		Total HxCDF	39.5 K	39.5 U
	ISM-AOI077-0.5	Total TeCDD	3.77 K	3.77 U
		Total PeCDD	12.5 K	12.5 U
		Total HxCDD	70.8 K	70.8 U
		Total TeCDF	17.7 K	17.7 U
		Total PeCDF	60.1 K	60.1 U
	ISM-AOI072-0.5	1,2,3,7,8-PeCDD	1.37 JK	1.37 UJ
		2,3,7,8-TCDF	0.383 JK	0.383 UJ
		Total TeCDD	2.37 K	2.37 U
		Total PeCDD	10.1 K	10.1 U
		Total TeCDF	8.11 K	8.11 U
		Total PeCDF	23.3 K	23.3 U
	ISM-AOI066-0.5-1	Total TeCDD	4.73 K	4.73 U
		Total PeCDD	16.8 K	16.8 U
		Total TeCDF	13.7 K	13.7 U
		Total HxCDF	112 K	112 U
	ISM-AOI066-0.5-2	Total TeCDD	8.20 K	8.20 U
		Total TeCDF	20.6 K	20.6 U
		Total PeCDF	78.4 K	78.4 U
		Total HxCDF	307 K	307 U
	ISM-AOI066-0.5-3	2,3,7,8-TCDD	0.263 JK	0.263 UJ
		2,3,7,8-TCDF	0.531 K	0.531 U
		Total TeCDD	1.87 K	1.87 U
		Total PeCDD	14.0 K	14.0 U
		Total TeCDF	5.99 K	5.99 U
		Total HxCDF	134 K	134 U
		Total HpCDF	279 K	279 U
	ISM-AOI076-0.5	2,3,7,8-TCDD	0.311 JK	0.311 UJ
		Total TeCDD	6.53 K	6.53 U
Total HxCDD		59.3 K	59.3 U	
Total TeCDF		19.3 K	19.3 U	
Total PeCDF		38.1 K	38.1 U	
Total HxCDF		75.6 K	75.6 U	
ISM-AOI052-0.5	1,2,3,7,8-PeCDF	0.585 JK	0.585 UJ	
	Total TeCDD	3.55 K	3.55 U	



Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
		Total PeCDD	7.66 K	7.66 U
		Total TeCDF	7.95 K	7.95 U
		Total PeCDF	24.7 K	24.7 U
		Total HpCDF	86.7 K	86.7 U
	ISM-AOI067-0.5	2,3,7,8-TCDD	0.111 JK	0.111 UJ
		1,2,3,7,8-PeCDD	0.325 JK	0.325 UJ
		2,3,7,8-TCDF	0.216 JK	0.216 UJ
		1,2,3,7,8-PeCDF	0.376 JK	0.376 UJ
		Total TeCDD	1.13 K	1.13 U
		Total PeCDD	2.98 JK	2.98 UJ
		Total HxCDD	17.0 K	17.0 U
		Total TeCDF	2.31 K	2.31 U
		Total PeCDF	8.47 K	8.47 U
		Total HxCDF	16.9 K	16.9 U
WO10849	ISM-AOI073-0.5	Total TeCDD	8.03 K	8.03 U
		Total PeCDD	13.1 K	13.1 U
		Total HxCDD	77.7 K	77.7 U
		Total TeCDF	8.53 K	8.53 U
	ISM-AOI075-0.5	2,3,7,8-TCDD	1.20 K	1.20 U
		1,2,3,4,7,8-HxCDD	2.95 K	2.95 U
		1,2,3,7,8-PeCDF	1.52 JK	1.52 UJ
		Total TeCDD	9.02 K	9.02 U
		Total PeCDD	13.3 K	13.3 U
		Total HxCDD	75.2 K	75.2 U
		Total TeCDF	14.3 K	14.3 U
	Total PeCDF	36.8 K	36.8 U	
	ISM-AOI068-0.5	2,3,7,8-TCDF	0.612 K	0.612 U
		Total TeCDD	2.19 K	2.19 U
		Total PeCDD	7.90 K	7.90 U
		Total TeCDF	5.96 K	5.96 U
Total HxCDF		63.6 K	63.6 U	
Total HpCDF	107 K	107 U		
WO10955	ISM-AOI062-0.5	2,3,7,8-TCDF	0.954 K	0.954 U
		Total TeCDD	3.17 K	3.17 U
		Total PeCDD	11.4 K	11.4 U
		Total TeCDF	11.2 K	11.2 U
		Total PeCDF	43.3 K	43.3 U
		Total HxCDF	106 K	106 U
	ISM-AOI071-S-0.5	Total TeCDD	2.28 K	2.28 U
		Total PeCDD	7.06 K	7.06 U
		Total HxCDD	66.4 K	66.4 U
		Total TeCDF	8.80 K	8.80 U
		Total PeCDF	37.3 K	37.3 U
	ISM-AOI046-0.5	2,3,7,8-TCDD	0.326 JK	0.326 UJ
		Total TeCDD	2.91 K	2.91 U
		Total PeCDD	11.8 K	11.8 U

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
		Total TeCDF	9.50 K	9.50 U
		Total PeCDF	55.3 K	55.3 U
		Total HxCDF	183 K	183 U
		Total HpCDF	225 K	225 U
	ISM-AOI057-0.5	Total TeCDD	6.66 K	6.66 U
	ISM-AOI063-0.5-1	Total PeCDD	4.90 K	4.90 U
		Total HxCDD	27.2 K	27.2 U
		Total TeCDF	9.87 K	9.87 U
		Total PeCDF	20.7 K	20.7 U
	ISM-AOI063-05-2	Total HpCDF	35.7 K	35.7 U
		Total TeCDD	2.89 K	2.89 U
		Total PeCDD	7.99 K	7.99 U
		Total TeCDF	13.2 KP	13.2 U
		Total PeCDF	52.0 KP	52.0 U
	ISM-AOI063-0.5-3	Total HxCDF	118 KP	118 U
		Total HpCDF	209 K	209 U
		2,3,7,8-TeCDD	0.282 JK	0.282 UJ
		Total TeCDD	7.16 K	7.16 U
Total PeCDD		11.8 K	11.8 U	
11527	ISM-AOI004-0.5	Total TeCDF	31.8 K	31.8 U
		Total PeCDF	51.6 K	51.6 U
		Total TeCDD	24.1	24.1 U
		Total PeCDD	50.0	50.0 U
WO11203	ISM-AOI045-0.5	1,2,3,7,8-PeCDD	0.849 JK	0.849 UJ
		1,2,3,7,8-PeCDF	0.668 JK	0.668 UJ
		Total PeCDD	8.72 K	8.72 U
		Total HxCDD	37.6 K	37.6 U
		Total TeCDF	5.36 K	5.36 U
		Total PeCDF	18.1 K	18.1 U
		Total HxCDF	40.3 K	40.3 U
		Total HpCDF	54.8 K	54.8 U
	ISM-AOI048-0.5	2,3,7,8-TCDD	0.453 JK	0.453 UJ
		1,2,3,7,8,9-HxCDF	1.37 JK	1.37 UJ
		Total TeCDD	3.48 K	3.48 U
		Total HxCDD	55.1 K	55.1 U
		Total TeCDF	7.79 K	7.79 U
		Total PeCDF	29.0 K	29.0 U
	ISM-AOI059-0.5	Total HxCDF	84.4 K	84.4 U
		2,3,7,8-TCDD	0.532 K	0.532 U
		Total TeCDD	4.89 K	4.89 U
		Total PeCDD	23.8 K	23.8 U
Total TeCDF		7.53 K	7.53 U	
Total PeCDF		78.9 K	78.9 U	
Total HxCDF		387 K	387 U	
WO11257	ISM-AOI078-0.5	Total HpCDF	704 K	704 U
		Total PeCDD	26.5 K	26.5 U



Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
		Total TeCDF	40.5 K	40.5 U
		2,3,7,8-TCDF (confirmation)	2.94 K	2.94 U

Notes:

J = result is an estimated value.

K = result is an EMPC.

P = result is estimated due to diphenyl ether interference.

pg/g = picograms per gram.

U result is non-detect.

In report WO10955, some USEPA Method 1613B total homolog results were flagged by the laboratory as estimated due to diphenyl ether interference. All of the flagged total homolog results were associated with congener detections; thus, the total homolog results were qualified with “J” as estimated by the reviewer.

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
WO10955	ISM-AOI057-0.5	Total TeCDF	36.0 P	36.0 J
		Total PeCDF	107 P	107 J
		Total HpCDF	178 P	178 J

Notes:

J = result is an estimated value.

P = result is estimated due to diphenyl ether interference.

pg/g = picograms per gram.

Some USEPA Method 1613B results were slightly outside required retention times used for positive analyte identification. Results that exceeded retention times were qualified by the laboratory as not detected at or above the EDL, with an elevated detection limit assigned.

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

## HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

### Holding Times

Extractions and analyses were performed within the recommended holding time criteria. Archived samples were frozen at -18 degrees Celsius in order to extend holding times. Results from archived samples were appropriately flagged by the laboratory for holding time exceedances; qualification was not necessary.

### Preservation and Sample Storage

The samples were preserved and stored appropriately.

## BLANKS

### Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. Where an analyte was detected in a sample and in the associated method blank, the sample result was qualified if the sample concentration was less than five times the method blank concentration. MRLs/EDLs were elevated to the concentration detected in the samples, qualified “U,” and assigned as the sample result. Non-detect sample results associated with method blank detections (including EMPCs) were not qualified.

In reports B6C5686V1 and B6C5685V1, the USEPA Method 1613B method blank had a detection of OCDD at 0.382 pg/g. Associated results were greater than five times the method blank concentration; thus, no results were qualified.

In report B6C4894V1 the USEPA Method 1613B method blank had detections of multiple dioxin and furan compounds above the EDL. Associated sample results were qualified as follows:

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
B6C4894V1	ISM-AOI041A-0.5	1,2,3,4,7,8,9-Hepta CDF	3.03	3.03 U
		1,2,3,7,8-Penta CDD	1.61	1.61 U
		1,2,3,7,8-Penta CDF	1.2	1.2 U
		2,3,7,8-Tetra CDF	0.6	0.6 U
		2,3,4,7,8-Penta CDF	2.06	2.06 U

In report WO10575 the USEPA Method 1613B method blank had detections of 1,2,3,7,8-PeCDF (EMPC 0.194 pg/g), 1,2,3,4,6,7,8-HpCDF (0.292 pg/g) and total PeCDF (0.384 pg/g) above the EDL. Results qualified for EMPCs did not require additional qualification. All remaining associated sample results were greater than five times the detected concentrations with the following exceptions, which were qualified by the reviewer with “UJ” as estimated, not detected:

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
WO10575	ISM-AOI044-0.5	1,2,3,7,8-PeCDF	0.927 J	0.927 UJ
	ISM-AOI049-0.5	1,2,3,7,8-PeCDF	0.460 J	0.460 UJ
	ISM-AOI051-0.5	1,2,3,7,8-PeCDF	0.587 J	0.587 UJ
	ISM-AOI072-0.5	1,2,3,7,8-PeCDF	0.676 J	0.676 UJ

In report WO10955, the USEPA Method 1613B batch 34946 method blank had detections below the reporting limit for all reported congeners and total homologs. Some method blank detections were also flagged as EMPCs. Sample results less than five times the method blank concentrations were qualified with “U” as non-detect at the reported value. Sample results already qualified as EMPCs did not require additional qualification. Qualified sample results are indicated in the table below, along with associated method blank concentrations.



Report	Sample ID	Analyte	Method Blank (pg/g)	5 x Method Blank (pg/g)	Original Result (pg/g)	Qualified Result (pg/g)
WO10955	ISM-AOI062-0.5	2,3,7,8-TeCDD	0.074 JK	0.37	0.267 J	0.267 UJ
	ISM-AOI063-0.5-1	2,3,7,8-TeCDD	0.074 JK	0.37	0.362 J	0.362 UJ
		1,2,3,7,8-PeCDF	0.108 J	0.54	0.449 J	0.449 UJ
	ISM-AOI063-0.5-2	2,3,7,8-TeCDD	0.074 JK	0.37	0.307 J	0.307 UJ
	ISM-AOI071-0.5	2,3,7,8-TeCDD	0.074 JK	0.37	0.245 J	0.245 UJ

In report WO11203, the USEPA Method 1613B batch 35400 method blank had detections below the reporting limit for OCDD, at 0.252 pg/g. All associated sample results were significantly greater than the reporting limit; thus, no results were qualified.

Remaining associated results were not detected at the EDL or were greater than five times the method blank concentration and thus, did not require qualification.

#### Equipment Rinsate Blanks

Equipment rinsate blanks were submitted for analysis by USEPA Method 1613B. The equipment rinsate blanks were non-detect for all target analytes.

#### Trip Blanks

Trip blanks were not required for this sampling event.

#### LABELED ANALOG STANDARD RECOVERY RESULTS

All USEPA Method 1613B and 8290A samples were spiked with C13 labeled analog standards (surrogates) to evaluate and document data quality.

In report B6H7368V1, the USEPA Method 1613B surrogates 37CL4 2,3,7,8-Tetra CDD and C13-2,3,7,8-TCDD results for sample Row-P2-020-0.5 were below acceptance criteria at 26% and 24%, respectively. The sample was qualified as follows:

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
B6H7368V1	ROW-P2-020-0.5	2,3,7,8-TCDD	0.771	0.771 J

All remaining surrogate recoveries were within acceptance limits.

#### MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

MS/MSD results are used to evaluate laboratory precision and accuracy. All MS/MSD samples were extracted and analyzed at the required frequency. The laboratory noted some MS/MSD results that exceeded acceptance criteria due to matrix effects or high analyte concentration. MS/MSD results that exceeded acceptance criteria due to high analyte concentration did not require qualification.

In report B681136V1, the USEPA Method 1613B 1,2,3,4,6,7,8-Hepta CDD MS result was below acceptance criteria at 47%. The sample used to prepare the MS was qualified as follows:

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
B681136V2	ROW-P2-001-0.5	1,2,3,4,6,7,8-Hepta CDD	669	669 J

In report B6A8214V2R, the USEPA Method 1613B Octa CDD MS result was below acceptance criteria at 44%. The sample used to prepare the MS was qualified as follows:

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
B6A8214V2R	ROW-P2-015-0.5	Octa CDD	1860	1860 J

In report B6H7368V1, the USEPA Method 1613B 1,2,3,4,6,7,8-Hepta CDF result exceeded acceptance criteria at 139%. This exceedance is minor; thus, no results were qualified. USEPA Method 1613B 1,2,3,4,6,7,8-Hepta CDD and Octa CDD MS results also exceeded acceptance criteria at 352% and 239%, respectively. The sample used to prepare the MS was qualified as follows:

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
B6H7368V1	ROW-P2-033-0.5	1,2,3,4,6,7,8-Hepta CDD	2810	2810 J
		Octa CDD	19300	19300 J

No other results were qualified as all other associated quality control results met acceptance criteria, including sample and analyte specific-labeled analog standards.

## LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency.

A duplicate sample associated with report A6C0884 and A6C0990 analyzed for total organic carbon slightly exceeded the relative percent difference acceptance criteria at 23%. No actions were taken by the reviewer as the exceedance was minor and all other batch quality control met acceptance limits.

The laboratory noted that the duplicate results associated with report B681136V1 for Octa CDF and Total Hexa CDF likely exceeded RPD criteria due to sample heterogeneity. No actions were taken by the qualifier as the field duplicate met acceptance criteria and represented the same sample location.



In report B6A1069V2, the USEPA Method 1613B Total Penta CDD, Total Tetra CDF, and Total Penta CDF laboratory duplicate RPDs exceeded acceptance laboratory criteria of 25% at 35.2%, 34.1%, and 28.5%, likely due to sample heterogeneity. The sample used to prepare the laboratory duplicate, SS-ROW001-0.5, was qualified as follows:

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
B6A1069V2	SS-ROW001-0.5	Total Penta CDD	36.0	36.0 J
		Total Tetra CDF	11.9	11.9 J
		Total Penta CDF	96.8	96.8

In report B6A8214V2R, the USEPA Method 1613B Total Hepta CDF RPD exceeded acceptance criteria, at 29%, for sample ROW-P2-013-0.5. This exceedance is minor; thus, no results were qualified.

In reports B6C5686V1 and B6C5685V1, the USEPA Method 1613B Total Penta CDF and Total Hexa CDF RPDs exceeded acceptance criteria at 26% and 30%, respectively. These exceedances are minor; thus, no results were qualified.

In report B6H7368V1, the USEPA Method 1613B Total Tetra CDD and Octa CDF laboratory duplicate RPDs exceeded acceptance criteria. The sample was qualified as follows:

Report	Sample ID	Analyte	RPD	Original Result (pg/g)	Qualified Result (pg/g)
B6H7368V1	ROW-P2-020-0.5	Total Tetra CDD	109	11.7	11.7 J
		Octa CDF	37	528	528 J

In report B6H4471V1, the USEPA Method 1613B Octa CDD laboratory duplicate RPD exceeded acceptance criteria at 33%. This exceedance is minor; thus, no results were qualified.

In report A6H0510, the USEPA Method 5310B MOD TOC laboratory duplicate RPD exceeded acceptance criteria at 37%. The sample was qualified as follows:

Report	Sample ID	Analyte	RPD	Original Result (mg/kg)	Qualified Result (mg/kg)
A6H0510	ROW-002N-0.5	TOC	37	29000	29000 J

All remaining RPDs were within acceptance limits.

## LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) (sometimes called a spiked blank) is spiked with target analytes to provide information on laboratory

precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

All LCS/LCSD analytes were within acceptance limits for percent recovery.

## FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. A field duplicate was submitted for analysis in report B681136V2 (Row-P2-002-0.5/Row-P2-002-0.5-Dup). MFA uses acceptance criteria of 100 percent RPD for results that are less than five times the MRL, or 50 percent RPD for results that are greater than five times the MRL. Non-detect data are not used in the evaluation of field duplicate results. All field duplicate results met RPD acceptance limit criteria.

## ISM REPLICATE EVALUATION

### WO10575

In report WO10575, triplicate composite samples were collected and submitted to Apex and CFA for dioxin/furan and TOC analysis (ISM-AOI066-0.5-1, ISM-AOI066-0.5-2, and ISM-AOI066-0.5-3). The relative standard deviations (RSDs) of the replicate sets of dioxin/furan congener results were calculated.

RSDs ranged from 31.2 percent to 66.1 percent for dioxin/furan congeners and homologs. ISM replicate results were qualified as estimates when RSDs exceeded 35 percent. Results below the EDL were qualified with “UJ” as estimated, non-detect. Results above the EDL were qualified with “J” as estimated. A summary of exceedances and qualifiers added is shown below:

Sample ID	Analyte	Percent RSD	Qualifier Added
ISM-AOI066-0.5-1 ISM-AOI066-0.5-2 ISM-AOI066-0.5-3	1,2,3,4,6,7,8-HpCDD	54.1	J/UJ
	1,2,3,4,6,7,8-HpCDF	60.6	J/UJ
	1,2,3,4,7,8,9-HpCDF	59.0	J/UJ
	1,2,3,4,7,8-HxCDD	56.0	J/UJ
	1,2,3,4,7,8-HxCDF	66.1	J/UJ
	1,2,3,6,7,8-HxCDD	53.0	J/UJ
	1,2,3,6,7,8-HxCDF	36.0	J/UJ
	1,2,3,7,8,9-HxCDD	53.9	J/UJ
	1,2,3,7,8,9-HxCDF	67.5	J/UJ
	1,2,3,7,8-PeCDD	53.3	J/UJ
	1,2,3,7,8-PeCDF	48.3	J/UJ
	2,3,4,6,7,8-HxCDF	37.4	J/UJ



Sample ID	Analyte	Percent RSD	Qualifier Added
	2,3,4,7,8-PeCDF	49.8	J/UJ
	2,3,7,8-TCDD	42.5	J/UJ
	2,3,7,8-TCDF	44.0	J/UJ
	OCDD	64.5	J/UJ
	OCDF	55.8	J/UJ
	Total HpCDDs	54.3	J/UJ
	Total HpCDFs	65.6	J/UJ
	Total HxCDDs	44.0	J/UJ
	Total HxCDFs	57.9	J/UJ
	Total PeCDFs	38.5	J/UJ
	Total TCDDs	64.3	J/UJ
	Total TCDFs	54.4	J/UJ

#### WO10955

In report WO10955, triplicate composite samples were collected and submitted to Apex and CFA for dioxin/furan and TOC analysis (ISM-AOI063-0.5-1, ISM-AOI063-0.5-2 and ISM-AOI063-0.5-3). The relative standard deviations (RSDs) of the replicate sets of dioxin/furan congener results were calculated.

RSDs ranged from 5.3 percent for TOC and 12.9 percent to 74.5 percent for dioxin/furan congeners and homologs. ISM replicate results were qualified as estimates when RSDs exceeded 35 percent. Non-detect results were qualified with “J” as estimated. Detected results were qualified with “J” as estimated. A summary of exceedances and qualifiers added is shown below:

Sample ID	Analyte	Percent RSD	Qualifier Added
ISM-AOI063-0.5-1 ISM-AOI063-0.5-1 ISM-AOI063-0.5-1	1,2,3,4,6,7,8-HpCDD	55.8	J/UJ
	1,2,3,4,6,7,8-HpCDF	57.2	J/UJ
	1,2,3,4,7,8,9-HpCDF	58.3	J/UJ
	1,2,3,4,7,8-HxCDD	45.4	J/UJ
	1,2,3,4,7,8-HxCDF	50.6	J/UJ
	1,2,3,6,7,8-HxCDD	51.8	J/UJ
	1,2,3,6,7,8-HxCDF	50.2	J/UJ
	1,2,3,7,8,9-HxCDD	46.0	J/UJ
	1,2,3,7,8,9-HxCDF	44.0	J/UJ
	1,2,3,7,8-PeCDD	37.4	J/UJ

Sample ID	Analyte	Percent RSD	Qualifier Added
	1,2,3,7,8-PeCDF	52.6	J/UJ
	2,3,4,6,7,8-HxCDF	49.6	J/UJ
	2,3,4,7,8-PeCDF	40.2	J/UJ
	2,3,7,8-TCDF	37.4	J/UJ
	OCDD	62.6	J/UJ
	OCDF	74.5	J/UJ
	Total HpCDD	53.8	J/UJ
	Total HpCDF	70.1	J/UJ
	Total HxCDD	38.9	J/UJ
	Total HxCDF	55.5	J/UJ
	Total PeCDD	42.0	J/UJ
	Total PeCDF	43.3	J/UJ
	Total TeCDD	72.0	J/UJ
	Total TeCDF	64.6	J/UJ

## REPORTING LIMITS

Maxxam, CAL, CFA, and Apex used routine MRLs and EDLs for non-detect results. The reviewer confirmed that sample specific detection limits reported by CAL were EDLs. MRLs and EDLs were adjusted for samples requiring dilutions because of high analyte concentrations, matrix interferences, or ratio criteria exceedances (resulting in EMPCs).

## DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

The laboratory reported some samples beginning with AOI as beginning with AO1. Results have been reported with the correct sample name in analytical results tables.

All ISM sample names reported by Apex, CAL, CFA, and Maxxam were appended with “— After Processing.” Samples are referenced in this validation memorandum by the original sample name for brevity.

In report B6A8212V1, there is an extraneous space between “P2-” and “019” in the sample name. No action was taken by the reviewer.

In report A7H0225, the sample name for ISM-AOI059-0.5 was recorded incorrectly on the chain of custody (COC) as ISM-AOI048-05, which was the name of a different sample in the same work order; the correct sample name was recorded on the container label, and identified by matching the collection times provided on both the container label and the COC. The correct sample name was reported. No additional action was required.

No other anomalies were found.



## REFERENCES

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- Apex. 2016. Quality systems manual. Apex Laboratories, LLC, Tigard, Oregon. April 1.
- CAL. 2016. Quality assurance manual. Ceres Analytical Laboratory, Inc., El Dorado Hills, California.
- CFA. 2016. Quality assurance plan. Cape Fear Analytical, LLC, Wilmington, North Carolina. April 5.
- Maxxam. 2015. QA/QC Interpretation Guide. Maxxam Analytics. Mississauga, Ontario.
- USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846 Update V. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 1, July 2014).
- USEPA. 2010. USEPA contract laboratory program national functional guidelines for inorganic superfund data review. EPA 540/R-10/011. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.
- USEPA. 2011. USEPA contract laboratory program national functional guidelines for chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) data review. EPA-540-R-11-016. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. September.

# Apex Labs

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Monday, May 11, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

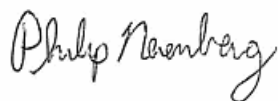
Enclosed are the results of analyses for work order A5D0549, which was received by the laboratory on 4/17/2015 at 2:50:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

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Apex Laboratories



Philip Nerenberg, Lab Director

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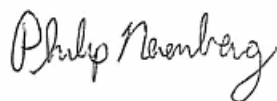
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 05/11/15 15:15

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI007-0.5-As Received	A5D0549-01	Soil	04/16/15 13:45	04/17/15 14:50
ISM-AOI007-0.5-After ISM	A5D0549-02	Soil	04/16/15 13:45	04/17/15 14:50
ISM-AOI011-0.5-As Received	A5D0549-03	Soil	04/16/15 16:00	04/17/15 14:50
ISM-AOI011-0.5-After ISM	A5D0549-04	Soil	04/16/15 16:00	04/17/15 14:50
ISM-AOI031-0.5-As Received	A5D0549-05	Soil	04/16/15 14:30	04/17/15 14:50
ISM-AOI031-0.5-After ISM	A5D0549-06	Soil	04/16/15 14:30	04/17/15 14:50
ISM-AOI018-0.5-B-C-As Received	A5D0549-07	Soil	04/16/15 17:30	04/17/15 14:50
ISM-AOI018-0.5-B-C-After ISM	A5D0549-08	Soil	04/16/15 17:30	04/17/15 14:50
ISM-AOI018-0.5-B-A-As Received	A5D0549-09	Soil	04/16/15 16:45	04/17/15 14:50
ISM-AOI018-0.5-B-A-After ISM	A5D0549-10	Soil	04/16/15 16:45	04/17/15 14:50
ISM-AOI018-0.5-B-B-As Received	A5D0549-11	Soil	04/16/15 17:00	04/17/15 14:50
ISM-AOI018-0.5-B-B-After ISM	A5D0549-12	Soil	04/16/15 17:00	04/17/15 14:50
ISM-AOI006-0.5-As Received	A5D0549-13	Soil	04/16/15 13:00	04/17/15 14:50
ISM-AOI006-0.5-After ISM	A5D0549-14	Soil	04/16/15 13:00	04/17/15 14:50
ISM-AOI013-0.5-F-As Received	A5D0549-15	Soil	04/16/15 11:30	04/17/15 14:50
ISM-AOI013-0.5-F-After ISM	A5D0549-16	Soil	04/16/15 11:30	04/17/15 14:50
ISM-AOI018-0.5-F-As Received	A5D0549-17	Soil	04/16/15 18:00	04/17/15 14:50
ISM-AOI018-0.5-F-After ISM	A5D0549-18	Soil	04/16/15 18:00	04/17/15 14:50
ISM-AOI005-0.5-As Received	A5D0549-19	Soil	04/16/15 10:00	04/17/15 14:50
ISM-AOI005-0.5-After ISM	A5D0549-20	Soil	04/16/15 10:00	04/17/15 14:50
ISM-AOI013-0.5-B-As Received	A5D0549-21	Soil	04/16/15 12:00	04/17/15 14:50
ISM-AOI013-0.5-B-After ISM	A5D0549-22	Soil	04/16/15 12:00	04/17/15 14:50
SBS-AOI018-1.0	A5D0549-23	Soil	04/16/15 17:15	04/17/15 14:50
SBS-AOI006-1.0	A5D0549-24	Soil	04/16/15 13:00	04/17/15 14:50
SBS-AOI005-1.0-Dup	A5D0549-25	Soil	04/16/15 10:30	04/17/15 14:50
SBS-AOI005-1.0	A5D0549-26	Soil	04/16/15 10:30	04/17/15 14:50



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Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

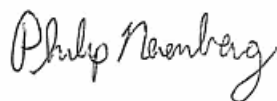
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 05/11/15 15:15

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI007-0.5-After ISM (A5D0549-02)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI011-0.5-After ISM (A5D0549-04)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI031-0.5-After ISM (A5D0549-06)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI018-0.5-B-C-After ISM (A5D0549-08)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI018-0.5-B-A-After ISM (A5D0549-10)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI018-0.5-B-B-After ISM (A5D0549-12)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI006-0.5-After ISM (A5D0549-14)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI013-0.5-F-After ISM (A5D0549-16)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI018-0.5-F-After ISM (A5D0549-18)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	

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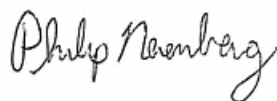
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 Project Manager: Madi Novak

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## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI005-0.5-After ISM (A5D0549-20)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI013-0.5-B-After ISM (A5D0549-22)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>SBS-AOI018-1.0 (A5D0549-23)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>7500</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>SBS-AOI006-1.0 (A5D0549-24)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>10000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>SBS-AOI005-1.0-Dup (A5D0549-25)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	
<b>SBS-AOI005-1.0 (A5D0549-26)</b>			<b>Matrix: Soil</b>					
Batch: 5040707								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	04/29/15 15:20	PSEP/SM 5310B MOD	



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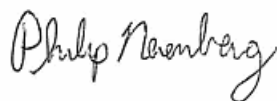
## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI007-0.5-As Received (A5D0549-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	72.1	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI007-0.5-After ISM (A5D0549-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.6	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI011-0.5-As Received (A5D0549-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	80.3	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI011-0.5-After ISM (A5D0549-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	98.0	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI031-0.5-As Received (A5D0549-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	70.6	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI031-0.5-After ISM (A5D0549-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.6	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI018-0.5-B-C-As Received (A5D0549-07)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	71.2	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI018-0.5-B-C-After ISM (A5D0549-08)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.9	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI018-0.5-B-A-As Received (A5D0549-09)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	73.4	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI018-0.5-B-A-After ISM (A5D0549-10)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.9	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI018-0.5-B-B-As Received (A5D0549-11)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	71.5	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI018-0.5-B-B-After ISM (A5D0549-12)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.9	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI006-0.5-As Received (A5D0549-13)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	76.1	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI006-0.5-After ISM (A5D0549-14)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.8	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI013-0.5-F-As Received (A5D0549-15)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	76.2	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI013-0.5-F-After ISM (A5D0549-16)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				

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Project: **Port of Ridgefield ISM**  
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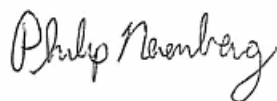
Reported:  
05/11/15 15:15

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI013-0.5-F-After ISM (A5D0549-16)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.8	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI018-0.5-F-As Received (A5D0549-17)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	70.8	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI018-0.5-F-After ISM (A5D0549-18)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.6	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI005-0.5-As Received (A5D0549-19)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	75.1	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI005-0.5-After ISM (A5D0549-20)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.9	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI013-0.5-B-As Received (A5D0549-21)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040555</b>				
% Solids	77.8	---	1.00	% by Weight	1	04/22/15 09:54	EPA 8000C	
<b>ISM-AOI013-0.5-B-After ISM (A5D0549-22)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	97.8	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>SBS-AOI018-1.0 (A5D0549-23)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040633</b>				
% Solids	81.6	---	1.00	% by Weight	1	04/24/15 08:59	EPA 8000C	
<b>SBS-AOI006-1.0 (A5D0549-24)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040633</b>				
% Solids	79.7	---	1.00	% by Weight	1	04/24/15 08:59	EPA 8000C	
<b>SBS-AOI005-1.0-Dup (A5D0549-25)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040633</b>				
% Solids	81.6	---	1.00	% by Weight	1	04/24/15 08:59	EPA 8000C	
<b>SBS-AOI005-1.0 (A5D0549-26)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040633</b>				
% Solids	80.1	---	1.00	% by Weight	1	04/24/15 08:59	EPA 8000C	

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 Portland, OR 97209

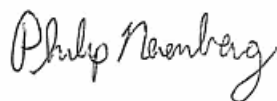
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 05/11/15 15:15

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040707 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5040707-BLK1)</b>						Prepared: 04/27/15 08:42 Analyzed: 04/29/15 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5040707-BS1)</b>						Prepared: 04/27/15 08:42 Analyzed: 04/29/15 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>Duplicate (5040707-DUP1)</b>						Prepared: 04/27/15 08:42 Analyzed: 04/29/15 15:20						
<b>QC Source Sample: ISM-AOI007-0.5-After ISM (A5D0549-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	21000	---	200	mg/kg	1	---	21000	---	---	0.8	20%	
<b>Duplicate (5040707-DUP2)</b>						Prepared: 04/27/15 08:42 Analyzed: 04/29/15 15:20						
<b>QC Source Sample: SBS-AOI005-1.0 (A5D0549-26)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	11000	---	200	mg/kg	1	---	13000	---	---	19	20%	





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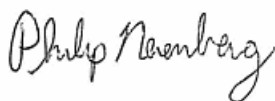
Reported:  
05/11/15 15:15

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040555 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040555-DUP1)</b>						Prepared: 04/21/15 10:38 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0514-03)												
EPA 8000C												
% Solids	86.5	---	1.00	% by Weight	1	---	86.2	---	---	0.3	20%	
<b>Duplicate (5040555-DUP2)</b>						Prepared: 04/21/15 10:38 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0521-09)												
EPA 8000C												
% Solids	87.6	---	1.00	% by Weight	1	---	86.9	---	---	0.8	20%	
<b>Duplicate (5040555-DUP3)</b>						Prepared: 04/21/15 10:38 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0571-03)												
EPA 8000C												
% Solids	84.7	---	1.00	% by Weight	1	---	84.5	---	---	0.2	20%	
<b>Duplicate (5040555-DUP4)</b>						Prepared: 04/21/15 10:38 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0571-12)												
EPA 8000C												
% Solids	81.5	---	1.00	% by Weight	1	---	81.5	---	---	0	20%	
<b>Duplicate (5040555-DUP5)</b>						Prepared: 04/21/15 15:09 Analyzed: 04/22/15 09:54						
QC Source Sample: ISM-AOI013-0.5-B-As Received (A5D0549-21)												
EPA 8000C												
% Solids	75.4	---	1.00	% by Weight	1	---	77.8	---	---	3	20%	
<b>Duplicate (5040555-DUP6)</b>						Prepared: 04/21/15 15:10 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0136-17)												
EPA 8000C												
% Solids	70.3	---	1.00	% by Weight	1	---	70.6	---	---	0.4	20%	
<b>Duplicate (5040555-DUP7)</b>						Prepared: 04/21/15 19:05 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0609-02)												
EPA 8000C												
% Solids	75.4	---	1.00	% by Weight	1	---	75.7	---	---	0.4	20%	
<b>Duplicate (5040555-DUP8)</b>						Prepared: 04/21/15 19:05 Analyzed: 04/22/15 09:54						

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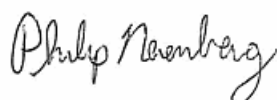
Reported:  
05/11/15 15:15

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040555 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040555-DUP8)</b>						Prepared: 04/21/15 19:05 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0617-02)												
EPA 8000C												
% Solids	77.2	---	1.00	% by Weight	1	---	77.8	---	---	0.8	20%	
<b>Duplicate (5040555-DUP9)</b>						Prepared: 04/21/15 19:05 Analyzed: 04/22/15 09:54						
QC Source Sample: Other (A5D0621-02)												
EPA 8000C												
% Solids	84.0	---	1.00	% by Weight	1	---	83.5	---	---	0.6	20%	
<b>Batch 5040633 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040633-DUP1)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0552-03)												
EPA 8000C												
% Solids	73.9	---	1.00	% by Weight	1	---	73.9	---	---	0	20%	
<b>Duplicate (5040633-DUP2)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0599-01)												
EPA 8000C												
% Solids	88.1	---	1.00	% by Weight	1	---	88.1	---	---	0	20%	
<b>Duplicate (5040633-DUP3)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0599-07)												
EPA 8000C												
% Solids	73.7	---	1.00	% by Weight	1	---	73.9	---	---	0.3	20%	
<b>Duplicate (5040633-DUP4)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0599-19)												
EPA 8000C												
% Solids	86.1	---	1.00	% by Weight	1	---	86.8	---	---	0.8	20%	
<b>Duplicate (5040633-DUP5)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0672-01)												
EPA 8000C												

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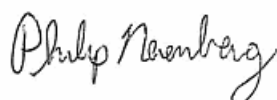
Reported:  
 05/11/15 15:15

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040633 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040633-DUP5)</b>						Prepared: 04/23/15 10:04 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0672-01)												
% Solids	93.1	---	1.00	% by Weight	1	---	93.6	---	---	0.5	20%	
<b>Duplicate (5040633-DUP6)</b>						Prepared: 04/23/15 19:14 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0697-01)												
EPA 8000C												
% Solids	77.7	---	1.00	% by Weight	1	---	78.4	---	---	0.9	20%	
<b>Duplicate (5040633-DUP7)</b>						Prepared: 04/23/15 19:14 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0701-01)												
EPA 8000C												
% Solids	90.2	---	1.00	% by Weight	1	---	89.8	---	---	0.4	20%	
<b>Duplicate (5040633-DUP8)</b>						Prepared: 04/23/15 19:14 Analyzed: 04/24/15 08:59						
QC Source Sample: Other (A5D0705-02)												
EPA 8000C												
% Solids	77.3	---	1.00	% by Weight	1	---	77.2	---	---	0.1	20%	
<b>Batch 5040757 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040757-DUP1)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0481-27)												
EPA 8000C												
% Solids	92.3	---	1.00	% by Weight	1	---	92.3	---	---	0	20%	
<b>Duplicate (5040757-DUP2)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0713-01)												
EPA 8000C												
% Solids	46.5	---	1.00	% by Weight	1	---	48.2	---	---	4	20%	
<b>Duplicate (5040757-DUP3)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0731-05)												
EPA 8000C												
% Solids	79.7	---	1.00	% by Weight	1	---	80.5	---	---	1	20%	

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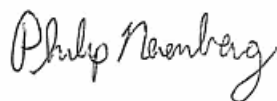
**Reported:**  
05/11/15 15:15

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040757 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040757-DUP4)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0731-15)												
EPA 8000C												
% Solids	93.2	---	1.00	% by Weight	1	---	92.6	---	---	0.6	20%	
<b>Duplicate (5040757-DUP5)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0772-09)												
EPA 8000C												
% Solids	94.2	---	1.00	% by Weight	1	---	94.2	---	---	0	20%	
<b>Duplicate (5040757-DUP6)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0777-05)												
EPA 8000C												
% Solids	92.5	---	1.00	% by Weight	1	---	91.8	---	---	0.8	20%	
<b>Duplicate (5040757-DUP7)</b>						Prepared: 04/28/15 11:26 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0800-06)												
EPA 8000C												
% Solids	77.5	---	1.00	% by Weight	1	---	76.5	---	---	1	20%	
<b>Duplicate (5040757-DUP8)</b>						Prepared: 04/28/15 11:26 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0813-02)												
EPA 8000C												
% Solids	89.0	---	1.00	% by Weight	1	---	89.8	---	---	0.9	20%	
<b>Duplicate (5040757-DUP9)</b>						Prepared: 04/28/15 11:30 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0819-02)												
EPA 8000C												
% Solids	93.3	---	1.00	% by Weight	1	---	92.7	---	---	0.6	20%	
<b>Duplicate (5040757-DUPA)</b>						Prepared: 04/28/15 15:57 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0833-02)												
EPA 8000C												
% Solids	87.1	---	1.00	% by Weight	1	---	87.3	---	---	0.2	20%	
<b>Duplicate (5040757-DUPB)</b>						Prepared: 04/28/15 16:48 Analyzed: 04/29/15 08:58						

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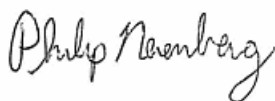
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040757 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040757-DUPB)</b>						Prepared: 04/28/15 16:48 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0842-02)												
EPA 8000C												
% Solids	78.3	---	1.00	% by Weight	1	---	78.4	---	---	0.1	20%	
<b>Duplicate (5040757-DUPC)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0845-03)												
EPA 8000C												
% Solids	80.6	---	1.00	% by Weight	1	---	80.2	---	---	0.5	20%	
<b>Duplicate (5040757-DUPD)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0845-11)												
EPA 8000C												
% Solids	80.5	---	1.00	% by Weight	1	---	81.9	---	---	2	20%	
<b>Duplicate (5040757-DUPE)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0850-02)												
EPA 8000C												
% Solids	89.0	---	1.00	% by Weight	1	---	89.0	---	---	0	20%	



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## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5040707</b>							
A5D0549-02	Soil	PSEP/SM 5310B MOD	04/16/15 13:45	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-04	Soil	PSEP/SM 5310B MOD	04/16/15 16:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-06	Soil	PSEP/SM 5310B MOD	04/16/15 14:30	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-08	Soil	PSEP/SM 5310B MOD	04/16/15 17:30	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-10	Soil	PSEP/SM 5310B MOD	04/16/15 16:45	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-12	Soil	PSEP/SM 5310B MOD	04/16/15 17:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-14	Soil	PSEP/SM 5310B MOD	04/16/15 13:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-16	Soil	PSEP/SM 5310B MOD	04/16/15 11:30	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-18	Soil	PSEP/SM 5310B MOD	04/16/15 18:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-20	Soil	PSEP/SM 5310B MOD	04/16/15 10:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-22	Soil	PSEP/SM 5310B MOD	04/16/15 12:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-23	Soil	PSEP/SM 5310B MOD	04/16/15 17:15	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-24	Soil	PSEP/SM 5310B MOD	04/16/15 13:00	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-25	Soil	PSEP/SM 5310B MOD	04/16/15 10:30	04/27/15 08:42	5g/5g	5g/5g	NA
A5D0549-26	Soil	PSEP/SM 5310B MOD	04/16/15 10:30	04/27/15 08:42	5g/5g	5g/5g	NA

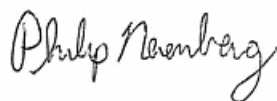
### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5040555</b>							
A5D0549-01	Soil	EPA 8000C	04/16/15 13:45	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA

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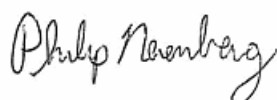
Reported:  
 05/11/15 15:15

## SAMPLE PREPARATION INFORMATION

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A5D0549-03	Soil	EPA 8000C	04/16/15 16:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-05	Soil	EPA 8000C	04/16/15 14:30	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-07	Soil	EPA 8000C	04/16/15 17:30	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-09	Soil	EPA 8000C	04/16/15 16:45	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-11	Soil	EPA 8000C	04/16/15 17:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-13	Soil	EPA 8000C	04/16/15 13:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-15	Soil	EPA 8000C	04/16/15 11:30	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-17	Soil	EPA 8000C	04/16/15 18:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-19	Soil	EPA 8000C	04/16/15 10:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-21	Soil	EPA 8000C	04/16/15 12:00	04/21/15 15:09	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5040633</b>							
A5D0549-23	Soil	EPA 8000C	04/16/15 17:15	04/23/15 10:05	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-24	Soil	EPA 8000C	04/16/15 13:00	04/23/15 10:05	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-25	Soil	EPA 8000C	04/16/15 10:30	04/23/15 10:05	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-26	Soil	EPA 8000C	04/16/15 10:30	04/23/15 10:05	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5040757</b>							
A5D0549-02	Soil	EPA 8000C	04/16/15 13:45	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-04	Soil	EPA 8000C	04/16/15 16:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-06	Soil	EPA 8000C	04/16/15 14:30	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-08	Soil	EPA 8000C	04/16/15 17:30	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-10	Soil	EPA 8000C	04/16/15 16:45	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-12	Soil	EPA 8000C	04/16/15 17:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-14	Soil	EPA 8000C	04/16/15 13:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-16	Soil	EPA 8000C	04/16/15 11:30	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-18	Soil	EPA 8000C	04/16/15 18:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-20	Soil	EPA 8000C	04/16/15 10:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA
A5D0549-22	Soil	EPA 8000C	04/16/15 12:00	04/28/15 11:26	1N/A/1N/A	1N/A/1N/A	NA



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
05/11/15 15:15

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
05/11/15 15:15

Lab # ASD0501 of 2

## CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster & Alongi		Project Mgr: Madi Novak / Philip Nerenberg		Project Name: POR		Project # 9003.01.39	
Address: 2001 NW 19th Ave, Suite 200, Portland, OR 97209		Phone: 503-501-5204		Fax:		Email: P.Novak@MaulFoster.com	
Sampled by: Philip Nerenberg / Emily Curtis		ANALYSIS REQUEST		Priority Metals (13)		TCLP Metals (8)	
Site Location: OR (WA)		Matrix		RCRA Metals (8)		So. Ag. M, TL, V, Zn	
Other:		# OF CONTAINERS		8081 Chlor. Pest		Cd, Cr, Cu, Ca, Fe, Pb	
SAMPLE ID		TIME		8082 PCBs		Hg, Mn, Ni, K	
ISM-A0E013-G3-B		4-16-15 12:00 50		8270 SIM PAHs		Al, Sb, Ar, Ba, Be, Cd	
SBS-A0I018-1.0		17:15		8260 VOCs		As, Ag, Na, TL, V, Zn	
SBS-A0E006-1.0		13:00		8260 Halo VOCs		Ch, Cr, Cu, Ca, Fe, Pb	
SBS-A0I005-1.0-DUP		10:30		8260 RBDM VOCs		Mn, Ni, K	
SBS-A0E005-1.0		16:30		BTEN		Hg, Mn, Ni, K	
				NWTPH-Gx		As, Ag, Na, TL, V, Zn	
				NWTPH-Dx		Cd, Cr, Cu, Ca, Fe, Pb	
				NWTPH-HCID		Al, Sb, Ar, Ba, Be, Cd	
						Hg, Mn, Ni, K	
						As, Ag, Na, TL, V, Zn	
						Ch, Cr, Cu, Ca, Fe, Pb	
						Mn, Ni, K	
						Hg, Mn, Ni, K	
						As, Ag, Na, TL, V, Zn	
						Cd, Cr, Cu, Ca, Fe, Pb	
						Al, Sb, Ar, Ba, Be, Cd	
						Hg, Mn, Ni, K	
						As, Ag, Na, TL, V, Zn	
						Ch, Cr, Cu, Ca, Fe, Pb	
						Mn, Ni, K	
						Hg, Mn, Ni, K	
						As, Ag, Na, TL, V, Zn	
						Cd, Cr, Cu, Ca, Fe, Pb	
						Al, Sb, Ar, Ba, Be, Cd	
						Hg, Mn, Ni, K	
						As, Ag, Na, TL, V, Zn	
						Ch, Cr, Cu, Ca, Fe, Pb	
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						Al, Sb, Ar, Ba, Be, Cd	
						Hg, Mn, Ni, K	
						As, Ag, Na, TL, V, Zn	
						Ch, Cr, Cu, Ca, Fe, Pb	
						Mn, Ni, K	
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						Mn, Ni, K	
						Hg, Mn, Ni, K	
						As, Ag, Na, TL, V, Zn	
						Cd, Cr, Cu, Ca, Fe, Pb	
						Al, Sb, Ar, Ba, Be, Cd	
						Hg, Mn, Ni, K	



# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Friday, May 22, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01

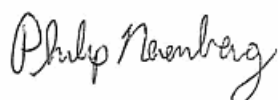
Enclosed are the results of analyses for work order A5D0781, which was received by the laboratory on 4/24/2015 at 1:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

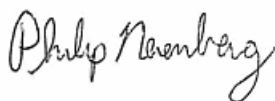
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

**Reported:**  
 05/22/15 16:29

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI017-0.5-C-As Received	A5D0781-01	Soil	04/23/15 11:25	04/24/15 13:00
ISM-AOI017-0.5-C-After ISM	A5D0781-02	Soil	04/23/15 11:25	04/24/15 13:00
ISM-AOI012-0.5-As Received	A5D0781-03	Soil	04/23/15 09:00	04/24/15 13:00
ISM-AOI012-0.5-After ISM	A5D0781-04	Soil	04/23/15 09:00	04/24/15 13:00
ISM-AOI029B-0.5-As Received	A5D0781-05	Soil	04/23/15 14:40	04/24/15 13:00
ISM-AOI029B-0.5-After ISM	A5D0781-06	Soil	04/23/15 14:40	04/24/15 13:00
ISM-AOI014-0.5-As Received	A5D0781-07	Soil	04/23/15 13:15	04/24/15 13:00
ISM-AOI014-0.5-After ISM	A5D0781-08	Soil	04/23/15 13:15	04/24/15 13:00
ISM-AOI036-0.5-As Received	A5D0781-09	Soil	04/23/15 14:15	04/24/15 13:00
ISM-AOI036-0.5-After ISM	A5D0781-10	Soil	04/23/15 14:15	04/24/15 13:00
ISM-AOI032-0.5-As Received	A5D0781-11	Soil	04/23/15 13:45	04/24/15 13:00
ISM-AOI032-0.5-After ISM	A5D0781-12	Soil	04/23/15 13:45	04/24/15 13:00
ISM-AOI017-0.5-B-As Received	A5D0781-13	Soil	04/23/15 10:50	04/24/15 13:00
ISM-AOI017-0.5-B-After ISM	A5D0781-14	Soil	04/23/15 10:50	04/24/15 13:00
ISM-AOI015-0.5-As Received	A5D0781-15	Soil	04/23/15 10:00	04/24/15 13:00
ISM-AOI015-0.5-After ISM	A5D0781-16	Soil	04/23/15 10:00	04/24/15 13:00
ISM-AOI017-0.5-A-As Received	A5D0781-17	Soil	04/23/15 10:30	04/24/15 13:00
ISM-AOI017-0.5-A-After ISM	A5D0781-18	Soil	04/23/15 10:30	04/24/15 13:00





**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

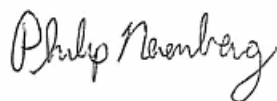
Reported:  
 05/22/15 16:29

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI017-0.5-C-After ISM (A5D0781-02)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI012-0.5-After ISM (A5D0781-04)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI029B-0.5-After ISM (A5D0781-06)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI014-0.5-After ISM (A5D0781-08)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI036-0.5-After ISM (A5D0781-10)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI032-0.5-After ISM (A5D0781-12)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI017-0.5-B-After ISM (A5D0781-14)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI015-0.5-After ISM (A5D0781-16)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>ISM-AOI017-0.5-A-After ISM (A5D0781-18)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01  
Project Manager: Madi Novak

Reported:  
05/22/15 16:29

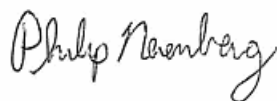
## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI017-0.5-C-As Received (A5D0781-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	80.1	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI017-0.5-C-After ISM (A5D0781-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.5	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI012-0.5-As Received (A5D0781-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	79.7	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI012-0.5-After ISM (A5D0781-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.6	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI029B-0.5-As Received (A5D0781-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	81.6	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI029B-0.5-After ISM (A5D0781-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	98.0	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI014-0.5-As Received (A5D0781-07)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	80.1	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI014-0.5-After ISM (A5D0781-08)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.7	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI036-0.5-As Received (A5D0781-09)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	81.4	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI036-0.5-After ISM (A5D0781-10)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.8	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI032-0.5-As Received (A5D0781-11)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	78.0	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI032-0.5-After ISM (A5D0781-12)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.6	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI017-0.5-B-As Received (A5D0781-13)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	79.4	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI017-0.5-B-After ISM (A5D0781-14)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.5	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI015-0.5-As Received (A5D0781-15)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	79.1	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI015-0.5-After ISM (A5D0781-16)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				

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Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

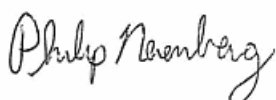
**Reported:**  
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## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI015-0.5-After ISM (A5D0781-16)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.4	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI017-0.5-A-As Received (A5D0781-17)</b>			<b>Matrix: Soil</b>	<b>Batch: 5040757</b>				
% Solids	79.9	---	1.00	% by Weight	1	04/29/15 08:58	EPA 8000C	
<b>ISM-AOI017-0.5-A-After ISM (A5D0781-18)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	97.1	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38

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 Project Number: 9003.01  
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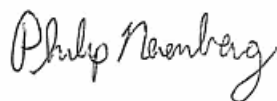
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 05/22/15 16:29

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050100 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050100-BLK1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5050100-BS1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>Duplicate (5050100-DUP1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>QC Source Sample: ISM-AOI017-0.5-C-After ISM (A5D0781-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	17000	---	200	mg/kg	1	---	17000	---	---	2	20%	
<b>Duplicate (5050100-DUP2)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>QC Source Sample: Other (A5D0913-17)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	12000	---	200	mg/kg	1	---	15000	---	---	21	20%	Q-01

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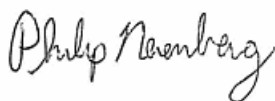
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05/22/15 16:29

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040757 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040757-DUP1)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0481-27)												
EPA 8000C												
% Solids	92.3	---	1.00	% by Weight	1	---	92.3	---	---	0	20%	
<b>Duplicate (5040757-DUP2)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0713-01)												
EPA 8000C												
% Solids	46.5	---	1.00	% by Weight	1	---	48.2	---	---	4	20%	
<b>Duplicate (5040757-DUP3)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0731-05)												
EPA 8000C												
% Solids	79.7	---	1.00	% by Weight	1	---	80.5	---	---	1	20%	
<b>Duplicate (5040757-DUP4)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0731-15)												
EPA 8000C												
% Solids	93.2	---	1.00	% by Weight	1	---	92.6	---	---	0.6	20%	
<b>Duplicate (5040757-DUP5)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0772-09)												
EPA 8000C												
% Solids	94.2	---	1.00	% by Weight	1	---	94.2	---	---	0	20%	
<b>Duplicate (5040757-DUP6)</b>						Prepared: 04/28/15 11:24 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0777-05)												
EPA 8000C												
% Solids	92.5	---	1.00	% by Weight	1	---	91.8	---	---	0.8	20%	
<b>Duplicate (5040757-DUP7)</b>						Prepared: 04/28/15 11:26 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0800-06)												
EPA 8000C												
% Solids	77.5	---	1.00	% by Weight	1	---	76.5	---	---	1	20%	
<b>Duplicate (5040757-DUP8)</b>						Prepared: 04/28/15 11:26 Analyzed: 04/29/15 08:58						

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Project Number: 9003.01  
Project Manager: Madi Novak

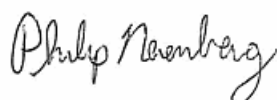
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05/22/15 16:29

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040757 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5040757-DUP8)</b>						Prepared: 04/28/15 11:26 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0813-02)												
EPA 8000C												
% Solids	89.0	---	1.00	% by Weight	1	---	89.8	---	---	0.9	20%	
<b>Duplicate (5040757-DUP9)</b>						Prepared: 04/28/15 11:30 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0819-02)												
EPA 8000C												
% Solids	93.3	---	1.00	% by Weight	1	---	92.7	---	---	0.6	20%	
<b>Duplicate (5040757-DUPA)</b>						Prepared: 04/28/15 15:57 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0833-02)												
EPA 8000C												
% Solids	87.1	---	1.00	% by Weight	1	---	87.3	---	---	0.2	20%	
<b>Duplicate (5040757-DUPB)</b>						Prepared: 04/28/15 16:48 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0842-02)												
EPA 8000C												
% Solids	78.3	---	1.00	% by Weight	1	---	78.4	---	---	0.1	20%	
<b>Duplicate (5040757-DUPC)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0845-03)												
EPA 8000C												
% Solids	80.6	---	1.00	% by Weight	1	---	80.2	---	---	0.5	20%	
<b>Duplicate (5040757-DUPD)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0845-11)												
EPA 8000C												
% Solids	80.5	---	1.00	% by Weight	1	---	81.9	---	---	2	20%	
<b>Duplicate (5040757-DUPE)</b>						Prepared: 04/28/15 19:25 Analyzed: 04/29/15 08:58						
QC Source Sample: Other (A5D0850-02)												
EPA 8000C												
% Solids	89.0	---	1.00	% by Weight	1	---	89.0	---	---	0	20%	

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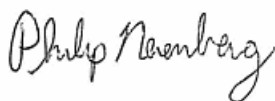
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050098 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050098-DUP1)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5C0205-33)												
EPA 8000C												
% Solids	90.0	---	1.00	% by Weight	1	---	88.7	---	---	1	20%	Q-38
<b>Duplicate (5050098-DUP2)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5D0722-07)												
EPA 8000C												
% Solids	99.9	---	1.00	% by Weight	1	---	99.9	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP3)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5D0722-16)												
EPA 8000C												
% Solids	99.8	---	1.00	% by Weight	1	---	99.8	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP4)</b>						Prepared: 05/05/15 08:17 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0036-01)												
EPA 8000C												
% Solids	94.0	---	1.00	% by Weight	1	---	94.5	---	---	0.5	20%	Q-38
<b>Duplicate (5050098-DUP5)</b>						Prepared: 05/05/15 08:17 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0073-05)												
EPA 8000C												
% Solids	89.2	---	1.00	% by Weight	1	---	89.5	---	---	0.3	20%	Q-38
<b>Duplicate (5050098-DUP6)</b>						Prepared: 05/05/15 11:22 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0076-03)												
EPA 8000C												
% Solids	49.6	---	1.00	% by Weight	1	---	50.8	---	---	2	20%	Q-38
<b>Duplicate (5050098-DUP7)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0101-02)												
EPA 8000C												
% Solids	82.8	---	1.00	% by Weight	1	---	82.8	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP8)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0109-01)												

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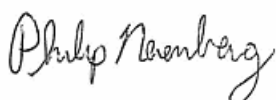
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050098 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050098-DUP8)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (ASE0109-01)												
EPA 8000C												
% Solids	86.4	---	1.00	% by Weight	1	---	87.1	---	---	0.8	20%	Q-38





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 Project Manager: Madi Novak

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## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

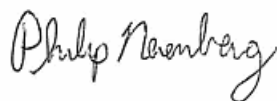
Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050100</b>							
A5D0781-02	Soil	PSEP/SM 5310B MOD	04/23/15 11:25	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-04	Soil	PSEP/SM 5310B MOD	04/23/15 09:00	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-06	Soil	PSEP/SM 5310B MOD	04/23/15 14:40	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-08	Soil	PSEP/SM 5310B MOD	04/23/15 13:15	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-10	Soil	PSEP/SM 5310B MOD	04/23/15 14:15	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-12	Soil	PSEP/SM 5310B MOD	04/23/15 13:45	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-14	Soil	PSEP/SM 5310B MOD	04/23/15 10:50	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-16	Soil	PSEP/SM 5310B MOD	04/23/15 10:00	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0781-18	Soil	PSEP/SM 5310B MOD	04/23/15 10:30	05/05/15 08:43	5g/5g	5g/5g	NA

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5040757</b>							
A5D0781-01	Soil	EPA 8000C	04/23/15 11:25	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-03	Soil	EPA 8000C	04/23/15 09:00	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-05	Soil	EPA 8000C	04/23/15 14:40	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-07	Soil	EPA 8000C	04/23/15 13:15	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-09	Soil	EPA 8000C	04/23/15 14:15	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-11	Soil	EPA 8000C	04/23/15 13:45	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-13	Soil	EPA 8000C	04/23/15 10:50	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-15	Soil	EPA 8000C	04/23/15 10:00	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-17	Soil	EPA 8000C	04/23/15 10:30	04/28/15 15:59	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5050098</b>							
A5D0781-02	Soil	EPA 8000C	04/23/15 11:25	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-04	Soil	EPA 8000C	04/23/15 09:00	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA

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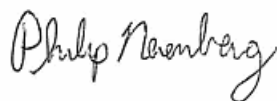
## SAMPLE PREPARATION INFORMATION

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A5D0781-06	Soil	EPA 8000C	04/23/15 14:40	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-08	Soil	EPA 8000C	04/23/15 13:15	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-10	Soil	EPA 8000C	04/23/15 14:15	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-12	Soil	EPA 8000C	04/23/15 13:45	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-14	Soil	EPA 8000C	04/23/15 10:50	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-16	Soil	EPA 8000C	04/23/15 10:00	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0781-18	Soil	EPA 8000C	04/23/15 10:30	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01  
Project Manager: Madi Novak

**Reported:**  
05/22/15 16:29

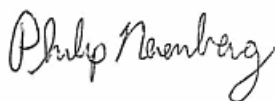
## Notes and Definitions

### Qualifiers:

- Q-01 Spike recovery and/or RPD is outside acceptance limits.  
Q-38 Oven outside of control limits during drying step.

### Notes and Conventions:

- DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.  
Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.  
For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.  
Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.  
--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.  
\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01  
Project Manager: Madi Novak

Reported:  
05/22/15 16:29

**CHAIN OF CUSTODY**

Company: Maul Foster & Alongi, Inc. Project Mgr: Madi Novak Project Name: Port of Ridgefield ISM Project # 9003.01  
Address: 2001 NW 19th Ave, Ste 200 Portland, OR 97209 Phone: 503-718-2323 Fax: 503-718-0333 Email: emalongi@mfaulforster.com

Site Location: OR (WA) Other: \_\_\_\_\_  
Sampled by: Erik Novak

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX	NWTPH-GX	\$260 VOC	\$260 RBDM VOCs	\$260 BTEX	\$270 SVOC	\$270 SIM PAHS	8082 PCBs	600 TPO	RCPA Metals (8)	TCLP Metals (5)	Al, Sb, As, Ba, Be, Cd, Cr, Cu, Co, Ni, Pb, Se, Ag, Na, TL, V, Zn, Hg, Mn, Mo, Ni, Rb, Sr	TOTAL DISS TCLP	1200-COLS	1200-Z	BoXins 1613B	ToC	ISM
1 ISM-A01017-0.5-C	4/13/15	11:25	S	1																	X	X	X
2 ISM-A01018-0.5	4/13/15	10:00		1																	X	X	X
3 ISM-A01019-0.5	4/13/15	14:40		1																	X	X	X
4 ISM-A01020-0.5	4/13/15	13:15		1																	X	X	X
5 ISM-A01021-0.5	4/13/15	14:15		1																	X	X	X
6 ISM-A01022-0.5	4/13/15	13:15		1																	X	X	X
7 ISM-A01023-0.5-B	4/13/15	10:50		1																	X	X	X
8 ISM-A01024-0.5-S	4/13/15	10:00		1																	X	X	X
9 ISM-A01027-0.5-A	4/13/15	10:30		1																	X	X	X

Normal Turn Around Time (TAT) = 7-10 Business Days YES NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS: \_\_\_\_\_

RELINQUISHED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: 4/21/15 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Printed Name: Erik Novak Printed Name: Madi Novak  
Time: 13:00 Time: 15:00

Company: MFA Company: MFA

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Thursday, June 11, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield / 9003.01

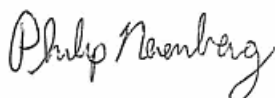
Enclosed are the results of analyses for work order A5D0784, which was received by the laboratory on 4/24/2015 at 1:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01  
Project Manager: Madi Novak

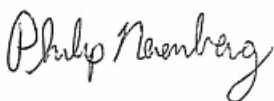
**Reported:**  
06/11/15 09:32

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW036-0.5	A5D0784-01	Soil	04/23/15 15:10	04/24/15 13:00
SS-ROW036-1.0	A5D0784-02	Soil	04/23/15 15:20	04/24/15 13:00
SBS-AOI032-1.0	A5D0784-03	Soil	04/23/15 15:30	04/24/15 13:00
SS-ROW012-0.5	A5D0784-05	Soil	04/23/15 16:00	04/24/15 13:00
SS-ROW014-0.5	A5D0784-06	Soil	04/23/15 16:20	04/24/15 13:00
SS-ROW014-1.0	A5D0784-07	Soil	04/23/15 16:30	04/24/15 13:00
SBS-AOI017-1.0	A5D0784-08	Soil	04/23/15 16:40	04/24/15 13:00

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01  
Project Manager: Madi Novak

**Reported:**  
06/11/15 09:32

## ANALYTICAL CASE NARRATIVE

**Work Order: A5D0784**

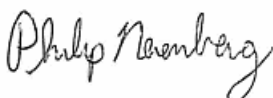
Amended Report Revision 1:

This report supersedes all previous reports.

Additional Analyses-

TOC analysis was added to samples SS-ROW036-1.0 and SS-ROW014-1.0 after the original report was finalized. This revised report contains both the original and the added data.

Philip Nerenberg  
Lab Director  
6/12/15



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

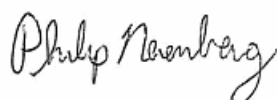
**Reported:**  
 06/11/15 09:32

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW036-0.5 (A5D0784-01)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SS-ROW036-1.0 (A5D0784-02)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>SBS-AOI032-1.0 (A5D0784-03)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SS-ROW012-0.5 (A5D0784-05)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SS-ROW014-0.5 (A5D0784-06)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	
<b>SS-ROW014-1.0 (A5D0784-07)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>SBS-AOI017-1.0 (A5D0784-08)</b>			<b>Matrix: Soil</b>					
Batch: 5040846								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	05/05/15 13:30	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01  
Project Manager: Madi Novak

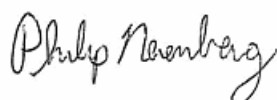
**Reported:**  
06/11/15 09:32

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5040846 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5040846-BLK1)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5040846-BS1)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	8900	---		mg/kg	1	10000	---	89	85-115%	---	---	
<b>Duplicate (5040846-DUP1)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>QC Source Sample: Other (A5D0682-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	1200	---	200	mg/kg	1	---	1200	---	---	4	20%	
<b>Duplicate (5040846-DUP2)</b>						Prepared: 04/30/15 11:24 Analyzed: 05/04/15 17:15						
<b>QC Source Sample: Other (A5D0719-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	34000	---	200	mg/kg	1	---	32000	---	---	7	20%	
<b>Batch 5050889 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050889-BLK1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5050889-BS1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (5050889-DUP1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>QC Source Sample: Other (A5E0713-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	19000	---	200	mg/kg	1	---	19000	---	---	0.7	20%	

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01  
 Project Manager: Madi Novak

**Reported:**  
 06/11/15 09:32

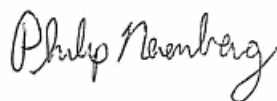
### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b><u>Batch: 5040846</u></b>							
A5D0784-01	Soil	PSEP/SM 5310B MOD	04/23/15 15:10	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-03	Soil	PSEP/SM 5310B MOD	04/23/15 15:30	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-05	Soil	PSEP/SM 5310B MOD	04/23/15 16:00	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-06	Soil	PSEP/SM 5310B MOD	04/23/15 16:20	04/30/15 11:24	5g/5g	5g/5g	NA
A5D0784-08	Soil	PSEP/SM 5310B MOD	04/23/15 16:40	04/30/15 11:24	5g/5g	5g/5g	NA
<b><u>Batch: 5050889</u></b>							
A5D0784-02	Soil	PSEP/SM 5310B MOD	04/23/15 15:20	05/29/15 13:34	5g/5g	5g/5g	NA
A5D0784-07	Soil	PSEP/SM 5310B MOD	04/23/15 16:30	05/29/15 13:34	5g/5g	5g/5g	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01  
Project Manager: Madi Novak

Reported:  
06/11/15 09:32

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





Tuesday, June 23, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

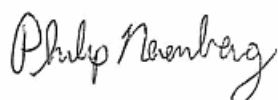
Enclosed are the results of analyses for work order A5D0913, which was received by the laboratory on 4/30/2015 at 2:25:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**

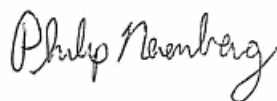
Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 06/23/15 14:28

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI020B-0.5-As Received	A5D0913-01	Soil	04/30/15 08:40	04/30/15 14:25
ISM-AOI020B-0.5-After ISM	A5D0913-02	Soil	04/30/15 08:40	04/30/15 14:25
ISM-AOI021-0.5-As Received	A5D0913-03	Soil	04/30/15 09:25	04/30/15 14:25
ISM-AOI021-0.5-After ISM	A5D0913-04	Soil	04/30/15 09:25	04/30/15 14:25
ISM-AOI030-0.5-As Received	A5D0913-05	Soil	04/30/15 10:00	04/30/15 14:25
ISM-AOI030-0.5-After ISM	A5D0913-06	Soil	04/30/15 10:00	04/30/15 14:25
ISM-AOI024-0.5-As Received	A5D0913-07	Soil	04/30/15 10:30	04/30/15 14:25
ISM-AOI024-0.5-After ISM	A5D0913-08	Soil	04/30/15 10:30	04/30/15 14:25
ISM-AOI025-0.5-As Received	A5D0913-09	Soil	04/30/15 11:10	04/30/15 14:25
ISM-AOI025-0.5-After ISM	A5D0913-10	Soil	04/30/15 11:10	04/30/15 14:25
ISM-AOI027-0.5-As Received	A5D0913-11	Soil	04/30/15 11:40	04/30/15 14:25
ISM-AOI027-0.5-After ISM	A5D0913-12	Soil	04/30/15 11:40	04/30/15 14:25
ISM-AOI029A-0.5-As Received	A5D0913-13	Soil	04/30/15 12:10	04/30/15 14:25
ISM-AOI029A-0.5-After ISM	A5D0913-14	Soil	04/30/15 12:10	04/30/15 14:25
SS-ROW030-0.5	A5D0913-15	Soil	04/30/15 12:40	04/30/15 14:25
SS-ROW030-1.0	A5D0913-16	Soil	04/30/15 12:45	04/30/15 14:25
SBS-A01020B-1.0	A5D0913-17	Soil	04/30/15 13:15	04/30/15 14:25





**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
06/23/15 14:28

## ANALYTICAL CASE NARRATIVE

**Work Order: A5D0913**

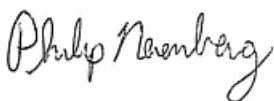
Amended Report Revision 1:

This report supersedes all previous reports.

Additional Analyses-

TOC analysis was added to sample SS-ROW030-1.0 after the original report was finalized. This revised report contains both the original and the added data.

Philip Nerenberg  
Lab Director  
6/23/15



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 06/23/15 14:28

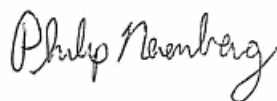
## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI020B-0.5-After ISM (A5D0913-02)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI021-0.5-After ISM (A5D0913-04)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI030-0.5-After ISM (A5D0913-06)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI024-0.5-After ISM (A5D0913-08)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI025-0.5-After ISM (A5D0913-10)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI027-0.5-After ISM (A5D0913-12)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>ISM-AOI029A-0.5-After ISM (A5D0913-14)</b>			<b>Matrix: Soil</b>					
Batch: 5050270								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	05/12/15 15:20	PSEP/SM 5310B MOD	
<b>SS-ROW030-0.5 (A5D0913-15)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	
<b>SS-ROW030-1.0 (A5D0913-16)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>9400</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	H-08

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**Maul Foster & Alongi, INC.**  
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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

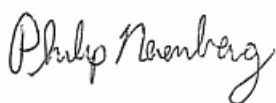
**Reported:**  
 06/23/15 14:28

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-A01020B-1.0 (A5D0913-17)</b>			<b>Matrix: Soil</b>					
Batch: 5050100								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	05/07/15 18:05	PSEP/SM 5310B MOD	

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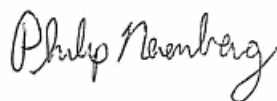
## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>ISM-AOI020B-0.5-As Received (A5D0913-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	77.6	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI020B-0.5-After ISM (A5D0913-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.1	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI021-0.5-As Received (A5D0913-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	79.7	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI021-0.5-After ISM (A5D0913-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.2	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI030-0.5-As Received (A5D0913-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	82.0	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI030-0.5-After ISM (A5D0913-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.3	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI024-0.5-As Received (A5D0913-07)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	78.0	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI024-0.5-After ISM (A5D0913-08)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.1	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI025-0.5-As Received (A5D0913-09)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	80.6	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI025-0.5-After ISM (A5D0913-10)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.6	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI027-0.5-As Received (A5D0913-11)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	76.7	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI027-0.5-After ISM (A5D0913-12)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.4	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>ISM-AOI029A-0.5-As Received (A5D0913-13)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	77.4	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>ISM-AOI029A-0.5-After ISM (A5D0913-14)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050208</b>				
% Solids	97.5	---	1.00	% by Weight	1	05/08/15 09:04	EPA 8000C	Q-38
<b>SS-ROW030-0.5 (A5D0913-15)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				
% Solids	78.0	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38
<b>SBS-A01020B-1.0 (A5D0913-17)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050098</b>				

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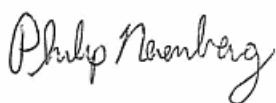
<b>Maul Foster &amp; Alongi, INC.</b> 2001 NW 19th Ave, STE 200 Portland, OR 97209	Project: <b>Port of Ridgefield ISM</b> Project Number: 9003.01.39 Project Manager: Madi Novak	<b>Reported:</b> 06/23/15 14:28
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### ANALYTICAL SAMPLE RESULTS

<b>Percent Dry Weight</b>
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Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-A01020B-1.0 (A5D0913-17)</b>			<b>Matrix: Soil</b>		<b>Batch: 5050098</b>			
% Solids	82.3	---	1.00	% by Weight	1	05/06/15 10:18	EPA 8000C	Q-38

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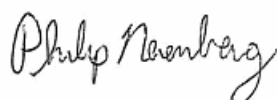
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050100 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050100-BLK1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5050100-BS1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>Duplicate (5050100-DUP1)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>QC Source Sample: Other (A5D0781-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	17000	---	200	mg/kg	1	---	17000	---	---	2	20%	
<b>Duplicate (5050100-DUP2)</b>						Prepared: 05/05/15 08:43 Analyzed: 05/07/15 18:05						
<b>QC Source Sample: SBS-A01020B-1.0 (A5D0913-17)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	12000	---	200	mg/kg	1	---	15000	---	---	21	20%	Q-01
<b>Batch 5050270 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050270-BLK1)</b>						Prepared: 05/09/15 09:03 Analyzed: 05/12/15 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5050270-BS1)</b>						Prepared: 05/09/15 09:03 Analyzed: 05/12/15 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (5050270-DUP1)</b>						Prepared: 05/09/15 09:03 Analyzed: 05/12/15 15:20						
<b>QC Source Sample: ISM-AOI020B-0.5-After ISM (A5D0913-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	22000	---	200	mg/kg	1	---	22000	---	---	2	20%	
<b>Batch 5060404 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5060404-BLK1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	

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Project Manager: Madi Novak

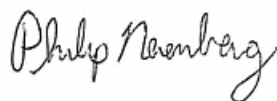
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06/23/15 14:28

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060404 - PSEP TOC</b>						<b>Soil</b>						
<b>LCS (5060404-BS1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (5060404-DUP1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: SS-ROW030-1.0 (A5D0913-16)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>9200</b>	---	200	mg/kg	1	---	9400	---	---	2	20%	
<b>Duplicate (5060404-DUP2)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: Other (A5F0363-17)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>19000</b>	---	200	mg/kg	1	---	19000	---	---	1	20%	

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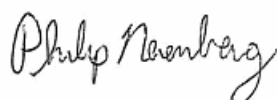
**Reported:**  
06/23/15 14:28

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050098 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050098-DUP1)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5C0205-33)												
EPA 8000C												
% Solids	90.0	---	1.00	% by Weight	1	---	88.7	---	---	1	20%	Q-38
<b>Duplicate (5050098-DUP2)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5D0722-07)												
EPA 8000C												
% Solids	99.9	---	1.00	% by Weight	1	---	99.9	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP3)</b>						Prepared: 05/05/15 08:14 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5D0722-16)												
EPA 8000C												
% Solids	99.8	---	1.00	% by Weight	1	---	99.8	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP4)</b>						Prepared: 05/05/15 08:17 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0036-01)												
EPA 8000C												
% Solids	94.0	---	1.00	% by Weight	1	---	94.5	---	---	0.5	20%	Q-38
<b>Duplicate (5050098-DUP5)</b>						Prepared: 05/05/15 08:17 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0073-05)												
EPA 8000C												
% Solids	89.2	---	1.00	% by Weight	1	---	89.5	---	---	0.3	20%	Q-38
<b>Duplicate (5050098-DUP6)</b>						Prepared: 05/05/15 11:22 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0076-03)												
EPA 8000C												
% Solids	49.6	---	1.00	% by Weight	1	---	50.8	---	---	2	20%	Q-38
<b>Duplicate (5050098-DUP7)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0101-02)												
EPA 8000C												
% Solids	82.8	---	1.00	% by Weight	1	---	82.8	---	---	0	20%	Q-38
<b>Duplicate (5050098-DUP8)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						

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Project Manager: Madi Novak

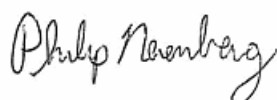
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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050098 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050098-DUP8)</b>						Prepared: 05/05/15 19:02 Analyzed: 05/06/15 10:18						
QC Source Sample: Other (A5E0109-01)												
EPA 8000C												
% Solids	86.4	---	1.00	% by Weight	1	---	87.1	---	---	0.8	20%	Q-38
<b>Batch 5050208 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050208-DUP1)</b>						Prepared: 05/07/15 14:29 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0156-01)												
EPA 8000C												
% Solids	80.1	---	1.00	% by Weight	1	---	80.6	---	---	0.6	20%	Q-38
<b>Duplicate (5050208-DUP2)</b>						Prepared: 05/07/15 14:29 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0172-03)												
EPA 8000C												
% Solids	78.0	---	1.00	% by Weight	1	---	77.9	---	---	0.1	20%	Q-38
<b>Duplicate (5050208-DUP3)</b>						Prepared: 05/07/15 18:13 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0178-05)												
EPA 8000C												
% Solids	74.5	---	1.00	% by Weight	1	---	73.7	---	---	1	20%	Q-38
<b>Duplicate (5050208-DUP4)</b>						Prepared: 05/07/15 18:51 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0188-01)												
EPA 8000C												
% Solids	82.2	---	1.00	% by Weight	1	---	82.5	---	---	0.4	20%	Q-38
<b>Duplicate (5050208-DUP5)</b>						Prepared: 05/07/15 18:51 Analyzed: 05/08/15 09:04						
QC Source Sample: Other (A5E0193-04)												
EPA 8000C												
% Solids	75.9	---	1.00	% by Weight	1	---	76.4	---	---	0.7	20%	Q-38

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
 Project Manager: Madi Novak

Reported:  
 06/23/15 14:28

### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050100</b>							
A5D0913-15	Soil	PSEP/SM 5310B MOD	04/30/15 12:40	05/05/15 08:43	5g/5g	5g/5g	NA
A5D0913-17	Soil	PSEP/SM 5310B MOD	04/30/15 13:15	05/05/15 08:43	5g/5g	5g/5g	NA
<b>Batch: 5050270</b>							
A5D0913-02	Soil	PSEP/SM 5310B MOD	04/30/15 08:40	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-04	Soil	PSEP/SM 5310B MOD	04/30/15 09:25	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-06	Soil	PSEP/SM 5310B MOD	04/30/15 10:00	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-08	Soil	PSEP/SM 5310B MOD	04/30/15 10:30	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-10	Soil	PSEP/SM 5310B MOD	04/30/15 11:10	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-12	Soil	PSEP/SM 5310B MOD	04/30/15 11:40	05/09/15 09:03	5g/5g	5g/5g	NA
A5D0913-14	Soil	PSEP/SM 5310B MOD	04/30/15 12:10	05/09/15 09:03	5g/5g	5g/5g	NA
<b>Batch: 5060404</b>							
A5D0913-16	Soil	PSEP/SM 5310B MOD	04/30/15 12:45	06/12/15 08:34	5g/5g	5g/5g	NA

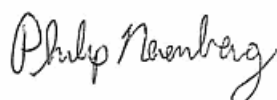
#### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050098</b>							
A5D0913-01	Soil	EPA 8000C	04/30/15 08:40	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-03	Soil	EPA 8000C	04/30/15 09:25	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-05	Soil	EPA 8000C	04/30/15 10:00	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-07	Soil	EPA 8000C	04/30/15 10:30	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-09	Soil	EPA 8000C	04/30/15 11:10	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-11	Soil	EPA 8000C	04/30/15 11:40	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-13	Soil	EPA 8000C	04/30/15 12:10	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA

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Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
 Project Manager: Madi Novak

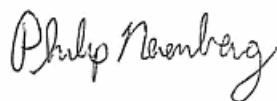
Reported:  
 06/23/15 14:28

### SAMPLE PREPARATION INFORMATION

#### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A5D0913-15	Soil	EPA 8000C	04/30/15 12:40	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-17	Soil	EPA 8000C	04/30/15 13:15	05/05/15 08:17	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5050208</b>							
A5D0913-02	Soil	EPA 8000C	04/30/15 08:40	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-04	Soil	EPA 8000C	04/30/15 09:25	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-06	Soil	EPA 8000C	04/30/15 10:00	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-08	Soil	EPA 8000C	04/30/15 10:30	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-10	Soil	EPA 8000C	04/30/15 11:10	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-12	Soil	EPA 8000C	04/30/15 11:40	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA
A5D0913-14	Soil	EPA 8000C	04/30/15 12:10	05/07/15 14:29	1N/A/1N/A	1N/A/1N/A	NA



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
06/23/15 14:28

## Notes and Definitions

### Qualifiers:

- H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.
- Q-01 Spike recovery and/or RPD is outside acceptance limits.
- Q-38 Oven outside of control limits during drying step.

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Tuesday, June 9, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

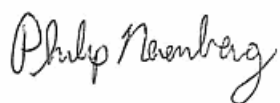
Enclosed are the results of analyses for work order A5E0255, which was received by the laboratory on 5/8/2015 at 9:40:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

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---

Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

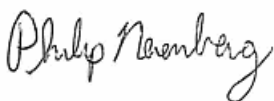
**Reported:**  
06/09/15 17:46

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW004-0.5	A5E0255-01	Soil	05/07/15 14:05	05/08/15 09:40
SBS-ROW008-0.5	A5E0255-03	Soil	05/07/15 14:30	05/08/15 09:40
ISM-AOI016-0.5-As Received	A5E0255-05	Soil	05/07/15 15:25	05/08/15 09:40
ISM-AOI016-0.5-After ISM	A5E0255-06	Soil	05/07/15 15:25	05/08/15 09:40

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 Portland, OR 97209

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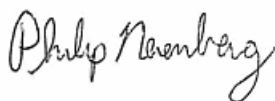
**Reported:**  
 06/09/15 17:46

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW004-0.5 (A5E0255-01)</b>			<b>Matrix: Soil</b>					
Batch: 5050493								
<b>Total Organic Carbon</b>	<b>4000</b>	---	200	mg/kg	1	05/20/15 12:15	PSEP/SM 5310B MOD	
<b>SBS-ROW008-0.5 (A5E0255-03)</b>			<b>Matrix: Soil</b>					
Batch: 5050493								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	05/20/15 12:15	PSEP/SM 5310B MOD	
<b>ISM-AOI016-0.5-After ISM (A5E0255-06)</b>			<b>Matrix: Soil</b>					
Batch: 5050493								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	05/20/15 12:15	PSEP/SM 5310B MOD	

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 Portland, OR 97209

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 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

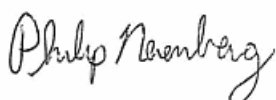
**Reported:**  
 06/09/15 17:46

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI016-0.5-As Received (A5E0255-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050405</b>				
% Solids	78.8	---	1.00	% by Weight	1	05/14/15 08:24	EPA 8000C	
<b>ISM-AOI016-0.5-After ISM (A5E0255-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5050790</b>				
% Solids	96.5	---	1.00	% by Weight	1	05/28/15 08:26	EPA 8000C	

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

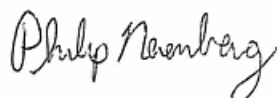
**Reported:**  
 06/09/15 17:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050493 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050493-BLK1)</b>						Prepared: 05/15/15 12:31 Analyzed: 05/20/15 12:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5050493-BS1)</b>						Prepared: 05/15/15 12:31 Analyzed: 05/20/15 12:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (5050493-DUP1)</b>						Prepared: 05/15/15 12:31 Analyzed: 05/20/15 12:15						
<b>QC Source Sample: Other (A5E0213-04)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	3200	---	200	mg/kg	1	---	2800	---	---	13	20%	

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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

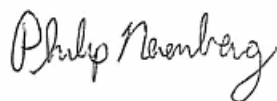
Reported:  
06/09/15 17:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050405 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050405-DUP1)</b>						Prepared: 05/13/15 14:18 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0249-10)												
EPA 8000C												
% Solids	67.8	---	1.00	% by Weight	1	---	67.5	---	---	0.4	20%	
<b>Duplicate (5050405-DUP2)</b>						Prepared: 05/13/15 14:18 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0305-03)												
EPA 8000C												
% Solids	73.0	---	1.00	% by Weight	1	---	74.1	---	---	1	20%	
<b>Duplicate (5050405-DUP3)</b>						Prepared: 05/13/15 14:19 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0305-13)												
EPA 8000C												
% Solids	69.5	---	1.00	% by Weight	1	---	68.7	---	---	1	20%	
<b>Duplicate (5050405-DUP4)</b>						Prepared: 05/13/15 18:31 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0375-01)												
EPA 8000C												
% Solids	86.8	---	1.00	% by Weight	1	---	88.1	---	---	1	20%	
<b>Duplicate (5050405-DUP5)</b>						Prepared: 05/13/15 18:31 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0379-01)												
EPA 8000C												
% Solids	77.4	---	1.00	% by Weight	1	---	77.1	---	---	0.4	20%	
<b>Duplicate (5050405-DUP6)</b>						Prepared: 05/13/15 19:25 Analyzed: 05/14/15 08:24						
QC Source Sample: Other (A5E0388-02)												
EPA 8000C												
% Solids	81.0	---	1.00	% by Weight	1	---	80.6	---	---	0.5	20%	
<b>Batch 5050790 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050790-DUP1)</b>						Prepared: 05/27/15 11:00 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0711-06)												
EPA 8000C												

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

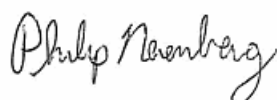
Reported:  
 06/09/15 17:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050790 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050790-DUP1)</b>						Prepared: 05/27/15 11:00 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0711-06)												
% Solids	89.7	---	1.00	% by Weight	1	---	89.6	---	---	0.1	20%	
<b>Duplicate (5050790-DUP2)</b>						Prepared: 05/27/15 14:32 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0747-02)												
EPA 8000C												
% Solids	79.1	---	1.00	% by Weight	1	---	79.2	---	---	0.1	20%	
<b>Duplicate (5050790-DUP3)</b>						Prepared: 05/27/15 18:25 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0770-05)												
EPA 8000C												
% Solids	74.5	---	1.00	% by Weight	1	---	74.3	---	---	0.3	20%	
<b>Duplicate (5050790-DUP4)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0775-01)												
EPA 8000C												
% Solids	75.1	---	1.00	% by Weight	1	---	76.6	---	---	2	20%	
<b>Duplicate (5050790-DUP5)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0778-03)												
EPA 8000C												
% Solids	88.8	---	1.00	% by Weight	1	---	88.3	---	---	0.6	20%	
<b>Duplicate (5050790-DUP6)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0782-02)												
EPA 8000C												
% Solids	89.3	---	1.00	% by Weight	1	---	89.5	---	---	0.2	20%	

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/09/15 17:46

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

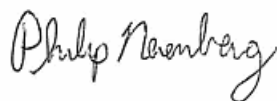
Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050493</b>							
A5E0255-01	Soil	PSEP/SM 5310B MOD	05/07/15 14:05	05/15/15 12:31	5g/5g	5g/5g	NA
A5E0255-03	Soil	PSEP/SM 5310B MOD	05/07/15 14:30	05/15/15 12:31	5g/5g	5g/5g	NA
A5E0255-06	Soil	PSEP/SM 5310B MOD	05/07/15 15:25	05/15/15 12:31	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050405</b>							
A5E0255-05	Soil	EPA 8000C	05/07/15 15:25	05/13/15 14:18	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5050790</b>							
A5E0255-06	Soil	EPA 8000C	05/07/15 15:25	05/27/15 11:00	1N/A/1N/A	1N/A/1N/A	NA

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Philip Nerenberg, Lab Director

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Project Number: 9003.01.39  
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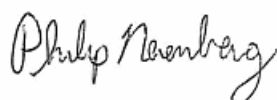
Reported:  
06/09/15 17:46

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

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- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/09/15 17:46

**CHAIN OF CUSTODY**

Lab # ASG 00551

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: MFA Project Mgr: Phil Wiescher Project Name: Port of Ridgefield Project # 9003.01.39  
 Address: 2001 NW 19th Ave #200/PDX, OR Phone: 5035015209 Fax: \_\_\_\_\_ Email: PWiescher@maulfooster.com  
 Sampled by: PW/EWH

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
					YES	NO
1 SS-Row004-0.5	6/7/15	14:05	SO	2		
2 SS-Row004-1.0	"	14:15	SO	2		
3 SS-Row008-0.5	"	14:30	SO	2		
4 SBS-Row008-1.0	"	15:00	SO	2		
5 19M-AD106-0.5	6/11/15	15:25	SO	2		
6						
7						
8						
9						
10						

Site Location: OR (with circled 'W')  
Other: \_\_\_\_\_

Normal Turn Around Time (TAT) = 7-10 Business Days  YES  NO

TAT Requested (circle): 3 Day

SPECIAL INSTRUCTIONS:  
Letm samples by (sim processing).  
Archive (SBS-Row008-1.0)  
SBS-Row004-1.0

RECEIVED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_  
 Signature: Emily Hester Date: 6/9/15 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: Emily Hester Time: 4:10 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_  
 Company: MFA Company: Apex

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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Monday, August 17, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

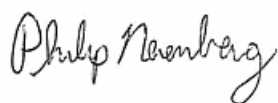
Enclosed are the results of analyses for work order A5E0713, which was received by the laboratory on 5/22/2015 at 10:36:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

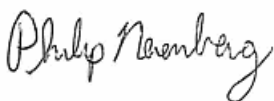
**Reported:**  
08/17/15 17:01

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI008-0.5-As Received	A5E0713-01	Soil	05/21/15 14:40	05/22/15 10:36
ISM-AOI008-0.5-After ISM	A5E0713-02	Soil	05/21/15 14:40	05/22/15 10:36
ISM-AOI030-0.5-As Received	A5E0713-03	Soil	05/21/15 15:15	05/22/15 10:36
ISM-AOI030-0.5-After ISM	A5E0713-04	Soil	05/21/15 15:15	05/22/15 10:36
SS-ROW026-0.5	A5E0713-05	Soil	05/21/15 16:10	05/22/15 10:36
SBS-ROW026-1.0	A5E0713-06	Soil	05/21/15 16:20	05/22/15 10:36

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
08/17/15 17:01

## ANALYTICAL CASE NARRATIVE

**Work Order: A5E0713**

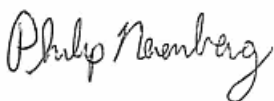
Amended Report Revision 1:

This report supersedes all previous reports.

Additional Analyses-

TOC analysis was added to sample SBS-ROW026-1.0 after the original report was finalized. This revised report contains both the original and the added data.

Philip Nerenberg  
Lab Director  
8/17/15





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 Portland, OR 97209

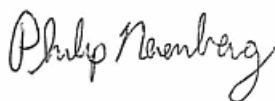
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 08/17/15 17:01

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI008-0.5-After ISM (A5E0713-02)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>ISM-AOI030-0.5-After ISM (A5E0713-04)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>SS-ROW026-0.5 (A5E0713-05)</b>			<b>Matrix: Soil</b>					
Batch: 5050889								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/01/15 13:45	PSEP/SM 5310B MOD	
<b>SBS-ROW026-1.0 (A5E0713-06)</b>			<b>Matrix: Soil</b>					
Batch: 5070088								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	07/07/15 11:00	PSEP/SM 5310B MOD	H-08



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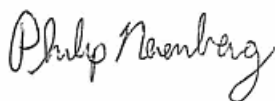
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 08/17/15 17:01

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI008-0.5-As Received (A5E0713-01)</b>			<b>Matrix: Soil</b>		<b>Batch: 5060061</b>			
% Solids	79.6	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>ISM-AOI008-0.5-After ISM (A5E0713-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 5060061</b>			
% Solids	96.8	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>ISM-AOI030-0.5-As Received (A5E0713-03)</b>			<b>Matrix: Soil</b>		<b>Batch: 5060061</b>			
% Solids	84.5	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>ISM-AOI030-0.5-After ISM (A5E0713-04)</b>			<b>Matrix: Soil</b>		<b>Batch: 5060061</b>			
% Solids	97.0	---	1.00	% by Weight	1	06/03/15 08:48	EPA 8000C	
<b>SS-ROW026-0.5 (A5E0713-05)</b>			<b>Matrix: Soil</b>		<b>Batch: 5050790</b>			
% Solids	84.9	---	1.00	% by Weight	1	05/28/15 08:26	EPA 8000C	





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2001 NW 19th Ave, STE 200  
Portland, OR 97209

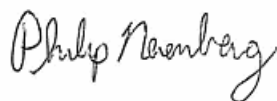
Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
08/17/15 17:01

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050889 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5050889-BLK1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5050889-BS1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (5050889-DUP1)</b>						Prepared: 05/29/15 13:34 Analyzed: 06/01/15 13:45						
<b>QC Source Sample: ISM-AOI008-0.5-After ISM (A5E0713-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>19000</b>	---	200	mg/kg	1	---	19000	---	---	0.7	20%	
<b>Batch 5070088 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5070088-BLK1)</b>						Prepared: 07/06/15 06:59 Analyzed: 07/07/15 11:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5070088-BS1)</b>						Prepared: 07/06/15 06:59 Analyzed: 07/07/15 11:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115%	---	---	
<b>Duplicate (5070088-DUP1)</b>						Prepared: 07/06/15 06:59 Analyzed: 07/07/15 11:00						
<b>QC Source Sample: SBS-ROW026-1.0 (A5E0713-06)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>10000</b>	---	200	mg/kg	1	---	12000	---	---	13	20%	



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Project: **Port of Ridgefield ISM**  
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Project Manager: Phil Wiescher

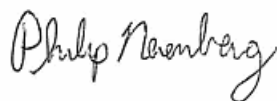
**Reported:**  
08/17/15 17:01

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5050790 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5050790-DUP1)</b>						Prepared: 05/27/15 11:00 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0711-06)												
EPA 8000C												
% Solids	89.7	---	1.00	% by Weight	1	---	89.6	---	---	0.1	20%	
<b>Duplicate (5050790-DUP2)</b>						Prepared: 05/27/15 14:32 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0747-02)												
EPA 8000C												
% Solids	79.1	---	1.00	% by Weight	1	---	79.2	---	---	0.1	20%	
<b>Duplicate (5050790-DUP3)</b>						Prepared: 05/27/15 18:25 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0770-05)												
EPA 8000C												
% Solids	74.5	---	1.00	% by Weight	1	---	74.3	---	---	0.3	20%	
<b>Duplicate (5050790-DUP4)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0775-01)												
EPA 8000C												
% Solids	75.1	---	1.00	% by Weight	1	---	76.6	---	---	2	20%	
<b>Duplicate (5050790-DUP5)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0778-03)												
EPA 8000C												
% Solids	88.8	---	1.00	% by Weight	1	---	88.3	---	---	0.6	20%	
<b>Duplicate (5050790-DUP6)</b>						Prepared: 05/27/15 19:43 Analyzed: 05/28/15 08:26						
QC Source Sample: Other (A5E0782-02)												
EPA 8000C												
% Solids	89.3	---	1.00	% by Weight	1	---	89.5	---	---	0.2	20%	
<b>Batch 5060061 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060061-DUP1)</b>						Prepared: 06/02/15 11:03 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0025-01)												
EPA 8000C												

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Philip Nerenberg, Lab Director

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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

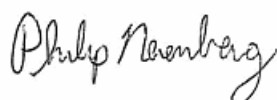
**Reported:**  
08/17/15 17:01

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060061 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060061-DUP1)</b>						Prepared: 06/02/15 11:03 Analyzed: 06/03/15 08:48						
<b>QC Source Sample: Other (A5F0025-01)</b>												
% Solids	88.6	---	1.00	% by Weight	1	---	89.7	---	---	1	20%	
<b>Duplicate (5060061-DUP2)</b>						Prepared: 06/02/15 14:35 Analyzed: 06/03/15 08:48						
<b>QC Source Sample: Other (A5F0053-05)</b>												
<b>EPA 8000C</b>												
% Solids	96.9	---	1.00	% by Weight	1	---	96.4	---	---	0.5	20%	
<b>Duplicate (5060061-DUP3)</b>						Prepared: 06/02/15 14:35 Analyzed: 06/03/15 08:48						
<b>QC Source Sample: Other (A5F0055-05)</b>												
<b>EPA 8000C</b>												
% Solids	80.7	---	1.00	% by Weight	1	---	81.8	---	---	1	20%	
<b>Duplicate (5060061-DUP4)</b>						Prepared: 06/02/15 14:35 Analyzed: 06/03/15 08:48						
<b>QC Source Sample: Other (A5F0056-05)</b>												
<b>EPA 8000C</b>												
% Solids	96.1	---	1.00	% by Weight	1	---	94.8	---	---	1	20%	
<b>Duplicate (5060061-DUP5)</b>						Prepared: 06/02/15 14:36 Analyzed: 06/03/15 08:48						
<b>QC Source Sample: Other (A5F0060-04)</b>												
<b>EPA 8000C</b>												
% Solids	99.9	---	1.00	% by Weight	1	---	99.9	---	---	0	20%	
<b>Duplicate (5060061-DUP6)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
<b>QC Source Sample: Other (A5F0087-01)</b>												
<b>EPA 8000C</b>												
% Solids	76.7	---	1.00	% by Weight	1	---	76.7	---	---	0	20%	
<b>Duplicate (5060061-DUP7)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
<b>QC Source Sample: Other (A5F0089-10)</b>												
<b>EPA 8000C</b>												
% Solids	84.7	---	1.00	% by Weight	1	---	84.6	---	---	0.1	20%	
<b>Duplicate (5060061-DUP8)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
<b>QC Source Sample: Other (A5F0096-01)</b>												

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Philip Nerenberg, Lab Director

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

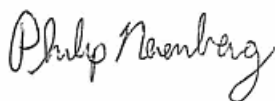
**Reported:**  
 08/17/15 17:01

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060061 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060061-DUP8)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0096-01)												
EPA 8000C												
% Solids	90.0	---	1.00	% by Weight	1	---	89.6	---	---	0.4	20%	
<b>Duplicate (5060061-DUP9)</b>						Prepared: 06/02/15 20:30 Analyzed: 06/03/15 08:48						
QC Source Sample: Other (A5F0100-02)												
EPA 8000C												
% Solids	89.7	---	1.00	% by Weight	1	---	90.0	---	---	0.3	20%	

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Philip Nerenberg, Lab Director

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 08/17/15 17:01

### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

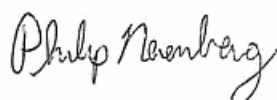
**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050889</b>							
A5E0713-02	Soil	PSEP/SM 5310B MOD	05/21/15 14:40	05/29/15 13:34	5g/5g	5g/5g	NA
A5E0713-04	Soil	PSEP/SM 5310B MOD	05/21/15 15:15	05/29/15 13:34	5g/5g	5g/5g	NA
A5E0713-05	Soil	PSEP/SM 5310B MOD	05/21/15 16:10	05/29/15 13:34	5g/5g	5g/5g	NA
<b>Batch: 5070088</b>							
A5E0713-06	Soil	PSEP/SM 5310B MOD	05/21/15 16:20	07/06/15 06:59	5g/5g	5g/5g	NA

#### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5050790</b>							
A5E0713-05	Soil	EPA 8000C	05/21/15 16:10	05/27/15 14:34	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 5060061</b>							
A5E0713-01	Soil	EPA 8000C	05/21/15 14:40	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA
A5E0713-02	Soil	EPA 8000C	05/21/15 14:40	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA
A5E0713-03	Soil	EPA 8000C	05/21/15 15:15	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA
A5E0713-04	Soil	EPA 8000C	05/21/15 15:15	06/02/15 11:03	1N/A/1N/A	1N/A/1N/A	NA



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
08/17/15 17:01

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

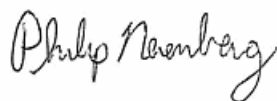
Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).







# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Monday, July 6, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

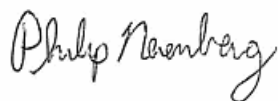
Enclosed are the results of analyses for work order A5F0015, which was received by the laboratory on 5/29/2015 at 4:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

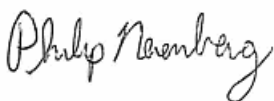
**Reported:**  
07/06/15 15:26

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI038-0.5-After ISM	A5F0015-02	Soil	05/29/15 09:00	05/29/15 16:00
ISM-AOI039-0.5-After ISM	A5F0015-04	Soil	05/29/15 09:45	05/29/15 16:00

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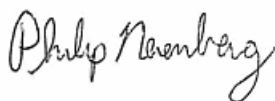
**Reported:**  
 07/06/15 15:26

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI038-0.5-After ISM (A5F0015-02)</b>			<b>Matrix: Soil</b>					
Batch: 5060236								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/11/15 11:55	PSEP/SM 5310B MOD	
<b>ISM-AOI039-0.5-After ISM (A5F0015-04)</b>			<b>Matrix: Soil</b>					
Batch: 5060236								
<b>Total Organic Carbon</b>	<b>26000</b>	---	200	mg/kg	1	06/11/15 11:55	PSEP/SM 5310B MOD	

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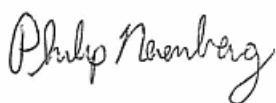
**Reported:**  
 07/06/15 15:26

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI038-0.5-After ISM (A5F0015-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5060240</b>				
% Solids	96.7	---	1.00	% by Weight	1	06/09/15 08:50	EPA 8000C	
<b>ISM-AOI039-0.5-After ISM (A5F0015-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5060240</b>				
% Solids	96.4	---	1.00	% by Weight	1	06/09/15 08:50	EPA 8000C	

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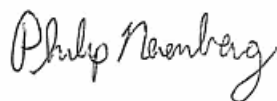
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 07/06/15 15:26

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060236 - PSEP Solids in Soil/Sediment</b>						<b>Soil</b>						
<b>Blank (5060236-BLK1)</b>						Prepared: 06/08/15 07:55 Analyzed: 06/11/15 11:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5060236-BS1)</b>						Prepared: 06/08/15 07:55 Analyzed: 06/11/15 11:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9900	---		mg/kg	1	10000	---	99	85-115%	---	---	
<b>Duplicate (5060236-DUP1)</b>						Prepared: 06/08/15 07:55 Analyzed: 06/11/15 11:55						
<b>QC Source Sample: ISM-AOI038-0.5-After ISM (A5F0015-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	21000	---	200	mg/kg	1	---	20000	---	---	4	20%	





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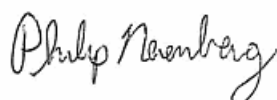
Reported:  
07/06/15 15:26

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060240 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060240-DUP1)</b>						Prepared: 06/08/15 09:15 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5E0698-08)												
EPA 8000C												
% Solids	76.1	---	1.00	% by Weight	1	---	75.6	---	---	0.7	10%	
<b>Duplicate (5060240-DUP2)</b>						Prepared: 06/08/15 09:15 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0230-10)												
EPA 8000C												
% Solids	82.5	---	1.00	% by Weight	1	---	82.5	---	---	0	10%	
<b>Duplicate (5060240-DUP3)</b>						Prepared: 06/08/15 09:15 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0235-05)												
EPA 8000C												
% Solids	76.5	---	1.00	% by Weight	1	---	76.4	---	---	0.1	10%	
<b>Duplicate (5060240-DUP4)</b>						Prepared: 06/08/15 11:31 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0251-08)												
EPA 8000C												
% Solids	84.3	---	1.00	% by Weight	1	---	85.5	---	---	1	10%	
<b>Duplicate (5060240-DUP5)</b>						Prepared: 06/08/15 15:31 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0254-13)												
EPA 8000C												
% Solids	85.3	---	1.00	% by Weight	1	---	89.1	---	---	4	10%	
<b>Duplicate (5060240-DUP6)</b>						Prepared: 06/08/15 18:53 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0268-02)												
EPA 8000C												
% Solids	76.2	---	1.00	% by Weight	1	---	75.6	---	---	0.8	10%	
<b>Duplicate (5060240-DUP7)</b>						Prepared: 06/08/15 19:12 Analyzed: 06/09/15 08:50						
QC Source Sample: Other (A5F0272-02)												
EPA 8000C												
% Solids	91.9	---	1.00	% by Weight	1	---	91.7	---	---	0.2	10%	

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 07/06/15 15:26

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP Solids in Soil/Sediment

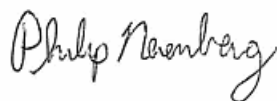
Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5060236</b>							
A5F0015-02	Soil	PSEP/SM 5310B MOD	05/29/15 09:00	06/08/15 07:55	5g/5g	5g/5g	NA
A5F0015-04	Soil	PSEP/SM 5310B MOD	05/29/15 09:45	06/08/15 07:55	5g/5g	5g/5g	NA

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5060240</b>							
A5F0015-02	Soil	EPA 8000C	05/29/15 09:00	06/08/15 11:38	1N/A/1N/A	1N/A/1N/A	NA
A5F0015-04	Soil	EPA 8000C	05/29/15 09:45	06/08/15 11:38	1N/A/1N/A	1N/A/1N/A	NA

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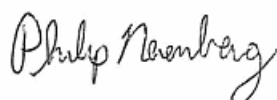
Reported:  
07/06/15 15:26

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



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Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
07/06/15 15:26

Lab # A5FO015 coc 1 of 1

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>		Project Mgr: <b>Phil Wiescher</b>		Project Name: <b>FOR OPP</b>		Project # <b>9003.01.39</b>	
Address: <b>2001 NW 19th Ave. #200 PDX OR</b>		Phone: <b>503.501.5209</b>		Fax:		Email: <b>phil.wiescher@maulfooster.com</b>	
Sampled by:							
Site Location: <u>OR</u>							
Other: <u>WA</u>							
LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTH-HCID	NWTH-DX	NWTH-GX
1	5/15/15	9:00	SO	1			
2	5/15/15	9:45	SO	1			
3							
4							
5							
6							
7							
8							
9							
10							
SPECIAL INSTRUCTIONS:				<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Normal Turn Around Time (TAT) = 7-10 Business Days TAT Requested (circle)    1 Day    2 Day    3 Day    4 DAY    5 DAY    Other: _____			
RELINQUISHED BY:				RECEIVED BY:			
Signature: <u>Emily Curtis</u>				Signature: <u>[Signature]</u>			
Date: _____				Date: _____			
Printed Name: <u>Emily Curtis</u>				Printed Name: _____			
Time: _____				Time: _____			
Company: <u>MFA</u>				Company: _____			

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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Tuesday, September 8, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield / 9003.01.39

Enclosed are the results of analyses for work order A5F0363, which was received by the laboratory on 6/9/2015 at 2:35:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209


Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 09/08/15 16:53

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW013-0.5	A5F0363-01	Soil	06/08/15 08:00	06/09/15 14:35
SBS-ROW013-1.0	A5F0363-02	Soil	06/08/15 08:05	06/09/15 14:35
SS-ROW005-0.5	A5F0363-03	Soil	06/08/15 08:40	06/09/15 14:35
SBS-ROW005-1.0	A5F0363-04	Soil	06/08/15 08:50	06/09/15 14:35
SS-ROW019-0.5	A5F0363-05	Soil	06/08/15 09:20	06/09/15 14:35
SBS-ROW019-1.0	A5F0363-06	Soil	06/08/15 09:35	06/09/15 14:35
SS-ROW022-0.5	A5F0363-07	Soil	06/08/15 10:00	06/09/15 14:35
SBS-ROW022-1.0	A5F0363-08	Soil	06/08/15 10:15	06/09/15 14:35
SS-ROW016-0.5	A5F0363-09	Soil	06/08/15 10:45	06/09/15 14:35
SBS-ROW016-1.0	A5F0363-10	Soil	06/08/15 10:55	06/09/15 14:35
SS-ROW025-0.5	A5F0363-11	Soil	06/08/15 11:30	06/09/15 14:35
SBS-ROW025-1.0	A5F0363-12	Soil	06/08/15 11:45	06/09/15 14:35
SS-ROW029B-0.5	A5F0363-13	Soil	06/08/15 12:15	06/09/15 14:35
SBS-ROW029B-1.0	A5F0363-14	Soil	06/08/15 12:25	06/09/15 14:35
SS-ROW023-0.5	A5F0363-15	Soil	06/08/15 13:00	06/09/15 14:35
SBS-ROW023-1.0	A5F0363-16	Soil	06/08/15 13:15	06/09/15 14:35
SS-ROW018-0.5	A5F0363-17	Soil	06/08/15 13:40	06/09/15 14:35
SBS-ROW018-1.0	A5F0363-18	Soil	06/08/15 13:55	06/09/15 14:35





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**Reported:**  
09/08/15 16:53

## ANALYTICAL CASE NARRATIVE

**Work Order: A5F0363**

Amended Report Revision 1:

This report supersedes all previous reports.

Additional Analyses-

TOC analyses were added to samples:

SBS-ROW-013-1.0  
SBS-ROW-005-1.0  
SBS-ROW-019-1.0  
SBS-ROW-022-1.0  
SBS-ROW-016-1.0  
SBS-ROW-025-1.0  
SBS-ROW-029-1.0  
SBS-ROW-023-1.0  
SBS-ROW-018-1.0

after the original report was finalized. This revised report contains both the original and the added data.

Philip Nerenberg  
Lab Director  
9/8/15

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 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 09/08/15 16:53

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW013-0.5 (A5F0363-01)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW013-1.0 (A5F0363-02)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW005-0.5 (A5F0363-03)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW005-1.0 (A5F0363-04)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW019-0.5 (A5F0363-05)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW019-1.0 (A5F0363-06)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>10000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW022-0.5 (A5F0363-07)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW022-1.0 (A5F0363-08)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW016-0.5 (A5F0363-09)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	

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Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

Reported:  
 09/08/15 16:53

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-ROW016-1.0 (A5F0363-10)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW025-0.5 (A5F0363-11)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW025-1.0 (A5F0363-12)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW029B-0.5 (A5F0363-13)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW029B-1.0 (A5F0363-14)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW023-0.5 (A5F0363-15)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>24000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW023-1.0 (A5F0363-16)</b>			<b>Matrix: Soil</b>					
Batch: 5070256								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	07/14/15 13:20	PSEP/SM 5310B MOD	H-08
<b>SS-ROW018-0.5 (A5F0363-17)</b>			<b>Matrix: Soil</b>					
Batch: 5060404								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/15/15 16:05	PSEP/SM 5310B MOD	
<b>SBS-ROW018-1.0 (A5F0363-18)</b>			<b>Matrix: Soil</b>					
Batch: 5070326								
<b>Total Organic Carbon</b>	<b>1.8</b>	---	0.020	% by Weight	1	07/15/15 09:20	PSEP/SM 5310B MOD	H-08

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak


Reported:  
09/08/15 16:53

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060404 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5060404-BLK1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5060404-BS1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (5060404-DUP1)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: Other (A5D0913-16)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9200	---	200	mg/kg	1	---	9400	---	---	2	20%	
<b>Duplicate (5060404-DUP2)</b>						Prepared: 06/12/15 08:34 Analyzed: 06/15/15 16:05						
<b>QC Source Sample: SS-ROW018-0.5 (A5F0363-17)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	19000	---	200	mg/kg	1	---	19000	---	---	1	20%	
<b>Batch 5070256 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5070256-BLK1)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5070256-BS1)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (5070256-DUP1)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>QC Source Sample: SBS-ROW013-1.0 (A5F0363-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	14000	---	200	mg/kg	1	---	15000	---	---	13	20%	
<b>Duplicate (5070256-DUP2)</b>						Prepared: 07/10/15 08:25 Analyzed: 07/14/15 13:20						
<b>QC Source Sample: Other (A5G0047-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	6600	---	200	mg/kg	1	---	8000	---	---	19	20%	

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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
09/08/15 16:53

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5070326 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (5070326-BLK1)</b>						Prepared: 07/14/15 08:07 Analyzed: 07/15/15 09:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	0.020	% by Weight	1	---	---	---	---	---	---	---
<b>LCS (5070326-BS1)</b>						Prepared: 07/14/15 08:07 Analyzed: 07/15/15 09:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (5070326-DUP1)</b>						Prepared: 07/14/15 08:07 Analyzed: 07/15/15 09:20						
<b>QC Source Sample: SBS-ROW018-1.0 (A5F0363-18)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	1.9	---	0.020	% by Weight	1	---	1.8	---	---	7	20%	



**Maul Foster & Alongi, INC.**  
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 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 09/08/15 16:53

### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5060404</b>							
A5F0363-01	Soil	PSEP/SM 5310B MOD	06/08/15 08:00	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-03	Soil	PSEP/SM 5310B MOD	06/08/15 08:40	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-05	Soil	PSEP/SM 5310B MOD	06/08/15 09:20	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-07	Soil	PSEP/SM 5310B MOD	06/08/15 10:00	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-09	Soil	PSEP/SM 5310B MOD	06/08/15 10:45	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-11	Soil	PSEP/SM 5310B MOD	06/08/15 11:30	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-13	Soil	PSEP/SM 5310B MOD	06/08/15 12:15	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-15	Soil	PSEP/SM 5310B MOD	06/08/15 13:00	06/12/15 08:34	5g/5g	5g/5g	NA
A5F0363-17	Soil	PSEP/SM 5310B MOD	06/08/15 13:40	06/12/15 08:34	5g/5g	5g/5g	NA
<b>Batch: 5070256</b>							
A5F0363-02	Soil	PSEP/SM 5310B MOD	06/08/15 08:05	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-04	Soil	PSEP/SM 5310B MOD	06/08/15 08:50	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-06	Soil	PSEP/SM 5310B MOD	06/08/15 09:35	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-08	Soil	PSEP/SM 5310B MOD	06/08/15 10:15	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-10	Soil	PSEP/SM 5310B MOD	06/08/15 10:55	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-12	Soil	PSEP/SM 5310B MOD	06/08/15 11:45	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-14	Soil	PSEP/SM 5310B MOD	06/08/15 12:25	07/10/15 08:25	5g/5g	5g/5g	NA
A5F0363-16	Soil	PSEP/SM 5310B MOD	06/08/15 13:15	07/10/15 08:25	5g/5g	5g/5g	NA

**Batch: 5070326**

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 09/08/15 16:53

**SAMPLE PREPARATION INFORMATION**

**Conventional Chemistry Parameters**

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A5F0363-18	Soil	PSEP/SM 5310B MOD	06/08/15 13:55	07/14/15 08:07	5g/5g	5g/5g	NA

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
09/08/15 16:53

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
09/08/15 16:53

Lab # ASF0363 of \_\_\_\_\_

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>Maul Foster Alongi</b>		Project Mgr: <b>Madi Novak/Phil W</b>		Project Name: <b>Port</b>		Project # <b>9003.01.39</b>	
Address: <b>2001 NW 15th Ave, Suite 200, Portland, OR</b>		Phone: <b>503-501-5212</b>		Fax: _____		Email: <b>maul@maul-foster.com</b>	
Sampled by: <b>Justin Porebs</b>							
<b>ANALYSIS REQUEST</b>							
Site Location: <b>OR WA</b>							
Other: _____							
LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX	NWTPH-GX
1 <b>SS-Row013-0.5</b>	<b>6/15/15</b>	<b>800</b>	<b>S</b>	<b>2</b>			
2 <b>SBS-Row013-1.0</b>		<b>605</b>					
3 <b>SS-Row005-0.5</b>		<b>916</b>					
4 <b>SBS-Row005-1.0</b>		<b>530</b>					
5 <b>SS-Row017-0.5</b>		<b>410</b>					
6 <b>SBS-Row017-1.0</b>		<b>435</b>					
7 <b>SS-Row022-0.5</b>		<b>1000</b>					
8 <b>SBS-Row022-1.0</b>		<b>1015</b>					
9 <b>SS-Row016-0.5</b>		<b>1015</b>					
10 <b>SBS-Row016-1.0</b>		<b>1055</b>					
Normal Turn Around Time (TAT) = 7-10 Business Days				<input checked="" type="radio"/> YES <input type="radio"/> NO			
TAT Requested (circle)				1 Day    2 Day    3 Day    4 DAY    5 DAY    Other: _____			
SPECIAL INSTRUCTIONS:							
RELINQUISHED BY:				RECEIVED BY:			
Signature: <i>[Signature]</i>				Signature: _____			
Date: <b>6/15/15</b>				Date: _____			
Printed Name: <b>Justin Porebs</b>				Printed Name: _____			
Time: <b>14:35</b>				Time: _____			
Company: <b>MFA</b>				Company: <b>Apex</b>			

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
09/08/15 16:53

Lab # ASF0363 COC ZofZ

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>Maul Foster Alongi</u>		Project Mgr: <u>Madi Novak</u>		Project Name: <u>Port</u>		Project # <u>9003.01.39</u>																				
Address: <u>2001 NW 19th Ave, St 200</u>		Phone: <u>503-718-0333</u>		Fax: <u>503-718-0333</u>		Email: <u>maul@mfalongi.com</u>																				
Sampled by: <u>Justin Pounds</u>		ANALYSIS REQUEST																								
Site Location: <u>OR</u> WA																										
Other: _____																										
LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX	NWTPH-GX	8260 VOC	8260 RBDM VOCs	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCA Metals (8)	TCLP Metals (8)	Al, Si, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Hg, Mn, Ni, Ni, Zn, Se, Ag, Na, TL, V, Zr	TOTAL DISS TCLP	1200-COLS	1200-Z	Dioxin 1638	TDC 53103	Arachne			
1	6/8/15	1330	S	2																						
2		1145	S																							
3		1015	S																							
4		1125	S																							
5		1300	S																							
6		1315	S																							
7		1340	S																							
8		1355	S																							
9																										
10																										

Normal Turn Around Time (TAT) = 7-10 Business Days YES NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_

Signature: Justin Pounds Date: 6/8/15 Signature: [Signature] Date: 6/14/15

Printed Name: Justin Pounds Time: 1:55 Printed Name: Robert Time: 1435

Company: MFA Company: Apex

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*Philip Nerenberg*

Philip Nerenberg, Lab Director

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# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Wednesday, July 15, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

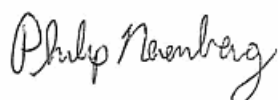
Enclosed are the results of analyses for work order A5F0658, which was received by the laboratory on 6/22/2015 at 12:30:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

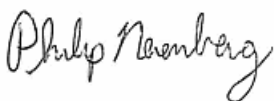
**Reported:**  
07/15/15 12:36

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI019-0.5-As Received	A5F0658-01	Soil	06/22/15 09:00	06/22/15 12:30
ISM-AOI019-0.5-After ISM	A5F0658-02	Soil	06/22/15 09:00	06/22/15 12:30

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Philip Nerenberg, Lab Director

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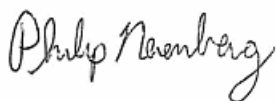
<b>Maul Foster &amp; Alongi, INC.</b> 2001 NW 19th Ave, STE 200 Portland, OR 97209	Project: <b>Port of Ridgefield ISM</b> Project Number: 9003.01.39 Project Manager: Phil Wiescher	<b>Reported:</b> 07/15/15 12:36
--	--	------------------------------------

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI019-0.5-After ISM (A5F0658-02)</b>			<b>Matrix: Soil</b>					
Batch: 5060771								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/30/15 12:55	PSEP/SM 5310B MOD	

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

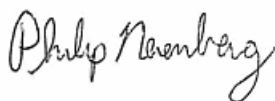
**Reported:**  
 07/15/15 12:36

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI019-0.5-As Received (A5F0658-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5060702</b>				
% Solids	86.3	---	1.00	% by Weight	1	06/24/15 08:05	EPA 8000C	Q-38
<b>ISM-AOI019-0.5-After ISM (A5F0658-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5060702</b>				
% Solids	96.6	---	1.00	% by Weight	1	06/24/15 08:05	EPA 8000C	Q-38

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Philip Nerenberg, Lab Director

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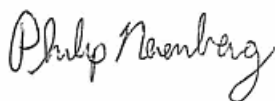
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 07/15/15 12:36

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060771 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5060771-BLK1)</b>						Prepared: 06/25/15 08:52 Analyzed: 06/30/15 12:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5060771-BS1)</b>						Prepared: 06/25/15 08:52 Analyzed: 06/30/15 12:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9600	---		mg/kg	1	10000	---	96	85-115%	---	---	
<b>Duplicate (5060771-DUP1)</b>						Prepared: 06/25/15 08:52 Analyzed: 06/30/15 12:55						
<b>QC Source Sample: ISM-AOI019-0.5-After ISM (A5F0658-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	18000	---	200	mg/kg	1	---	19000	---	---	3	20%	





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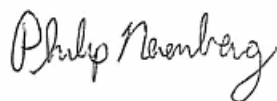
Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 07/15/15 12:36

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5060702 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5060702-DUP1)</b>						Prepared: 06/23/15 14:33 Analyzed: 06/24/15 08:05						
QC Source Sample: Other (A5F0643-18)												
EPA 8000C												
% Solids	98.5	---	1.00	% by Weight	1	---	98.1	---	---	0.4	10%	Q-38
<b>Duplicate (5060702-DUP2)</b>						Prepared: 06/23/15 14:33 Analyzed: 06/24/15 08:05						
QC Source Sample: Other (A5F0666-04)												
EPA 8000C												
% Solids	88.0	---	1.00	% by Weight	1	---	87.9	---	---	0.1	10%	Q-38
<b>Duplicate (5060702-DUP3)</b>						Prepared: 06/23/15 19:12 Analyzed: 06/24/15 08:05						
QC Source Sample: Other (A5F0698-01)												
EPA 8000C												
% Solids	74.4	---	1.00	% by Weight	1	---	74.1	---	---	0.4	10%	Q-38
<b>Duplicate (5060702-DUP4)</b>						Prepared: 06/23/15 19:12 Analyzed: 06/24/15 08:05						
QC Source Sample: Other (A5F0704-02)												
EPA 8000C												
% Solids	86.5	---	1.00	% by Weight	1	---	88.1	---	---	2	10%	Q-38
<b>Duplicate (5060702-DUP5)</b>						Prepared: 06/23/15 19:12 Analyzed: 06/24/15 08:05						
QC Source Sample: Other (A5F0710-02)												
EPA 8000C												
% Solids	83.3	---	1.00	% by Weight	1	---	83.9	---	---	0.7	10%	Q-38



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 07/15/15 12:36

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

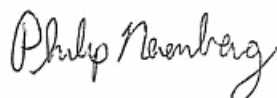
Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5060771</b>							
A5F0658-02	Soil	PSEP/SM 5310B MOD	06/22/15 09:00	06/25/15 08:52	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5060702</b>							
A5F0658-01	Soil	EPA 8000C	06/22/15 09:00	06/23/15 14:33	1N/A/1N/A	1N/A/1N/A	NA
A5F0658-02	Soil	EPA 8000C	06/22/15 09:00	06/23/15 14:33	1N/A/1N/A	1N/A/1N/A	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
07/15/15 12:36

## Notes and Definitions

### Qualifiers:

Q-38 Oven outside of control limits during drying step.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

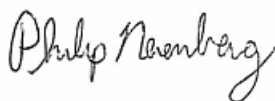
Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
07/15/15 12:36

**CHAIN OF CUSTODY**

Lab # A SF055 COC 1 of 4

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: MFA Project Mgr: Phil Wiescher Project Name: FOR OPP Project # 9003.01.39  
 Address: 2001 NW 19th Ave. #200, Portland, OR Phone: 503.504.5209 Fax: \_\_\_\_\_ Email: phil.wiescher@maulfooster.com

Sampled by: \_\_\_\_\_

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST		
					TOTAL HSS TCLP	1209-COLS	USEPA 1413 B
1	7/15/15	05:50	ISM - A6E019 - 0.5	1	AL, SB, AS, BA, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BV, BW, BX, BY, BZ	XXXX	XXXX
2							
3							
4							
5							
6							
7							
8							
9							
10							

SPECIAL INSTRUCTIONS: \_\_\_\_\_

Normal Turn Around Time (TAT) = 7-10 Business Days (YES) NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_  
 Signature: Emily Curtis Date: 7/15/15 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: Emily Curtis Time: 12:30 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_  
 Company: MFA Company: \_\_\_\_\_

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Tuesday, August 25, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield / 9003.01.39

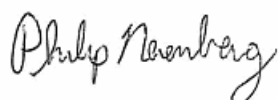
Enclosed are the results of analyses for work order A5G0852, which was received by the laboratory on 7/29/2015 at 12:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

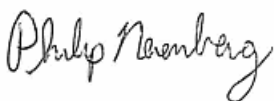
**Reported:**  
08/25/15 15:30

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Comp-AOI004-0.5	A5G0852-02	Soil	07/28/15 14:15	07/29/15 12:00

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

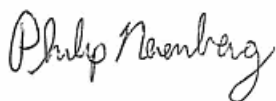
**Reported:**  
 08/25/15 15:30

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>Comp-AOI004-0.5 (A5G0852-02)</b>			<b>Matrix: Soil</b>					
Batch: 5080149								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	08/10/15 12:45	SM 5310B MOD	

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

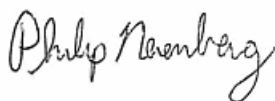
**Reported:**  
 08/25/15 15:30

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5080149 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5080149-BLK1)</b>						Prepared: 08/07/15 06:48 Analyzed: 08/10/15 12:45						
<b>SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5080149-BS1)</b>						Prepared: 08/07/15 06:48 Analyzed: 08/10/15 12:45						
<b>SM 5310B MOD</b>												
Total Organic Carbon	9900	---		mg/kg	1	10000	---	99	85-115%	---	---	
<b>Duplicate (5080149-DUP1)</b>						Prepared: 08/07/15 06:48 Analyzed: 08/10/15 12:45						
<b>QC Source Sample: Comp-AOI004-0.5 (A5G0852-02)</b>												
<b>SM 5310B MOD</b>												
Total Organic Carbon	<b>23000</b>	---	200	mg/kg	1	---	21000	---	---	12	20%	

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 08/25/15 15:30

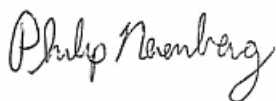
## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5080149</b>							
A5G0852-02	Soil	SM 5310B MOD	07/28/15 14:15	08/07/15 06:48	5g/5g	5g/5g	NA

Apex Laboratories



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Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

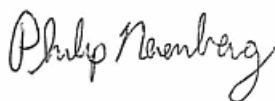
**Reported:**  
08/25/15 15:30

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





Wednesday, October 28, 2015

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: POR OPP / 9003.01.39

Enclosed are the results of analyses for work order A510106, which was received by the laboratory on 9/2/2015 at 12:45:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 10/28/15 15:48

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SBS-ROW005-2.0	A5I0106-02	Soil	08/26/15 09:00	09/02/15 12:45
SBS-ROW013-2.0	A5I0106-06	Soil	09/01/15 13:15	09/02/15 12:45
SBS-ROW014-2.0	A5I0106-10	Soil	08/26/15 10:15	09/02/15 12:45
SBS-ROW016-2.0	A5I0106-14	Soil	09/01/15 15:30	09/02/15 12:45
SBS-ROW019-1.5	A5I0106-17	Soil	08/26/15 13:30	09/02/15 12:45
SBS-ROW019-2.0	A5I0106-18	Soil	09/01/15 16:00	09/02/15 12:45
SBS-ROW022-1.5	A5I0106-19	Soil	08/26/15 12:15	09/02/15 12:45
SBS-ROW023-1.5	A5I0106-21	Soil	09/01/15 14:15	09/02/15 12:45
SBS-ROW023-2.0	A5I0106-22	Soil	09/01/15 14:30	09/02/15 12:45
SBS-ROW025-1.5	A5I0106-25	Soil	08/26/15 14:00	09/02/15 12:45
SBS-ROW026-1.5	A5I0106-27	Soil	08/26/15 15:30	09/02/15 12:45
SBS-ROW026-2.0	A5I0106-28	Soil	08/26/15 15:45	09/02/15 12:45
SBS-ROW029B-1.5	A5I0106-29	Soil	08/26/15 14:45	09/02/15 12:45



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
10/28/15 15:48

## ANALYTICAL CASE NARRATIVE

**Work Order: A5I0106**

Amended Report Revision 1:

This report supersedes all previous reports.

Additional Analyses-

TOC analysis was added to samples SBS-ROW026-2.0, SBS-ROW019-2.0, and SBS-ROW023-1.5 after the original report was finalized. This revised report contains both the original and the added data.

Philip Nerenberg  
Lab Director  
6/12/15-



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher


**Reported:**  
 10/28/15 15:48

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-ROW005-2.0 (A5I0106-02)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>9900</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW013-2.0 (A5I0106-06)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>6800</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW014-2.0 (A5I0106-10)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>8400</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW016-2.0 (A5I0106-14)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>3800</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW019-1.5 (A5I0106-17)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>9100</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW019-2.0 (A5I0106-18)</b>			<b>Matrix: Soil</b>					
Batch: 5100292								
<b>Total Organic Carbon</b>	<b>4000</b>	---	200	mg/kg	1	10/12/15 14:15	PSEP/SM 5310B MOD	H-08
<b>SBS-ROW022-1.5 (A5I0106-19)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW023-1.5 (A5I0106-21)</b>			<b>Matrix: Soil</b>					
Batch: 5100292								
<b>Total Organic Carbon</b>	<b>10000</b>	---	200	mg/kg	1	10/12/15 14:15	PSEP/SM 5310B MOD	H-08
<b>SBS-ROW023-2.0 (A5I0106-22)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 10/28/15 15:48

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-ROW025-1.5 (A5I0106-25)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>9200</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW026-1.5 (A5I0106-27)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>9600</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	
<b>SBS-ROW026-2.0 (A5I0106-28)</b>			<b>Matrix: Soil</b>					
Batch: 5100292								
<b>Total Organic Carbon</b>	<b>7900</b>	---	200	mg/kg	1	10/12/15 14:15	PSEP/SM 5310B MOD	H-08
<b>SBS-ROW029B-1.5 (A5I0106-29)</b>			<b>Matrix: Soil</b>					
Batch: 5090182								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	09/09/15 14:25	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209


Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
10/28/15 15:48

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5090182 - PSEP Solids in Soil/Sediment</b>						<b>Soil</b>						
<b>Blank (5090182-BLK1)</b>						Prepared: 09/08/15 09:58 Analyzed: 09/09/15 14:25						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5090182-BS1)</b>						Prepared: 09/08/15 09:58 Analyzed: 09/09/15 14:25						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9900	---		mg/kg	1	10000	---	99	85-115%	---	---	
<b>Duplicate (5090182-DUP1)</b>						Prepared: 09/08/15 09:58 Analyzed: 09/09/15 14:25						
<b>QC Source Sample: SBS-ROW005-2.0 (A510106-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>9800</b>	---	200	mg/kg	1	---	9900	---	---	0.6	20%	
<b>Batch 5100292 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (5100292-BLK1)</b>						Prepared: 10/09/15 13:53 Analyzed: 10/12/15 14:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5100292-BS1)</b>						Prepared: 10/09/15 13:53 Analyzed: 10/12/15 14:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>Duplicate (5100292-DUP1)</b>						Prepared: 10/09/15 13:53 Analyzed: 10/12/15 14:15						
<b>QC Source Sample: SBS-ROW019-2.0 (A510106-18)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>3800</b>	---	200	mg/kg	1	---	4000	---	---	5	20%	H-08



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 10/28/15 15:48

### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP Solids in Soil/Sediment**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5090182</b>							
A5I0106-02	Soil	PSEP/SM 5310B MOD	08/26/15 09:00	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-06	Soil	PSEP/SM 5310B MOD	09/01/15 13:15	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-10	Soil	PSEP/SM 5310B MOD	08/26/15 10:15	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-14	Soil	PSEP/SM 5310B MOD	09/01/15 15:30	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-17	Soil	PSEP/SM 5310B MOD	08/26/15 13:30	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-19	Soil	PSEP/SM 5310B MOD	08/26/15 12:15	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-22	Soil	PSEP/SM 5310B MOD	09/01/15 14:30	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-25	Soil	PSEP/SM 5310B MOD	08/26/15 14:00	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-27	Soil	PSEP/SM 5310B MOD	08/26/15 15:30	09/08/15 09:58	5g/5g	5g/5g	NA
A5I0106-29	Soil	PSEP/SM 5310B MOD	08/26/15 14:45	09/08/15 09:58	5g/5g	5g/5g	NA

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5100292</b>							
A5I0106-18	Soil	PSEP/SM 5310B MOD	09/01/15 16:00	10/09/15 13:53	5g/5g	5g/5g	NA
A5I0106-21	Soil	PSEP/SM 5310B MOD	09/01/15 14:15	10/09/15 13:53	5g/5g	5g/5g	NA
A5I0106-28	Soil	PSEP/SM 5310B MOD	08/26/15 15:45	10/09/15 13:53	5g/5g	5g/5g	NA

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
10/28/15 15:48

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
10/28/15 15:48

**APEX LABS**      **CHAIN OF CUSTODY**      Lab # A510106      coc 1 of 3

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>Maul Foster &amp; Alongi</b>		Project Mgr: <b>Phil Wiescher</b>		Project Name: <b>POR OPP</b>		Project # <b>9003.01.39</b>	
Address: <b>2001 NW 19th Ave. #200 Portland, OR</b>		Phone: <b>503.501.5209</b>		Fax:		Email: <b>Phil.Wiescher@maulfoalongs.com</b>	
Sampled by: <b>PW/EC/IEH</b>							
ANALYSIS REQUEST							
Site Location: <b>OR</b>	<input checked="" type="checkbox"/> WA <input type="checkbox"/> AZ <input type="checkbox"/> CA <input type="checkbox"/> CO <input type="checkbox"/> CT <input type="checkbox"/> DC <input type="checkbox"/> FL <input type="checkbox"/> GA <input type="checkbox"/> HI <input type="checkbox"/> IL <input type="checkbox"/> IN <input type="checkbox"/> IA <input type="checkbox"/> KS <input type="checkbox"/> KY <input type="checkbox"/> LA <input type="checkbox"/> MA <input type="checkbox"/> MD <input type="checkbox"/> ME <input type="checkbox"/> MI <input type="checkbox"/> MN <input type="checkbox"/> MO <input type="checkbox"/> MS <input type="checkbox"/> MT <input type="checkbox"/> NC <input type="checkbox"/> ND <input type="checkbox"/> NE <input type="checkbox"/> NH <input type="checkbox"/> NJ <input type="checkbox"/> NM <input type="checkbox"/> NV <input type="checkbox"/> NY <input type="checkbox"/> OH <input type="checkbox"/> OK <input type="checkbox"/> OR <input type="checkbox"/> PA <input type="checkbox"/> RI <input type="checkbox"/> SC <input type="checkbox"/> SD <input type="checkbox"/> TN <input type="checkbox"/> TX <input type="checkbox"/> UT <input type="checkbox"/> VA <input type="checkbox"/> VT <input type="checkbox"/> WA <input type="checkbox"/> WI <input type="checkbox"/> WY						
Other:							
LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx
1 SB5-ROW005-1.5	8/2/15	0845	SO 2				
2 SB5-ROW005-2.0		0900					
3 SB5-ROW005-2.5		0915					
4 SB5-ROW005-3.0		0930					
5 SB5-ROW013-1.5	9/1/15	1300					
6 SB5-ROW013-2.0		1315					
7 SB5-ROW013-2.5		1330					
8 SB5-ROW013-3.0		1345					
9 SB5-ROW014-1.5	9-26	1000					
10 SB5-ROW014-2.0		1015					
Normal Turn Around Time (TAT) = 7-10 Business Days							
TAT Requested (circle)      1 Day      2 Day      3 Day      4 DAY      5 DAY      Other: _____ <input checked="" type="radio"/> YES <input type="radio"/> NO							
SPECIAL INSTRUCTIONS: •Dioxins to Maximum •No ISM processing							
RELINQUISHED BY: Signature: <i>Emily Curtis</i> Date: 9-2-15				RECEIVED BY: Signature: <i>Phil Wiescher</i> Date: 9/2/15			
Printed Name: <b>EMILY CURTIS</b>				Printed Name: <b>Phil Wiescher</b>			
Company: <b>MFA</b>				Company: <b>Apex</b>			

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
10/28/15 15:48

**APEX LABS**      **CHAIN OF CUSTODY**      Lab # AS10100      coc Z-013

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster & Alongi		Project Mgr: Phil Wiescher		Project Name: POR OPP		Project # 9003.01.39	
Address: 2001 NW 19th Ave, #200 Portland, OR		Phone: 503 501 5209		Fax:		Email: P.WIESCHER@maulfooster.com	
Sampled by: P.W./E.C./E.H.							
Site Location: OR	Other: WA	ANALYSIS REQUEST					
SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTH-HCID	NWTH-DX
1 SBS-Rowolig-2.5	8260	10/30	1030	SO2	1		
2 SBS-Rowolig-3.0	1045	10/15	1045		1		
3 SBS-Rowolig-1.5	1515	9/15	1515		1		
4 SBS-Rowolig-2.0	1530	10/15	1530		1		
5 SBS-Rowolig-2.5	1545	10/15	1545		1		
6 SBS-Rowolig-3.0	1545	10/15	1545		1		
7 SBS-Rowolig-1.5	1330	8/20/15	1330		1		
8 SBS-Rowolig-2.0	1600	9/15/15	1600		1		
9 SBS-Rowolig-1.5	1215	8/20/15	1215		1		
10 SBS-Rowolig-2.0	1230	10/15	1230		1		
Normal Turn Around Time (TAT) = 7-10 Business Days		YES <input checked="" type="radio"/> NO <input type="radio"/>		SPECIAL INSTRUCTIONS: • Dioxins to Maxcam • No ISM processing			
TAT Requested (circle)		1 Day	2 Day	3 Day	Other:		
SAMPLES ARE HELD FOR 30 DAYS		4 DAY	5 DAY				
RELINQUISHED BY:		RECEIVED BY:					
Signature: Emily M... Date: 9/2/15	Signature: [Signature] Date: 9/2/15	Signature: [Signature]					
Printed Name: Emily M... Time: [Time]	Printed Name: [Name] Time: 12:45	Printed Name: [Name]					
Company: MAF	Company: Apex	Company: [Company]					

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
10/28/15 15:48

Lab # ASJ0100 coc 5 of 3

**CHAIN OF CUSTODY**

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster & Alongi		Project Mgr: Phil Wiescher		Project Name: POR OPP		Project # 9003.01.39	
Address: 2001 NW 19th Ave, Portland, OR		Phone: 503.501.5209		Fax:		Email: P.Wiescher@maul-foster.com	
Sampled by: PW/EC/EH		ANALYSIS REQUEST					
Site Location: OR	Other: (NA)	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	
SAMPLE ID							
1 SB5-ROW023-1.5			9-15	1415	SO	2	
2 SB5-ROW023-2.0				1430			
3 SB5-ROW023-2.5				1445			
4 SB5-ROW023-3.0				1445			
5 SB5-ROW025-1.5			9-20-15	1400			
6 SB5-ROW025-2.0				1415			
7 SB5-ROW026-1.5				1530			
8 SB5-ROW026-2.0				1545			
9 SB5-ROW028-1.5				1445			
10 SB5-ROW024R-2.0				1500			
Normal Turn Around Time (TAT) = 7-10 Business Days							
TAT Requested (circle)		1 Day		2 Day		3 Day	
		4 DAY		5 DAY		Other: _____	
SPECIAL INSTRUCTIONS: • Dioxins to Maxam • NO ISM processing							
RELINQUISHED BY: Signature: Emily Murtin Date: 9-2-15 Printed Name: Emily Murtin				RECEIVED BY: Signature: [Signature] Date: 9/2/15 Printed Name: [Signature]			
Company: MFA				Company: Apex			

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Thursday, October 15, 2015

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: POR OPP / 9003.01.39

Enclosed are the results of analyses for work order A510609, which was received by the laboratory on 9/21/2015 at 2:20:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
10/15/15 17:05

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI026-0.5-As Received	A5I0609-01	Soil	09/21/15 11:00	09/21/15 14:20
ISM-AOI026-0.5-After ISM	A5I0609-02	Soil	09/21/15 11:00	09/21/15 14:20

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Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 10/15/15 17:05

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI026-0.5-After ISM (A5I0609-02)</b>			<b>Matrix: Soil</b>					
Batch: 5090724								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	10/02/15 15:45	PSEP/SM 5310B MOD	

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 10/15/15 17:05

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI026-0.5-As Received (A5I0609-01)</b>			<b>Matrix: Soil</b>		<b>Batch: 5090696</b>			
% Solids	87.6	---	1.00	% by Weight	1	09/26/15 11:10	EPA 8000C	
<b>ISM-AOI026-0.5-After ISM (A5I0609-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 5090696</b>			
% Solids	97.2	---	1.00	% by Weight	1	09/26/15 11:10	EPA 8000C	

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209


Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 10/15/15 17:05

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5090724 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5090724-BLK1)</b>						Prepared: 09/25/15 14:42 Analyzed: 10/02/15 15:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5090724-BS1)</b>						Prepared: 09/25/15 14:42 Analyzed: 10/02/15 15:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	10000	---		mg/kg	1	10000	---	102	85-115%	---	---	
<b>Duplicate (5090724-DUP1)</b>						Prepared: 09/25/15 14:42 Analyzed: 10/02/15 15:45						
<b>QC Source Sample: ISM-AOI026-0.5-After ISM (A510609-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	17000	---	200	mg/kg	1	---	16000	---	---	5	20%	





Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
10/15/15 17:05

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5090696 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5090696-DUP1)</b>						Prepared: 09/25/15 10:04 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510679-02)												
EPA 8000C												
% Solids	79.5	---	1.00	% by Weight	1	---	79.6	---	---	0.2	10%	
<b>Duplicate (5090696-DUP2)</b>						Prepared: 09/25/15 16:14 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510717-08)												
EPA 8000C												
% Solids	76.1	---	1.00	% by Weight	1	---	75.7	---	---	0.4	10%	
<b>Duplicate (5090696-DUP3)</b>						Prepared: 09/25/15 16:16 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510753-01)												
EPA 8000C												
% Solids	73.9	---	1.00	% by Weight	1	---	73.5	---	---	0.5	10%	
<b>Duplicate (5090696-DUP4)</b>						Prepared: 09/25/15 17:51 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510762-01)												
EPA 8000C												
% Solids	81.4	---	1.00	% by Weight	1	---	83.3	---	---	2	10%	
<b>Duplicate (5090696-DUP5)</b>						Prepared: 09/25/15 18:09 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510766-04)												
EPA 8000C												
% Solids	90.1	---	1.00	% by Weight	1	---	90.1	---	---	0.08	10%	
<b>Duplicate (5090696-DUP6)</b>						Prepared: 09/25/15 18:09 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510767-03)												
EPA 8000C												
% Solids	74.1	---	1.00	% by Weight	1	---	74.2	---	---	0.2	10%	
<b>Duplicate (5090696-DUP7)</b>						Prepared: 09/25/15 19:22 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510774-02)												
EPA 8000C												
% Solids	79.7	---	1.00	% by Weight	1	---	79.6	---	---	0.1	10%	
<b>Duplicate (5090696-DUP8)</b>						Prepared: 09/25/15 19:22 Analyzed: 09/26/15 11:10						

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 10/15/15 17:05

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5090696 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5090696-DUP8)</b>						Prepared: 09/25/15 19:22 Analyzed: 09/26/15 11:10						
QC Source Sample: Other (A510777-06)												
EPA 8000C												
% Solids	75.9	---	1.00	% by Weight	1	---	75.7	---	---	0.2	10%	

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 10/15/15 17:05

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5090724</b>							
A5I0609-02	Soil	PSEP/SM 5310B MOD	09/21/15 11:00	09/25/15 14:42	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5090696</b>							
A5I0609-01	Soil	EPA 8000C	09/21/15 11:00	09/25/15 19:22	1N/A/1N/A	1N/A/1N/A	NA
A5I0609-02	Soil	EPA 8000C	09/21/15 11:00	09/25/15 19:22	1N/A/1N/A	1N/A/1N/A	NA

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
10/15/15 17:05

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Thursday, January 14, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: POR OPP / 9003.39.01

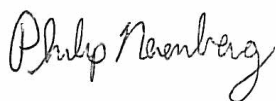
Enclosed are the results of analyses for work order A5K0059, which was received by the laboratory on 11/3/2015 at 10:20:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.39.01  
 Project Manager: Phil Wiescher

**Reported:**  
 01/14/16 09:12

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW038S-0.5	A5K0059-01	Sediment	11/02/15 08:55	11/03/15 10:20
SS-ROW029BS-0.5	A5K0059-04	Sediment	11/02/15 09:40	11/03/15 10:20
SBS-ROW029BS-1.5	A5K0059-06	Sediment	11/02/15 09:50	11/03/15 10:20
SS-ROW010W-0.5	A5K0059-07	Sediment	11/02/15 10:30	11/03/15 10:20
SBS-ROW010W-1.5	A5K0059-09	Sediment	11/02/15 10:40	11/03/15 10:20
SS-ROW010E-0.5	A5K0059-10	Sediment	11/02/15 11:30	11/03/15 10:20
SS-ROW022W-0.5	A5K0059-13	Sediment	11/02/15 12:15	11/03/15 10:20
SBS-ROW022W-1.5	A5K0059-15	Sediment	11/02/15 12:25	11/03/15 10:20
SS-ROW022E-0.5	A5K0059-16	Sediment	11/02/15 12:45	11/03/15 10:20
SS-ROW022E-0.5-DUP	A5K0059-17	Sediment	11/02/15 12:45	11/03/15 10:20
SS-ROW033W-0.5	A5K0059-20	Sediment	11/02/15 14:10	11/03/15 10:20
SBS-ROW033W-1.5	A5K0059-22	Sediment	11/02/15 14:20	11/03/15 10:20

Apex Laboratories



Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.39.01  
 Project Manager: Phil Wiescher

Reported:  
 01/14/16 09:12

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW038S-0.5 (A5K0059-01)</b>			<b>Matrix: Sediment</b>					
Batch: 5110203								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	11/10/15 13:46	PSEP/SM 5310B MOD	
<b>SS-ROW029BS-0.5 (A5K0059-04)</b>			<b>Matrix: Sediment</b>					
Batch: 5110203								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	11/10/15 13:46	PSEP/SM 5310B MOD	
<b>SBS-ROW029BS-1.5 (A5K0059-06)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>9200</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08
<b>SS-ROW010W-0.5 (A5K0059-07)</b>			<b>Matrix: Sediment</b>					
Batch: 5110203								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	11/10/15 13:46	PSEP/SM 5310B MOD	
<b>SBS-ROW010W-1.5 (A5K0059-09)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>8400</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08
<b>SS-ROW010E-0.5 (A5K0059-10)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08
<b>SS-ROW022W-0.5 (A5K0059-13)</b>			<b>Matrix: Sediment</b>					
Batch: 5110203								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	11/10/15 13:46	PSEP/SM 5310B MOD	
<b>SBS-ROW022W-1.5 (A5K0059-15)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08
<b>SS-ROW022E-0.5 (A5K0059-16)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.39.01  
 Project Manager: Phil Wiescher

**Reported:**  
 01/14/16 09:12

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW022E-0.5-DUP (A5K0059-17)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08
<b>SS-ROW033W-0.5 (A5K0059-20)</b>			<b>Matrix: Sediment</b>					
Batch: 5110203								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	11/10/15 13:46	PSEP/SM 5310B MOD	
<b>SBS-ROW033W-1.5 (A5K0059-22)</b>			<b>Matrix: Sediment</b>					
Batch: 5120217								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	12/15/15 13:55	PSEP/SM 5310B MOD	H-08

Apex Laboratories



Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209


Project: **POR OPP**  
 Project Number: 9003.39.01  
 Project Manager: Phil Wiescher

Reported:  
 01/14/16 09:12

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5110203 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5110203-BLK1)</b>						Prepared: 11/06/15 11:01 Analyzed: 11/10/15 13:46						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5110203-BS1)</b>						Prepared: 11/06/15 11:01 Analyzed: 11/10/15 13:46						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115%	---	---	
<b>Duplicate (5110203-DUP1)</b>						Prepared: 11/06/15 11:01 Analyzed: 11/10/15 13:46						
<b>QC Source Sample: SS-ROW038S-0.5 (A5K0059-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	18000	---	200	mg/kg	1	---	17000	---	---	10	20%	
<b>Batch 5120217 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (5120217-BLK1)</b>						Prepared: 12/08/15 07:45 Analyzed: 12/15/15 13:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (5120217-BS1)</b>						Prepared: 12/08/15 07:45 Analyzed: 12/15/15 13:55						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115%	---	---	
<b>Duplicate (5120217-DUP1)</b>						Prepared: 12/08/15 07:45 Analyzed: 12/15/15 13:55						
<b>QC Source Sample: SBS-ROW029BS-1.5 (A5K0059-06)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	8900	---	200	mg/kg	1	---	9200	---	---	3	20%	H-08



**Maul Foster & Alongi, INC.**  
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 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.39.01  
 Project Manager: Phil Wiescher

**Reported:**  
 01/14/16 09:12


## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5110203</b>							
A5K0059-01	Sediment	PSEP/SM 5310B MOD	11/02/15 08:55	11/06/15 11:01	5g/5g	5g/5g	NA
A5K0059-04	Sediment	PSEP/SM 5310B MOD	11/02/15 09:40	11/06/15 11:01	5g/5g	5g/5g	NA
A5K0059-07	Sediment	PSEP/SM 5310B MOD	11/02/15 10:30	11/06/15 11:01	5g/5g	5g/5g	NA
A5K0059-13	Sediment	PSEP/SM 5310B MOD	11/02/15 12:15	11/06/15 11:01	5g/5g	5g/5g	NA
A5K0059-20	Sediment	PSEP/SM 5310B MOD	11/02/15 14:10	11/06/15 11:01	5g/5g	5g/5g	NA
<b>Batch: 5120217</b>							
A5K0059-06	Sediment	PSEP/SM 5310B MOD	11/02/15 09:50	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-09	Sediment	PSEP/SM 5310B MOD	11/02/15 10:40	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-10	Sediment	PSEP/SM 5310B MOD	11/02/15 11:30	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-15	Sediment	PSEP/SM 5310B MOD	11/02/15 12:25	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-16	Sediment	PSEP/SM 5310B MOD	11/02/15 12:45	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-17	Sediment	PSEP/SM 5310B MOD	11/02/15 12:45	12/08/15 07:45	5g/5g	5g/5g	NA
A5K0059-22	Sediment	PSEP/SM 5310B MOD	11/02/15 14:20	12/08/15 07:45	5g/5g	5g/5g	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.39.01  
Project Manager: Phil Wiescher

Reported:  
01/14/16 09:12

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.


Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.39.01  
Project Manager: Phil Wiescher

Reported:  
01/14/16 09:12

A5K005A  
coc 1 of 3

### CHAIN OF CUSTODY

### APEX LABS

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>		Project Mgr: <b>Phil Wiescher</b>		Project Name: <b>POR opp</b>		Project # <b>9003.39.01</b>																				
Address: <b>2001 NW 19th Ave, Suite 200, Portland, OR</b>		Phone: <b>503-501-8209</b>		Fax: _____		Email: <b>pwiescher@maulfooster.com</b>																				
Sampled by: <b>PW/ENH</b>		Lab # _____		Lab # _____		Lab # _____																				
Site Location: <b>OR</b> (WA)		Other: _____		Other: _____		Other: _____																				
SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTRH-CID	NWTRH-DX	NWTRH-GX	8260 VOC	8260 RBDM VOCs	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCA Metals (8)	TCLP Metals (8)	AL, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Ni, Pb, Hg, Mg, Mn, Mo, Ni, Zn, Se, Ag, Na, TL, V, Zn	TOTAL DISS TCLP	1200-COLS	1200-Z	Dioxin PCBs	TOC PSEP/Sm	Archive		
SS-ROW0385-0.5		11/15/15	0855	S	2																					
SB-ROW0385-1.0		"	0900	S	2																					
SB5-ROW0385-1.5		"	0905	S	2																					
SB5-ROW02985-0.5		"	0940	S	2																					
SB5-ROW02985-1.0		"	0945	S	2																					
SB5-ROW02985-1.5		"	0950	S	2																					
SS-ROW010W-0.5		"	1030	S	2																					
SB5-ROW010W-1.0		"	1035	S	2																					
SB5-ROW010W-1.5		"	1040	S	2																					
SS-ROW010E-0.5		"	1130	S	2																					
Normal Turn Around Time (TAT) = 7-10 Business Days						<input checked="" type="radio"/> YES <input type="radio"/> NO		SPECIAL INSTRUCTIONS: <b>Dioxins to Maxam.</b>																		
TAT Requested (circle)						1 Day		2 Day		3 Day		4 DAY		5 DAY		Other: _____		RECEIVED BY: _____								
SAMPLES ARE HELD FOR 30 DAYS						RECEIVED BY: _____		Signature: _____		Date: 11/17/15		Signature: _____		Date: _____		Signature: _____		Date: _____		RECEIVED BY: _____						
Signature: _____						Date: 1/3		Signature: _____		Date: 11/17/15		Signature: _____		Date: _____		Signature: _____		Date: _____		RECEIVED BY: _____						
Printed Name: <b>Philip Nerenberg</b>						Time: 10:20		Printed Name: <b>Phil Wiescher</b>		Time: 10:20		Printed Name: _____		Time: _____		Printed Name: _____		Time: _____		RECEIVED BY: _____						
Company: <b>MFA</b>						Company: _____		Company: <b>Apex</b>		Company: _____		Company: _____		Company: _____		Company: _____		Company: _____		RECEIVED BY: _____						

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.39.01  
Project Manager: Phil Wiescher

Reported:  
01/14/16 09:12

Lab # A5K0039  
COC 2 of 3

### CHAIN OF CUSTODY

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>		Project Mgr: <b>Phil Wiescher</b>		Project Name: <b>POR OPP</b>		Project # <b>9003.39.01</b>	
Address: <b>Portland, OR</b>		Phone:		Fax:		Email:	
Sampled by: <b>PW/ENH</b>		Site Location: <b>OR</b> (WA)		Other:		ANALYSIS REQUEST	
LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-CID	NWTPH-DX	NWTPH-GX
1	11/2/15	1135	S	2			
2	"	1140	S	2			
3	"	1215	S	2			
4	"	1220	S	2			
5	"	1225	S	2			
6	"	1245	S	2			
7	"	1245	S	2			
8	"	1255	S	2			
9	"	1305	S	2			
10	"	1410	S	2			

AL, Sb, As, Ba, Be, Bi, Cd, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, P, Rn, Se, Ag, Na, TL, V, Zn	
TOTAL DISS TCTP	
1200-Z	
1200-COLS	
TCR Metals (8)	
TCR Metals (8)	
600 TTO	
8082 PCBs	
8270 SIM PAHs	
8270 SVOC	
8260 BTEX	
8260 RBDM VOCs	
8260 VOC	

SPECIAL INSTRUCTIONS: **Dioxins to Maxam.**

Normal Turn Around Time (TAT) = 7-10 Business Days

TAT Requested (circle)	1 Day	2 Day	3 Day	4 DAY	5 DAY	Other:
<input checked="" type="radio"/>						

RECEIVED BY: **[Signature]** Date: **11/3**

RECEIVED BY: **[Signature]** Date: **11/3**

Signature: **[Signature]** Date: **11/3**

Printed Name: **[Signature]** Time: **10:20**

Company: **MFA**

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.39.01  
Project Manager: Phil Wiescher

Reported:  
01/14/16 09:12

Lab # A5K0059      COC 3 of 3

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>MFA</u>		Project Mgr: <u>Phil Wiescher</u>		Project Name: <u>POR OPP</u>		Project # <u>9003.39.01</u>	
Address: <u>Portland, OR</u>		Phone:		Fax:		Email:	
Sampled by: <u>PW   ENH</u>		Project Mgr: <u>Phil Wiescher</u>		Project Name: <u>POR OPP</u>		Project # <u>9003.39.01</u>	
Site Location: <u>OR</u>		Project Mgr: <u>Phil Wiescher</u>		Project Name: <u>POR OPP</u>		Project # <u>9003.39.01</u>	
Other: <u>WA</u>		Project Mgr: <u>Phil Wiescher</u>		Project Name: <u>POR OPP</u>		Project # <u>9003.39.01</u>	
SAMPLE ID		DATE		TIME		MATRIX	
1 <u>SBS-ROW033W-1.0</u>		<u>1/2/15</u>		<u>1415</u>		<u>S</u>	
2 <u>SBS-ROW033W-1.5</u>		<u>"</u>		<u>1420</u>		<u>S</u>	
3							
4							
5							
6							
7							
8							
9							
10							
Normal Turn Around Time (TAT) = 7-10 Business Days		1 Day		2 Day		3 Day	
TAT Requested (circle)		<u>3 DAY</u>		4 DAY		5 DAY	
Other:							
RECEIVED BY: <u>[Signature]</u>		DATE: <u>1/13</u>		SIGNATURE: <u>[Signature]</u>		DATE: <u>1/13</u>	
PRINTED NAME: <u>[Name]</u>		TIME: <u>10:28</u>		PRINTED NAME: <u>[Name]</u>		TIME: <u>11:20</u>	
COMPANY: <u>MFA</u>		COMPANY: <u>[Company]</u>		COMPANY: <u>[Company]</u>		COMPANY: <u>[Company]</u>	

SPECIAL INSTRUCTIONS:  
Dioxins to Maxam.

ANALYSIS REQUEST

AL, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Hg, Mn, Mo, Ni, K, P, S, Se, Ag, Na, Ti, V, Zr, TOTAL DISS TCLP	1200-COLS	1200-Z	Dioxin 1613B	TCC PCB 15M	TCC PCB 15M	Archive
TCLP Metals (8)	RCRA Metals (8)	600 TTO	8082 PCBs	8270 SIM PAHs	8270 SVOC	8260 BTEX
8260 RBDM VOCs	8260 VOC	NWTPH-GX	NWTPH-DX	NWTPH-HCID	# OF CONTAINERS	MATRIX

*Philip Nerenberg*



# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Wednesday, January 13, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A5K0831, which was received by the laboratory on 11/20/2015 at 1:57:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

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Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
01/13/16 10:58

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-A0I009-0.5-As Received	A5K0831-01	Soil	11/20/15 09:15	11/20/15 13:57
ISM-A0I009-0.5-After ISM	A5K0831-02	Soil	11/20/15 09:15	11/20/15 13:57
COMP-A0I001-0.5	A5K0831-03	Soil	11/20/15 10:20	11/20/15 13:57
ISM-A0I002-0.5-As Received	A5K0831-04	Soil	11/20/15 11:00	11/20/15 13:57
ISM-A0I002-0.5-After ISM	A5K0831-05	Soil	11/20/15 11:00	11/20/15 13:57
ISM-A0I037-0.5-As Received	A5K0831-06	Soil	11/20/15 11:30	11/20/15 13:57
ISM-A0I037-0.5-After ISM	A5K0831-07	Soil	11/20/15 11:30	11/20/15 13:57

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher


**Reported:**  
 01/13/16 10:58

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-A0I009-0.5-After ISM (A5K0831-02)</b>			<b>Matrix: Soil</b>					
Batch: 5120050								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	12/04/15 14:20	PSEP/SM 5310B MOD	
<b>COMP-A0I001-0.5 (A5K0831-03)</b>			<b>Matrix: Soil</b>					
Batch: 5120050								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	12/04/15 14:20	PSEP/SM 5310B MOD	
<b>ISM-A0I002-0.5-After ISM (A5K0831-05)</b>			<b>Matrix: Soil</b>					
Batch: 5120050								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	12/04/15 14:20	PSEP/SM 5310B MOD	
<b>ISM-A0I037-0.5-After ISM (A5K0831-07)</b>			<b>Matrix: Soil</b>					
Batch: 5120050								
<b>Total Organic Carbon</b>	<b>23000</b>	---	200	mg/kg	1	12/04/15 14:20	PSEP/SM 5310B MOD	

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Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 10:58

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-A0I009-0.5-As Received (A5K0831-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	79.1	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>ISM-A0I009-0.5-After ISM (A5K0831-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	97.3	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>COMP-A0I001-0.5 (A5K0831-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	76.9	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>ISM-A0I002-0.5-As Received (A5K0831-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	76.3	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>ISM-A0I002-0.5-After ISM (A5K0831-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	97.6	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>ISM-A0I037-0.5-As Received (A5K0831-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	77.9	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	
<b>ISM-A0I037-0.5-After ISM (A5K0831-07)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120201</b>				
% Solids	97.7	---	1.00	% by Weight	1	12/08/15 07:54	EPA 8000C	

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Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 10:58

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5120050 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5120050-BLK1)</b>						Prepared: 12/02/15 09:37 Analyzed: 12/04/15 14:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5120050-BS1)</b>						Prepared: 12/02/15 09:37 Analyzed: 12/04/15 14:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9400	---		mg/kg	1	10000	---	94	85-115%	---	---	
<b>Duplicate (5120050-DUP1)</b>						Prepared: 12/02/15 09:37 Analyzed: 12/04/15 14:20						
<b>QC Source Sample: COMP-A01001-0.5 (A5K0831-03)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	18000	---	200	mg/kg	1	---	18000	---	---	2	20%	



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Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 10:58

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5120201 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5120201-DUP1)</b>						Prepared: 12/07/15 14:45 Analyzed: 12/08/15 07:54						
QC Source Sample: Other (A5L0116-01)												
EPA 8000C												
% Solids	91.5	---	1.00	% by Weight	1	---	91.3	---	---	0.3	10%	
<b>Duplicate (5120201-DUP2)</b>						Prepared: 12/07/15 14:51 Analyzed: 12/08/15 07:54						
QC Source Sample: Other (A5L0167-06)												
EPA 8000C												
% Solids	86.9	---	1.00	% by Weight	1	---	87.9	---	---	1	10%	
<b>Duplicate (5120201-DUP3)</b>						Prepared: 12/07/15 19:42 Analyzed: 12/08/15 07:54						
QC Source Sample: Other (A5L0224-01)												
EPA 8000C												
% Solids	72.9	---	1.00	% by Weight	1	---	73.3	---	---	0.5	10%	
<b>Duplicate (5120201-DUP4)</b>						Prepared: 12/07/15 19:42 Analyzed: 12/08/15 07:54						
QC Source Sample: Other (A5L0232-02)												
EPA 8000C												
% Solids	68.0	---	1.00	% by Weight	1	---	67.8	---	---	0.3	10%	





**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 10:58

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5120050</b>							
A5K0831-02	Soil	PSEP/SM 5310B MOD	11/20/15 09:15	12/02/15 09:37	5g/5g	5g/5g	NA
A5K0831-03	Soil	PSEP/SM 5310B MOD	11/20/15 10:20	12/02/15 09:37	5g/5g	5g/5g	NA
A5K0831-05	Soil	PSEP/SM 5310B MOD	11/20/15 11:00	12/02/15 09:37	5g/5g	5g/5g	NA
A5K0831-07	Soil	PSEP/SM 5310B MOD	11/20/15 11:30	12/02/15 09:37	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5120201</b>							
A5K0831-01	Soil	EPA 8000C	11/20/15 09:15	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-02	Soil	EPA 8000C	11/20/15 09:15	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-03	Soil	EPA 8000C	11/20/15 10:20	12/07/15 14:54	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-04	Soil	EPA 8000C	11/20/15 11:00	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-05	Soil	EPA 8000C	11/20/15 11:00	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-06	Soil	EPA 8000C	11/20/15 11:30	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA
A5K0831-07	Soil	EPA 8000C	11/20/15 11:30	12/07/15 14:51	1N/A/1N/A	1N/A/1N/A	NA



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher


Reported:  
01/13/16 10:58

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).







# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Wednesday, January 13, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A5L0163, which was received by the laboratory on 12/2/2015 at 3:25:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

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Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 01/13/16 09:46

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI028B-0.5-As Received	A5L0163-01	Soil	12/02/15 10:40	12/02/15 15:25
ISM-AOI028B-0.5-After ISM	A5L0163-02	Soil	12/02/15 10:40	12/02/15 15:25
ISM-AOI034-0.5-As Received	A5L0163-03	Soil	12/02/15 11:00	12/02/15 15:25
ISM-AOI034-0.5-After ISM	A5L0163-04	Soil	12/02/15 11:00	12/02/15 15:25
ISM-AOI028A-0.5-As Received	A5L0163-05	Soil	12/02/15 11:50	12/02/15 15:25
ISM-AOI028A-0.5-After ISM	A5L0163-06	Soil	12/02/15 11:50	12/02/15 15:25
ISM-AOI022-0.5-As Received	A5L0163-07	Soil	12/02/15 12:30	12/02/15 15:25
ISM-AOI022-0.5-After ISM	A5L0163-08	Soil	12/02/15 12:30	12/02/15 15:25
ISM-AOI010-0.5-As Received	A5L0163-09	Soil	12/02/15 13:40	12/02/15 15:25
ISM-AOI010-0.5-After ISM	A5L0163-10	Soil	12/02/15 13:40	12/02/15 15:25

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209


Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 09:46

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI028B-0.5-After ISM (A5L0163-02)</b>			<b>Matrix: Soil</b>					
Batch: 5120406								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	12/16/15 13:00	PSEP/SM 5310B MOD	
<b>ISM-AOI034-0.5-After ISM (A5L0163-04)</b>			<b>Matrix: Soil</b>					
Batch: 5120406								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	12/16/15 13:00	PSEP/SM 5310B MOD	
<b>ISM-AOI028A-0.5-After ISM (A5L0163-06)</b>			<b>Matrix: Soil</b>					
Batch: 5120406								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	12/16/15 13:00	PSEP/SM 5310B MOD	
<b>ISM-AOI022-0.5-After ISM (A5L0163-08)</b>			<b>Matrix: Soil</b>					
Batch: 5120406								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	12/16/15 13:00	PSEP/SM 5310B MOD	
<b>ISM-AOI010-0.5-After ISM (A5L0163-10)</b>			<b>Matrix: Soil</b>					
Batch: 5120406								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	12/16/15 13:00	PSEP/SM 5310B MOD	





Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher


Reported:  
01/13/16 09:46

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI028B-0.5-As Received (A5L0163-01)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	76.3	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI028B-0.5-After ISM (A5L0163-02)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	96.4	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI034-0.5-As Received (A5L0163-03)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	79.0	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI034-0.5-After ISM (A5L0163-04)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	96.3	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI028A-0.5-As Received (A5L0163-05)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	78.2	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI028A-0.5-After ISM (A5L0163-06)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	96.8	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI022-0.5-As Received (A5L0163-07)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	80.0	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI022-0.5-After ISM (A5L0163-08)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	96.8	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI010-0.5-As Received (A5L0163-09)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	78.6	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	
<b>ISM-AOI010-0.5-After ISM (A5L0163-10)</b>			<b>Matrix: Soil</b>	<b>Batch: 5120337</b>				
% Solids	96.6	---	1.00	% by Weight	1	12/11/15 07:55	EPA 8000C	

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Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 09:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5120406 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (5120406-BLK1)</b>						Prepared: 12/14/15 10:02 Analyzed: 12/16/15 13:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (5120406-BS1)</b>						Prepared: 12/14/15 10:02 Analyzed: 12/16/15 13:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>LCS (5120406-BS2)</b>						Prepared: 12/14/15 10:02 Analyzed: 12/21/15 12:30						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9600	---		mg/kg	1	10000	---	96	85-115%	---	---	
<b>Duplicate (5120406-DUP1)</b>						Prepared: 12/14/15 10:02 Analyzed: 12/16/15 13:00						
<b>QC Source Sample: ISM-AOI028B-0.5-After ISM (A5L0163-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	20000	---	200	mg/kg	1	---	19000	---	---	4	20%	
<b>Duplicate (5120406-DUP2)</b>						Prepared: 12/14/15 10:02 Analyzed: 12/21/15 12:30						
<b>QC Source Sample: Other (A5L0393-07)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	8200	---	200	mg/kg	1	---	11000	---	---	27	20%	Q-01



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher


Reported:  
01/13/16 09:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 5120337 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (5120337-DUP1)</b>						Prepared: 12/10/15 13:54 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0258-02)												
EPA 8000C												
% Solids	87.5	---	1.00	% by Weight	1	---	87.5	---	---	0.07	10%	
<b>Duplicate (5120337-DUP2)</b>						Prepared: 12/10/15 13:56 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0341-04)												
EPA 8000C												
% Solids	74.7	---	1.00	% by Weight	1	---	74.6	---	---	0.09	10%	
<b>Duplicate (5120337-DUP3)</b>						Prepared: 12/10/15 13:57 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0341-10)												
EPA 8000C												
% Solids	75.7	---	1.00	% by Weight	1	---	76.0	---	---	0.3	10%	
<b>Duplicate (5120337-DUP4)</b>						Prepared: 12/10/15 15:27 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0370-02)												
EPA 8000C												
% Solids	82.3	---	1.00	% by Weight	1	---	80.9	---	---	2	10%	
<b>Duplicate (5120337-DUP5)</b>						Prepared: 12/10/15 18:03 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0394-01)												
EPA 8000C												
% Solids	78.6	---	1.00	% by Weight	1	---	78.5	---	---	0.08	10%	
<b>Duplicate (5120337-DUP6)</b>						Prepared: 12/10/15 19:45 Analyzed: 12/11/15 07:55						
QC Source Sample: Other (A5L0403-02)												
EPA 8000C												
% Solids	85.3	---	1.00	% by Weight	1	---	87.1	---	---	2	10%	

Apex Laboratories



Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 01/13/16 09:46

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5120406</b>							
A5L0163-02	Soil	PSEP/SM 5310B MOD	12/02/15 10:40	12/14/15 10:02	5g/5g	5g/5g	NA
A5L0163-04	Soil	PSEP/SM 5310B MOD	12/02/15 11:00	12/14/15 10:02	5g/5g	5g/5g	NA
A5L0163-06	Soil	PSEP/SM 5310B MOD	12/02/15 11:50	12/14/15 10:02	5g/5g	5g/5g	NA
A5L0163-08	Soil	PSEP/SM 5310B MOD	12/02/15 12:30	12/14/15 10:02	5g/5g	5g/5g	NA
A5L0163-10	Soil	PSEP/SM 5310B MOD	12/02/15 13:40	12/14/15 10:02	5g/5g	5g/5g	NA

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 5120337</b>							
A5L0163-01	Soil	EPA 8000C	12/02/15 10:40	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-02	Soil	EPA 8000C	12/02/15 10:40	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-03	Soil	EPA 8000C	12/02/15 11:00	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-04	Soil	EPA 8000C	12/02/15 11:00	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-05	Soil	EPA 8000C	12/02/15 11:50	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-06	Soil	EPA 8000C	12/02/15 11:50	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-07	Soil	EPA 8000C	12/02/15 12:30	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-08	Soil	EPA 8000C	12/02/15 12:30	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-09	Soil	EPA 8000C	12/02/15 13:40	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA
A5L0163-10	Soil	EPA 8000C	12/02/15 13:40	12/10/15 13:57	1N/A/1N/A	1N/A/1N/A	NA



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
01/13/16 09:46

## Notes and Definitions

### Qualifiers:

Q-01 Spike recovery and/or RPD is outside acceptance limits.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.


Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
01/13/16 09:46

Lab # A5L0163 of \_\_\_\_\_  
COC \_\_\_\_\_

### CHAIN OF CUSTODY

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>		Project Mgr: <b>Phil Wiescher</b>		Project Name: <b>Port opp</b>		Project # <b>9003.01.39</b>	
Address: <b>Portland OR</b>		Phone: _____		Fax: _____		Email: <b>PWiescher@maulfoal.com</b>	
Sampled by: _____ Site Location: <b>OR</b> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">WA</span> Other: _____							
LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWPH-ICID	NWPH-DX	NWPH-GX
1 15M-A01028B-0.5	12/21/15	10:40	SO	1			
2 15M-A01034-0.5	"	11:00	SO	1			
3 15M-A01028A-0.5	"	11:50	SO	1			
4 15M-A01008-0.5	"	12:30	SO	1			
5 15M-A01010-0.5	"	13:40	SO	1			
6							
7							
8							
9							
10							
ANALYSIS REQUEST AT, SB, AS, BA, BB, BC, CD CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ TOTAL DISS TCLP 1200-Z Dioxin-1613B TC-PCB 15m processing				SPECIAL INSTRUCTIONS: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>			
TAT Requested (circle) 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 4 DAY <input type="checkbox"/> 5 DAY <input type="checkbox"/> Other: _____				RECEIVED BY: _____ Signature: _____ Date: <b>12-21-15</b> Time: _____			
RELINQUISHED BY: Signature: <b>Phil Wiescher</b> Date: <b>12-21-15</b> Printed Name: <b>Phil Wiescher</b> Time: <b>15:25</b>				RECEIVED BY: Signature: _____ Date: _____ Printed Name: _____ Time: _____			
Company: <b>MFA</b>				Company: <b>Apex</b>			

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.





Your Project #: A5E0713  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/06/17**  
Report #: R3468440  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5A4222**

**Received: 2015/06/02, 15:15**

Sample Matrix: Soil  
# Samples Received: 3

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	2	2015/06/06	2015/06/10	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	1	2015/06/06	2015/06/11	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation in Soil	3	N/A	2015/06/16	BRL SOP-00406	EPA 8290A m
Moisture	3	N/A	2015/06/04	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

=====  
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AJL537	AJL538	AJL539			
Sampling Date		2015/05/21 14:40	2015/05/21 15:15	2015/05/21 16:10			
COC Number		na	na	na			
	Units	ISM-AOI008-0. 5-AFTER ISM	ISM-AOI030-0. 5-AFTER ISM	SS-ROW026-0.5	RDL	MDL	QC Batch
Moisture	%	2.6	2.6	15	1.0	0.040	4051616
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AJL537							
Sampling Date		2015/05/21 14:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI008-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.87	0.119	0.200	0.0400	1.00	1.87		4059381
1,2,3,7,8-Penta CDD *	pg/g	1.92	0.127	1.00	0.0400	1.00	1.92		4059381
1,2,3,4,7,8-Hexa CDD *	pg/g	3.19	0.128	1.00	0.0400	0.100	0.319		4059381
1,2,3,6,7,8-Hexa CDD *	pg/g	12.7	0.134	1.00	0.0400	0.100	1.27		4059381
1,2,3,7,8,9-Hexa CDD *	pg/g	8.79	0.131	1.00	0.0400	0.100	0.879		4059381
1,2,3,4,6,7,8-Hepta CDD *	pg/g	288	0.255	1.00	0.0400	0.0100	2.88		4059381
Octa CDD *	pg/g	1720	0.116	2.00	0.0800	0.000300	0.516		4059381
Total Tetra CDD *	pg/g	4.37	0.119	0.200	0.0400			7	4059381
Total Penta CDD *	pg/g	9.15	0.127	1.00	0.0400			10	4059381
Total Hexa CDD *	pg/g	67.7	0.131	1.00	0.0400			7	4059381
Total Hepta CDD *	pg/g	468	0.255	1.00	0.0400			2	4059381
2,3,7,8-Tetra CDF **	pg/g	1.42	0.0659	0.200	0.0400	0.100	0.142		4059381
1,2,3,7,8-Penta CDF **	pg/g	0.829	0.101	1.00	0.0400	0.0300	0.0249		4059381
2,3,4,7,8-Penta CDF **	pg/g	0.999	0.100	1.00	0.0400	0.300	0.300		4059381
1,2,3,4,7,8-Hexa CDF **	pg/g	4.07	0.185	1.00	0.0400	0.100	0.407		4059381
1,2,3,6,7,8-Hexa CDF **	pg/g	2.15	0.189	1.00	0.0400	0.100	0.215		4059381
2,3,4,6,7,8-Hexa CDF **	pg/g	1.46	0.175	1.00	0.0400	0.100	0.146		4059381
1,2,3,7,8,9-Hexa CDF **	pg/g	0.276	0.182	1.00	0.0400	0.100	0.0276		4059381
1,2,3,4,6,7,8-Hepta CDF **	pg/g	46.8	0.175	1.00	0.0400	0.0100	0.468		4059381
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.76	0.176	1.00	0.0400	0.0100	0.0276		4059381
Octa CDF **	pg/g	90.2	0.113	2.00	0.0800	0.000300	0.0271		4059381
Total Tetra CDF **	pg/g	6.97	0.0659	0.200	0.0400			13	4059381
Total Penta CDF **	pg/g	9.77	0.101	1.00	0.0400			10	4059381
Total Hexa CDF **	pg/g	50.7	0.183	1.00	0.0400			11	4059381
Total Hepta CDF **	pg/g	132	0.176	1.00	0.0400			4	4059381
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.95	0.11	1.0	0.90	0.100	0.0950		4068022
TOTAL TOXIC EQUIVALENCY	pg/g						11.4		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	103							4059381
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AJL537							
Sampling Date		2015/05/21 14:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI008-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	104							4059381
C13-1234678 HeptaCDF **	%	88							4059381
C13-123478 HexaCDD *	%	85							4059381
C13-123478 HexaCDF **	%	83							4059381
C13-1234789 HeptaCDF **	%	86							4059381
C13-123678 HexaCDD *	%	99							4059381
C13-123678 HexaCDF **	%	84							4059381
C13-12378 PentaCDD *	%	114							4059381
C13-12378 PentaCDF **	%	107							4059381
C13-123789 HexaCDF **	%	89							4059381
C13-234678 HexaCDF **	%	86							4059381
C13-23478 PentaCDF **	%	120							4059381
C13-2378 TetraCDD *	%	95							4059381
C13-2378 TetraCDF **	%	99							4059381
C13-OCDD *	%	101							4059381
Confirmation C13-2378 TetraCDF **	%	95							4068022

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AJL538							
Sampling Date		2015/05/21 15:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI030-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.265	0.117	0.200	0.0400	1.00	0.265		4059381
1,2,3,7,8-Penta CDD *	pg/g	2.15	0.103	1.00	0.0400	1.00	2.15		4059381
1,2,3,4,7,8-Hexa CDD *	pg/g	4.41	0.133	1.00	0.0400	0.100	0.441		4059381
1,2,3,6,7,8-Hexa CDD *	pg/g	15.3	0.139	1.00	0.0400	0.100	1.53		4059381
1,2,3,7,8,9-Hexa CDD *	pg/g	12.3	0.136	1.00	0.0400	0.100	1.23		4059381
1,2,3,4,6,7,8-Hepta CDD *	pg/g	337	0.198	1.00	0.0400	0.0100	3.37		4059381
Octa CDD *	pg/g	1720	0.359	2.00	0.0800	0.000300	0.516		4059381
Total Tetra CDD *	pg/g	2.37	0.117	0.200	0.0400			8	4059381
Total Penta CDD *	pg/g	11.7	0.103	1.00	0.0400			11	4059381
Total Hexa CDD *	pg/g	92.6	0.136	1.00	0.0400			7	4059381
Total Hepta CDD *	pg/g	571	0.198	1.00	0.0400			2	4059381
2,3,7,8-Tetra CDF **	pg/g	1.12	0.0875	0.200	0.0400	0.100	0.112		4059381
1,2,3,7,8-Penta CDF **	pg/g	0.926	0.0796	1.00	0.0400	0.0300	0.0278		4059381
2,3,4,7,8-Penta CDF **	pg/g	1.20	0.0786	1.00	0.0400	0.300	0.360		4059381
1,2,3,4,7,8-Hexa CDF **	pg/g	5.30	0.130	1.00	0.0400	0.100	0.530		4059381
1,2,3,6,7,8-Hexa CDF **	pg/g	2.47	0.133	1.00	0.0400	0.100	0.247		4059381
2,3,4,6,7,8-Hexa CDF **	pg/g	1.69	0.123	1.00	0.0400	0.100	0.169		4059381
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.165 (1)	0.165	1.00	0.0400	0.100	0.0165		4059381
1,2,3,4,6,7,8-Hepta CDF **	pg/g	45.1	0.249	1.00	0.0400	0.0100	0.451		4059381
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.45	0.250	1.00	0.0400	0.0100	0.0245		4059381
Octa CDF **	pg/g	74.4	0.143	2.00	0.0800	0.000300	0.0223		4059381
Total Tetra CDF **	pg/g	5.63	0.0875	0.200	0.0400			12	4059381
Total Penta CDF **	pg/g	11.9	0.0791	1.00	0.0400			11	4059381
Total Hexa CDF **	pg/g	61.3	0.128	1.00	0.0400			9	4059381
Total Hepta CDF **	pg/g	120	0.250	1.00	0.0400			4	4059381
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.699	0.084	1.0	0.90	0.100	0.0699		4068022
TOTAL TOXIC EQUIVALENCY	pg/g						11.4		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AJL538							
<b>Sampling Date</b>		2015/05/21 15:15							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI030-0. 5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	106							4059381
C13-1234678 HeptaCDD *	%	95							4059381
C13-1234678 HeptaCDF **	%	87							4059381
C13-123478 HexaCDD *	%	81							4059381
C13-123478 HexaCDF **	%	82							4059381
C13-1234789 HeptaCDF **	%	90							4059381
C13-123678 HexaCDD *	%	92							4059381
C13-123678 HexaCDF **	%	82							4059381
C13-12378 PentaCDD *	%	112							4059381
C13-12378 PentaCDF **	%	102							4059381
C13-123789 HexaCDF **	%	88							4059381
C13-234678 HexaCDF **	%	82							4059381
C13-23478 PentaCDF **	%	117							4059381
C13-2378 TetraCDD *	%	92							4059381
C13-2378 TetraCDF **	%	96							4059381
C13-OCDD *	%	96							4059381
Confirmation C13-2378 TetraCDF **	%	92							4068022

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 \*\* CDF = Chloro Dibenzo-p-Furan



Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AL539							
Sampling Date		2015/05/21 16:10							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW026-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.494	0.107	0.200	0.0400	1.00	0.494		4059381
1,2,3,7,8-Penta CDD *	pg/g	2.59	0.116	1.00	0.0400	1.00	2.59		4059381
1,2,3,4,7,8-Hexa CDD *	pg/g	5.27	0.0979	1.00	0.0400	0.100	0.527		4059381
1,2,3,6,7,8-Hexa CDD *	pg/g	18.8	0.102	1.00	0.0400	0.100	1.88		4059381
1,2,3,7,8,9-Hexa CDD *	pg/g	13.1	0.100	1.00	0.0400	0.100	1.31		4059381
1,2,3,4,6,7,8-Hepta CDD *	pg/g	424	0.118	1.00	0.0400	0.0100	4.24		4059381
Octa CDD *	pg/g	2470	0.109	2.00	0.0800	0.000300	0.741		4059381
Total Tetra CDD *	pg/g	4.57	0.107	0.200	0.0400			11	4059381
Total Penta CDD *	pg/g	15.4	0.116	1.00	0.0400			11	4059381
Total Hexa CDD *	pg/g	106	0.100	1.00	0.0400			7	4059381
Total Hepta CDD *	pg/g	749	0.118	1.00	0.0400			2	4059381
2,3,7,8-Tetra CDF **	pg/g	1.38	0.104	0.200	0.0400	0.100	0.138		4059381
1,2,3,7,8-Penta CDF **	pg/g	1.42	0.109	1.00	0.0400	0.0300	0.0426		4059381
2,3,4,7,8-Penta CDF **	pg/g	1.88	0.108	1.00	0.0400	0.300	0.564		4059381
1,2,3,4,7,8-Hexa CDF **	pg/g	8.48	0.105	1.00	0.0400	0.100	0.848		4059381
1,2,3,6,7,8-Hexa CDF **	pg/g	3.95	0.108	1.00	0.0400	0.100	0.395		4059381
2,3,4,6,7,8-Hexa CDF **	pg/g	2.10	0.0995	1.00	0.0400	0.100	0.210		4059381
1,2,3,7,8,9-Hexa CDF **	pg/g	0.220	0.103	1.00	0.0400	0.100	0.0220		4059381
1,2,3,4,6,7,8-Hepta CDF **	pg/g	72.2	0.104	1.00	0.0400	0.0100	0.722		4059381
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.80	0.105	1.00	0.0400	0.0100	0.0380		4059381
Octa CDF **	pg/g	77.8	0.116	2.00	0.0800	0.000300	0.0233		4059381
Total Tetra CDF **	pg/g	8.44	0.104	0.200	0.0400			13	4059381
Total Penta CDF **	pg/g	20.4	0.108	1.00	0.0400			11	4059381
Total Hexa CDF **	pg/g	103	0.104	1.00	0.0400			12	4059381
Total Hepta CDF **	pg/g	175	0.105	1.00	0.0400			3	4059381
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.937	0.086	1.0	0.90	0.100	0.0937		4068022
TOTAL TOXIC EQUIVALENCY	pg/g						14.7		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	108							4059381
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AJL539							
Sampling Date		2015/05/21 16:10							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW026-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	109							4059381
C13-1234678 HeptaCDF **	%	100							4059381
C13-123478 HexaCDD *	%	90							4059381
C13-123478 HexaCDF **	%	96							4059381
C13-1234789 HeptaCDF **	%	100							4059381
C13-123678 HexaCDD *	%	109							4059381
C13-123678 HexaCDF **	%	94							4059381
C13-12378 PentaCDD *	%	113							4059381
C13-12378 PentaCDF **	%	109							4059381
C13-123789 HexaCDF **	%	107							4059381
C13-234678 HexaCDF **	%	98							4059381
C13-23478 PentaCDF **	%	124							4059381
C13-2378 TetraCDD *	%	100							4059381
C13-2378 TetraCDF **	%	106							4059381
C13-OCDD *	%	116							4059381
Confirmation C13-2378 TetraCDF **	%	98							4068022

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**TEST SUMMARY**

**Maxxam ID:** AJL537  
**Sample ID:** ISM-AOI008-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/06/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4059381	2015/06/06	2015/06/10	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4068022	N/A	2015/06/16	Vica Cioranic
Moisture	BAL	4051616	N/A	2015/06/04	Valentina Kaftani

**Maxxam ID:** AJL538  
**Sample ID:** ISM-AOI030-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/06/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4059381	2015/06/06	2015/06/10	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4068022	N/A	2015/06/16	Vica Cioranic
Moisture	BAL	4051616	N/A	2015/06/04	Valentina Kaftani

**Maxxam ID:** AJL539  
**Sample ID:** SS-ROW026-0.5  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/06/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4059381	2015/06/06	2015/06/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4068022	N/A	2015/06/16	Vica Cioranic
Moisture	BAL	4051616	N/A	2015/06/04	Valentina Kaftani

**Maxxam ID:** AJL539 Dup  
**Sample ID:** SS-ROW026-0.5  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/06/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4059381	2015/06/06	2015/06/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4068022	N/A	2015/06/16	Vica Cioranic



Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.9°C
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**Results relate only to the items tested.**

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
4051616	BOP	RPD - Sample/Sample Dup	Moisture	2015/06/04	9.2		%	20
4059381	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/06/10		105	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/10		96	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/10		106	%	28 - 143
			C13-123478 HexaCDD	2015/06/10		89	%	32 - 141
			C13-123478 HexaCDF	2015/06/10		93	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/10		97	%	26 - 138
			C13-123678 HexaCDD	2015/06/10		106	%	28 - 130
			C13-123678 HexaCDF	2015/06/10		96	%	26 - 123
			C13-12378 PentaCDD	2015/06/10		104	%	25 - 181
			C13-12378 PentaCDF	2015/06/10		99	%	24 - 185
			C13-123789 HexaCDF	2015/06/10		99	%	29 - 147
			C13-234678 HexaCDF	2015/06/10		94	%	28 - 136
			C13-23478 PentaCDF	2015/06/10		112	%	21 - 178
			C13-2378 TetraCDD	2015/06/10		91	%	25 - 164
			C13-2378 TetraCDF	2015/06/10		92	%	24 - 169
			C13-OCDD	2015/06/10		97	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/10		118	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/06/10		118	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/06/10		115	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/06/10		127	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/06/10		106	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/06/10		107	%	70 - 140
			Octa CDD	2015/06/10		115	%	78 - 144
			2,3,7,8-Tetra CDF	2015/06/10		122	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/06/10		119	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/06/10		116	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/06/10		117	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/06/10		118	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/06/10		110	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/06/10		101	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/06/10		101	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/06/10		122	%	78 - 138
			Octa CDF	2015/06/10		109	%	63 - 170
4059381	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/06/10		103	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/10		95	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/10		94	%	28 - 143
			C13-123478 HexaCDD	2015/06/10		88	%	32 - 141
			C13-123478 HexaCDF	2015/06/10		95	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/10		84	%	26 - 138
			C13-123678 HexaCDD	2015/06/10		103	%	28 - 130
			C13-123678 HexaCDF	2015/06/10		93	%	26 - 123
			C13-12378 PentaCDD	2015/06/10		102	%	25 - 181
			C13-12378 PentaCDF	2015/06/10		98	%	24 - 185
			C13-123789 HexaCDF	2015/06/10		95	%	29 - 147
			C13-234678 HexaCDF	2015/06/10		91	%	28 - 136
			C13-23478 PentaCDF	2015/06/10		109	%	21 - 178
			C13-2378 TetraCDD	2015/06/10		89	%	25 - 164
			C13-2378 TetraCDF	2015/06/10		93	%	24 - 169
			C13-OCDD	2015/06/10		96	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/10	<0.0623, EDL=0.0623		pg/g	
			1,2,3,7,8-Penta CDD	2015/06/10	<0.117, EDL=0.117		pg/g	

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/06/10	<0.0861, EDL=0.0861		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/06/10	<0.0901, EDL=0.0901		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/06/10	<0.0880, EDL=0.0880		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/06/10	0.0961, EDL=0.0854		pg/g	
			Octa CDD	2015/06/10	<0.233, EDL=0.233 (1)		pg/g	
			Total Tetra CDD	2015/06/10	<0.0623, EDL=0.0623		pg/g	
			Total Penta CDD	2015/06/10	<0.117, EDL=0.117		pg/g	
			Total Hexa CDD	2015/06/10	<0.125, EDL=0.125 (1)		pg/g	
			Total Hepta CDD	2015/06/10	0.0961, EDL=0.0854		pg/g	
			2,3,7,8-Tetra CDF	2015/06/10	<0.0738, EDL=0.0738		pg/g	
			1,2,3,7,8-Penta CDF	2015/06/10	<0.0754, EDL=0.0754		pg/g	
			2,3,4,7,8-Penta CDF	2015/06/10	<0.0745, EDL=0.0745		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/06/10	<0.0734, EDL=0.0734		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/06/10	<0.0751, EDL=0.0751		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/06/10	<0.0694, EDL=0.0694		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/06/10	<0.0722, EDL=0.0722		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/06/10	<0.0622, EDL=0.0622		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/06/10	<0.0624, EDL=0.0624		pg/g	
			Octa CDF	2015/06/10	<0.122, EDL=0.122		pg/g	
			Total Tetra CDF	2015/06/10	<0.0738, EDL=0.0738		pg/g	
			Total Penta CDF	2015/06/10	<0.0749, EDL=0.0749		pg/g	
			Total Hexa CDF	2015/06/10	<0.0724, EDL=0.0724		pg/g	
			Total Hepta CDF	2015/06/10	<0.0623, EDL=0.0623		pg/g	
4059381	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/06/11	NC		%	25
			1,2,3,7,8-Penta CDD	2015/06/11	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/06/11	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/06/11	1.7		%	25
			1,2,3,7,8,9-Hexa CDD	2015/06/11	4.4		%	25



Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/06/11	1.2		%	25
			Octa CDD	2015/06/11	1.4		%	25
			Total Tetra CDD	2015/06/11	34 (2)		%	25
			Total Penta CDD	2015/06/11	20		%	25
			Total Hexa CDD	2015/06/11	3.4		%	25
			Total Hepta CDD	2015/06/11	1.9		%	25
			2,3,7,8-Tetra CDF	2015/06/11	2.2		%	25
			1,2,3,7,8-Penta CDF	2015/06/11	NC		%	25
			2,3,4,7,8-Penta CDF	2015/06/11	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/06/11	2.8		%	25
			1,2,3,6,7,8-Hexa CDF	2015/06/11	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/06/11	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/06/11	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/06/11	7.4		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/06/11	NC		%	25
			Octa CDF	2015/06/11	3.9		%	25
			Total Tetra CDF	2015/06/11	24		%	25
			Total Penta CDF	2015/06/11	29 (2)		%	25
			Total Hexa CDF	2015/06/11	18		%	25
			Total Hepta CDF	2015/06/11	7.6		%	25
4068022	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/06/16	<0.097, EDL=0.097		pg/g	
			Confirmation C13-2378 TetraCDF	2015/06/16		91	%	40 - 135
4068022	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/06/16	NC		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

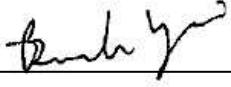
(2) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

Maxxam Job #: B5A4222  
Report Date: 2015/06/17

Apex Laboratories  
Client Project #: A5E0713

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Cristina Carriere, Scientific Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5F0059  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/06/20**  
Report #: R3473075  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5A5395**

**Received: 2015/06/03, 14:30**

Sample Matrix: Water  
# Samples Received: 1

<b>Analyses</b>	<b>Quantity</b>	<b>Date Extracted</b>	<b>Date Analyzed</b>	<b>Laboratory Method</b>	<b>Reference</b>
Dioxins/Furans in Water (1613B) (1)	1	2015/06/10	2015/06/17	BRL SOP-00410	EPA 1613B m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

=====

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Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		AJR503							
Sampling Date		2015/06/01 14:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	Units	RINSATE-SA-2	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	<1.12	1.12	10.9	4.00	1.00	1.12		4069087
1,2,3,7,8-Penta CDD *	pg/L	<1.10	1.10	54.3	4.00	1.00	1.10		4069087
1,2,3,4,7,8-Hexa CDD *	pg/L	<1.10	1.10	54.3	4.00	0.100	0.110		4069087
1,2,3,6,7,8-Hexa CDD *	pg/L	<1.15	1.15	54.3	4.00	0.100	0.115		4069087
1,2,3,7,8,9-Hexa CDD *	pg/L	<1.13	1.13	54.3	4.00	0.100	0.113		4069087
1,2,3,4,6,7,8-Hepta CDD *	pg/L	<1.12	1.12	54.3	4.00	0.0100	0.0112		4069087
Octa CDD *	pg/L	<1.18	1.18	109	8.00	0.000300	0.000354		4069087
Total Tetra CDD *	pg/L	<1.12	1.12	10.9	4.00				4069087
Total Penta CDD *	pg/L	<1.10	1.10	54.3	4.00				4069087
Total Hexa CDD *	pg/L	<1.28 (1)	1.28	54.3	4.00				4069087
Total Hepta CDD *	pg/L	<1.12	1.12	54.3	4.00				4069087
2,3,7,8-Tetra CDF **	pg/L	<1.12	1.12	10.9	4.00	0.100	0.112		4069087
1,2,3,7,8-Penta CDF **	pg/L	<1.14	1.14	54.3	4.00	0.0300	0.0342		4069087
2,3,4,7,8-Penta CDF **	pg/L	<1.11	1.11	54.3	4.00	0.300	0.333		4069087
1,2,3,4,7,8-Hexa CDF **	pg/L	<1.11	1.11	54.3	4.00	0.100	0.111		4069087
1,2,3,6,7,8-Hexa CDF **	pg/L	<1.15	1.15	54.3	4.00	0.100	0.115		4069087
2,3,4,6,7,8-Hexa CDF **	pg/L	<1.05	1.05	54.3	4.00	0.100	0.105		4069087
1,2,3,7,8,9-Hexa CDF **	pg/L	<1.10	1.10	54.3	4.00	0.100	0.110		4069087
1,2,3,4,6,7,8-Hepta CDF **	pg/L	<1.16	1.16	54.3	4.00	0.0100	0.0116		4069087
1,2,3,4,7,8,9-Hepta CDF **	pg/L	<1.16	1.16	54.3	4.00	0.0100	0.0116		4069087
Octa CDF **	pg/L	<1.15	1.15	109	8.00	0.000300	0.000345		4069087
Total Tetra CDF **	pg/L	<1.12	1.12	10.9	4.00				4069087
Total Penta CDF **	pg/L	<1.12	1.12	54.3	4.00				4069087
Total Hexa CDF **	pg/L	<1.10	1.10	54.3	4.00				4069087
Total Hepta CDF **	pg/L	<1.16	1.16	54.3	4.00				4069087
TOTAL TOXIC EQUIVALENCY	pg/L						3.51		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		AJR503							
Sampling Date		2015/06/01 14:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	Units	RINSATE-SA-2	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93							4069087
C13-1234678 HeptaCDD *	%	77							4069087
C13-1234678 HeptaCDF **	%	88							4069087
C13-123478 HexaCDD *	%	69							4069087
C13-123478 HexaCDF **	%	68							4069087
C13-1234789 HeptaCDF **	%	81							4069087
C13-123678 HexaCDD *	%	84							4069087
C13-123678 HexaCDF **	%	67							4069087
C13-12378 PentaCDD *	%	116							4069087
C13-12378 PentaCDF **	%	107							4069087
C13-123789 HexaCDF **	%	81							4069087
C13-234678 HexaCDF **	%	74							4069087
C13-23478 PentaCDF **	%	128							4069087
C13-2378 TetraCDD *	%	84							4069087
C13-2378 TetraCDF **	%	91							4069087
C13-OCDD *	%	80							4069087
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**TEST SUMMARY**

**Maxxam ID:** AJR503  
**Sample ID:** RINSATE-SA-2  
**Matrix:** Water

**Collected:** 2015/06/01  
**Shipped:**  
**Received:** 2015/06/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	4069087	2015/06/10	2015/06/17	Owen Cosby



Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
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**Results relate only to the items tested.**

Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits	
4069087	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/06/17		93	%	35 - 197	
			C13-1234678 HeptaCDD	2015/06/17		91	%	23 - 140	
			C13-1234678 HeptaCDF	2015/06/17		85	%	28 - 143	
			C13-123478 HexaCDD	2015/06/17		61	%	32 - 141	
			C13-123478 HexaCDF	2015/06/17		63	%	26 - 152	
			C13-1234789 HeptaCDF	2015/06/17		92	%	28 - 143	
			C13-123678 HexaCDD	2015/06/17		77	%	28 - 130	
			C13-123678 HexaCDF	2015/06/17		63	%	26 - 123	
			C13-12378 PentaCDD	2015/06/17		111	%	25 - 181	
			C13-12378 PentaCDF	2015/06/17		112	%	24 - 185	
			C13-123789 HexaCDF	2015/06/17		94	%	28 - 136	
			C13-234678 HexaCDF	2015/06/17		67	%	29 - 147	
			C13-23478 PentaCDF	2015/06/17		127	%	21 - 178	
			C13-2378 TetraCDD	2015/06/17		87	%	24 - 164	
			C13-2378 TetraCDF	2015/06/17		96	%	24 - 169	
			C13-OCDD	2015/06/17		88	%	17 - 157	
			2,3,7,8-Tetra CDD	2015/06/17		110	%	67 - 158	
			1,2,3,7,8-Penta CDD	2015/06/17		104	%	25 - 181	
			1,2,3,4,7,8-Hexa CDD	2015/06/17		104	%	70 - 164	
			1,2,3,6,7,8-Hexa CDD	2015/06/17		102	%	76 - 134	
			1,2,3,7,8,9-Hexa CDD	2015/06/17		113	%	64 - 162	
			1,2,3,4,6,7,8-Hepta CDD	2015/06/17		88	%	70 - 140	
			Octa CDD	2015/06/17		100	%	78 - 144	
			2,3,7,8-Tetra CDF	2015/06/17		112	%	75 - 158	
			1,2,3,7,8-Penta CDF	2015/06/17		102	%	80 - 134	
			2,3,4,7,8-Penta CDF	2015/06/17		104	%	68 - 160	
			1,2,3,4,7,8-Hexa CDF	2015/06/17		102	%	72 - 134	
			1,2,3,6,7,8-Hexa CDF	2015/06/17		101	%	84 - 130	
			2,3,4,6,7,8-Hexa CDF	2015/06/17		102	%	70 - 156	
			1,2,3,7,8,9-Hexa CDF	2015/06/17		103	%	78 - 130	
			1,2,3,4,6,7,8-Hepta CDF	2015/06/17		105	%	82 - 122	
			1,2,3,4,7,8,9-Hepta CDF	2015/06/17		110	%	78 - 138	
Octa CDF	2015/06/17		106	%	63 - 170				
4069087	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/06/17		84	%	35 - 197	
			C13-1234678 HeptaCDD	2015/06/17		79	%	23 - 140	
			C13-1234678 HeptaCDF	2015/06/17		70	%	28 - 143	
			C13-123478 HexaCDD	2015/06/17		54	%	32 - 141	
			C13-123478 HexaCDF	2015/06/17		58	%	26 - 152	
			C13-1234789 HeptaCDF	2015/06/17		74	%	28 - 143	
			C13-123678 HexaCDD	2015/06/17		57	%	28 - 130	
			C13-123678 HexaCDF	2015/06/17		55	%	26 - 123	
			C13-12378 PentaCDD	2015/06/17		97	%	25 - 181	
			C13-12378 PentaCDF	2015/06/17		92	%	24 - 185	
			C13-123789 HexaCDF	2015/06/17		77	%	28 - 136	
			C13-234678 HexaCDF	2015/06/17		60	%	29 - 147	
			C13-23478 PentaCDF	2015/06/17		107	%	21 - 178	
			C13-2378 TetraCDD	2015/06/17		74	%	24 - 164	
			C13-2378 TetraCDF	2015/06/17		84	%	24 - 169	
			C13-OCDD	2015/06/17		71	%	17 - 157	
			2,3,7,8-Tetra CDD	2015/06/17			<1.20, EDL=1.20		pg/L
			1,2,3,7,8-Penta CDD	2015/06/17			<1.15, EDL=1.15		pg/L

Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/06/17	<1.15, EDL=1.15		pg/L	
			1,2,3,6,7,8-Hexa CDD	2015/06/17	<1.20, EDL=1.20		pg/L	
			1,2,3,7,8,9-Hexa CDD	2015/06/17	1.44, EDL=1.18		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2015/06/17	<1.21, EDL=1.21		pg/L	
			Octa CDD	2015/06/17	<2.53, EDL=2.53 (1)		pg/L	
			Total Tetra CDD	2015/06/17	<1.20, EDL=1.20		pg/L	
			Total Penta CDD	2015/06/17	<987, EDL=987 (1)		pg/L	
			Total Hexa CDD	2015/06/17	1.44, EDL=1.18		pg/L	
			Total Hepta CDD	2015/06/17	<1.21, EDL=1.21		pg/L	
			2,3,7,8-Tetra CDF	2015/06/17	<1.11, EDL=1.11		pg/L	
			1,2,3,7,8-Penta CDF	2015/06/17	<1.11, EDL=1.11		pg/L	
			2,3,4,7,8-Penta CDF	2015/06/17	1.71, EDL=1.08		pg/L	
			1,2,3,4,7,8-Hexa CDF	2015/06/17	<1.12, EDL=1.12		pg/L	
			1,2,3,6,7,8-Hexa CDF	2015/06/17	<1.16, EDL=1.16		pg/L	
			2,3,4,6,7,8-Hexa CDF	2015/06/17	<1.06, EDL=1.06		pg/L	
			1,2,3,7,8,9-Hexa CDF	2015/06/17	1.65, EDL=1.11		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2015/06/17	<1.13, EDL=1.13		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2015/06/17	<1.14, EDL=1.14		pg/L	
			Octa CDF	2015/06/17	1.45, EDL=1.10		pg/L	
			Total Tetra CDF	2015/06/17	<1.11, EDL=1.11		pg/L	
			Total Penta CDF	2015/06/17	1.71, EDL=1.10		pg/L	
			Total Hexa CDF	2015/06/17	1.65, EDL=1.11		pg/L	



Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

**QUALITY ASSURANCE REPORT(CONT'D)**


QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			Total Hepta CDF	2015/06/17	<1.14, EDL=1.14		pg/L	
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.</p>								

Maxxam Job #: B5A5395  
Report Date: 2015/06/20

Apex Laboratories  
Client Project #: A5F0059

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Your Project #: A5D0913  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/06**  
Report #: R3712159  
Version: 3 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B5B1038**

**Received: 2015/06/10, 14:08**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/06/13	2015/06/18	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/25	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2015/06/11	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

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**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		AKR642			
<b>Sampling Date</b>		2015/04/30 12:45			
<b>COC Number</b>		na			
	<b>UNITS</b>	<b>SS-ROW030-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	17	1.0	0.50	4062229
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AKR642							
Sampling Date		2015/04/30 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW030-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.158	0.120	0.200	0.0400	1.00	0.158		4068018
1,2,3,7,8-Penta CDD *	pg/g	1.67	0.120	1.00	0.0400	1.00	1.67		4068018
1,2,3,4,7,8-Hexa CDD *	pg/g	3.05	0.104	1.00	0.0400	0.100	0.305		4068018
1,2,3,6,7,8-Hexa CDD *	pg/g	9.45	0.109	1.00	0.0400	0.100	0.945		4068018
1,2,3,7,8,9-Hexa CDD *	pg/g	7.98	0.106	1.00	0.0400	0.100	0.798		4068018
1,2,3,4,6,7,8-Hepta CDD *	pg/g	199	0.107	1.00	0.0400	0.0100	1.99		4068018
Octa CDD *	pg/g	924	0.109	2.00	0.0800	0.000300	0.277		4068018
Total Tetra CDD *	pg/g	1.04	0.120	0.200	0.0400			4	4068018
Total Penta CDD *	pg/g	6.13	0.120	1.00	0.0400			9	4068018
Total Hexa CDD *	pg/g	50.9	0.106	1.00	0.0400			7	4068018
Total Hepta CDD *	pg/g	322	0.107	1.00	0.0400			2	4068018
2,3,7,8-Tetra CDF **	pg/g	0.423	0.106	0.200	0.0400	0.100	0.0423		4068018
1,2,3,7,8-Penta CDF **	pg/g	0.703	0.101	1.00	0.0400	0.0300	0.0211		4068018
2,3,4,7,8-Penta CDF **	pg/g	0.934	0.100	1.00	0.0400	0.300	0.280		4068018
1,2,3,4,7,8-Hexa CDF **	pg/g	3.63	0.104	1.00	0.0400	0.100	0.363		4068018
1,2,3,6,7,8-Hexa CDF **	pg/g	1.84	0.106	1.00	0.0400	0.100	0.184		4068018
2,3,4,6,7,8-Hexa CDF **	pg/g	1.19	0.0980	1.00	0.0400	0.100	0.119		4068018
1,2,3,7,8,9-Hexa CDF **	pg/g	0.275	0.102	1.00	0.0400	0.100	0.0275		4068018
1,2,3,4,6,7,8-Hepta CDF **	pg/g	23.9	0.102	1.00	0.0400	0.0100	0.239		4068018
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.53	0.102	1.00	0.0400	0.0100	0.0153		4068018
Octa CDF **	pg/g	32.4	0.107	2.00	0.0800	0.000300	0.00972		4068018
Total Tetra CDF **	pg/g	2.29	0.106	0.200	0.0400			8	4068018
Total Penta CDF **	pg/g	11.6	0.101	1.00	0.0400			8	4068018
Total Hexa CDF **	pg/g	42.0	0.102	1.00	0.0400			10	4068018
Total Hepta CDF **	pg/g	60.1	0.102	1.00	0.0400			4	4068018
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.34	0.34	1.0	0.90	0.100	0.0340		4205624
TOTAL TOXIC EQUIVALENCY	pg/g						7.44		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4068018
C13-1234678 HeptaCDD *	%	81							4068018
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AKR642							
Sampling Date		2015/04/30 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW030-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	81							4068018
C13-123478 HexaCDD *	%	68							4068018
C13-123478 HexaCDF **	%	72							4068018
C13-1234789 HeptaCDF **	%	81							4068018
C13-123678 HexaCDD *	%	81							4068018
C13-123678 HexaCDF **	%	71							4068018
C13-12378 PentaCDD *	%	108							4068018
C13-12378 PentaCDF **	%	94							4068018
C13-123789 HexaCDF **	%	80							4068018
C13-234678 HexaCDF **	%	71							4068018
C13-23478 PentaCDF **	%	114							4068018
C13-2378 TetraCDD *	%	85							4068018
C13-2378 TetraCDF **	%	90							4068018
C13-OCDD *	%	81							4068018
Confirmation C13-2378 TetraCDF **	%	81							4205624

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin



**TEST SUMMARY**

**Maxxam ID:** AKR642  
**Sample ID:** SS-ROW030-1.0  
**Matrix:** Soil

**Collected:** 2015/04/30  
**Shipped:**  
**Received:** 2015/06/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4068018	2015/06/13	2015/06/18	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4205624	N/A	2015/09/25	Leila Azzam
Moisture	BAL	4062229	N/A	2015/06/11	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.3°C
-----------	-------

Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4062229	BOP	RPD - Sample/Sample Dup	Moisture	2015/06/11	1.1		%	20
4068018	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/06/18		93	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/18		87	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/18		73	%	28 - 143
			C13-123478 HexaCDD	2015/06/18		64	%	32 - 141
			C13-123478 HexaCDF	2015/06/18		66	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/18		76	%	26 - 138
			C13-123678 HexaCDD	2015/06/18		73	%	28 - 130
			C13-123678 HexaCDF	2015/06/18		64	%	26 - 123
			C13-12378 PentaCDD	2015/06/18		113	%	25 - 181
			C13-12378 PentaCDF	2015/06/18		99	%	24 - 185
			C13-123789 HexaCDF	2015/06/18		79	%	29 - 147
			C13-234678 HexaCDF	2015/06/18		65	%	28 - 136
			C13-23478 PentaCDF	2015/06/18		120	%	21 - 178
			C13-2378 TetraCDD	2015/06/18		86	%	25 - 164
			C13-2378 TetraCDF	2015/06/18		95	%	24 - 169
			C13-OCDD	2015/06/18		74	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/18		110	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/06/18		101	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/06/18		109	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/06/18		97	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/06/18		127	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/06/18		99	%	70 - 140
			Octa CDD	2015/06/18		100	%	78 - 144
			2,3,7,8-Tetra CDF	2015/06/18		109	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/06/18		104	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/06/18		96	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/06/18		104	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/06/18		109	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/06/18		113	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/06/18		105	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/06/18		107	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/06/18		105	%	78 - 138
			Octa CDF	2015/06/18		95	%	63 - 170
4068018	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/06/18		96	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/18		83	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/18		86	%	28 - 143
			C13-123478 HexaCDD	2015/06/18		66	%	32 - 141
			C13-123478 HexaCDF	2015/06/18		74	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/18		85	%	26 - 138
			C13-123678 HexaCDD	2015/06/18		80	%	28 - 130
			C13-123678 HexaCDF	2015/06/18		73	%	26 - 123
			C13-12378 PentaCDD	2015/06/18		118	%	25 - 181
			C13-12378 PentaCDF	2015/06/18		104	%	24 - 185
			C13-123789 HexaCDF	2015/06/18		83	%	29 - 147
			C13-234678 HexaCDF	2015/06/18		75	%	28 - 136
			C13-23478 PentaCDF	2015/06/18		130	%	21 - 178
			C13-2378 TetraCDD	2015/06/18		90	%	25 - 164
			C13-2378 TetraCDF	2015/06/18		100	%	24 - 169
			C13-OCDD	2015/06/18		79	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/18	<0.113, EDL=0.113		pg/g	
			1,2,3,7,8-Penta CDD	2015/06/18	<0.127, EDL=0.127		pg/g	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/06/18	<0.112, EDL=0.112		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/06/18	<0.117, EDL=0.117		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/06/18	<0.115, EDL=0.115		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/06/18	<0.112, EDL=0.112		pg/g	
			Octa CDD	2015/06/18	0.224, EDL=0.116		pg/g	
			Total Tetra CDD	2015/06/18	<0.113, EDL=0.113		pg/g	
			Total Penta CDD	2015/06/18	<0.127, EDL=0.127		pg/g	
			Total Hexa CDD	2015/06/18	<0.115, EDL=0.115		pg/g	
			Total Hepta CDD	2015/06/18	<0.112, EDL=0.112		pg/g	
			2,3,7,8-Tetra CDF	2015/06/18	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDF	2015/06/18	<0.112, EDL=0.112		pg/g	
			2,3,4,7,8-Penta CDF	2015/06/18	<0.111, EDL=0.111		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/06/18	<0.113, EDL=0.113		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/06/18	<0.116, EDL=0.116		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/06/18	<0.107, EDL=0.107		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/06/18	<0.111, EDL=0.111		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/06/18	<0.101, EDL=0.101		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/06/18	<0.102, EDL=0.102		pg/g	
			Octa CDF	2015/06/18	<0.103, EDL=0.103		pg/g	
			Total Tetra CDF	2015/06/18	<0.103, EDL=0.103		pg/g	
			Total Penta CDF	2015/06/18	<0.112, EDL=0.112		pg/g	
			Total Hexa CDF	2015/06/18	<0.112, EDL=0.112		pg/g	
			Total Hepta CDF	2015/06/18	<0.102, EDL=0.102		pg/g	
4205624	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	<0.12, EDL=0.12		pg/g	
			Confirmation C13-2378 TetraCDF	2015/09/25		73	%	40 - 135

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4205624	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	NC		%	100
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).</p>								

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





Your Project #: A5F0015  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/06/25**  
Report #: R3495415  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5B3319**

**Received: 2015/06/12, 13:35**

Sample Matrix: Soil  
# Samples Received: 2

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	2	2015/06/16	2015/06/22	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation in Soil	2	N/A	2015/06/22	BRL SOP-00406	EPA 8290A m
Moisture	2	N/A	2015/06/15	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		ALC368	ALC369			
Sampling Date		2015/05/29 09:00	2015/05/29 09:45			
COC Number		na	na			
	Units	ISM-AOI038-0. 5-AFTER ISM	ISM-AOI039-0. 5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	4.7	2.7	1.0	1.0	4065928
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALC368							
Sampling Date		2015/05/29 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI038-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.81	0.102	0.200	0.0400	1.00	1.81		4073864
1,2,3,7,8-Penta CDD *	pg/g	6.94	0.0826	1.00	0.0400	1.00	6.94		4073864
1,2,3,4,7,8-Hexa CDD *	pg/g	14.1	0.118	1.00	0.0400	0.100	1.41		4073864
1,2,3,6,7,8-Hexa CDD *	pg/g	37.5	0.124	1.00	0.0400	0.100	3.75		4073864
1,2,3,7,8,9-Hexa CDD *	pg/g	37.7	0.121	1.00	0.0400	0.100	3.77		4073864
1,2,3,4,6,7,8-Hepta CDD *	pg/g	747	0.0780	1.00	0.0400	0.0100	7.47		4073864
Octa CDD *	pg/g	3960	0.416	2.00	0.0800	0.000300	1.19		4073864
Total Tetra CDD *	pg/g	8.14	0.102	0.200	0.0400			12	4073864
Total Penta CDD *	pg/g	34.4	0.0826	1.00	0.0400			12	4073864
Total Hexa CDD *	pg/g	260	0.121	1.00	0.0400			7	4073864
Total Hepta CDD *	pg/g	1280	0.0780	1.00	0.0400			2	4073864
2,3,7,8-Tetra CDF **	pg/g	2.40	0.0999	0.200	0.0400	0.100	0.240		4073864
1,2,3,7,8-Penta CDF **	pg/g	1.86	0.172	1.00	0.0400	0.0300	0.0558		4073864
2,3,4,7,8-Penta CDF **	pg/g	2.67	0.169	1.00	0.0400	0.300	0.801		4073864
1,2,3,4,7,8-Hexa CDF **	pg/g	13.1	0.132	1.00	0.0400	0.100	1.31		4073864
1,2,3,6,7,8-Hexa CDF **	pg/g	7.06	0.135	1.00	0.0400	0.100	0.706		4073864
2,3,4,6,7,8-Hexa CDF **	pg/g	4.97	0.125	1.00	0.0400	0.100	0.497		4073864
1,2,3,7,8,9-Hexa CDF **	pg/g	0.283	0.130	1.00	0.0400	0.100	0.0283		4073864
1,2,3,4,6,7,8-Hepta CDF **	pg/g	129	0.119	1.00	0.0400	0.0100	1.29		4073864
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.61	0.119	1.00	0.0400	0.0100	0.0661		4073864
Octa CDF **	pg/g	282	0.113	2.00	0.0800	0.000300	0.0846		4073864
Total Tetra CDF **	pg/g	13.5	0.0999	0.200	0.0400			13	4073864
Total Penta CDF **	pg/g	27.1	0.171	1.00	0.0400			10	4073864
Total Hexa CDF **	pg/g	156	0.130	1.00	0.0400			11	4073864
Total Hepta CDF **	pg/g	359	0.119	1.00	0.0400			4	4073864
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.51	0.059	1.0	0.90	0.100	0.151		4077299
TOTAL TOXIC EQUIVALENCY	pg/g						31.3		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	106							4073864
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALC368							
Sampling Date		2015/05/29 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI038-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	107							4073864
C13-1234678 HeptaCDF **	%	92							4073864
C13-123478 HexaCDD *	%	79							4073864
C13-123478 HexaCDF **	%	78							4073864
C13-1234789 HeptaCDF **	%	96							4073864
C13-123678 HexaCDD *	%	94							4073864
C13-123678 HexaCDF **	%	76							4073864
C13-12378 PentaCDD *	%	113							4073864
C13-12378 PentaCDF **	%	97							4073864
C13-123789 HexaCDF **	%	93							4073864
C13-234678 HexaCDF **	%	78							4073864
C13-23478 PentaCDF **	%	114							4073864
C13-2378 TetraCDD *	%	93							4073864
C13-2378 TetraCDF **	%	94							4073864
C13-OCDD *	%	108							4073864
Confirmation C13-2378 TetraCDF **	%	90							4077299

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALC369							
Sampling Date		2015/05/29 09:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI039-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	2.45	0.123	0.200	0.0400	1.00	2.45		4073864
1,2,3,7,8-Penta CDD *	pg/g	2.71	0.0816	1.00	0.0400	1.00	2.71		4073864
1,2,3,4,7,8-Hexa CDD *	pg/g	4.77	0.123	1.00	0.0400	0.100	0.477		4073864
1,2,3,6,7,8-Hexa CDD *	pg/g	19.0	0.128	1.00	0.0400	0.100	1.90		4073864
1,2,3,7,8,9-Hexa CDD *	pg/g	12.1	0.125	1.00	0.0400	0.100	1.21		4073864
1,2,3,4,6,7,8-Hepta CDD *	pg/g	428	0.0985	1.00	0.0400	0.0100	4.28		4073864
Octa CDD *	pg/g	2580	0.282	2.00	0.0800	0.000300	0.774		4073864
Total Tetra CDD *	pg/g	7.12	0.123	0.200	0.0400			9	4073864
Total Penta CDD *	pg/g	16.1	0.0816	1.00	0.0400			10	4073864
Total Hexa CDD *	pg/g	103	0.126	1.00	0.0400			7	4073864
Total Hepta CDD *	pg/g	716	0.0985	1.00	0.0400			2	4073864
2,3,7,8-Tetra CDF **	pg/g	2.36	0.0852	0.200	0.0400	0.100	0.236		4073864
1,2,3,7,8-Penta CDF **	pg/g	1.33	0.0928	1.00	0.0400	0.0300	0.0399		4073864
2,3,4,7,8-Penta CDF **	pg/g	2.43	0.0916	1.00	0.0400	0.300	0.729		4073864
1,2,3,4,7,8-Hexa CDF **	pg/g	17.4	0.100	1.00	0.0400	0.100	1.74		4073864
1,2,3,6,7,8-Hexa CDF **	pg/g	4.85	0.103	1.00	0.0400	0.100	0.485		4073864
2,3,4,6,7,8-Hexa CDF **	pg/g	3.11	0.0948	1.00	0.0400	0.100	0.311		4073864
1,2,3,7,8,9-Hexa CDF **	pg/g	0.231	0.0986	1.00	0.0400	0.100	0.0231		4073864
1,2,3,4,6,7,8-Hepta CDF **	pg/g	94.7	0.174	1.00	0.0400	0.0100	0.947		4073864
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.60	0.175	1.00	0.0400	0.0100	0.0660		4073864
Octa CDF **	pg/g	140	0.109	2.00	0.0800	0.000300	0.0420		4073864
Total Tetra CDF **	pg/g	14.5	0.0852	0.200	0.0400			13	4073864
Total Penta CDF **	pg/g	24.7	0.0922	1.00	0.0400			10	4073864
Total Hexa CDF **	pg/g	143	0.0990	1.00	0.0400			11	4073864
Total Hepta CDF **	pg/g	284	0.175	1.00	0.0400			4	4073864
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.34	0.057	1.0	0.90	0.100	0.134		4077299
TOTAL TOXIC EQUIVALENCY	pg/g						18.3		

**Surrogate Recovery (%)**

37CL4 2378 Tetra CDD *	%	113							4073864
------------------------	---	-----	--	--	--	--	--	--	---------

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALC369							
Sampling Date		2015/05/29 09:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI039-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	104							4073864
C13-1234678 HeptaCDF **	%	90							4073864
C13-123478 HexaCDD *	%	83							4073864
C13-123478 HexaCDF **	%	82							4073864
C13-1234789 HeptaCDF **	%	96							4073864
C13-123678 HexaCDD *	%	99							4073864
C13-123678 HexaCDF **	%	82							4073864
C13-12378 PentaCDD *	%	108							4073864
C13-12378 PentaCDF **	%	91							4073864
C13-123789 HexaCDF **	%	95							4073864
C13-234678 HexaCDF **	%	82							4073864
C13-23478 PentaCDF **	%	107							4073864
C13-2378 TetraCDD *	%	94							4073864
C13-2378 TetraCDF **	%	90							4073864
C13-OCDD *	%	107							4073864
Confirmation C13-2378 TetraCDF **	%	91							4077299

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**TEST SUMMARY**

**Maxxam ID:** ALC368  
**Sample ID:** ISM-AOI038-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/05/29  
**Shipped:**  
**Received:** 2015/06/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4073864	2015/06/16	2015/06/22	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4077299	N/A	2015/06/22	Vica Cioranic
Moisture	BAL	4065928	N/A	2015/06/15	Chamika Deeyagaha

**Maxxam ID:** ALC369  
**Sample ID:** ISM-AOI039-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/05/29  
**Shipped:**  
**Received:** 2015/06/12

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4073864	2015/06/16	2015/06/22	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4077299	N/A	2015/06/22	Vica Cioranic
Moisture	BAL	4065928	N/A	2015/06/15	Chamika Deeyagaha

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	12.5°C
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#### DIOXINS AND FURANS BY HRMS (SOIL)

Spiked Blank Dioxins/Furans in Soil (1613B): \*\* Native percent recoveries calculated with respect to the Method Spike \*\*

**Results relate only to the items tested.**

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
4065928	BOP	RPD - Sample/Sample Dup	Moisture	2015/06/15	0		%	20
4073864	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/06/21		96	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/21		93	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/21		86	%	28 - 143
			C13-123478 HexaCDD	2015/06/21		62	%	32 - 141
			C13-123478 HexaCDF	2015/06/21		64	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/21		94	%	26 - 138
			C13-123678 HexaCDD	2015/06/21		78	%	28 - 130
			C13-123678 HexaCDF	2015/06/21		64	%	26 - 123
			C13-12378 PentaCDD	2015/06/21		111	%	25 - 181
			C13-12378 PentaCDF	2015/06/21		111	%	24 - 185
			C13-123789 HexaCDF	2015/06/21		96	%	29 - 147
			C13-234678 HexaCDF	2015/06/21		68	%	28 - 136
			C13-23478 PentaCDF	2015/06/21		126	%	21 - 178
			C13-2378 TetraCDD	2015/06/21		87	%	25 - 164
			C13-2378 TetraCDF	2015/06/21		96	%	24 - 169
			C13-OCDD	2015/06/21		89	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/21		97	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/06/21		98	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/06/21		100	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/06/21		91	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/06/21		120	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/06/21		77	%	70 - 140
			Octa CDD	2015/06/21		52 (1)	%	78 - 144
			2,3,7,8-Tetra CDF	2015/06/21		91	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/06/21		96	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/06/21		98	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/06/21		99	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/06/21		108	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/06/21		98	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/06/21		94	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/06/21		88	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/06/21		90	%	78 - 138
			Octa CDF	2015/06/21		96	%	63 - 170
4073864	OBC	RPD	2,3,7,8-Tetra CDD	2015/06/21	8.9		%	25
			1,2,3,7,8-Penta CDD	2015/06/21	2.0		%	25
			1,2,3,4,7,8-Hexa CDD	2015/06/21	4.1		%	25
			1,2,3,6,7,8-Hexa CDD	2015/06/21	4.3		%	25
			1,2,3,7,8,9-Hexa CDD	2015/06/21	6.9		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/06/21	19		%	25
			Octa CDD	2015/06/21	36 (1)		%	25
			2,3,7,8-Tetra CDF	2015/06/21	8.4		%	25
			1,2,3,7,8-Penta CDF	2015/06/21	3.1		%	25
			2,3,4,7,8-Penta CDF	2015/06/21	2.0		%	25
			1,2,3,4,7,8-Hexa CDF	2015/06/21	1.0		%	25
			1,2,3,6,7,8-Hexa CDF	2015/06/21	1.8		%	25
			2,3,4,6,7,8-Hexa CDF	2015/06/21	2.0		%	25
			1,2,3,7,8,9-Hexa CDF	2015/06/21	8.2		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/06/21	1.1		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/06/21	2.2		%	25
			Octa CDF	2015/06/21	4.3		%	25
4073864	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/06/21		86	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/21		81	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/21		71	%	28 - 143



Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			C13-123478 HexaCDD	2015/06/21		56	%	32 - 141
			C13-123478 HexaCDF	2015/06/21		59	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/21		76	%	26 - 138
			C13-123678 HexaCDD	2015/06/21		58	%	28 - 130
			C13-123678 HexaCDF	2015/06/21		56	%	26 - 123
			C13-12378 PentaCDD	2015/06/21		97	%	25 - 181
			C13-12378 PentaCDF	2015/06/21		92	%	24 - 185
			C13-123789 HexaCDF	2015/06/21		78	%	29 - 147
			C13-234678 HexaCDF	2015/06/21		61	%	28 - 136
			C13-23478 PentaCDF	2015/06/21		107	%	21 - 178
			C13-2378 TetraCDD	2015/06/21		75	%	25 - 164
			C13-2378 TetraCDF	2015/06/21		84	%	24 - 169
			C13-OCDD	2015/06/21		73	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/21	<0.0981, EDL=0.0981		pg/g	
			1,2,3,7,8-Penta CDD	2015/06/21	<0.154, EDL=0.154		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/06/21	<0.0809, EDL=0.0809		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/06/21	<0.0847, EDL=0.0847		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/06/21	0.130, EDL=0.0827		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/06/21	<0.0815, EDL=0.0815		pg/g	
			Octa CDD	2015/06/21	<0.231, EDL=0.231 (2)		pg/g	
			Total Tetra CDD	2015/06/21	<0.0981, EDL=0.0981		pg/g	
			Total Penta CDD	2015/06/21	<89.7, EDL=89.7 (2)		pg/g	
			Total Hexa CDD	2015/06/21	0.130, EDL=0.0829		pg/g	
			Total Hepta CDD	2015/06/21	<0.0815, EDL=0.0815		pg/g	
			2,3,7,8-Tetra CDF	2015/06/21	<0.0961, EDL=0.0961		pg/g	
			1,2,3,7,8-Penta CDF	2015/06/21	<0.106, EDL=0.106		pg/g	
			2,3,4,7,8-Penta CDF	2015/06/21	<0.104, EDL=0.104		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/06/21	<0.0865, EDL=0.0865		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/06/21	<0.0884, EDL=0.0884		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/06/21	<0.0818, EDL=0.0818		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/06/21	0.152, EDL=0.0850		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/06/21	<0.0907, EDL=0.0907		pg/g	

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

Apex Laboratories  
Client Project #: A5F0015

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/06/21	<0.0911, EDL=0.0911		pg/g	
			Octa CDF	2015/06/21	0.134, EDL=0.101		pg/g	
			Total Tetra CDF	2015/06/21	<0.0961, EDL=0.0961		pg/g	
			Total Penta CDF	2015/06/21	<0.105, EDL=0.105		pg/g	
			Total Hexa CDF	2015/06/21	0.152, EDL=0.0853		pg/g	
			Total Hepta CDF	2015/06/21	<0.0909, EDL=0.0909		pg/g	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

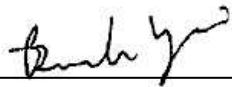
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B5B3319  
Report Date: 2015/06/25

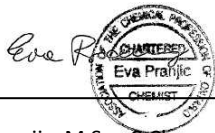
Apex Laboratories  
Client Project #: A5F0015

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

---

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





Your Project #: A5F0363  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/07/02**  
Report #: R3530145  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5B5514**

**Received: 2015/06/16, 15:20**

Sample Matrix: Soil  
# Samples Received: 9

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/06/18	2015/06/23	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	8	2015/06/18	2015/06/24	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation in Soil	9	N/A	2015/06/24	BRL SOP-00406	EPA 8290A m
Moisture	9	N/A	2015/06/17	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		ALN385	ALN386	ALN387	ALN388	ALN389			
Sampling Date		2015/06/08 08:00	2015/06/08 08:40	2015/06/08 09:20	2015/06/08 10:00	2015/06/08 10:45			
COC Number		na	na	na	na	na			
	Units	SS-ROW-013-0.5	SS-ROW-005-0.5	SS-ROW-019-0.5	SS-ROW-022-0.5	SS-ROW-016-0.5	RDL	MDL	QC Batch
Moisture	%	7.5	7.0	8.9	21	16	1.0	1.0	4070782
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

Maxxam ID		ALN390	ALN391	ALN392	ALN393			
Sampling Date		2015/06/08 11:30	2015/06/08 12:15	2015/06/08 13:00	2015/06/08 13:40			
COC Number		na	na	na	na			
	Units	SS-ROW-025-0.5	SS-ROW-029B-0.5	SS-ROW-023-0.5	SS-ROW-018-0.5	RDL	MDL	QC Batch
Moisture	%	15	13	13	14	1.0	1.0	4070782
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN385							
Sampling Date		2015/06/08 08:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-013-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.49	0.119	0.200	0.0400	1.00	1.49		4076658
1,2,3,7,8-Penta CDD *	pg/g	23.4	0.149	1.00	0.0400	1.00	23.4		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	70.7	0.0804	1.00	0.0400	0.100	7.07		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	378	0.0843	1.00	0.0400	0.100	37.8		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	188	0.0839	1.00	0.0400	0.100	18.8		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	8550 (1)	2.08	20.0	0.0400	0.0100	85.5		4076658
Octa CDD *	pg/g	50400 (1)	2.05	39.9	0.0800	0.000300	15.1		4076658
Total Tetra CDD *	pg/g	13.4	0.119	0.200	0.0400			12	4076658
Total Penta CDD *	pg/g	112	0.149	1.00	0.0400			12	4076658
Total Hexa CDD *	pg/g	1640	0.0832	1.00	0.0400			7	4076658
Total Hepta CDD *	pg/g	14900 (1)	2.08	20.0	0.0400			2	4076658
2,3,7,8-Tetra CDF **	pg/g	11.4	0.115	0.200	0.0400	0.100	1.14		4076658
1,2,3,7,8-Penta CDF **	pg/g	36.3	0.156	1.00	0.0400	0.0300	1.09		4076658
2,3,4,7,8-Penta CDF **	pg/g	58.6	0.152	1.00	0.0400	0.300	17.6		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	280	0.347	1.00	0.0400	0.100	28.0		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	109	0.362	1.00	0.0400	0.100	10.9		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	60.3	0.328	1.00	0.0400	0.100	6.03		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	4.57	0.350	1.00	0.0400	0.100	0.457		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	1120	0.0922	1.00	0.0400	0.0100	11.2		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	71.6	0.0919	1.00	0.0400	0.0100	0.716		4076658
Octa CDF **	pg/g	1080	0.339	2.00	0.0800	0.000300	0.324		4076658
Total Tetra CDF **	pg/g	57.4	0.115	0.200	0.0400			15	4076658
Total Penta CDF **	pg/g	462	0.154	1.00	0.0400			13	4076658
Total Hexa CDF **	pg/g	2940	0.346	1.00	0.0400			12	4076658
Total Hepta CDF **	pg/g	3070	0.0920	1.00	0.0400			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<9.5 (2)	9.5	1.0	0.90	0.100	0.950		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						266		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 20X Dilution \*\*  
(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.



Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		ALN385							
<b>Sampling Date</b>		2015/06/08 08:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW-013-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93							4076658
C13-1234678 HeptaCDD *	%	80 (1)							4076658
C13-1234678 HeptaCDF **	%	83							4076658
C13-123478 HexaCDD *	%	77							4076658
C13-123478 HexaCDF **	%	82							4076658
C13-1234789 HeptaCDF **	%	85							4076658
C13-123678 HexaCDD *	%	90							4076658
C13-123678 HexaCDF **	%	80							4076658
C13-12378 PentaCDD *	%	90							4076658
C13-12378 PentaCDF **	%	86							4076658
C13-123789 HexaCDF **	%	87							4076658
C13-234678 HexaCDF **	%	82							4076658
C13-23478 PentaCDF **	%	100							4076658
C13-2378 TetraCDD *	%	84							4076658
C13-2378 TetraCDF **	%	87							4076658
C13-OCDD *	%	96 (1)							4076658
Confirmation C13-2378 TetraCDF **	%	84							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 20X Dilution \*\*

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN386							
Sampling Date		2015/06/08 08:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-005-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.664	0.165	0.200	0.0399	1.00	0.664		4076658
1,2,3,7,8-Penta CDD *	pg/g	7.09	0.113	0.998	0.0399	1.00	7.09		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	16.5	0.136	0.998	0.0399	0.100	1.65		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	65.3	0.143	0.998	0.0399	0.100	6.53		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	45.4	0.142	0.998	0.0399	0.100	4.54		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1400	0.194	0.998	0.0399	0.0100	14.0		4076658
Octa CDD *	pg/g	8630 (1)	0.505	9.98	0.0798	0.000300	2.59		4076658
Total Tetra CDD *	pg/g	4.92	0.165	0.200	0.0399			7	4076658
Total Penta CDD *	pg/g	31.6	0.113	0.998	0.0399			11	4076658
Total Hexa CDD *	pg/g	330	0.141	0.998	0.0399			7	4076658
Total Hepta CDD *	pg/g	2380	0.194	0.998	0.0399			2	4076658
2,3,7,8-Tetra CDF **	pg/g	2.87	0.0927	0.200	0.0399	0.100	0.287		4076658
1,2,3,7,8-Penta CDF **	pg/g	4.43	0.166	0.998	0.0399	0.0300	0.133		4076658
2,3,4,7,8-Penta CDF **	pg/g	6.08	0.161	0.998	0.0399	0.300	1.82		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	31.6	0.247	0.998	0.0399	0.100	3.16		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	14.9	0.257	0.998	0.0399	0.100	1.49		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	8.70	0.233	0.998	0.0399	0.100	0.870		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.712	0.249	0.998	0.0399	0.100	0.0712		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	194	0.117	0.998	0.0399	0.0100	1.94		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	12.3	0.117	0.998	0.0399	0.0100	0.123		4076658
Octa CDF **	pg/g	257	0.195	2.00	0.0798	0.000300	0.0771		4076658
Total Tetra CDF **	pg/g	13.0	0.0927	0.200	0.0399			12	4076658
Total Penta CDF **	pg/g	56.7	0.163	0.998	0.0399			11	4076658
Total Hexa CDF **	pg/g	382	0.246	0.998	0.0399			11	4076658
Total Hepta CDF **	pg/g	519	0.117	0.998	0.0399			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.84	0.11	1.0	0.90	0.100	0.184		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						46.9		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) ** From 5X Dilution **									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN386							
Sampling Date		2015/06/08 08:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-005-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	87							4076658
C13-1234678 HeptaCDF **	%	80							4076658
C13-123478 HexaCDD *	%	75							4076658
C13-123478 HexaCDF **	%	80							4076658
C13-1234789 HeptaCDF **	%	85							4076658
C13-123678 HexaCDD *	%	89							4076658
C13-123678 HexaCDF **	%	78							4076658
C13-12378 PentaCDD *	%	92							4076658
C13-12378 PentaCDF **	%	86							4076658
C13-123789 HexaCDF **	%	85							4076658
C13-234678 HexaCDF **	%	80							4076658
C13-23478 PentaCDF **	%	100							4076658
C13-2378 TetraCDD *	%	81							4076658
C13-2378 TetraCDF **	%	84							4076658
C13-OCDD *	%	113 (1)							4076658
Confirmation C13-2378 TetraCDF **	%	79							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*



Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN387							
Sampling Date		2015/06/08 09:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-019-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.803	0.161	0.199	0.0398	1.00	0.803		4076658
1,2,3,7,8-Penta CDD *	pg/g	3.23	0.0938	0.996	0.0398	1.00	3.23		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	7.15	0.114	0.996	0.0398	0.100	0.715		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	31.9	0.119	0.996	0.0398	0.100	3.19		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	20.1	0.119	0.996	0.0398	0.100	2.01		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	673	0.298	0.996	0.0398	0.0100	6.73		4076658
Octa CDD *	pg/g	3540	0.274	1.99	0.0797	0.000300	1.06		4076658
Total Tetra CDD *	pg/g	1.28	0.161	0.199	0.0398			3	4076658
Total Penta CDD *	pg/g	12.4	0.0938	0.996	0.0398			11	4076658
Total Hexa CDD *	pg/g	144	0.118	0.996	0.0398			7	4076658
Total Hepta CDD *	pg/g	1080	0.298	0.996	0.0398			2	4076658
2,3,7,8-Tetra CDF **	pg/g	1.13	0.166	0.199	0.0398	0.100	0.113		4076658
1,2,3,7,8-Penta CDF **	pg/g	2.77	0.126	0.996	0.0398	0.0300	0.0831		4076658
2,3,4,7,8-Penta CDF **	pg/g	4.11	0.122	0.996	0.0398	0.300	1.23		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	19.6	0.120	0.996	0.0398	0.100	1.96		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	7.93	0.125	0.996	0.0398	0.100	0.793		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	4.55	0.114	0.996	0.0398	0.100	0.455		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.473	0.121	0.996	0.0398	0.100	0.0473		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	93.5	0.0979	0.996	0.0398	0.0100	0.935		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.15	0.0976	0.996	0.0398	0.0100	0.0515		4076658
Octa CDF **	pg/g	87.4	0.255	1.99	0.0797	0.000300	0.0262		4076658
Total Tetra CDF **	pg/g	2.41	0.166	0.199	0.0398			3	4076658
Total Penta CDF **	pg/g	30.8	0.124	0.996	0.0398			10	4076658
Total Hexa CDF **	pg/g	192	0.120	0.996	0.0398			11	4076658
Total Hepta CDF **	pg/g	229	0.0978	0.996	0.0398			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.21	0.12	1.0	0.90	0.100	0.121		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						23.4		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93							4076658
C13-1234678 HeptaCDD *	%	90							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN387							
Sampling Date		2015/06/08 09:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-019-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	85							4076658
C13-123478 HexaCDD *	%	80							4076658
C13-123478 HexaCDF **	%	84							4076658
C13-1234789 HeptaCDF **	%	90							4076658
C13-123678 HexaCDD *	%	94							4076658
C13-123678 HexaCDF **	%	85							4076658
C13-12378 PentaCDD *	%	96							4076658
C13-12378 PentaCDF **	%	90							4076658
C13-123789 HexaCDF **	%	90							4076658
C13-234678 HexaCDF **	%	85							4076658
C13-23478 PentaCDF **	%	106							4076658
C13-2378 TetraCDD *	%	83							4076658
C13-2378 TetraCDF **	%	79							4076658
C13-OCDD *	%	105							4076658
Confirmation C13-2378 TetraCDF **	%	76							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN388							
Sampling Date		2015/06/08 10:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-022-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.430	0.180	0.199	0.0399	1.00	0.430		4076658
1,2,3,7,8-Penta CDD *	pg/g	2.98	0.0987	0.997	0.0399	1.00	2.98		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	7.19	0.107	0.997	0.0399	0.100	0.719		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	26.2	0.112	0.997	0.0399	0.100	2.62		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	20.1	0.112	0.997	0.0399	0.100	2.01		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	572	0.275	0.997	0.0399	0.0100	5.72		4076658
Octa CDD *	pg/g	3220	0.770	1.99	0.0797	0.000300	0.966		4076658
Total Tetra CDD *	pg/g	3.04	0.180	0.199	0.0399			6	4076658
Total Penta CDD *	pg/g	15.4	0.0987	0.997	0.0399			10	4076658
Total Hexa CDD *	pg/g	142	0.111	0.997	0.0399			7	4076658
Total Hepta CDD *	pg/g	987	0.275	0.997	0.0399			2	4076658
2,3,7,8-Tetra CDF **	pg/g	2.03	0.0778	0.199	0.0399	0.100	0.203		4076658
1,2,3,7,8-Penta CDF **	pg/g	1.79	0.112	0.997	0.0399	0.0300	0.0537		4076658
2,3,4,7,8-Penta CDF **	pg/g	2.76	0.109	0.997	0.0399	0.300	0.828		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	11.3	0.0901	0.997	0.0399	0.100	1.13		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	5.68	0.0940	0.997	0.0399	0.100	0.568		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	3.71	0.0852	0.997	0.0399	0.100	0.371		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.278	0.0908	0.997	0.0399	0.100	0.0278		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	84.6	0.127	0.997	0.0399	0.0100	0.846		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.88	0.127	0.997	0.0399	0.0100	0.0488		4076658
Octa CDF **	pg/g	193	0.205	1.99	0.0797	0.000300	0.0579		4076658
Total Tetra CDF **	pg/g	12.3	0.0778	0.199	0.0399			12	4076658
Total Penta CDF **	pg/g	29.8	0.110	0.997	0.0399			10	4076658
Total Hexa CDF **	pg/g	156	0.0899	0.997	0.0399			11	4076658
Total Hepta CDF **	pg/g	237	0.127	0.997	0.0399			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.18	0.083	1.0	0.90	0.100	0.118		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						19.5		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4076658
C13-1234678 HeptaCDD *	%	90							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN388							
Sampling Date		2015/06/08 10:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-022-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	84							4076658
C13-123478 HexaCDD *	%	78							4076658
C13-123478 HexaCDF **	%	81							4076658
C13-1234789 HeptaCDF **	%	89							4076658
C13-123678 HexaCDD *	%	91							4076658
C13-123678 HexaCDF **	%	82							4076658
C13-12378 PentaCDD *	%	104							4076658
C13-12378 PentaCDF **	%	94							4076658
C13-123789 HexaCDF **	%	89							4076658
C13-234678 HexaCDF **	%	82							4076658
C13-23478 PentaCDF **	%	121							4076658
C13-2378 TetraCDD *	%	87							4076658
C13-2378 TetraCDF **	%	89							4076658
C13-OCDD *	%	105							4076658
Confirmation C13-2378 TetraCDF **	%	85							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN389							
Sampling Date		2015/06/08 10:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-016-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.435	0.0833	0.200	0.0400	1.00	0.435		4076658
1,2,3,7,8-Penta CDD *	pg/g	4.05	0.115	0.999	0.0400	1.00	4.05		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	8.74	0.197	0.999	0.0400	0.100	0.874		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	34.2	0.207	0.999	0.0400	0.100	3.42		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	23.6	0.206	0.999	0.0400	0.100	2.36		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	665	0.153	0.999	0.0400	0.0100	6.65		4076658
Octa CDD *	pg/g	3860	0.150	2.00	0.0800	0.000300	1.16		4076658
Total Tetra CDD *	pg/g	1.87	0.0833	0.200	0.0400			6	4076658
Total Penta CDD *	pg/g	21.8	0.115	0.999	0.0400			12	4076658
Total Hexa CDD *	pg/g	190	0.204	0.999	0.0400			7	4076658
Total Hepta CDD *	pg/g	1200	0.153	0.999	0.0400			2	4076658
2,3,7,8-Tetra CDF **	pg/g	1.72	0.159	0.200	0.0400	0.100	0.172		4076658
1,2,3,7,8-Penta CDF **	pg/g	2.78	0.122	0.999	0.0400	0.0300	0.0834		4076658
2,3,4,7,8-Penta CDF **	pg/g	4.09	0.119	0.999	0.0400	0.300	1.23		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	17.3	0.138	0.999	0.0400	0.100	1.73		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	8.35	0.144	0.999	0.0400	0.100	0.835		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	5.23	0.130	0.999	0.0400	0.100	0.523		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.353	0.139	0.999	0.0400	0.100	0.0353		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	105	0.159	0.999	0.0400	0.0100	1.05		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.25	0.158	0.999	0.0400	0.0100	0.0525		4076658
Octa CDF **	pg/g	133	0.287	2.00	0.0800	0.000300	0.0399		4076658
Total Tetra CDF **	pg/g	5.38	0.159	0.200	0.0400			9	4076658
Total Penta CDF **	pg/g	43.9	0.120	0.999	0.0400			11	4076658
Total Hexa CDF **	pg/g	213	0.137	0.999	0.0400			12	4076658
Total Hepta CDF **	pg/g	270	0.159	0.999	0.0400			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.56	0.10	1.0	0.90	0.100	0.156		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						24.7		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4076658
C13-1234678 HeptaCDD *	%	86							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN389							
Sampling Date		2015/06/08 10:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-016-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	79							4076658
C13-123478 HexaCDD *	%	78							4076658
C13-123478 HexaCDF **	%	82							4076658
C13-1234789 HeptaCDF **	%	85							4076658
C13-123678 HexaCDD *	%	91							4076658
C13-123678 HexaCDF **	%	81							4076658
C13-12378 PentaCDD *	%	91							4076658
C13-12378 PentaCDF **	%	84							4076658
C13-123789 HexaCDF **	%	90							4076658
C13-234678 HexaCDF **	%	83							4076658
C13-23478 PentaCDF **	%	98							4076658
C13-2378 TetraCDD *	%	86							4076658
C13-2378 TetraCDF **	%	79							4076658
C13-OCDD *	%	98							4076658
Confirmation C13-2378 TetraCDF **	%	79							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin



Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN390							
Sampling Date		2015/06/08 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-025-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.715	0.137	0.199	0.0399	1.00	0.715		4076658
1,2,3,7,8-Penta CDD *	pg/g	8.46	0.127	0.997	0.0399	1.00	8.46		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	22.3	0.160	0.997	0.0399	0.100	2.23		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	63.6	0.168	0.997	0.0399	0.100	6.36		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	55.6	0.167	0.997	0.0399	0.100	5.56		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1430	0.173	0.997	0.0399	0.0100	14.3		4076658
Octa CDD *	pg/g	8360 (1)	0.507	9.97	0.0798	0.000300	2.51		4076658
Total Tetra CDD *	pg/g	6.55	0.137	0.199	0.0399			10	4076658
Total Penta CDD *	pg/g	41.7	0.127	0.997	0.0399			12	4076658
Total Hexa CDD *	pg/g	373	0.166	0.997	0.0399			7	4076658
Total Hepta CDD *	pg/g	2390	0.173	0.997	0.0399			2	4076658
2,3,7,8-Tetra CDF **	pg/g	2.30	0.116	0.199	0.0399	0.100	0.230		4076658
1,2,3,7,8-Penta CDF **	pg/g	2.99	0.151	0.997	0.0399	0.0300	0.0897		4076658
2,3,4,7,8-Penta CDF **	pg/g	3.59	0.147	0.997	0.0399	0.300	1.08		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	17.5	0.187	0.997	0.0399	0.100	1.75		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	10.9	0.195	0.997	0.0399	0.100	1.09		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	6.85	0.177	0.997	0.0399	0.100	0.685		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.456	0.189	0.997	0.0399	0.100	0.0456		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	186	0.173	0.997	0.0399	0.0100	1.86		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	12.1	0.173	0.997	0.0399	0.0100	0.121		4076658
Octa CDF **	pg/g	385	0.157	1.99	0.0798	0.000300	0.116		4076658
Total Tetra CDF **	pg/g	17.9	0.116	0.199	0.0399			13	4076658
Total Penta CDF **	pg/g	47.8	0.149	0.997	0.0399			10	4076658
Total Hexa CDF **	pg/g	285	0.187	0.997	0.0399			12	4076658
Total Hepta CDF **	pg/g	512	0.173	0.997	0.0399			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.73	0.097	1.0	0.90	0.100	0.173		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						47.1		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	100							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) ** From 5X Dilution Run **									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN390							
Sampling Date		2015/06/08 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-025-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	98							4076658
C13-1234678 HeptaCDF **	%	90							4076658
C13-123478 HexaCDD *	%	85							4076658
C13-123478 HexaCDF **	%	91							4076658
C13-1234789 HeptaCDF **	%	93							4076658
C13-123678 HexaCDD *	%	103							4076658
C13-123678 HexaCDF **	%	91							4076658
C13-12378 PentaCDD *	%	104							4076658
C13-12378 PentaCDF **	%	94							4076658
C13-123789 HexaCDF **	%	97							4076658
C13-234678 HexaCDF **	%	91							4076658
C13-23478 PentaCDF **	%	110							4076658
C13-2378 TetraCDD *	%	92							4076658
C13-2378 TetraCDF **	%	94							4076658
C13-OCDD *	%	118 (1)							4076658
Confirmation C13-2378 TetraCDF **	%	91							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution Run \*\*

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN391							
Sampling Date		2015/06/08 12:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-029B-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.573	0.126	0.200	0.0400	1.00	0.573		4076658
1,2,3,7,8-Penta CDD *	pg/g	6.05	0.121	1.00	0.0400	1.00	6.05		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	16.2	0.109	1.00	0.0400	0.100	1.62		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	45.4	0.114	1.00	0.0400	0.100	4.54		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	43.2	0.114	1.00	0.0400	0.100	4.32		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	990	0.123	1.00	0.0400	0.0100	9.90		4076658
Octa CDD *	pg/g	5360 (1)	0.506	10.0	0.0800	0.000300	1.61		4076658
Total Tetra CDD *	pg/g	4.35	0.126	0.200	0.0400			9	4076658
Total Penta CDD *	pg/g	31.5	0.121	1.00	0.0400			12	4076658
Total Hexa CDD *	pg/g	303	0.113	1.00	0.0400			7	4076658
Total Hepta CDD *	pg/g	1810	0.123	1.00	0.0400			2	4076658
2,3,7,8-Tetra CDF **	pg/g	2.06	0.101	0.200	0.0400	0.100	0.206		4076658
1,2,3,7,8-Penta CDF **	pg/g	2.39	0.108	1.00	0.0400	0.0300	0.0717		4076658
2,3,4,7,8-Penta CDF **	pg/g	3.45	0.105	1.00	0.0400	0.300	1.04		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	17.4	0.114	1.00	0.0400	0.100	1.74		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	8.97	0.119	1.00	0.0400	0.100	0.897		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	6.46	0.108	1.00	0.0400	0.100	0.646		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.366	0.115	1.00	0.0400	0.100	0.0366		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	152	0.122	1.00	0.0400	0.0100	1.52		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	9.96	0.122	1.00	0.0400	0.0100	0.0996		4076658
Octa CDF **	pg/g	311	0.103	2.00	0.0800	0.000300	0.0933		4076658
Total Tetra CDF **	pg/g	10.9	0.101	0.200	0.0400			13	4076658
Total Penta CDF **	pg/g	37.7	0.106	1.00	0.0400			11	4076658
Total Hexa CDF **	pg/g	209	0.114	1.00	0.0400			12	4076658
Total Hepta CDF **	pg/g	424	0.122	1.00	0.0400			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.34	0.11	1.0	0.90	0.100	0.134		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						34.9		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	102							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) 5X dilution									



Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN391							
Sampling Date		2015/06/08 12:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-029B-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	102							4076658
C13-1234678 HeptaCDF **	%	90							4076658
C13-123478 HexaCDD *	%	82							4076658
C13-123478 HexaCDF **	%	86							4076658
C13-1234789 HeptaCDF **	%	101							4076658
C13-123678 HexaCDD *	%	99							4076658
C13-123678 HexaCDF **	%	86							4076658
C13-12378 PentaCDD *	%	103							4076658
C13-12378 PentaCDF **	%	93							4076658
C13-123789 HexaCDF **	%	97							4076658
C13-234678 HexaCDF **	%	90							4076658
C13-23478 PentaCDF **	%	110							4076658
C13-2378 TetraCDD *	%	92							4076658
C13-2378 TetraCDF **	%	92							4076658
C13-OCDD *	%	102							4076658
Confirmation C13-2378 TetraCDF **	%	93							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN392							
Sampling Date		2015/06/08 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-023-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.484	0.153	0.200	0.0400	1.00	0.484		4076658
1,2,3,7,8-Penta CDD *	pg/g	6.08	0.136	1.00	0.0400	1.00	6.08		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	17.0	0.0974	1.00	0.0400	0.100	1.70		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	53.6	0.102	1.00	0.0400	0.100	5.36		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	42.5	0.102	1.00	0.0400	0.100	4.25		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1240	0.121	1.00	0.0400	0.0100	12.4		4076658
Octa CDD *	pg/g	6530 (1)	0.501	10.0	0.0800	0.000300	1.96		4076658
Total Tetra CDD *	pg/g	2.76	0.153	0.200	0.0400			6	4076658
Total Penta CDD *	pg/g	26.1	0.136	1.00	0.0400			11	4076658
Total Hexa CDD *	pg/g	277	0.101	1.00	0.0400			7	4076658
Total Hepta CDD *	pg/g	1970	0.121	1.00	0.0400			2	4076658
2,3,7,8-Tetra CDF **	pg/g	1.40	0.123	0.200	0.0400	0.100	0.140		4076658
1,2,3,7,8-Penta CDF **	pg/g	2.34	0.141	1.00	0.0400	0.0300	0.0702		4076658
2,3,4,7,8-Penta CDF **	pg/g	3.09	0.137	1.00	0.0400	0.300	0.927		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	20.2	0.100	1.00	0.0400	0.100	2.02		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	9.45	0.105	1.00	0.0400	0.100	0.945		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	6.75	0.0948	1.00	0.0400	0.100	0.675		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.439	0.101	1.00	0.0400	0.100	0.0439		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	284	0.100	1.00	0.0400	0.0100	2.84		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	21.4	0.100	1.00	0.0400	0.0100	0.214		4076658
Octa CDF **	pg/g	783	0.109	2.00	0.0800	0.000300	0.235		4076658
Total Tetra CDF **	pg/g	5.01	0.123	0.200	0.0400			10	4076658
Total Penta CDF **	pg/g	23.7	0.139	1.00	0.0400			10	4076658
Total Hexa CDF **	pg/g	285	0.100	1.00	0.0400			12	4076658
Total Hepta CDF **	pg/g	946	0.100	1.00	0.0400			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.11	0.11	1.0	0.90	0.100	0.111		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						40.3		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	89							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) 5X dilution									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN392							
Sampling Date		2015/06/08 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-023-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	95							4076658
C13-1234678 HeptaCDF **	%	86							4076658
C13-123478 HexaCDD *	%	78							4076658
C13-123478 HexaCDF **	%	81							4076658
C13-1234789 HeptaCDF **	%	94							4076658
C13-123678 HexaCDD *	%	93							4076658
C13-123678 HexaCDF **	%	81							4076658
C13-12378 PentaCDD *	%	94							4076658
C13-12378 PentaCDF **	%	84							4076658
C13-123789 HexaCDF **	%	91							4076658
C13-234678 HexaCDF **	%	83							4076658
C13-23478 PentaCDF **	%	100							4076658
C13-2378 TetraCDD *	%	79							4076658
C13-2378 TetraCDF **	%	78							4076658
C13-OCDD *	%	103							4076658
Confirmation C13-2378 TetraCDF **	%	75							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN393							
Sampling Date		2015/06/08 13:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-018-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.396	0.148	0.199	0.0398	1.00	0.396		4076658
1,2,3,7,8-Penta CDD *	pg/g	3.29	0.110	0.995	0.0398	1.00	3.29		4076658
1,2,3,4,7,8-Hexa CDD *	pg/g	7.71	0.105	0.995	0.0398	0.100	0.771		4076658
1,2,3,6,7,8-Hexa CDD *	pg/g	22.8	0.110	0.995	0.0398	0.100	2.28		4076658
1,2,3,7,8,9-Hexa CDD *	pg/g	20.4	0.110	0.995	0.0398	0.100	2.04		4076658
1,2,3,4,6,7,8-Hepta CDD *	pg/g	521	0.121	0.995	0.0398	0.0100	5.21		4076658
Octa CDD *	pg/g	2910	0.105	1.99	0.0796	0.000300	0.873		4076658
Total Tetra CDD *	pg/g	2.49	0.148	0.199	0.0398			6	4076658
Total Penta CDD *	pg/g	18.5	0.110	0.995	0.0398			12	4076658
Total Hexa CDD *	pg/g	146	0.109	0.995	0.0398			7	4076658
Total Hepta CDD *	pg/g	916	0.121	0.995	0.0398			2	4076658
2,3,7,8-Tetra CDF **	pg/g	1.43	0.110	0.199	0.0398	0.100	0.143		4076658
1,2,3,7,8-Penta CDF **	pg/g	1.31	0.112	0.995	0.0398	0.0300	0.0393		4076658
2,3,4,7,8-Penta CDF **	pg/g	1.54	0.109	0.995	0.0398	0.300	0.462		4076658
1,2,3,4,7,8-Hexa CDF **	pg/g	7.33	0.109	0.995	0.0398	0.100	0.733		4076658
1,2,3,6,7,8-Hexa CDF **	pg/g	4.41	0.114	0.995	0.0398	0.100	0.441		4076658
2,3,4,6,7,8-Hexa CDF **	pg/g	2.71	0.103	0.995	0.0398	0.100	0.271		4076658
1,2,3,7,8,9-Hexa CDF **	pg/g	0.216	0.110	0.995	0.0398	0.100	0.0216		4076658
1,2,3,4,6,7,8-Hepta CDF **	pg/g	84.3	0.110	0.995	0.0398	0.0100	0.843		4076658
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.87	0.109	0.995	0.0398	0.0100	0.0587		4076658
Octa CDF **	pg/g	199	0.113	1.99	0.0796	0.000300	0.0597		4076658
Total Tetra CDF **	pg/g	6.25	0.110	0.199	0.0398			12	4076658
Total Penta CDF **	pg/g	18.7	0.111	0.995	0.0398			10	4076658
Total Hexa CDF **	pg/g	115	0.109	0.995	0.0398			11	4076658
Total Hepta CDF **	pg/g	251	0.109	0.995	0.0398			4	4076658
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.87	0.12	1.0	0.90	0.100	0.0870		4078908
TOTAL TOXIC EQUIVALENCY	pg/g						17.9		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	100							4076658
C13-1234678 HeptaCDD *	%	97							4076658
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ALN393							
Sampling Date		2015/06/08 13:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW-018-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	87							4076658
C13-123478 HexaCDD *	%	84							4076658
C13-123478 HexaCDF **	%	85							4076658
C13-1234789 HeptaCDF **	%	95							4076658
C13-123678 HexaCDD *	%	103							4076658
C13-123678 HexaCDF **	%	83							4076658
C13-12378 PentaCDD *	%	115							4076658
C13-12378 PentaCDF **	%	98							4076658
C13-123789 HexaCDF **	%	93							4076658
C13-234678 HexaCDF **	%	86							4076658
C13-23478 PentaCDF **	%	118							4076658
C13-2378 TetraCDD *	%	92							4076658
C13-2378 TetraCDF **	%	90							4076658
C13-OCDD *	%	117							4076658
Confirmation C13-2378 TetraCDF **	%	91							4078908

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**TEST SUMMARY**

**Maxxam ID:** ALN385  
**Sample ID:** SS-ROW-013-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/23	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN386  
**Sample ID:** SS-ROW-005-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN387  
**Sample ID:** SS-ROW-019-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN388  
**Sample ID:** SS-ROW-022-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN388 Dup  
**Sample ID:** SS-ROW-022-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic

**Maxxam ID:** ALN389  
**Sample ID:** SS-ROW-016-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani



Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**TEST SUMMARY**

**Maxxam ID:** ALN390  
**Sample ID:** SS-ROW-025-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN391  
**Sample ID:** SS-ROW-029B-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN392  
**Sample ID:** SS-ROW-023-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

**Maxxam ID:** ALN393  
**Sample ID:** SS-ROW-018-0.5  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4076658	2015/06/18	2015/06/24	Kay Shaw
2378TCDF Confirmation in Soil	HRMS/MS	4078908	N/A	2015/06/24	Vica Cioranic
Moisture	BAL	4070782	N/A	2015/06/17	Valentina Kaftani

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.0°C
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**Results relate only to the items tested.**

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
4070782	BOP	RPD - Sample/Sample Dup	Moisture	2015/06/17	4.1		%	20
4076658	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/06/24		102	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/24		91	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/24		85	%	28 - 143
			C13-123478 HexaCDD	2015/06/24		88	%	32 - 141
			C13-123478 HexaCDF	2015/06/24		85	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/24		91	%	26 - 138
			C13-123678 HexaCDD	2015/06/24		100	%	28 - 130
			C13-123678 HexaCDF	2015/06/24		87	%	26 - 123
			C13-12378 PentaCDD	2015/06/24		104	%	25 - 181
			C13-12378 PentaCDF	2015/06/24		94	%	24 - 185
			C13-123789 HexaCDF	2015/06/24		97	%	29 - 147
			C13-234678 HexaCDF	2015/06/24		91	%	28 - 136
			C13-23478 PentaCDF	2015/06/24		110	%	21 - 178
			C13-2378 TetraCDD	2015/06/24		89	%	25 - 164
			C13-2378 TetraCDF	2015/06/24		88	%	24 - 169
			C13-OCDD	2015/06/24		97	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/24		106	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/06/24		98	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/06/24		105	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/06/24		94	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/06/24		115	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/06/24		104	%	70 - 140
			Octa CDD	2015/06/24		101	%	78 - 144
			2,3,7,8-Tetra CDF	2015/06/24		103	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/06/24		104	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/06/24		94	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/06/24		104	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/06/24		102	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/06/24		103	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/06/24		99	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/06/24		106	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/06/24		102	%	78 - 138
			Octa CDF	2015/06/24		97	%	63 - 170
4076658	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/06/23		98	%	35 - 197
			C13-1234678 HeptaCDD	2015/06/23		103	%	23 - 140
			C13-1234678 HeptaCDF	2015/06/23		99	%	28 - 143
			C13-123478 HexaCDD	2015/06/23		96	%	32 - 141
			C13-123478 HexaCDF	2015/06/23		99	%	26 - 152
			C13-1234789 HeptaCDF	2015/06/23		105	%	26 - 138
			C13-123678 HexaCDD	2015/06/23		113	%	28 - 130
			C13-123678 HexaCDF	2015/06/23		99	%	26 - 123
			C13-12378 PentaCDD	2015/06/23		116	%	25 - 181
			C13-12378 PentaCDF	2015/06/23		108	%	24 - 185
			C13-123789 HexaCDF	2015/06/23		108	%	29 - 147
			C13-234678 HexaCDF	2015/06/23		102	%	28 - 136
			C13-23478 PentaCDF	2015/06/23		128	%	21 - 178
			C13-2378 TetraCDD	2015/06/23		99	%	25 - 164
			C13-2378 TetraCDF	2015/06/23		104	%	24 - 169
			C13-OCDD	2015/06/23		105	%	17 - 157
			2,3,7,8-Tetra CDD	2015/06/23	<0.104, EDL=0.104		pg/g	
			1,2,3,7,8-Penta CDD	2015/06/23	<0.106, EDL=0.106		pg/g	



Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/06/23	<0.0857, EDL=0.0857		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/06/23	<0.0899, EDL=0.0899		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/06/23	<0.0895, EDL=0.0895		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/06/23	0.296, EDL=0.0952		pg/g	
			Octa CDD	2015/06/23	3.64, EDL=0.268		pg/g	
			Total Tetra CDD	2015/06/23	<0.104, EDL=0.104		pg/g	
			Total Penta CDD	2015/06/23	<0.106, EDL=0.106		pg/g	
			Total Hexa CDD	2015/06/23	<0.0887, EDL=0.0887		pg/g	
			Total Hepta CDD	2015/06/23	0.296, EDL=0.0952		pg/g	
			2,3,7,8-Tetra CDF	2015/06/23	<0.0962, EDL=0.0962		pg/g	
			1,2,3,7,8-Penta CDF	2015/06/23	<0.0694, EDL=0.0694		pg/g	
			2,3,4,7,8-Penta CDF	2015/06/23	<0.0676, EDL=0.0676		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/06/23	<0.0717, EDL=0.0717		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/06/23	<0.0747, EDL=0.0747		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/06/23	<0.0678, EDL=0.0678		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/06/23	<0.0722, EDL=0.0722		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/06/23	<0.0700, EDL=0.0700		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/06/23	<0.0698, EDL=0.0698		pg/g	
			Octa CDF	2015/06/23	0.284, EDL=0.141		pg/g	
			Total Tetra CDF	2015/06/23	<0.0962, EDL=0.0962		pg/g	
			Total Penta CDF	2015/06/23	<0.0685, EDL=0.0685		pg/g	
			Total Hexa CDF	2015/06/23	<0.0715, EDL=0.0715		pg/g	
			Total Hepta CDF	2015/06/23	0.114, EDL=0.0699		pg/g	
4076658	KKS	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/06/24	NC		%	25
			1,2,3,7,8-Penta CDD	2015/06/24	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/06/24	4.3		%	25
			1,2,3,6,7,8-Hexa CDD	2015/06/24	5.0		%	25
			1,2,3,7,8,9-Hexa CDD	2015/06/24	4.9		%	25

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/06/24	14		%	25
			Octa CDD	2015/06/24	12		%	25
			Total Tetra CDD	2015/06/24	48 (1)		%	25
			Total Penta CDD	2015/06/24	4.4		%	25
			Total Hexa CDD	2015/06/24	2.3		%	25
			Total Hepta CDD	2015/06/24	13		%	25
			2,3,7,8-Tetra CDF	2015/06/24	24		%	25
			1,2,3,7,8-Penta CDF	2015/06/24	NC		%	25
			2,3,4,7,8-Penta CDF	2015/06/24	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/06/24	1.3		%	25
			1,2,3,6,7,8-Hexa CDF	2015/06/24	5.3		%	25
			2,3,4,6,7,8-Hexa CDF	2015/06/24	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/06/24	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/06/24	30 (1)		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/06/24	NC		%	25
			Octa CDF	2015/06/24	68 (1)		%	25
			Total Tetra CDF	2015/06/24	56 (1)		%	25
			Total Penta CDF	2015/06/24	3.4		%	25
			Total Hexa CDF	2015/06/24	12		%	25
			Total Hepta CDF	2015/06/24	51 (1)		%	25
4078908	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/06/24	<0.092, EDL=0.092		pg/g	
			Confirmation C13-2378 TetraCDF	2015/06/24		84	%	40 - 135
4078908	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/06/24	NC		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

Maxxam Job #: B5B5514  
Report Date: 2015/07/02

Apex Laboratories  
Client Project #: A5F0363

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

---

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





Your Project #: A5F0658  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/02**  
**Report #: R3707749**  
**Version: 2R**

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B5C4634**

**Received: 2015/06/26, 13:25**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Dioxins/Furans in Soil (1613B) (1)	1	2015/06/30	2015/07/04	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/29	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2015/06/30	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.  
\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Total cover pages: 1

Maxxam Job #: B5C4634  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5F0658

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		ANG978			
Sampling Date		2015/06/22 09:00			
COC Number		na			
	<b>Units</b>	<b>ISM-AOI019-0.5-AFTER ISM</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>

Moisture	%	2.3	1.0	0.50	4086742
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

Maxxam Job #: B5C4634  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5F0658

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ANG978							
Sampling Date		2015/06/22 09:00							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI019-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	2.69	0.152	0.200	0.0400	1.00	2.69		4091157
1,2,3,7,8-Penta CDD	pg/g	3.27	0.107	1.00	0.0400	1.00	3.27		4091157
1,2,3,4,7,8-Hexa CDD	pg/g	5.92	0.223	1.00	0.0400	0.100	0.592		4091157
1,2,3,6,7,8-Hexa CDD	pg/g	30.1	0.234	1.00	0.0400	0.100	3.01		4091157
1,2,3,7,8,9-Hexa CDD	pg/g	16.9	0.233	1.00	0.0400	0.100	1.69		4091157
1,2,3,4,6,7,8-Hepta CDD	pg/g	529	0.187	1.00	0.0400	0.0100	5.29		4091157
Octa CDD	pg/g	2540	0.897	2.00	0.0800	0.000300	0.762		4091157
Total Tetra CDD	pg/g	7.32	0.152	0.200	0.0400			9	4091157
Total Penta CDD	pg/g	16.1	0.107	1.00	0.0400			10	4091157
Total Hexa CDD	pg/g	141	0.231	1.00	0.0400			7	4091157
Total Hepta CDD	pg/g	866	0.187	1.00	0.0400			2	4091157
2,3,7,8-Tetra CDF **	pg/g	2.42	0.138	0.200	0.0400	0.100	0.242		4091157
1,2,3,7,8-Penta CDF	pg/g	2.18	0.142	1.00	0.0400	0.0300	0.0654		4091157
2,3,4,7,8-Penta CDF	pg/g	3.23	0.139	1.00	0.0400	0.300	0.969		4091157
1,2,3,4,7,8-Hexa CDF	pg/g	17.2	0.100	1.00	0.0400	0.100	1.72		4091157
1,2,3,6,7,8-Hexa CDF	pg/g	6.87	0.105	1.00	0.0400	0.100	0.687		4091157
2,3,4,6,7,8-Hexa CDF	pg/g	4.57	0.0948	1.00	0.0400	0.100	0.457		4091157
1,2,3,7,8,9-Hexa CDF	pg/g	0.304	0.101	1.00	0.0400	0.100	0.0304		4091157
1,2,3,4,6,7,8-Hepta CDF	pg/g	81.3	0.103	1.00	0.0400	0.0100	0.813		4091157
1,2,3,4,7,8,9-Hepta CDF	pg/g	4.46	0.103	1.00	0.0400	0.0100	0.0446		4091157
Octa CDF	pg/g	67.4	0.198	2.00	0.0800	0.000300	0.0202		4091157
Total Tetra CDF	pg/g	20.4	0.138	0.200	0.0400			15	4091157
Total Penta CDF	pg/g	62.1	0.141	1.00	0.0400			10	4091157
Total Hexa CDF	pg/g	188	0.100	1.00	0.0400			11	4091157
Total Hepta CDF	pg/g	206	0.103	1.00	0.0400			4	4091157
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.25	0.19	1.0	0.90	0.100	0.125		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						22.2		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds



Maxxam Job #: B5C4634  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5F0658

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ANG978							
Sampling Date		2015/06/22 09:00							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI019-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	92							4091157
C13-1234678 HeptaCDD	%	105							4091157
C13-1234678 HeptaCDF **	%	95							4091157
C13-123478 HexaCDD	%	88							4091157
C13-123478 HexaCDF	%	82							4091157
C13-1234789 HeptaCDF	%	93							4091157
C13-123678 HexaCDD	%	85							4091157
C13-123678 HexaCDF	%	89							4091157
C13-12378 PentaCDD	%	91							4091157
C13-12378 PentaCDF	%	82							4091157
C13-123789 HexaCDF	%	91							4091157
C13-234678 HexaCDF	%	87							4091157
C13-23478 PentaCDF	%	103							4091157
C13-2378 TetraCDD	%	79							4091157
C13-2378 TetraCDF	%	89							4091157
C13-OCDD	%	133							4091157
Confirmation C13-2378 TetraCDF	%	69							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B5C4634  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5F0658

**Test Summary**

**Maxxam ID** ANG978  
**Sample ID** ISM-AOI019-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/06/22  
**Shipped**  
**Received** 2015/06/26

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4091157	2015/06/30	2015/07/04	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4086742	N/A	2015/06/30	Valentina Kaftani

Maxxam Job #: B5C4634  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5F0658

Package 1	16.2°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

**GENERAL COMMENTS**

Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**



Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5F0658  
P.O. #:  
Site Location:

**Quality Assurance Report**

Maxxam Job Number: GB5C4634

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4086742 MYG	RPD - Sample/Sample						
	Dup	Moisture	2015/06/30	2.6		%	20
4091157 OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/07/03		86	%	35 - 197
	Spiked Blank DUP	37CL4 2378 Tetra CDD	2015/07/03		100	%	35 - 197
	Spiked Blank	C13-1234678 HeptaCDD	2015/07/03		94	%	23 - 140
	Spiked Blank DUP	C13-1234678 HeptaCDD	2015/07/03		104	%	23 - 140
	Spiked Blank	C13-1234678 HeptaCDF	2015/07/03		85	%	28 - 143
	Spiked Blank DUP	C13-1234678 HeptaCDF	2015/07/03		96	%	28 - 143
	Spiked Blank	C13-123478 HexaCDD	2015/07/03		81	%	32 - 141
	Spiked Blank DUP	C13-123478 HexaCDD	2015/07/03		91	%	32 - 141
	Spiked Blank	C13-123478 HexaCDF	2015/07/03		79	%	26 - 152
	Spiked Blank DUP	C13-123478 HexaCDF	2015/07/03		88	%	26 - 152
	Spiked Blank	C13-1234789 HeptaCDF	2015/07/03		79	%	26 - 138
	Spiked Blank DUP	C13-1234789 HeptaCDF	2015/07/03		82	%	26 - 138
	Spiked Blank	C13-123678 HexaCDD	2015/07/03		80	%	28 - 130
	Spiked Blank DUP	C13-123678 HexaCDD	2015/07/03		88	%	28 - 130
	Spiked Blank	C13-123678 HexaCDF	2015/07/03		85	%	26 - 123
	Spiked Blank DUP	C13-123678 HexaCDF	2015/07/03		93	%	26 - 123
	Spiked Blank	C13-12378 PentaCDD	2015/07/03		85	%	25 - 181
	Spiked Blank DUP	C13-12378 PentaCDD	2015/07/03		92	%	25 - 181
	Spiked Blank	C13-12378 PentaCDF	2015/07/03		74	%	24 - 185
	Spiked Blank DUP	C13-12378 PentaCDF	2015/07/03		77	%	24 - 185
	Spiked Blank	C13-123789 HexaCDF	2015/07/03		87	%	29 - 147
	Spiked Blank DUP	C13-123789 HexaCDF	2015/07/03		91	%	29 - 147
	Spiked Blank	C13-234678 HexaCDF	2015/07/03		79	%	28 - 136
	Spiked Blank DUP	C13-234678 HexaCDF	2015/07/03		88	%	28 - 136
	Spiked Blank	C13-23478 PentaCDF	2015/07/03		89	%	21 - 178
	Spiked Blank DUP	C13-23478 PentaCDF	2015/07/03		95	%	21 - 178
	Spiked Blank	C13-2378 TetraCDD	2015/07/03		78	%	25 - 164
	Spiked Blank DUP	C13-2378 TetraCDD	2015/07/03		87	%	25 - 164
	Spiked Blank	C13-2378 TetraCDF	2015/07/03		82	%	24 - 169
	Spiked Blank DUP	C13-2378 TetraCDF	2015/07/03		85	%	24 - 169
	Spiked Blank	C13-OCDD	2015/07/03		110	%	17 - 157
	Spiked Blank DUP	C13-OCDD	2015/07/03		136	%	17 - 157
	Spiked Blank	2,3,7,8-Tetra CDD	2015/07/03		109	%	67 - 158
	Spiked Blank DUP	2,3,7,8-Tetra CDD	2015/07/03		108	%	67 - 158
	RPD	2,3,7,8-Tetra CDD	2015/07/03	0.92		%	25
	Spiked Blank	1,2,3,7,8-Penta CDD	2015/07/03		111	%	25 - 181
	Spiked Blank DUP	1,2,3,7,8-Penta CDD	2015/07/03		108	%	25 - 181
	RPD	1,2,3,7,8-Penta CDD	2015/07/03	2.7		%	25
	Spiked Blank	1,2,3,4,7,8-Hexa CDD	2015/07/03		117	%	70 - 164
	Spiked Blank DUP	1,2,3,4,7,8-Hexa CDD	2015/07/03		113	%	70 - 164
	RPD	1,2,3,4,7,8-Hexa CDD	2015/07/03	3.5		%	25
	Spiked Blank	1,2,3,6,7,8-Hexa CDD	2015/07/03		125	%	76 - 134
	Spiked Blank DUP	1,2,3,6,7,8-Hexa CDD	2015/07/03		122	%	76 - 134
	RPD	1,2,3,6,7,8-Hexa CDD	2015/07/03	2.4		%	25
	Spiked Blank	1,2,3,7,8,9-Hexa CDD	2015/07/03		137	%	64 - 162
	Spiked Blank DUP	1,2,3,7,8,9-Hexa CDD	2015/07/03		128	%	64 - 162
	RPD	1,2,3,7,8,9-Hexa CDD	2015/07/03	6.8		%	25
	Spiked Blank	1,2,3,4,6,7,8-Hepta CDD	2015/07/03		108	%	70 - 140
	Spiked Blank DUP	1,2,3,4,6,7,8-Hepta CDD	2015/07/03		106	%	70 - 140
	RPD	1,2,3,4,6,7,8-Hepta CDD	2015/07/03	1.9		%	25
	Spiked Blank	Octa CDD	2015/07/03		90	%	78 - 144
	Spiked Blank DUP	Octa CDD	2015/07/03		87	%	78 - 144

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5F0658  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)  
Maxxam Job Number: GB5C4634

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4091157 OBC	RPD	Octa CDD	2015/07/03	3.4		%	25
	Spiked Blank	2,3,7,8-Tetra CDF	2015/07/03		110	%	75 - 158
	Spiked Blank DUP	2,3,7,8-Tetra CDF	2015/07/03		106	%	75 - 158
	RPD	2,3,7,8-Tetra CDF	2015/07/03	3.7		%	25
	Spiked Blank	1,2,3,7,8-Penta CDF	2015/07/03		118	%	80 - 134
	Spiked Blank DUP	1,2,3,7,8-Penta CDF	2015/07/03		116	%	80 - 134
	RPD	1,2,3,7,8-Penta CDF	2015/07/03	1.7		%	25
	Spiked Blank	2,3,4,7,8-Penta CDF	2015/07/03		104	%	68 - 160
	Spiked Blank DUP	2,3,4,7,8-Penta CDF	2015/07/03		100	%	68 - 160
	RPD	2,3,4,7,8-Penta CDF	2015/07/03	3.9		%	25
	Spiked Blank	1,2,3,4,7,8-Hexa CDF	2015/07/03		121	%	72 - 134
	Spiked Blank DUP	1,2,3,4,7,8-Hexa CDF	2015/07/03		118	%	72 - 134
	RPD	1,2,3,4,7,8-Hexa CDF	2015/07/03	2.5		%	25
	Spiked Blank	1,2,3,6,7,8-Hexa CDF	2015/07/03		116	%	84 - 130
	Spiked Blank DUP	1,2,3,6,7,8-Hexa CDF	2015/07/03		114	%	84 - 130
	RPD	1,2,3,6,7,8-Hexa CDF	2015/07/03	1.7		%	25
	Spiked Blank	2,3,4,6,7,8-Hexa CDF	2015/07/03		118	%	70 - 156
	Spiked Blank DUP	2,3,4,6,7,8-Hexa CDF	2015/07/03		116	%	70 - 156
	RPD	2,3,4,6,7,8-Hexa CDF	2015/07/03	1.7		%	25
	Spiked Blank	1,2,3,7,8,9-Hexa CDF	2015/07/03		114	%	78 - 130
	Spiked Blank DUP	1,2,3,7,8,9-Hexa CDF	2015/07/03		110	%	78 - 130
	RPD	1,2,3,7,8,9-Hexa CDF	2015/07/03	3.6		%	25
	Spiked Blank	1,2,3,4,6,7,8-Hepta CDF	2015/07/03		114	%	82 - 122
	Spiked Blank DUP	1,2,3,4,6,7,8-Hepta CDF	2015/07/03		111	%	82 - 122
	RPD	1,2,3,4,6,7,8-Hepta CDF	2015/07/03	2.7		%	25
	Spiked Blank	1,2,3,4,7,8,9-Hepta CDF	2015/07/03		119	%	78 - 138
	Spiked Blank DUP	1,2,3,4,7,8,9-Hepta CDF	2015/07/03		113	%	78 - 138
	RPD	1,2,3,4,7,8,9-Hepta CDF	2015/07/03	5.2		%	25
	Spiked Blank	Octa CDF	2015/07/03		86	%	63 - 170
	Spiked Blank DUP	Octa CDF	2015/07/03		71	%	63 - 170
	RPD	Octa CDF	2015/07/03	19		%	25
	Method Blank	37CL4 2378 Tetra CDD	2015/07/03		91	%	35 - 197
		C13-1234678 HeptaCDD	2015/07/03		93	%	23 - 140
		C13-1234678 HeptaCDF	2015/07/03		85	%	28 - 143
		C13-123478 HexaCDD	2015/07/03		78	%	32 - 141
		C13-123478 HexaCDF	2015/07/03		78	%	26 - 152
		C13-1234789 HeptaCDF	2015/07/03		81	%	26 - 138
		C13-123678 HexaCDD	2015/07/03		80	%	28 - 130
		C13-123678 HexaCDF	2015/07/03		84	%	26 - 123
		C13-12378 PentaCDD	2015/07/03		81	%	25 - 181
		C13-12378 PentaCDF	2015/07/03		69	%	24 - 185
		C13-123789 HexaCDF	2015/07/03		85	%	29 - 147
		C13-234678 HexaCDF	2015/07/03		79	%	28 - 136
		C13-23478 PentaCDF	2015/07/03		83	%	21 - 178
		C13-2378 TetraCDD	2015/07/03		78	%	25 - 164
		C13-2378 TetraCDF	2015/07/03		82	%	24 - 169
		C13-OCDD	2015/07/03		115	%	17 - 157
		2,3,7,8-Tetra CDD	2015/07/03	<0.0919, EDL=0.0919		pg/g	
		1,2,3,7,8-Penta CDD	2015/07/03	<0.120, EDL=0.120		pg/g	
		1,2,3,4,7,8-Hexa CDD	2015/07/03	<0.106, EDL=0.106		pg/g	
		1,2,3,6,7,8-Hexa CDD	2015/07/03	<0.111, EDL=0.111		pg/g	
		1,2,3,7,8,9-Hexa CDD	2015/07/03	<0.111, EDL=0.111		pg/g	
		1,2,3,4,6,7,8-Hepta CDD	2015/07/03	<0.0888, EDL=0.0888		pg/g	
		Octa CDD	2015/07/03	0.308, EDL=0.125		pg/g	
		Total Tetra CDD	2015/07/03	<0.0919, EDL=0.0919		pg/g	

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5F0658  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB5C4634

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4091157 OBC	Method Blank	Total Penta CDD	2015/07/03	<0.120, EDL=0.120		pg/g	
		Total Hexa CDD	2015/07/03	<0.110, EDL=0.110		pg/g	
		Total Hepta CDD	2015/07/03	<0.0888, EDL=0.0888		pg/g	
		2,3,7,8-Tetra CDF	2015/07/03	<0.0643, EDL=0.0643		pg/g	
		1,2,3,7,8-Penta CDF	2015/07/03	<0.0889, EDL=0.0889		pg/g	
		2,3,4,7,8-Penta CDF	2015/07/03	<0.0865, EDL=0.0865		pg/g	
		1,2,3,4,7,8-Hexa CDF	2015/07/03	<0.0671, EDL=0.0671		pg/g	
		1,2,3,6,7,8-Hexa CDF	2015/07/03	<0.0699, EDL=0.0699		pg/g	
		2,3,4,6,7,8-Hexa CDF	2015/07/03	<0.0634, EDL=0.0634		pg/g	
		1,2,3,7,8,9-Hexa CDF	2015/07/03	<0.0676, EDL=0.0676		pg/g	
		1,2,3,4,6,7,8-Hepta CDF	2015/07/03	<0.115, EDL=0.115		pg/g	
		1,2,3,4,7,8,9-Hepta CDF	2015/07/03	<0.115, EDL=0.115		pg/g	
		Octa CDF	2015/07/03	<0.124, EDL=0.124		pg/g	
		Total Tetra CDF	2015/07/03	<0.0643, EDL=0.0643		pg/g	
		Total Penta CDF	2015/07/03	<0.0877, EDL=0.0877		pg/g	
		Total Hexa CDF	2015/07/03	<0.0669, EDL=0.0669		pg/g	
		Total Hepta CDF	2015/07/03	<0.115, EDL=0.115		pg/g	
		4203313 LAZ	Method Blank	Confirmation C13-2378 TetraCDF	2015/09/29		92
Confirmation 2,3,7,8-Tetra CDF	2015/09/29			<0.12, EDL=0.12		pg/g	
RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF		2015/09/29	NC		%	100

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.  
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.  
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.  
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.  
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).




**Validation Signature Page**

**Maxxam Job #: B5C4634**

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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



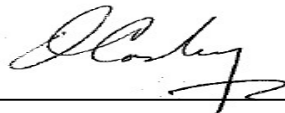
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Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



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Cristina Carriere, Scientific Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5E0713  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/07/08**  
Report #: R3566542  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5C7784**

**Received: 2015/07/02, 08:00**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/07/04	2015/07/06	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation in Soil	1	N/A	2015/07/07	BRL SOP-00406	EPA 8290A m
Moisture	1	N/A	2015/07/03	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International. is a NELAC accredited laboratory. Certificate # CANA001. Use of the NELAC logo however does not insure that Maxxam is accredited for all of the methods indicated. This certificate shall not be reproduced except in full, without the written approval of Maxxam Analytics Inc.

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		ANW939			
<b>Sampling Date</b>		2015/05/21 16:20			
<b>COC Number</b>		na			
	<b>Units</b>	<b>SBS-ROW026-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	29	1.0	1.0	4090646
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ANW939							
Sampling Date		2015/05/21 16:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SBS-ROW026-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	µg/g	0.566	0.101	0.200	0.0400	1.00	0.566		4093368
1,2,3,7,8-Penta CDD *	µg/g	3.50	0.107	1.00	0.0400	1.00	3.50		4093368
1,2,3,4,7,8-Hexa CDD *	µg/g	7.46	0.0997	1.00	0.0400	0.100	0.746		4093368
1,2,3,6,7,8-Hexa CDD *	µg/g	36.2	0.105	1.00	0.0400	0.100	3.62		4093368
1,2,3,7,8,9-Hexa CDD *	µg/g	23.3	0.104	1.00	0.0400	0.100	2.33		4093368
1,2,3,4,6,7,8-Hepta CDD *	µg/g	653	0.106	1.00	0.0400	0.0100	6.53		4093368
Octa CDD *	µg/g	3190	0.109	2.00	0.0800	0.000300	0.957		4093368
Total Tetra CDD *	µg/g	5.07	0.101	0.200	0.0400			10	4093368
Total Penta CDD *	µg/g	19.4	0.107	1.00	0.0400			10	4093368
Total Hexa CDD *	µg/g	181	0.103	1.00	0.0400			6	4093368
Total Hepta CDD *	µg/g	1100	0.106	1.00	0.0400			2	4093368
2,3,7,8-Tetra CDF **	µg/g	2.11	0.103	0.200	0.0400	0.100	0.211		4093368
1,2,3,7,8-Penta CDF **	µg/g	2.43	0.110	1.00	0.0400	0.0300	0.0729		4093368
2,3,4,7,8-Penta CDF **	µg/g	3.09	0.107	1.00	0.0400	0.300	0.927		4093368
1,2,3,4,7,8-Hexa CDF **	µg/g	16.1	0.102	1.00	0.0400	0.100	1.61		4093368
1,2,3,6,7,8-Hexa CDF **	µg/g	7.05	0.107	1.00	0.0400	0.100	0.705		4093368
2,3,4,6,7,8-Hexa CDF **	µg/g	4.12	0.0968	1.00	0.0400	0.100	0.412		4093368
1,2,3,7,8,9-Hexa CDF **	µg/g	0.284	0.103	1.00	0.0400	0.100	0.0284		4093368
1,2,3,4,6,7,8-Hepta CDF **	µg/g	131	0.103	1.00	0.0400	0.0100	1.31		4093368
1,2,3,4,7,8,9-Hepta CDF **	µg/g	6.46	0.103	1.00	0.0400	0.0100	0.0646		4093368
Octa CDF **	µg/g	102	0.108	2.00	0.0800	0.000300	0.0306		4093368
Total Tetra CDF **	µg/g	12.8	0.103	0.200	0.0400			13	4093368
Total Penta CDF **	µg/g	37.0	0.108	1.00	0.0400			11	4093368
Total Hexa CDF **	µg/g	201	0.102	1.00	0.0400			11	4093368
Total Hepta CDF **	µg/g	309	0.103	1.00	0.0400			4	4093368
Confirmation 2,3,7,8-Tetra CDF **	µg/g	1.52	0.12	1.0	0.90	0.100	0.152		4095053
TOTAL TOXIC EQUIVALENCY	µg/g						23.6		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	98							4093368
C13-1234678 HeptaCDD *	%	102							4093368
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ANW939							
Sampling Date		2015/05/21 16:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	SBS-ROW026-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	96							4093368
C13-123478 HexaCDD *	%	83							4093368
C13-123478 HexaCDF **	%	83							4093368
C13-1234789 HeptaCDF **	%	89							4093368
C13-123678 HexaCDD *	%	82							4093368
C13-123678 HexaCDF **	%	91							4093368
C13-12378 PentaCDD *	%	87							4093368
C13-12378 PentaCDF **	%	84							4093368
C13-123789 HexaCDF **	%	92							4093368
C13-234678 HexaCDF **	%	86							4093368
C13-23478 PentaCDF **	%	101							4093368
C13-2378 TetraCDD *	%	85							4093368
C13-2378 TetraCDF **	%	95							4093368
C13-OCDD *	%	126							4093368
Confirmation C13-2378 TetraCDF **	%	91							4095053

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**TEST SUMMARY**

**Maxxam ID:** ANW939  
**Sample ID:** SBS-ROW026-1.0  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/07/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4093368	2015/07/04	2015/07/06	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4095053	N/A	2015/07/07	Vica Cioranic
Moisture	BAL	4090646	N/A	2015/07/03	Min Yang

**Maxxam ID:** ANW939 Dup  
**Sample ID:** SBS-ROW026-1.0  
**Matrix:** Soil

**Collected:** 2015/05/21  
**Shipped:**  
**Received:** 2015/07/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4090646	N/A	2015/07/03	Min Yang



Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.6°C
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**Results relate only to the items tested.**

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
4090646	MYG	RPD - Sample/Sample Dup	Moisture	2015/07/03	4.4		%	20
4093368	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/07/06		90	%	35 - 197
			C13-1234678 HeptaCDD	2015/07/06		99	%	23 - 140
			C13-1234678 HeptaCDF	2015/07/06		93	%	28 - 143
			C13-123478 HexaCDD	2015/07/06		83	%	32 - 141
			C13-123478 HexaCDF	2015/07/06		83	%	26 - 152
			C13-1234789 HeptaCDF	2015/07/06		86	%	26 - 138
			C13-123678 HexaCDD	2015/07/06		85	%	28 - 130
			C13-123678 HexaCDF	2015/07/06		92	%	26 - 123
			C13-12378 PentaCDD	2015/07/06		84	%	25 - 181
			C13-12378 PentaCDF	2015/07/06		81	%	24 - 185
			C13-123789 HexaCDF	2015/07/06		92	%	29 - 147
			C13-234678 HexaCDF	2015/07/06		85	%	28 - 136
			C13-23478 PentaCDF	2015/07/06		98	%	21 - 178
			C13-2378 TetraCDD	2015/07/06		85	%	25 - 164
			C13-2378 TetraCDF	2015/07/06		93	%	24 - 169
			C13-OCDD	2015/07/06		103	%	17 - 157
			2,3,7,8-Tetra CDD	2015/07/06		110	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/07/06		96	%	70 - 142
			1,2,3,4,7,8-Hexa CDD	2015/07/06		96	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/07/06		96	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/07/06		100	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/07/06		92	%	70 - 140
			Octa CDD	2015/07/06		98	%	78 - 144
			2,3,7,8-Tetra CDF	2015/07/06		96	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/07/06		95	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/07/06		98	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/07/06		96	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/07/06		99	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/07/06		96	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/07/06		95	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/07/06		97	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/07/06		98	%	78 - 138
			Octa CDF	2015/07/06		104	%	63 - 170
4093368	OBC	RPD	2,3,7,8-Tetra CDD	2015/07/06	3.6		%	25
			1,2,3,7,8-Penta CDD	2015/07/06	4.1		%	25
			1,2,3,4,7,8-Hexa CDD	2015/07/06	2.1		%	25
			1,2,3,6,7,8-Hexa CDD	2015/07/06	3.1		%	25
			1,2,3,7,8,9-Hexa CDD	2015/07/06	3.9		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/07/06	6.3		%	25
			Octa CDD	2015/07/06	2.0		%	25
			2,3,7,8-Tetra CDF	2015/07/06	5.1		%	25
			1,2,3,7,8-Penta CDF	2015/07/06	2.1		%	25
			2,3,4,7,8-Penta CDF	2015/07/06	2.0		%	25
			1,2,3,4,7,8-Hexa CDF	2015/07/06	3.1		%	25
			1,2,3,6,7,8-Hexa CDF	2015/07/06	1.0		%	25
			2,3,4,6,7,8-Hexa CDF	2015/07/06	1.0		%	25
			1,2,3,7,8,9-Hexa CDF	2015/07/06	4.1		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/07/06	2.0		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/07/06	2.0		%	25
			Octa CDF	2015/07/06	3.9		%	25
4093368	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/07/06		84	%	35 - 197
			C13-1234678 HeptaCDD	2015/07/06		89	%	23 - 140
			C13-1234678 HeptaCDF	2015/07/06		88	%	28 - 143

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			C13-123478 HexaCDD	2015/07/06		75	%	32 - 141
			C13-123478 HexaCDF	2015/07/06		77	%	26 - 152
			C13-1234789 HeptaCDF	2015/07/06		75	%	26 - 138
			C13-123678 HexaCDD	2015/07/06		83	%	28 - 130
			C13-123678 HexaCDF	2015/07/06		84	%	26 - 123
			C13-12378 PentaCDD	2015/07/06		85	%	25 - 181
			C13-12378 PentaCDF	2015/07/06		78	%	24 - 185
			C13-123789 HexaCDF	2015/07/06		87	%	29 - 147
			C13-234678 HexaCDF	2015/07/06		80	%	28 - 136
			C13-23478 PentaCDF	2015/07/06		95	%	21 - 178
			C13-2378 TetraCDD	2015/07/06		76	%	25 - 164
			C13-2378 TetraCDF	2015/07/06		81	%	24 - 169
			C13-OCDD	2015/07/06		97	%	17 - 157
			2,3,7,8-Tetra CDD	2015/07/06	<0.105, EDL=0.105		pg/g	
			1,2,3,7,8-Penta CDD	2015/07/06	<0.101, EDL=0.101		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/07/06	<0.0996, EDL=0.0996		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/07/06	<0.105, EDL=0.105		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/07/06	<0.104, EDL=0.104		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/07/06	<0.106, EDL=0.106		pg/g	
			Octa CDD	2015/07/06	<0.105, EDL=0.105		pg/g	
			Total Tetra CDD	2015/07/06	<0.105, EDL=0.105		pg/g	
			Total Penta CDD	2015/07/06	<0.101, EDL=0.101		pg/g	
			Total Hexa CDD	2015/07/06	<0.103, EDL=0.103		pg/g	
			Total Hepta CDD	2015/07/06	<0.106, EDL=0.106		pg/g	
			2,3,7,8-Tetra CDF	2015/07/06	<0.108, EDL=0.108		pg/g	
			1,2,3,7,8-Penta CDF	2015/07/06	<0.110, EDL=0.110		pg/g	
			2,3,4,7,8-Penta CDF	2015/07/06	<0.107, EDL=0.107		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/07/06	<0.102, EDL=0.102		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/07/06	<0.107, EDL=0.107		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/07/06	<0.0968, EDL=0.0968		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/07/06	<0.103, EDL=0.103		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/07/06	<0.107, EDL=0.107		pg/g	



Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/07/06	<0.106, EDL=0.106		pg/g	
			Octa CDF	2015/07/06	<0.106, EDL=0.106		pg/g	
			Total Tetra CDF	2015/07/06	<0.108, EDL=0.108		pg/g	
			Total Penta CDF	2015/07/06	<0.109, EDL=0.109		pg/g	
			Total Hexa CDF	2015/07/06	<0.102, EDL=0.102		pg/g	
			Total Hepta CDF	2015/07/06	<0.107, EDL=0.107		pg/g	
4095053	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/07/07	<0.11, EDL=0.11		pg/g	
			Confirmation C13-2378 TetraCDF	2015/07/07		81	%	40 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

Maxxam Job #: B5C7784  
Report Date: 2015/07/08

Apex Laboratories  
Client Project #: A5E0713

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: A5F0363  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/06**  
Report #: R3712161  
Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B5D4823**

**Received: 2015/07/10, 12:09**

Sample Matrix: Soil  
# Samples Received: 9

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	6	2015/07/13	2015/07/17	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	1	2015/07/13	2015/07/18	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	2	2015/07/13	2015/07/24	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	6	N/A	2015/07/21	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2015/07/24	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/25	BRL SOP-00406	EPA M8290A / M1613
Moisture	9	N/A	2015/07/13	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		APH343	APH344	APH345	APH346	APH347			
Sampling Date		2015/06/08 08:05	2015/06/08 08:50	2015/06/08 09:35	2015/06/08 10:15	2015/06/08 10:55			
COC Number		NA	NA	NA	NA	NA			
	UNITS	SBS-ROW013-1.0	SBS-ROW005-1.0	SBS-ROW019-1.0	SBS-ROW022-1.0	SBS-ROW016-1.0	RDL	MDL	QC Batch
Moisture	%	12	9.5	11	19	17	1.0	0.50	4102231
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

Maxxam ID		APH348	APH349	APH350	APH351			
Sampling Date		2015/06/08 11:45	2015/06/08 12:25	2015/06/08 13:15	2015/06/08 13:55			
COC Number		NA	NA	NA	NA			
	UNITS	SBS-ROW025-1.0	SBS-ROW029B-1.0	SBS-ROW023-1.0	SBS-ROW018-1.0	RDL	MDL	QC Batch
Moisture	%	17	13	15	14	1.0	0.50	4102231
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH343							
Sampling Date		2015/06/08 08:05							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW013-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<2.00	2.00	3.99	0.0399	1.00	2.00		4106052
1,2,3,7,8-Penta CDD *	pg/g	16.3	2.02	19.9	0.0399	1.00	16.3		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	50.5	1.92	19.9	0.0399	0.100	5.05		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	367	2.04	19.9	0.0399	0.100	36.7		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	142	2.05	19.9	0.0399	0.100	14.2		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	7280	2.00	19.9	0.0399	0.0100	72.8		4106052
Octa CDD *	pg/g	38300	2.02	39.9	0.0798	0.000300	11.5		4106052
Total Tetra CDD *	pg/g	<2.00	2.00	3.99	0.0399			0	4106052
Total Penta CDD *	pg/g	48.0	2.02	19.9	0.0399			7	4106052
Total Hexa CDD *	pg/g	1330	2.04	19.9	0.0399			7	4106052
Total Hepta CDD *	pg/g	11800	2.00	19.9	0.0399			2	4106052
2,3,7,8-Tetra CDF **	pg/g	9.96	2.04	3.99	0.0399	0.100	0.996		4106052
1,2,3,7,8-Penta CDF **	pg/g	37.4 (1)	2.02	19.9	0.0399	0.0300	1.12		4106052
2,3,4,7,8-Penta CDF **	pg/g	63.0	2.00	19.9	0.0399	0.300	18.9		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	331	2.01	19.9	0.0399	0.100	33.1		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	107	2.10	19.9	0.0399	0.100	10.7		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	66.7	1.96	19.9	0.0399	0.100	6.67		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	5.01	2.08	19.9	0.0399	0.100	0.501		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	1080	2.06	19.9	0.0399	0.0100	10.8		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	68.2	2.01	19.9	0.0399	0.0100	0.682		4106052
Octa CDF **	pg/g	531	2.05	39.9	0.0798	0.000300	0.159		4106052
Total Tetra CDF **	pg/g	15.3	2.04	3.99	0.0399			3	4106052
Total Penta CDF **	pg/g	423	2.01	19.9	0.0399			9	4106052
Total Hexa CDF **	pg/g	2180	2.04	19.9	0.0399			10	4106052
Total Hepta CDF **	pg/g	2870	2.04	19.9	0.0399			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	11.5	0.11	1.0	0.90	0.100	1.15		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						242		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	107							4106052
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) Archived portion analyzed at x20dilution									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH343							
Sampling Date		2015/06/08 08:05							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW013-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	117							4106052
C13-1234678 HeptaCDF **	%	74							4106052
C13-123478 HexaCDD *	%	95							4106052
C13-123478 HexaCDF **	%	66							4106052
C13-1234789 HeptaCDF **	%	98							4106052
C13-123678 HexaCDD *	%	98							4106052
C13-123678 HexaCDF **	%	84							4106052
C13-12378 PentaCDD *	%	104							4106052
C13-12378 PentaCDF **	%	98							4106052
C13-123789 HexaCDF **	%	103							4106052
C13-234678 HexaCDF **	%	93							4106052
C13-23478 PentaCDF **	%	113							4106052
C13-2378 TetraCDD *	%	78							4106052
C13-2378 TetraCDF **	%	73							4106052
C13-OCDD *	%	148							4106052
Confirmation C13-2378 TetraCDF **	%	88 (1)							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Recovery meets EPA 1613B criteria



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH344							
Sampling Date		2015/06/08 08:50							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW005-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.503	0.503	1.00	0.0400	1.00	0.503		4106052
1,2,3,7,8-Penta CDD *	pg/g	5.05	0.520	5.00	0.0400	1.00	5.05		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	13.6	0.473	5.00	0.0400	0.100	1.36		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	59.1	0.504	5.00	0.0400	0.100	5.91		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	35.8	0.505	5.00	0.0400	0.100	3.58		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1230	0.505	5.00	0.0400	0.0100	12.3		4106052
Octa CDD *	pg/g	6600	0.503	10.0	0.0800	0.000300	1.98		4106052
Total Tetra CDD *	pg/g	<0.583 (1)	0.583	1.00	0.0400			0	4106052
Total Penta CDD *	pg/g	24.2	0.520	5.00	0.0400			9	4106052
Total Hexa CDD *	pg/g	294	0.502	5.00	0.0400			7	4106052
Total Hepta CDD *	pg/g	2100	0.505	5.00	0.0400			2	4106052
2,3,7,8-Tetra CDF **	pg/g	1.83	0.502	1.00	0.0400	0.100	0.183		4106052
1,2,3,7,8-Penta CDF **	pg/g	2.68	0.505	5.00	0.0400	0.0300	0.0804		4106052
2,3,4,7,8-Penta CDF **	pg/g	4.10	0.500	5.00	0.0400	0.300	1.23		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	24.0	0.498	5.00	0.0400	0.100	2.40		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	11.0	0.518	5.00	0.0400	0.100	1.10		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	7.90	0.485	5.00	0.0400	0.100	0.790		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.667	0.514	5.00	0.0400	0.100	0.0667		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	175	0.508	5.00	0.0400	0.0100	1.75		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	11.4	0.497	5.00	0.0400	0.0100	0.114		4106052
Octa CDF **	pg/g	210	0.503	10.0	0.0800	0.000300	0.0630		4106052
Total Tetra CDF **	pg/g	6.54	0.502	1.00	0.0400			6	4106052
Total Penta CDF **	pg/g	55.4	0.502	5.00	0.0400			8	4106052
Total Hexa CDF **	pg/g	308	0.503	5.00	0.0400			10	4106052
Total Hepta CDF **	pg/g	474	0.503	5.00	0.0400			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.60 (2)	0.11	1.0	0.90	0.100	0.160		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						38.4		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.  
(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		APH344							
<b>Sampling Date</b>		2015/06/08 08:50							
<b>COC Number</b>		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-ROW005-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	98							4106052
C13-1234678 HeptaCDD *	%	92							4106052
C13-1234678 HeptaCDF **	%	80							4106052
C13-123478 HexaCDD *	%	76							4106052
C13-123478 HexaCDF **	%	72							4106052
C13-1234789 HeptaCDF **	%	79							4106052
C13-123678 HexaCDD *	%	78							4106052
C13-123678 HexaCDF **	%	77							4106052
C13-12378 PentaCDD *	%	84							4106052
C13-12378 PentaCDF **	%	82							4106052
C13-123789 HexaCDF **	%	79							4106052
C13-234678 HexaCDF **	%	74							4106052
C13-23478 PentaCDF **	%	90							4106052
C13-2378 TetraCDD *	%	75							4106052
C13-2378 TetraCDF **	%	81							4106052
C13-OCDD *	%	113							4106052
Confirmation C13-2378 TetraCDF **	%	100							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH345							
Sampling Date		2015/06/08 09:35							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.333	0.126	0.199	0.0398	1.00	0.333		4106052
1,2,3,7,8-Penta CDD *	pg/g	1.66	0.130	0.995	0.0398	1.00	1.66		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	4.82	0.117	0.995	0.0398	0.100	0.482		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	24.1	0.123	0.995	0.0398	0.100	2.41		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	13.2	0.120	0.995	0.0398	0.100	1.32		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	437	0.118	0.995	0.0398	0.0100	4.37		4106052
Octa CDD *	pg/g	2400	0.105	1.99	0.0796	0.000300	0.720		4106052
Total Tetra CDD *	pg/g	0.892	0.126	0.199	0.0398			3	4106052
Total Penta CDD *	pg/g	6.57	0.130	0.995	0.0398			8	4106052
Total Hexa CDD *	pg/g	103	0.120	0.995	0.0398			7	4106052
Total Hepta CDD *	pg/g	735	0.118	0.995	0.0398			2	4106052
2,3,7,8-Tetra CDF **	pg/g	0.668	0.144	0.199	0.0398	0.100	0.0668		4106052
1,2,3,7,8-Penta CDF **	pg/g	1.62	0.134	0.995	0.0398	0.0300	0.0486		4106052
2,3,4,7,8-Penta CDF **	pg/g	2.55	0.132	0.995	0.0398	0.300	0.765		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	16.2	0.130	0.995	0.0398	0.100	1.62		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	6.27	0.132	0.995	0.0398	0.100	0.627		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	3.78	0.123	0.995	0.0398	0.100	0.378		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.240	0.127	0.995	0.0398	0.100	0.0240		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	69.1	0.117	0.995	0.0398	0.0100	0.691		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.74	0.117	0.995	0.0398	0.0100	0.0474		4106052
Octa CDF **	pg/g	46.3	0.123	1.99	0.0796	0.000300	0.0139		4106052
Total Tetra CDF **	pg/g	4.26	0.144	0.199	0.0398			6	4106052
Total Penta CDF **	pg/g	48.2	0.133	0.995	0.0398			9	4106052
Total Hexa CDF **	pg/g	163	0.128	0.995	0.0398			10	4106052
Total Hepta CDF **	pg/g	178	0.117	0.995	0.0398			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.64	0.11	1.0	0.90	0.100	0.0640		4205624
TOTAL TOXIC EQUIVALENCY	pg/g						15.6		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4106052
C13-1234678 HeptaCDD *	%	95							4106052
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH345							
Sampling Date		2015/06/08 09:35							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	77							4106052
C13-123478 HexaCDD *	%	82							4106052
C13-123478 HexaCDF **	%	67							4106052
C13-1234789 HeptaCDF **	%	68							4106052
C13-123678 HexaCDD *	%	80							4106052
C13-123678 HexaCDF **	%	71							4106052
C13-12378 PentaCDD *	%	91							4106052
C13-12378 PentaCDF **	%	70							4106052
C13-123789 HexaCDF **	%	83							4106052
C13-234678 HexaCDF **	%	71							4106052
C13-23478 PentaCDF **	%	90							4106052
C13-2378 TetraCDD *	%	86							4106052
C13-2378 TetraCDF **	%	82							4106052
C13-OCDD *	%	110							4106052
Confirmation C13-2378 TetraCDF **	%	74							4205624

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH346							
Sampling Date		2015/06/08 10:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.352	0.140	0.200	0.0399	1.00	0.352		4106052
1,2,3,7,8-Penta CDD *	pg/g	3.54	0.130	0.998	0.0399	1.00	3.54		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	8.06	0.120	0.998	0.0399	0.100	0.806		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	36.5	0.126	0.998	0.0399	0.100	3.65		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	24.3	0.123	0.998	0.0399	0.100	2.43		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	600	0.116	0.998	0.0399	0.0100	6.00		4106052
Octa CDD *	pg/g	3000	0.126	2.00	0.0798	0.000300	0.900		4106052
Total Tetra CDD *	pg/g	3.38	0.140	0.200	0.0399			7	4106052
Total Penta CDD *	pg/g	18.9	0.130	0.998	0.0399			11	4106052
Total Hexa CDD *	pg/g	179	0.123	0.998	0.0399			7	4106052
Total Hepta CDD *	pg/g	1040	0.116	0.998	0.0399			2	4106052
2,3,7,8-Tetra CDF **	pg/g	2.46	0.130	0.200	0.0399	0.100	0.246		4106052
1,2,3,7,8-Penta CDF **	pg/g	2.34	0.117	0.998	0.0399	0.0300	0.0702		4106052
2,3,4,7,8-Penta CDF **	pg/g	3.57	0.116	0.998	0.0399	0.300	1.07		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	15.7	0.135	0.998	0.0399	0.100	1.57		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	7.71	0.138	0.998	0.0399	0.100	0.771		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	5.08	0.128	0.998	0.0399	0.100	0.508		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.311	0.133	0.998	0.0399	0.100	0.0311		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	107	0.122	0.998	0.0399	0.0100	1.07		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	7.29	0.123	0.998	0.0399	0.0100	0.0729		4106052
Octa CDF **	pg/g	173	0.127	2.00	0.0798	0.000300	0.0519		4106052
Total Tetra CDF **	pg/g	27.1	0.130	0.200	0.0399			15	4106052
Total Penta CDF **	pg/g	95.9	0.117	0.998	0.0399			9	4106052
Total Hexa CDF **	pg/g	196	0.134	0.998	0.0399			10	4106052
Total Hepta CDF **	pg/g	320	0.122	0.998	0.0399			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.05	0.087	1.0	0.90	0.100	0.205		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						23.1		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4106052
C13-1234678 HeptaCDD *	%	91							4106052
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH346							
Sampling Date		2015/06/08 10:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	71							4106052
C13-123478 HexaCDD *	%	81							4106052
C13-123478 HexaCDF **	%	68							4106052
C13-1234789 HeptaCDF **	%	67							4106052
C13-123678 HexaCDD *	%	77							4106052
C13-123678 HexaCDF **	%	71							4106052
C13-12378 PentaCDD *	%	92							4106052
C13-12378 PentaCDF **	%	73							4106052
C13-123789 HexaCDF **	%	81							4106052
C13-234678 HexaCDF **	%	72							4106052
C13-23478 PentaCDF **	%	89							4106052
C13-2378 TetraCDD *	%	81							4106052
C13-2378 TetraCDF **	%	77							4106052
C13-OCDD *	%	109							4106052
Confirmation C13-2378 TetraCDF **	%	88							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin



### DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		APH347							
Sampling Date		2015/06/08 10:55							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW016-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.426	0.139	0.200	0.0400	1.00	0.426		4106052
1,2,3,7,8-Penta CDD *	pg/g	4.90 (1)	0.124	1.00	0.0400	1.00	4.90		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	11.0	0.138	1.00	0.0400	0.100	1.10		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	50.5	0.145	1.00	0.0400	0.100	5.05		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	28.1	0.141	1.00	0.0400	0.100	2.81		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	861	0.107	1.00	0.0400	0.0100	8.61		4106052
Octa CDD *	pg/g	4460 (2)	1.37	10.0	0.0800	0.000300	1.34		4106052
Total Tetra CDD *	pg/g	5.22	0.139	0.200	0.0400			8	4106052
Total Penta CDD *	pg/g	25.0	0.124	1.00	0.0400			11	4106052
Total Hexa CDD *	pg/g	246	0.142	1.00	0.0400			7	4106052
Total Hepta CDD *	pg/g	1540	0.107	1.00	0.0400			2	4106052
2,3,7,8-Tetra CDF **	pg/g	2.23	0.131	0.200	0.0400	0.100	0.223		4106052
1,2,3,7,8-Penta CDF **	pg/g	3.58	0.123	1.00	0.0400	0.0300	0.107		4106052
2,3,4,7,8-Penta CDF **	pg/g	4.92	0.121	1.00	0.0400	0.300	1.48		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	24.6	0.122	1.00	0.0400	0.100	2.46		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	11.3	0.124	1.00	0.0400	0.100	1.13		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	6.65	0.115	1.00	0.0400	0.100	0.665		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.419	0.120	1.00	0.0400	0.100	0.0419		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	115	0.134	1.00	0.0400	0.0100	1.15		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	8.26	0.134	1.00	0.0400	0.0100	0.0826		4106052
Octa CDF **	pg/g	112	0.137	2.00	0.0800	0.000300	0.0336		4106052
Total Tetra CDF **	pg/g	20.6	0.131	0.200	0.0400			13	4106052
Total Penta CDF **	pg/g	134	0.122	1.00	0.0400			9	4106052
Total Hexa CDF **	pg/g	306	0.120	1.00	0.0400			11	4106052
Total Hepta CDF **	pg/g	320	0.134	1.00	0.0400			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.11 (3)	0.11	1.0	0.90	0.100	0.0110		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						31.4		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin

\*\* CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(2) Result from 5X dilution

(3) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		APH347							
<b>Sampling Date</b>		2015/06/08 10:55							
<b>COC Number</b>		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-ROW016-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	105							4106052
C13-1234678 HeptaCDD *	%	95							4106052
C13-1234678 HeptaCDF **	%	89							4106052
C13-123478 HexaCDD *	%	85							4106052
C13-123478 HexaCDF **	%	72							4106052
C13-1234789 HeptaCDF **	%	74							4106052
C13-123678 HexaCDD *	%	88							4106052
C13-123678 HexaCDF **	%	75							4106052
C13-12378 PentaCDD *	%	93							4106052
C13-12378 PentaCDF **	%	74							4106052
C13-123789 HexaCDF **	%	87							4106052
C13-234678 HexaCDF **	%	79							4106052
C13-23478 PentaCDF **	%	91							4106052
C13-2378 TetraCDD *	%	92							4106052
C13-2378 TetraCDF **	%	88							4106052
C13-OCDD *	%	138							4106052
Confirmation C13-2378 TetraCDF **	%	101							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH348							
Sampling Date		2015/06/08 11:45							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW025-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.188 (1)	0.188	0.199	0.0399	1.00	0.188		4106052
1,2,3,7,8-Penta CDD *	pg/g	2.62	0.133	0.997	0.0399	1.00	2.62		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	5.44	0.125	0.997	0.0399	0.100	0.544		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	22.4	0.131	0.997	0.0399	0.100	2.24		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	15.5	0.127	0.997	0.0399	0.100	1.55		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	395	0.136	0.997	0.0399	0.0100	3.95		4106052
Octa CDD *	pg/g	1930	0.126	1.99	0.0798	0.000300	0.579		4106052
Total Tetra CDD *	pg/g	2.19	0.133	0.199	0.0399			4	4106052
Total Penta CDD *	pg/g	12.5	0.133	0.997	0.0399			10	4106052
Total Hexa CDD *	pg/g	118	0.128	0.997	0.0399			7	4106052
Total Hepta CDD *	pg/g	666	0.136	0.997	0.0399			2	4106052
2,3,7,8-Tetra CDF **	pg/g	1.05	0.134	0.199	0.0399	0.100	0.105		4106052
1,2,3,7,8-Penta CDF **	pg/g	1.11	0.135	0.997	0.0399	0.0300	0.0333		4106052
2,3,4,7,8-Penta CDF **	pg/g	1.40	0.133	0.997	0.0399	0.300	0.420		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	6.64	0.132	0.997	0.0399	0.100	0.664		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	4.16	0.135	0.997	0.0399	0.100	0.416		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	2.81	0.125	0.997	0.0399	0.100	0.281		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.190	0.130	0.997	0.0399	0.100	0.0190		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	60.8	0.114	0.997	0.0399	0.0100	0.608		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.26	0.114	0.997	0.0399	0.0100	0.0426		4106052
Octa CDF **	pg/g	87.7	0.111	1.99	0.0798	0.000300	0.0263		4106052
Total Tetra CDF **	pg/g	12.0	0.134	0.199	0.0399			14	4106052
Total Penta CDF **	pg/g	41.0	0.134	0.997	0.0399			10	4106052
Total Hexa CDF **	pg/g	97.4	0.130	0.997	0.0399			10	4106052
Total Hepta CDF **	pg/g	174	0.114	0.997	0.0399			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.787	0.074	1.0	0.90	0.100	0.0787		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						14.3		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	92							4106052
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH348							
Sampling Date		2015/06/08 11:45							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW025-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	84							4106052
C13-1234678 HeptaCDF **	%	67							4106052
C13-123478 HexaCDD *	%	82							4106052
C13-123478 HexaCDF **	%	67							4106052
C13-1234789 HeptaCDF **	%	64							4106052
C13-123678 HexaCDD *	%	80							4106052
C13-123678 HexaCDF **	%	72							4106052
C13-12378 PentaCDD *	%	88							4106052
C13-12378 PentaCDF **	%	68							4106052
C13-123789 HexaCDF **	%	78							4106052
C13-234678 HexaCDF **	%	68							4106052
C13-23478 PentaCDF **	%	86							4106052
C13-2378 TetraCDD *	%	79							4106052
C13-2378 TetraCDF **	%	75							4106052
C13-OCDD *	%	101							4106052
Confirmation C13-2378 TetraCDF **	%	85							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH349							
Sampling Date		2015/06/08 12:25							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029B-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.342	0.126	0.200	0.0400	1.00	0.342		4106052
1,2,3,7,8-Penta CDD *	pg/g	3.69	0.136	0.999	0.0400	1.00	3.69		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	8.12	0.136	0.999	0.0400	0.100	0.812		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	28.9	0.142	0.999	0.0400	0.100	2.89		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	21.7	0.139	0.999	0.0400	0.100	2.17		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	523	0.108	0.999	0.0400	0.0100	5.23		4106052
Octa CDD *	pg/g	2540	0.112	2.00	0.0799	0.000300	0.762		4106052
Total Tetra CDD *	pg/g	3.73	0.126	0.200	0.0400			9	4106052
Total Penta CDD *	pg/g	15.3	0.136	0.999	0.0400			9	4106052
Total Hexa CDD *	pg/g	174	0.139	0.999	0.0400			7	4106052
Total Hepta CDD *	pg/g	995	0.108	0.999	0.0400			2	4106052
2,3,7,8-Tetra CDF **	pg/g	1.49	0.125	0.200	0.0400	0.100	0.149		4106052
1,2,3,7,8-Penta CDF **	pg/g	1.66	0.143	0.999	0.0400	0.0300	0.0498		4106052
2,3,4,7,8-Penta CDF **	pg/g	2.45	0.142	0.999	0.0400	0.300	0.735		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	11.8	0.121	0.999	0.0400	0.100	1.18		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	<5.98 (1)	5.98	0.999	0.0400	0.100	0.598		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	3.46	0.115	0.999	0.0400	0.100	0.346		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.268	0.119	0.999	0.0400	0.100	0.0268		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	84.4	0.115	0.999	0.0400	0.0100	0.844		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.76	0.115	0.999	0.0400	0.0100	0.0676		4106052
Octa CDF **	pg/g	127	0.114	2.00	0.0799	0.000300	0.0381		4106052
Total Tetra CDF **	pg/g	14.9	0.125	0.200	0.0400			14	4106052
Total Penta CDF **	pg/g	60.6	0.143	0.999	0.0400			11	4106052
Total Hexa CDF **	pg/g	145	0.120	0.999	0.0400			11	4106052
Total Hepta CDF **	pg/g	250	0.115	0.999	0.0400			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.32	0.093	1.0	0.90	0.100	0.132		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						19.9		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH349							
Sampling Date		2015/06/08 12:25							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029B-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4106052
C13-1234678 HeptaCDD *	%	100							4106052
C13-1234678 HeptaCDF **	%	85							4106052
C13-123478 HexaCDD *	%	89							4106052
C13-123478 HexaCDF **	%	77							4106052
C13-1234789 HeptaCDF **	%	75							4106052
C13-123678 HexaCDD *	%	93							4106052
C13-123678 HexaCDF **	%	81							4106052
C13-12378 PentaCDD *	%	98							4106052
C13-12378 PentaCDF **	%	79							4106052
C13-123789 HexaCDF **	%	92							4106052
C13-234678 HexaCDF **	%	86							4106052
C13-23478 PentaCDF **	%	105							4106052
C13-2378 TetraCDD *	%	93							4106052
C13-2378 TetraCDF **	%	86							4106052
C13-OCDD *	%	123							4106052
Confirmation C13-2378 TetraCDF **	%	96							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH350							
Sampling Date		2015/06/08 13:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.466	0.161	0.200	0.0399	1.00	0.466		4106052
1,2,3,7,8-Penta CDD *	pg/g	6.75	0.118	0.998	0.0399	1.00	6.75		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	14.0	0.145	0.998	0.0399	0.100	1.40		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	60.6	0.152	0.998	0.0399	0.100	6.06		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	37.5	0.148	0.998	0.0399	0.100	3.75		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1080	0.126	0.998	0.0399	0.0100	10.8		4106052
Octa CDD *	pg/g	5150 (1)	1.26	9.98	0.0798	0.000300	1.55		4106052
Total Tetra CDD *	pg/g	4.08	0.161	0.200	0.0399			7	4106052
Total Penta CDD *	pg/g	30.9	0.118	0.998	0.0399			10	4106052
Total Hexa CDD *	pg/g	278	0.149	0.998	0.0399			7	4106052
Total Hepta CDD *	pg/g	1740	0.126	0.998	0.0399			2	4106052
2,3,7,8-Tetra CDF **	pg/g	1.71	0.142	0.200	0.0399	0.100	0.171		4106052
1,2,3,7,8-Penta CDF **	pg/g	2.81 (2)	0.122	0.998	0.0399	0.0300	0.0843		4106052
2,3,4,7,8-Penta CDF **	pg/g	3.74	0.120	0.998	0.0399	0.300	1.12		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	21.8	0.137	0.998	0.0399	0.100	2.18		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	10.2	0.140	0.998	0.0399	0.100	1.02		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	6.76	0.130	0.998	0.0399	0.100	0.676		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	0.410	0.135	0.998	0.0399	0.100	0.0410		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	240	0.138	0.998	0.0399	0.0100	2.40		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	19.5	0.138	0.998	0.0399	0.0100	0.195		4106052
Octa CDF **	pg/g	469	0.139	2.00	0.0798	0.000300	0.141		4106052
Total Tetra CDF **	pg/g	15.0	0.142	0.200	0.0399			13	4106052
Total Penta CDF **	pg/g	66.1	0.121	0.998	0.0399			7	4106052
Total Hexa CDF **	pg/g	331	0.135	0.998	0.0399			11	4106052
Total Hepta CDF **	pg/g	852	0.138	0.998	0.0399			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<1.7 (3)	1.7	1.0	0.90	0.100	0.170		4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Result from 5X dilution  
(2) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.  
(3) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH350							
Sampling Date		2015/06/08 13:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g						38.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	58							4106052
C13-1234678 HeptaCDD *	%	62							4106052
C13-1234678 HeptaCDF **	%	52							4106052
C13-123478 HexaCDD *	%	58							4106052
C13-123478 HexaCDF **	%	48							4106052
C13-1234789 HeptaCDF **	%	47							4106052
C13-123678 HexaCDD *	%	57							4106052
C13-123678 HexaCDF **	%	49							4106052
C13-12378 PentaCDD *	%	64							4106052
C13-12378 PentaCDF **	%	49							4106052
C13-123789 HexaCDF **	%	57							4106052
C13-234678 HexaCDF **	%	50							4106052
C13-23478 PentaCDF **	%	63							4106052
C13-2378 TetraCDD *	%	57							4106052
C13-2378 TetraCDF **	%	55							4106052
C13-OCDD *	%	77							4106052
Confirmation C13-2378 TetraCDF **	%	62							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH351							
Sampling Date		2015/06/08 13:55							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW018-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.249	0.0976	0.199	0.0399	1.00	0.249		4106052
1,2,3,7,8-Penta CDD *	pg/g	1.62	0.108	0.997	0.0399	1.00	1.62		4106052
1,2,3,4,7,8-Hexa CDD *	pg/g	3.61	0.121	0.997	0.0399	0.100	0.361		4106052
1,2,3,6,7,8-Hexa CDD *	pg/g	15.9	0.127	0.997	0.0399	0.100	1.59		4106052
1,2,3,7,8,9-Hexa CDD *	pg/g	11.3	0.124	0.997	0.0399	0.100	1.13		4106052
1,2,3,4,6,7,8-Hepta CDD *	pg/g	298	0.0689	0.997	0.0399	0.0100	2.98		4106052
Octa CDD *	pg/g	1650	0.146	1.99	0.0797	0.000300	0.495		4106052
Total Tetra CDD *	pg/g	2.71	0.0976	0.199	0.0399			6	4106052
Total Penta CDD *	pg/g	8.45	0.108	0.997	0.0399			9	4106052
Total Hexa CDD *	pg/g	85.2	0.124	0.997	0.0399			7	4106052
Total Hepta CDD *	pg/g	526	0.0689	0.997	0.0399			2	4106052
2,3,7,8-Tetra CDF **	pg/g	1.34	0.106	0.199	0.0399	0.100	0.134		4106052
1,2,3,7,8-Penta CDF **	pg/g	0.776	0.0985	0.997	0.0399	0.0300	0.0233		4106052
2,3,4,7,8-Penta CDF **	pg/g	0.918	0.0972	0.997	0.0399	0.300	0.275		4106052
1,2,3,4,7,8-Hexa CDF **	pg/g	4.23	0.104	0.997	0.0399	0.100	0.423		4106052
1,2,3,6,7,8-Hexa CDF **	pg/g	<2.22 (1)	2.22	0.997	0.0399	0.100	0.222		4106052
2,3,4,6,7,8-Hexa CDF **	pg/g	1.61	0.0988	0.997	0.0399	0.100	0.161		4106052
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.103	0.103	0.997	0.0399	0.100	0.0103		4106052
1,2,3,4,6,7,8-Hepta CDF **	pg/g	50.5	0.136	0.997	0.0399	0.0100	0.505		4106052
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.27	0.136	0.997	0.0399	0.0100	0.0327		4106052
Octa CDF **	pg/g	104	0.115	1.99	0.0797	0.000300	0.0312		4106052
Total Tetra CDF **	pg/g	9.88	0.106	0.199	0.0399			13	4106052
Total Penta CDF **	pg/g	22.3	0.0979	0.997	0.0399			9	4106052
Total Hexa CDF **	pg/g	61.8	0.103	0.997	0.0399			9	4106052
Total Hepta CDF **	pg/g	168	0.136	0.997	0.0399			4	4106052
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<1.1 (1)	1.1	1.0	0.90	0.100	0.110		4115506
TOTAL TOXIC EQUIVALENCY	pg/g						10.2		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		APH351							
Sampling Date		2015/06/08 13:55							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW018-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	98							4106052
C13-1234678 HeptaCDD *	%	94							4106052
C13-1234678 HeptaCDF **	%	80							4106052
C13-123478 HexaCDD *	%	84							4106052
C13-123478 HexaCDF **	%	69							4106052
C13-1234789 HeptaCDF **	%	72							4106052
C13-123678 HexaCDD *	%	77							4106052
C13-123678 HexaCDF **	%	79							4106052
C13-12378 PentaCDD *	%	98							4106052
C13-12378 PentaCDF **	%	80							4106052
C13-123789 HexaCDF **	%	85							4106052
C13-234678 HexaCDF **	%	72							4106052
C13-23478 PentaCDF **	%	111							4106052
C13-2378 TetraCDD *	%	79							4106052
C13-2378 TetraCDF **	%	82							4106052
C13-OCDD *	%	111							4106052
Confirmation C13-2378 TetraCDF **	%	82							4115506

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** APH343  
**Sample ID:** SBS-ROW013-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/24	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/24	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH344  
**Sample ID:** SBS-ROW005-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/24	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/24	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH345  
**Sample ID:** SBS-ROW019-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4205624	N/A	2015/09/25	Leila Azzam
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH346  
**Sample ID:** SBS-ROW022-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH347  
**Sample ID:** SBS-ROW016-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH348  
**Sample ID:** SBS-ROW025-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic

**TEST SUMMARY**

**Maxxam ID:** APH348  
**Sample ID:** SBS-ROW025-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH349  
**Sample ID:** SBS-ROW029B-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH350  
**Sample ID:** SBS-ROW023-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/17	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH350 Dup  
**Sample ID:** SBS-ROW023-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

**Maxxam ID:** APH351  
**Sample ID:** SBS-ROW018-1.0  
**Matrix:** Soil

**Collected:** 2015/06/08  
**Shipped:**  
**Received:** 2015/07/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4106052	2015/07/13	2015/07/18	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4115506	N/A	2015/07/21	Vica Cioranic
Moisture	BAL	4102231	N/A	2015/07/13	Bonali Patel - inactive

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.7°C
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Archived portion of LCS1 analyzed  
Report revised to reflect addition of missed TCDF confirmations.

Sample APH343-01 : Archive portion analyzed

Sample APH344-01 : Archived portion analyzed

**Results relate only to the items tested.**



**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4102231	MYG	RPD - Sample/Sample Dup	Moisture	2015/07/13	1.3		%	20
4106052	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/07/24		129	%	35 - 197
			C13-1234678 HeptaCDD	2015/07/24		115	%	23 - 140
			C13-1234678 HeptaCDF	2015/07/24		96	%	28 - 143
			C13-123478 HexaCDD	2015/07/24		97	%	32 - 141
			C13-123478 HexaCDF	2015/07/24		90	%	26 - 152
			C13-1234789 HeptaCDF	2015/07/24		100	%	26 - 138
			C13-123678 HexaCDD	2015/07/24		88	%	28 - 130
			C13-123678 HexaCDF	2015/07/24		95	%	26 - 123
			C13-12378 PentaCDD	2015/07/24		111	%	25 - 181
			C13-12378 PentaCDF	2015/07/24		103	%	24 - 185
			C13-123789 HexaCDF	2015/07/24		105	%	29 - 147
			C13-234678 HexaCDF	2015/07/24		90	%	28 - 136
			C13-23478 PentaCDF	2015/07/24		117	%	21 - 178
			C13-2378 TetraCDD	2015/07/24		104	%	25 - 164
			C13-2378 TetraCDF	2015/07/24		110	%	24 - 169
			C13-OCDD	2015/07/24		130	%	17 - 157
			2,3,7,8-Tetra CDD	2015/07/24		116	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/07/24		112	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/07/24		112	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/07/24		120	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/07/24		135	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/07/24		103	%	70 - 140
			Octa CDD	2015/07/24		90	%	78 - 144
			2,3,7,8-Tetra CDF	2015/07/24		117	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/07/24		119	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/07/24		108	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/07/24		116	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/07/24		108	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/07/24		116	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/07/24		107	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/07/24		116	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/07/24		117	%	78 - 138
			Octa CDF	2015/07/24		91	%	63 - 170
4106052	KKS	RPD	2,3,7,8-Tetra CDD	2015/07/16	11		%	25
			1,2,3,7,8-Penta CDD	2015/07/16	9.3		%	25
			1,2,3,4,7,8-Hexa CDD	2015/07/16	3.6		%	25
			1,2,3,6,7,8-Hexa CDD	2015/07/16	11		%	25
			1,2,3,7,8,9-Hexa CDD	2015/07/16	11		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/07/16	5.0		%	25
			Octa CDD	2015/07/16	5.7		%	25
			2,3,7,8-Tetra CDF	2015/07/16	17		%	25
			1,2,3,7,8-Penta CDF	2015/07/16	14		%	25
			2,3,4,7,8-Penta CDF	2015/07/16	13		%	25
			1,2,3,4,7,8-Hexa CDF	2015/07/16	2.6		%	25
			1,2,3,6,7,8-Hexa CDF	2015/07/16	0		%	25
			2,3,4,6,7,8-Hexa CDF	2015/07/16	7.1		%	25
			1,2,3,7,8,9-Hexa CDF	2015/07/16	4.8		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/07/16	4.4		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/07/16	1.7		%	25
			Octa CDF	2015/07/16	17		%	25
4106052	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/07/17		96	%	35 - 197
			C13-1234678 HeptaCDD	2015/07/17		89	%	23 - 140
			C13-1234678 HeptaCDF	2015/07/17		75	%	28 - 143

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2015/07/17		78	%	32 - 141
			C13-123478 HexaCDF	2015/07/17		63	%	26 - 152
			C13-1234789 HeptaCDF	2015/07/17		73	%	26 - 138
			C13-123678 HexaCDD	2015/07/17		76	%	28 - 130
			C13-123678 HexaCDF	2015/07/17		65	%	26 - 123
			C13-12378 PentaCDD	2015/07/17		87	%	25 - 181
			C13-12378 PentaCDF	2015/07/17		66	%	24 - 185
			C13-123789 HexaCDF	2015/07/17		81	%	29 - 147
			C13-234678 HexaCDF	2015/07/17		68	%	28 - 136
			C13-23478 PentaCDF	2015/07/17		80	%	21 - 178
			C13-2378 TetraCDD	2015/07/17		86	%	25 - 164
			C13-2378 TetraCDF	2015/07/17		82	%	24 - 169
			C13-OCDD	2015/07/17		109	%	17 - 157
			2,3,7,8-Tetra CDD	2015/07/17	<0.121, EDL=0.121		pg/g	
			1,2,3,7,8-Penta CDD	2015/07/17	<0.140, EDL=0.140		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/07/17	<0.101, EDL=0.101		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/07/17	<0.106, EDL=0.106		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/07/17	<0.103, EDL=0.103		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/07/17	<0.124, EDL=0.124		pg/g	
			Octa CDD	2015/07/17	0.382, EDL=0.112		pg/g	
			Total Tetra CDD	2015/07/17	<0.121, EDL=0.121		pg/g	
			Total Penta CDD	2015/07/17	<0.140, EDL=0.140		pg/g	
			Total Hexa CDD	2015/07/17	<0.104, EDL=0.104		pg/g	
			Total Hepta CDD	2015/07/17	<0.124, EDL=0.124		pg/g	
			2,3,7,8-Tetra CDF	2015/07/17	<0.0638, EDL=0.0638		pg/g	
			1,2,3,7,8-Penta CDF	2015/07/17	<0.114, EDL=0.114		pg/g	
			2,3,4,7,8-Penta CDF	2015/07/17	<0.112, EDL=0.112		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/07/17	<0.115, EDL=0.115		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/07/17	<0.117, EDL=0.117		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/07/17	<0.109, EDL=0.109		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/07/17	<0.113, EDL=0.113		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/07/17	<0.115, EDL=0.115		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/07/17	<0.115, EDL=0.115		pg/g	
			Octa CDF	2015/07/17	<0.0981, EDL=0.0981		pg/g	
			Total Tetra CDF	2015/07/17	<0.0638, EDL=0.0638		pg/g	
			Total Penta CDF	2015/07/17	<0.113, EDL=0.113		pg/g	
			Total Hexa CDF	2015/07/17	<0.113, EDL=0.113		pg/g	
			Total Hepta CDF	2015/07/17	<0.115, EDL=0.115		pg/g	
4115506	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/07/21	<0.13, EDL=0.13		pg/g	
			Confirmation C13-2378 TetraCDF	2015/07/21		90	%	40 - 135
4205624	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	<0.12, EDL=0.12		pg/g	
			Confirmation C13-2378 TetraCDF	2015/09/25		73	%	40 - 135
4205624	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	NC		%	100
<p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).</p>								

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





Your Project #: A5G0852  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/08/21**  
Report #: R3636251  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5F3520**

**Received: 2015/08/04, 15:10**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/08/07	2015/08/12	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/08/13	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2015/08/05	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		ASX917			
<b>Sampling Date</b>		2015/07/28 14:15			
<b>COC Number</b>		NA			
	<b>UNITS</b>	<b>COMP-AOI004-0.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	12	1.0	0.50	4134467
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ASX917							
Sampling Date		2015/07/28 14:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	COMP-AOI004-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	µg/g	0.856	0.104	1.00	0.0400	1.00	0.856		4144456
1,2,3,7,8-Penta CDD *	µg/g	2.49	0.108	5.00	0.0400	1.00	2.49		4144456
1,2,3,4,7,8-Hexa CDD *	µg/g	4.65	0.0981	5.00	0.0400	0.100	0.465		4144456
1,2,3,6,7,8-Hexa CDD *	µg/g	20.3	0.107	5.00	0.0400	0.100	2.03		4144456
1,2,3,7,8,9-Hexa CDD *	µg/g	12.4	0.101	5.00	0.0400	0.100	1.24		4144456
1,2,3,4,6,7,8-Hepta CDD *	µg/g	320	0.102	5.00	0.0400	0.0100	3.20		4144456
Octa CDD *	µg/g	1860	0.146	10.0	0.0800	0.000300	0.558		4144456
Total Tetra CDD *	µg/g	3.27	0.104	1.00	0.0400			6	4144456
Total Penta CDD *	µg/g	13.1	0.108	5.00	0.0400			12	4144456
Total Hexa CDD *	µg/g	98.4	0.102	5.00	0.0400			7	4144456
Total Hepta CDD *	µg/g	537	0.102	5.00	0.0400			2	4144456
2,3,7,8-Tetra CDF **	µg/g	1.80	0.101	1.00	0.0400	0.100	0.180		4144456
1,2,3,7,8-Penta CDF **	µg/g	1.28	0.106	5.00	0.0400	0.0300	0.0384		4144456
2,3,4,7,8-Penta CDF **	µg/g	1.46	0.105	5.00	0.0400	0.300	0.438		4144456
1,2,3,4,7,8-Hexa CDF **	µg/g	5.98	0.101	5.00	0.0400	0.100	0.598		4144456
1,2,3,6,7,8-Hexa CDF **	µg/g	2.81	0.103	5.00	0.0400	0.100	0.281		4144456
2,3,4,6,7,8-Hexa CDF **	µg/g	2.35	0.0968	5.00	0.0400	0.100	0.235		4144456
1,2,3,7,8,9-Hexa CDF **	µg/g	0.176	0.101	5.00	0.0400	0.100	0.0176		4144456
1,2,3,4,6,7,8-Hepta CDF **	µg/g	42.1	0.104	5.00	0.0400	0.0100	0.421		4144456
1,2,3,4,7,8,9-Hepta CDF **	µg/g	2.63	0.103	5.00	0.0400	0.0100	0.0263		4144456
Octa CDF **	µg/g	68.6	0.107	10.0	0.0800	0.000300	0.0206		4144456
Total Tetra CDF **	µg/g	10.3	0.101	1.00	0.0400			13	4144456
Total Penta CDF **	µg/g	13.0	0.105	5.00	0.0400			9	4144456
Total Hexa CDF **	µg/g	76.8	0.100	5.00	0.0400			11	4144456
Total Hepta CDF **	µg/g	109	0.104	5.00	0.0400			4	4144456
Confirmation 2,3,7,8-Tetra CDF **	µg/g	0.74	0.11	1.0	0.90	0.100	0.0740		4148993
TOTAL TOXIC EQUIVALENCY	µg/g						13.0		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4144456
C13-1234678 HeptaCDD *	%	105							4144456
EDL = Estimated Detection Limit									
RDL = Reportable Detection Limit									
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,									
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.									
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds									
QC Batch = Quality Control Batch									
* CDD = Chloro Dibenzo-p-Dioxin									
** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		ASX917							
Sampling Date		2015/07/28 14:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	COMP-AOI004-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	101							4144456
C13-123478 HexaCDD *	%	103							4144456
C13-123478 HexaCDF **	%	101							4144456
C13-1234789 HeptaCDF **	%	98							4144456
C13-123678 HexaCDD *	%	95							4144456
C13-123678 HexaCDF **	%	109							4144456
C13-12378 PentaCDD *	%	96							4144456
C13-12378 PentaCDF **	%	85							4144456
C13-123789 HexaCDF **	%	112							4144456
C13-234678 HexaCDF **	%	104							4144456
C13-23478 PentaCDF **	%	101							4144456
C13-2378 TetraCDD *	%	93							4144456
C13-2378 TetraCDF **	%	97							4144456
C13-OCDD *	%	90							4144456
Confirmation C13-2378 TetraCDF **	%	113							4148993

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin



Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

### TEST SUMMARY

**Maxxam ID:** ASX917  
**Sample ID:** COMP-AOI004-0.5  
**Matrix:** Soil

**Collected:** 2015/07/28  
**Shipped:**  
**Received:** 2015/08/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4144456	2015/08/07	2015/08/12	Cathy Xu
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4148993	N/A	2015/08/13	Vica Cioranic
Moisture	BAL	4134467	N/A	2015/08/05	Valentina Kaftani

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.5°C
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**Results relate only to the items tested.**

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4134467	BOP	RPD - Sample/Sample Dup	Moisture	2015/08/05	5.2		%	20
4144456	CXU	Matrix Spike	37CL4 2378 Tetra CDD	2015/08/12		80	%	35 - 197
			C13-1234678 HeptaCDD	2015/08/12		100	%	23 - 140
			C13-1234678 HeptaCDF	2015/08/12		96	%	28 - 143
			C13-123478 HexaCDD	2015/08/12		98	%	32 - 141
			C13-123478 HexaCDF	2015/08/12		97	%	26 - 152
			C13-1234789 HeptaCDF	2015/08/12		93	%	26 - 138
			C13-123678 HexaCDD	2015/08/12		91	%	28 - 130
			C13-123678 HexaCDF	2015/08/12		104	%	26 - 123
			C13-12378 PentaCDD	2015/08/12		97	%	25 - 181
			C13-12378 PentaCDF	2015/08/12		84	%	24 - 185
			C13-123789 HexaCDF	2015/08/12		110	%	29 - 147
			C13-234678 HexaCDF	2015/08/12		98	%	28 - 136
			C13-23478 PentaCDF	2015/08/12		102	%	21 - 178
			C13-2378 TetraCDD	2015/08/12		92	%	25 - 164
			C13-2378 TetraCDF	2015/08/12		93	%	24 - 169
			C13-OCDD	2015/08/12		92	%	17 - 157
			2,3,7,8-Tetra CDD	2015/08/12		131	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/08/12		122	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/08/12		127	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/08/12		147 (1)	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/08/12		145	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/08/12		130	%	70 - 140
			Octa CDD	2015/08/12		133	%	78 - 144
			2,3,7,8-Tetra CDF	2015/08/12		133	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/08/12		139 (1)	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/08/12		117	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/08/12		139 (1)	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/08/12		125	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/08/12		135	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/08/12		122	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/08/12		134 (1)	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/08/12		134	%	78 - 138
			Octa CDF	2015/08/12		129	%	63 - 170
4144456	CXU	MS/MSD RPD	2,3,7,8-Tetra CDD	2015/08/12	17		%	25
			1,2,3,7,8-Penta CDD	2015/08/12	17		%	25
			1,2,3,4,7,8-Hexa CDD	2015/08/12	13		%	25
			1,2,3,6,7,8-Hexa CDD	2015/08/12	21		%	25
			1,2,3,7,8,9-Hexa CDD	2015/08/12	19		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/08/12	17		%	25
			Octa CDD	2015/08/12	15		%	25
			2,3,7,8-Tetra CDF	2015/08/12	17		%	25
			1,2,3,7,8-Penta CDF	2015/08/12	16		%	25
			2,3,4,7,8-Penta CDF	2015/08/12	17		%	25
			1,2,3,4,7,8-Hexa CDF	2015/08/12	15		%	25
			1,2,3,6,7,8-Hexa CDF	2015/08/12	15		%	25
			2,3,4,6,7,8-Hexa CDF	2015/08/12	19		%	25
			1,2,3,7,8,9-Hexa CDF	2015/08/12	17		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/08/12	17		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/08/12	17		%	25
			Octa CDF	2015/08/12	21		%	25
4144456	CXU	Spiked Blank	37CL4 2378 Tetra CDD	2015/08/12		55	%	35 - 197
			C13-1234678 HeptaCDD	2015/08/12		66	%	23 - 140
			C13-1234678 HeptaCDF	2015/08/12		66	%	28 - 143

Maxxam Job #: B5F3520  
Report Date: 2015/08/21

Apex Laboratories  
Client Project #: A5G0852

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2015/08/12		62	%	32 - 141
			C13-123478 HexaCDF	2015/08/12		64	%	26 - 152
			C13-1234789 HeptaCDF	2015/08/12		60	%	26 - 138
			C13-123678 HexaCDD	2015/08/12		60	%	28 - 130
			C13-123678 HexaCDF	2015/08/12		69	%	26 - 123
			C13-12378 PentaCDD	2015/08/12		57	%	25 - 181
			C13-12378 PentaCDF	2015/08/12		49	%	24 - 185
			C13-123789 HexaCDF	2015/08/12		69	%	29 - 147
			C13-234678 HexaCDF	2015/08/12		65	%	28 - 136
			C13-23478 PentaCDF	2015/08/12		59	%	21 - 178
			C13-2378 TetraCDD	2015/08/12		57	%	25 - 164
			C13-2378 TetraCDF	2015/08/12		53	%	24 - 169
			C13-OCDD	2015/08/12		61	%	17 - 157
			2,3,7,8-Tetra CDD	2015/08/12		101	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/08/12		98	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/08/12		112	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/08/12		121	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/08/12		121	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/08/12		111	%	70 - 140
			Octa CDD	2015/08/12		112	%	78 - 144
			2,3,7,8-Tetra CDF	2015/08/12		112	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/08/12		121	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/08/12		101	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/08/12		121	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/08/12		109	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/08/12		113	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/08/12		105	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/08/12		113	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/08/12		110	%	78 - 138
			Octa CDF	2015/08/12		98	%	63 - 170
4144456	CXU	Method Blank	37CL4 2378 Tetra CDD	2015/08/16		95	%	35 - 197
			C13-1234678 HeptaCDD	2015/08/16		91	%	23 - 140
			C13-1234678 HeptaCDF	2015/08/16		83	%	28 - 143
			C13-123478 HexaCDD	2015/08/16		90	%	32 - 141
			C13-123478 HexaCDF	2015/08/16		78	%	26 - 152
			C13-1234789 HeptaCDF	2015/08/16		83	%	26 - 138
			C13-123678 HexaCDD	2015/08/16		83	%	28 - 130
			C13-123678 HexaCDF	2015/08/16		87	%	26 - 123
			C13-12378 PentaCDD	2015/08/16		73	%	25 - 181
			C13-12378 PentaCDF	2015/08/16		66	%	24 - 185
			C13-123789 HexaCDF	2015/08/16		89	%	29 - 147
			C13-234678 HexaCDF	2015/08/16		84	%	28 - 136
			C13-23478 PentaCDF	2015/08/16		76	%	21 - 178
			C13-2378 TetraCDD	2015/08/16		79	%	25 - 164
			C13-2378 TetraCDF	2015/08/16		77	%	24 - 169
			C13-OCDD	2015/08/16		87	%	17 - 157
			2,3,7,8-Tetra CDD	2015/08/16	<0.135, EDL=0.135		pg/g	
			1,2,3,7,8-Penta CDD	2015/08/16	<0.0879, EDL=0.0879		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/08/16	<0.0988, EDL=0.0988		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/08/16	<0.107, EDL=0.107		pg/g	



Maxxam Job #: B5F3520  
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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2015/08/16	<0.102, EDL=0.102		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/08/16	<0.144, EDL=0.144		pg/g	
			Octa CDD	2015/08/16	0.121, EDL=0.115		pg/g	
			Total Tetra CDD	2015/08/16	0.734, EDL=0.135 (2)		pg/g	
			Total Penta CDD	2015/08/16	0.336, EDL=0.0879 (2)		pg/g	
			Total Hexa CDD	2015/08/16	1.78, EDL=0.103 (2)		pg/g	
			Total Hepta CDD	2015/08/16	<0.144, EDL=0.144		pg/g	
			2,3,7,8-Tetra CDF	2015/08/16	<0.0874, EDL=0.0874		pg/g	
			1,2,3,7,8-Penta CDF	2015/08/16	<0.0793, EDL=0.0793		pg/g	
			2,3,4,7,8-Penta CDF	2015/08/16	<0.0788, EDL=0.0788		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/08/16	<0.0717, EDL=0.0717		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/08/16	<0.0733, EDL=0.0733		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/08/16	<0.0687, EDL=0.0687		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/08/16	<0.0716, EDL=0.0716		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/08/16	<0.0917, EDL=0.0917		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/08/16	<0.0916, EDL=0.0916		pg/g	
			Octa CDF	2015/08/16	<0.0934, EDL=0.0934		pg/g	
			Total Tetra CDF	2015/08/16	<0.0874, EDL=0.0874		pg/g	
			Total Penta CDF	2015/08/16	<0.0791, EDL=0.0791		pg/g	
			Total Hexa CDF	2015/08/16	<0.0713, EDL=0.0713		pg/g	
			Total Hepta CDF	2015/08/16	<0.0916, EDL=0.0916		pg/g	
4144456	CXU	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/08/12	NC		%	25
			1,2,3,7,8-Penta CDD	2015/08/12	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/08/12	NC (2)		%	25
			1,2,3,6,7,8-Hexa CDD	2015/08/12	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/08/12	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/08/12	NC		%	25
			Octa CDD	2015/08/12	6.7		%	25
			Total Tetra CDD	2015/08/12	NC (2)		%	25
			Total Penta CDD	2015/08/12	NC (2)		%	25
			Total Hexa CDD	2015/08/12	NC (3)		%	25

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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Hepta CDD	2015/08/12	32 (3)		%	25
			2,3,7,8-Tetra CDF	2015/08/12	NC (4)		%	25
			1,2,3,7,8-Penta CDF	2015/08/12	NC		%	25
			2,3,4,7,8-Penta CDF	2015/08/12	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/08/12	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/08/12	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/08/12	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/08/12	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/08/12	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/08/12	NC		%	25
			Octa CDF	2015/08/12	NC		%	25
			Total Tetra CDF	2015/08/12	NC		%	25
			Total Penta CDF	2015/08/12	NC		%	25
			Total Hexa CDF	2015/08/12	NC		%	25
			Total Hepta CDF	2015/08/12	NC		%	25
4148993	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/08/13	<0.080, EDL=0.080		pg/g	
			Confirmation C13-2378 TetraCDF	2015/08/13		90	%	40 - 135
4148993	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/08/13	NC		%	100

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) EMPC / IAR - Peak detected meets S/N ratio but does not meet the ion abundance ratio.

(3) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

(4) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

Maxxam Job #: B5F3520  
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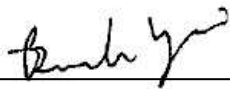
Apex Laboratories  
Client Project #: A5G0852

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: A5I0106  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/09/30**  
Report #: R3705803  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B511779**

**Received: 2015/09/09, 14:08**

Sample Matrix: Soil  
# Samples Received: 10

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/09/15	2015/09/23	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	9	2015/09/15	2015/09/25	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/25	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	9	N/A	2015/09/28	BRL SOP-00406	EPA M8290A / M1613
Moisture	10	N/A	2015/09/15	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AYJ607	AYJ608	AYJ609	AYJ610	AYJ611			
Sampling Date		2015/08/26 09:00	2015/09/01 13:15	2015/08/26 10:15	2015/09/01 15:30	2015/08/26 13:30			
COC Number		na	na	na	na	na			
	UNITS	SBS-ROW005-2.0	SBS-ROW013-2.0	SBS-ROW014-2.0	SBS-ROW016-2.0	SBS-ROW019-1.5	RDL	MDL	QC Batch
Moisture	%	7.6	6.2	8.1	11	5.4	1.0	0.50	4190489
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

Maxxam ID		AYJ612	AYJ613	AYJ614	AYJ615			
Sampling Date		2015/08/26 12:15	2015/09/01 14:30	2015/08/26 14:00	2015/08/26 15:30			
COC Number		na	na	na	na			
	UNITS	SBS-ROW022-1.5	SBS-ROW023-2.0	SBS-ROW025-1.5	SBS-ROW026-1.5	RDL	MDL	QC Batch
Moisture	%	8.7	8.9	7.5	8.2	1.0	0.50	4190489
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								

Maxxam ID		AYJ616			
Sampling Date		2015/08/26 14:45			
COC Number		na			
	UNITS	SBS-ROW029B-1.5	RDL	MDL	QC Batch
Moisture	%	9.3	1.0	0.50	4190489
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ607							
Sampling Date		2015/08/26 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW005-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.155	0.149	0.200	0.400	1.00	0.155		4205485
1,2,3,7,8-Penta CDD *	pg/g	1.56	0.132	1.00	0.400	1.00	1.56		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	3.89	0.111	1.00	0.400	0.100	0.389		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	14.2	0.119	1.00	0.400	0.100	1.42		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	9.58	0.119	1.00	0.400	0.100	0.958		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	279	0.116	1.00	0.400	0.0100	2.79		4205485
Octa CDD *	pg/g	1590	0.0923	2.00	0.800	0.000300	0.477		4205485
Total Tetra CDD *	pg/g	0.639	0.149	0.200	0.400			2	4205485
Total Penta CDD *	pg/g	8.03	0.132	1.00	0.400			11	4205485
Total Hexa CDD *	pg/g	79.7	0.118	1.00	0.400			8	4205485
Total Hepta CDD *	pg/g	517	0.116	1.00	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.897	0.111	0.200	0.400	0.100	0.0897		4205485
1,2,3,7,8-Penta CDF **	pg/g	1.06	0.102	1.00	0.400	0.0300	0.0318		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.35	0.101	1.00	0.400	0.300	0.405		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	6.06	0.0969	1.00	0.400	0.100	0.606		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	3.09	0.101	1.00	0.400	0.100	0.309		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	2.03	0.0942	1.00	0.400	0.100	0.203		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.183	0.0999	1.00	0.400	0.100	0.0183		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	49.9	0.106	1.00	0.400	0.0100	0.499		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.21	0.104	1.00	0.400	0.0100	0.0321		4205485
Octa CDF **	pg/g	82.1	0.121	2.00	0.800	0.000300	0.0246		4205485
Total Tetra CDF **	pg/g	6.56	0.111	0.200	0.400			11	4205485
Total Penta CDF **	pg/g	19.1	0.101	1.00	0.400			9	4205485
Total Hexa CDF **	pg/g	95.4	0.0979	1.00	0.400			10	4205485
Total Hepta CDF **	pg/g	138	0.105	1.00	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.48	0.18	1.0	0.90	0.100	0.0480		4205624
TOTAL TOXIC EQUIVALENCY	pg/g						9.93		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	100							4205485
C13-1234678 HeptaCDD *	%	80							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ607							
Sampling Date		2015/08/26 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW005-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	81							4205485
C13-123478 HexaCDD *	%	70							4205485
C13-123478 HexaCDF **	%	74							4205485
C13-1234789 HeptaCDF **	%	73							4205485
C13-123678 HexaCDD *	%	73							4205485
C13-123678 HexaCDF **	%	73							4205485
C13-12378 PentaCDD *	%	85							4205485
C13-12378 PentaCDF **	%	77							4205485
C13-123789 HexaCDF **	%	80							4205485
C13-234678 HexaCDF **	%	66							4205485
C13-23478 PentaCDF **	%	90							4205485
C13-2378 TetraCDD *	%	71							4205485
C13-2378 TetraCDF **	%	69							4205485
C13-OCDD *	%	65							4205485
Confirmation C13-2378 TetraCDF **	%	61							4205624

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ608							
Sampling Date		2015/09/01 13:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW013-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.109	0.109	0.199	0.400	1.00	0.109		4205485
1,2,3,7,8-Penta CDD *	pg/g	0.671	0.102	0.997	0.400	1.00	0.671		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	2.42	0.100	0.997	0.400	0.100	0.242		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	12.0	0.107	0.997	0.400	0.100	1.20		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	6.92	0.107	0.997	0.400	0.100	0.692		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	248	0.102	0.997	0.400	0.0100	2.48		4205485
Octa CDD *	pg/g	1520	0.101	1.99	0.800	0.000300	0.456		4205485
Total Tetra CDD *	pg/g	<0.109	0.109	0.199	0.400			0	4205485
Total Penta CDD *	pg/g	2.29	0.102	0.997	0.400			6	4205485
Total Hexa CDD *	pg/g	59.2	0.106	0.997	0.400			7	4205485
Total Hepta CDD *	pg/g	449	0.102	0.997	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.336	0.105	0.199	0.400	0.100	0.0336		4205485
1,2,3,7,8-Penta CDF **	pg/g	1.08	0.101	0.997	0.400	0.0300	0.0324		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.15	0.100	0.997	0.400	0.300	0.345		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	8.01	0.105	0.997	0.400	0.100	0.801		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	3.06	0.109	0.997	0.400	0.100	0.306		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	2.12	0.102	0.997	0.400	0.100	0.212		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.159	0.108	0.997	0.400	0.100	0.0159		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	40.3	0.107	0.997	0.400	0.0100	0.403		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.41	0.104	0.997	0.400	0.0100	0.0241		4205485
Octa CDF **	pg/g	49.6	0.101	1.99	0.800	0.000300	0.0149		4205485
Total Tetra CDF **	pg/g	2.04	0.105	0.199	0.400			7	4205485
Total Penta CDF **	pg/g	13.6	0.101	0.997	0.400			6	4205485
Total Hexa CDF **	pg/g	96.5	0.106	0.997	0.400			10	4205485
Total Hepta CDF **	pg/g	107	0.105	0.997	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.38	0.16	1.0	0.90	0.100	0.0380		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						8.04		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	80							4205485
C13-1234678 HeptaCDD *	%	60							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ608							
Sampling Date		2015/09/01 13:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW013-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	63							4205485
C13-123478 HexaCDD *	%	53							4205485
C13-123478 HexaCDF **	%	56							4205485
C13-1234789 HeptaCDF **	%	53							4205485
C13-123678 HexaCDD *	%	57							4205485
C13-123678 HexaCDF **	%	60							4205485
C13-12378 PentaCDD *	%	69							4205485
C13-12378 PentaCDF **	%	64							4205485
C13-123789 HexaCDF **	%	64							4205485
C13-234678 HexaCDF **	%	49							4205485
C13-23478 PentaCDF **	%	73							4205485
C13-2378 TetraCDD *	%	56							4205485
C13-2378 TetraCDF **	%	61							4205485
C13-OCDD *	%	42							4205485
Confirmation C13-2378 TetraCDF **	%	51							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ609							
Sampling Date		2015/08/26 10:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW014-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.109	0.109	0.199	0.400	1.00	0.109		4205485
1,2,3,7,8-Penta CDD *	pg/g	0.707	0.106	0.996	0.400	1.00	0.707		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	2.50	0.0990	0.996	0.400	0.100	0.250		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	12.3	0.105	0.996	0.400	0.100	1.23		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	6.41	0.106	0.996	0.400	0.100	0.641		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	271	0.109	0.996	0.400	0.0100	2.71		4205485
Octa CDD *	pg/g	1730	0.118	1.99	0.800	0.000300	0.519		4205485
Total Tetra CDD *	pg/g	<0.109	0.109	0.199	0.400			0	4205485
Total Penta CDD *	pg/g	2.43	0.106	0.996	0.400			5	4205485
Total Hexa CDD *	pg/g	57.0	0.105	0.996	0.400			6	4205485
Total Hepta CDD *	pg/g	482	0.109	0.996	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.494	0.107	0.199	0.400	0.100	0.0494		4205485
1,2,3,7,8-Penta CDF **	pg/g	1.33	0.107	0.996	0.400	0.0300	0.0399		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.58	0.106	0.996	0.400	0.300	0.474		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	9.42	0.103	0.996	0.400	0.100	0.942		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	3.61	0.107	0.996	0.400	0.100	0.361		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	2.13	0.100	0.996	0.400	0.100	0.213		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.174	0.106	0.996	0.400	0.100	0.0174		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	42.4	0.105	0.996	0.400	0.0100	0.424		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.35	0.102	0.996	0.400	0.0100	0.0235		4205485
Octa CDF **	pg/g	39.2	0.107	1.99	0.800	0.000300	0.0118		4205485
Total Tetra CDF **	pg/g	1.20	0.107	0.199	0.400			5	4205485
Total Penta CDF **	pg/g	13.6	0.106	0.996	0.400			7	4205485
Total Hexa CDF **	pg/g	111	0.104	0.996	0.400			10	4205485
Total Hepta CDF **	pg/g	110	0.103	0.996	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.24 (1)	0.24	1.0	0.90	0.100	0.0240		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						8.70		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	86							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ609							
Sampling Date		2015/08/26 10:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW014-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	59							4205485
C13-1234678 HeptaCDF **	%	62							4205485
C13-123478 HexaCDD *	%	53							4205485
C13-123478 HexaCDF **	%	58							4205485
C13-1234789 HeptaCDF **	%	56							4205485
C13-123678 HexaCDD *	%	60							4205485
C13-123678 HexaCDF **	%	60							4205485
C13-12378 PentaCDD *	%	65							4205485
C13-12378 PentaCDF **	%	61							4205485
C13-123789 HexaCDF **	%	64							4205485
C13-234678 HexaCDF **	%	54							4205485
C13-23478 PentaCDF **	%	70							4205485
C13-2378 TetraCDD *	%	57							4205485
C13-2378 TetraCDF **	%	58							4205485
C13-OCDD *	%	40							4205485
Confirmation C13-2378 TetraCDF **	%	49							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ610							
Sampling Date		2015/09/01 15:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW016-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.101	0.101	0.199	0.400	1.00	0.101		4205485
1,2,3,7,8-Penta CDD *	pg/g	0.452	0.102	0.997	0.400	1.00	0.452		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	1.39	0.0965	0.997	0.400	0.100	0.139		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	5.02	0.103	0.997	0.400	0.100	0.502		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	4.10	0.103	0.997	0.400	0.100	0.410		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	113	0.105	0.997	0.400	0.0100	1.13		4205485
Octa CDD *	pg/g	578	0.101	1.99	0.800	0.000300	0.173		4205485
Total Tetra CDD *	pg/g	<0.101	0.101	0.199	0.400			0	4205485
Total Penta CDD *	pg/g	2.25	0.102	0.997	0.400			6	4205485
Total Hexa CDD *	pg/g	28.3	0.102	0.997	0.400			7	4205485
Total Hepta CDD *	pg/g	204	0.105	0.997	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.250	0.102	0.199	0.400	0.100	0.0250		4205485
1,2,3,7,8-Penta CDF **	pg/g	0.344	0.103	0.997	0.400	0.0300	0.0103		4205485
2,3,4,7,8-Penta CDF **	pg/g	0.642	0.102	0.997	0.400	0.300	0.193		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	2.63	0.0989	0.997	0.400	0.100	0.263		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	1.45	0.103	0.997	0.400	0.100	0.145		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	1.47	0.0962	0.997	0.400	0.100	0.147		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.102	0.102	0.997	0.400	0.100	0.0102		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	14.9	0.108	0.997	0.400	0.0100	0.149		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.890	0.105	0.997	0.400	0.0100	0.00890		4205485
Octa CDF **	pg/g	16.8	0.104	1.99	0.800	0.000300	0.00504		4205485
Total Tetra CDF **	pg/g	2.22	0.102	0.199	0.400			5	4205485
Total Penta CDF **	pg/g	12.3	0.103	0.997	0.400			8	4205485
Total Hexa CDF **	pg/g	42.7	0.0999	0.997	0.400			9	4205485
Total Hepta CDF **	pg/g	36.2	0.106	0.997	0.400			3	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.17	0.11	1.0	0.90	0.100	0.0170		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						3.86		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	95							4205485
C13-1234678 HeptaCDD *	%	83							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ610							
Sampling Date		2015/09/01 15:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW016-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	97							4205485
C13-123478 HexaCDD *	%	71							4205485
C13-123478 HexaCDF **	%	73							4205485
C13-1234789 HeptaCDF **	%	81							4205485
C13-123678 HexaCDD *	%	77							4205485
C13-123678 HexaCDF **	%	79							4205485
C13-12378 PentaCDD *	%	85							4205485
C13-12378 PentaCDF **	%	81							4205485
C13-123789 HexaCDF **	%	84							4205485
C13-234678 HexaCDF **	%	69							4205485
C13-23478 PentaCDF **	%	97							4205485
C13-2378 TetraCDD *	%	75							4205485
C13-2378 TetraCDF **	%	82							4205485
C13-OCDD *	%	68							4205485
Confirmation C13-2378 TetraCDF **	%	70							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ611							
Sampling Date		2015/08/26 13:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.796	0.106	0.199	0.400	1.00	0.796		4205485
1,2,3,7,8-Penta CDD *	pg/g	4.13	0.102	0.996	0.400	1.00	4.13		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	12.8	0.101	0.996	0.400	0.100	1.28		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	54.8	0.107	0.996	0.400	0.100	5.48		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	31.3	0.107	0.996	0.400	0.100	3.13		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1220	0.104	0.996	0.400	0.0100	12.2		4205485
Octa CDD *	pg/g	8410 (1)	0.110	9.96	0.800	0.000300	2.52		4205485
Total Tetra CDD *	pg/g	2.98	0.106	0.199	0.400			6	4205485
Total Penta CDD *	pg/g	17.3	0.102	0.996	0.400			9	4205485
Total Hexa CDD *	pg/g	277	0.107	0.996	0.400			7	4205485
Total Hepta CDD *	pg/g	2190	0.104	0.996	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	2.04	0.106	0.199	0.400	0.100	0.204		4205485
1,2,3,7,8-Penta CDF **	pg/g	4.95	0.109	0.996	0.400	0.0300	0.149		4205485
2,3,4,7,8-Penta CDF **	pg/g	6.79	0.108	0.996	0.400	0.300	2.04		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	40.9	0.101	0.996	0.400	0.100	4.09		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	16.0	0.105	0.996	0.400	0.100	1.60		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	10.2	0.0979	0.996	0.400	0.100	1.02		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.526	0.104	0.996	0.400	0.100	0.0526		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	197	0.108	0.996	0.400	0.0100	1.97		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	10.5	0.105	0.996	0.400	0.0100	0.105		4205485
Octa CDF **	pg/g	160	0.111	1.99	0.800	0.000300	0.0480		4205485
Total Tetra CDF **	pg/g	13.4	0.106	0.199	0.400			9	4205485
Total Penta CDF **	pg/g	70.3	0.108	0.996	0.400			11	4205485
Total Hexa CDF **	pg/g	488	0.102	0.996	0.400			11	4205485
Total Hepta CDF **	pg/g	493	0.107	0.996	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.31	0.14	1.0	0.90	0.100	0.131		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						40.7		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	75							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) From 5xdilution									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ611							
Sampling Date		2015/08/26 13:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	59							4205485
C13-1234678 HeptaCDF **	%	58							4205485
C13-123478 HexaCDD *	%	47							4205485
C13-123478 HexaCDF **	%	50							4205485
C13-1234789 HeptaCDF **	%	53							4205485
C13-123678 HexaCDD *	%	53							4205485
C13-123678 HexaCDF **	%	52							4205485
C13-12378 PentaCDD *	%	61							4205485
C13-12378 PentaCDF **	%	57							4205485
C13-123789 HexaCDF **	%	56							4205485
C13-234678 HexaCDF **	%	47							4205485
C13-23478 PentaCDF **	%	65							4205485
C13-2378 TetraCDD *	%	52							4205485
C13-2378 TetraCDF **	%	56							4205485
C13-OCDD *	%	48 (1)							4205485
Confirmation C13-2378 TetraCDF **	%	48							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) From 5xdilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ612							
Sampling Date		2015/08/26 12:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.193 (1)	0.193	0.200	0.400	1.00	0.193		4205485
1,2,3,7,8-Penta CDD *	pg/g	1.11	0.109	0.999	0.400	1.00	1.11		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	2.31	0.0965	0.999	0.400	0.100	0.231		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	8.10	0.103	0.999	0.400	0.100	0.810		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	6.42	0.103	0.999	0.400	0.100	0.642		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	174	0.102	0.999	0.400	0.0100	1.74		4205485
Octa CDD *	pg/g	1170	0.112	2.00	0.800	0.000300	0.351		4205485
Total Tetra CDD *	pg/g	1.94	0.105	0.200	0.400			5	4205485
Total Penta CDD *	pg/g	7.03	0.109	0.999	0.400			9	4205485
Total Hexa CDD *	pg/g	55.1	0.102	0.999	0.400			7	4205485
Total Hepta CDD *	pg/g	329	0.102	0.999	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	1.41	0.106	0.200	0.400	0.100	0.141		4205485
1,2,3,7,8-Penta CDF **	pg/g	0.648	0.101	0.999	0.400	0.0300	0.0194		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.40	0.0995	0.999	0.400	0.300	0.420		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	4.10	0.108	0.999	0.400	0.100	0.410		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	2.75	0.113	0.999	0.400	0.100	0.275		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	2.68	0.105	0.999	0.400	0.100	0.268		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.119	0.112	0.999	0.400	0.100	0.0119		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	28.4	0.102	0.999	0.400	0.0100	0.284		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.83	0.0997	0.999	0.400	0.0100	0.0183		4205485
Octa CDF **	pg/g	61.6	0.113	2.00	0.800	0.000300	0.0185		4205485
Total Tetra CDF **	pg/g	12.9	0.106	0.200	0.400			11	4205485
Total Penta CDF **	pg/g	32.1	0.100	0.999	0.400			8	4205485
Total Hexa CDF **	pg/g	87.4	0.110	0.999	0.400			11	4205485
Total Hepta CDF **	pg/g	77.0	0.101	0.999	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.67	0.11	1.0	0.90	0.100	0.0670		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						6.87		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	90							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ612							
Sampling Date		2015/08/26 12:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	87							4205485
C13-1234678 HeptaCDF **	%	88							4205485
C13-123478 HexaCDD *	%	71							4205485
C13-123478 HexaCDF **	%	74							4205485
C13-1234789 HeptaCDF **	%	77							4205485
C13-123678 HexaCDD *	%	78							4205485
C13-123678 HexaCDF **	%	77							4205485
C13-12378 PentaCDD *	%	82							4205485
C13-12378 PentaCDF **	%	80							4205485
C13-123789 HexaCDF **	%	84							4205485
C13-234678 HexaCDF **	%	72							4205485
C13-23478 PentaCDF **	%	93							4205485
C13-2378 TetraCDD *	%	73							4205485
C13-2378 TetraCDF **	%	78							4205485
C13-OCDD *	%	70							4205485
Confirmation C13-2378 TetraCDF **	%	64							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ613							
Sampling Date		2015/09/01 14:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.106	0.106	0.200	0.400	1.00	0.106		4205485
1,2,3,7,8-Penta CDD *	pg/g	0.315	0.105	0.998	0.400	1.00	0.315		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	0.741	0.102	0.998	0.400	0.100	0.0741		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	2.60	0.109	0.998	0.400	0.100	0.260		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	2.36	0.109	0.998	0.400	0.100	0.236		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	71.4	0.103	0.998	0.400	0.0100	0.714		4205485
Octa CDD *	pg/g	462	0.112	2.00	0.800	0.000300	0.139		4205485
Total Tetra CDD *	pg/g	0.215	0.106	0.200	0.400			1	4205485
Total Penta CDD *	pg/g	1.26	0.105	0.998	0.400			4	4205485
Total Hexa CDD *	pg/g	15.2	0.108	0.998	0.400			6	4205485
Total Hepta CDD *	pg/g	115	0.103	0.998	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.179	0.109	0.200	0.400	0.100	0.0179		4205485
1,2,3,7,8-Penta CDF **	pg/g	0.149	0.106	0.998	0.400	0.0300	0.00447		4205485
2,3,4,7,8-Penta CDF **	pg/g	0.264	0.105	0.998	0.400	0.300	0.0792		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	1.30	0.103	0.998	0.400	0.100	0.130		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	0.626	0.107	0.998	0.400	0.100	0.0626		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	0.543	0.0999	0.998	0.400	0.100	0.0543		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.106	0.106	0.998	0.400	0.100	0.0106		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	21.3	0.106	0.998	0.400	0.0100	0.213		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.71	0.104	0.998	0.400	0.0100	0.0171		4205485
Octa CDF **	pg/g	81.8	0.115	2.00	0.800	0.000300	0.0245		4205485
Total Tetra CDF **	pg/g	0.779	0.109	0.200	0.400			5	4205485
Total Penta CDF **	pg/g	2.94	0.105	0.998	0.400			6	4205485
Total Hexa CDF **	pg/g	23.8	0.104	0.998	0.400			9	4205485
Total Hepta CDF **	pg/g	76.9	0.105	0.998	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.15 (1)	0.15	1.0	0.90	0.100	0.0150		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						2.45		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ613							
Sampling Date		2015/09/01 14:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	66							4205485
C13-1234678 HeptaCDF **	%	71							4205485
C13-123478 HexaCDD *	%	57							4205485
C13-123478 HexaCDF **	%	60							4205485
C13-1234789 HeptaCDF **	%	64							4205485
C13-123678 HexaCDD *	%	64							4205485
C13-123678 HexaCDF **	%	65							4205485
C13-12378 PentaCDD *	%	76							4205485
C13-12378 PentaCDF **	%	73							4205485
C13-123789 HexaCDF **	%	71							4205485
C13-234678 HexaCDF **	%	58							4205485
C13-23478 PentaCDF **	%	82							4205485
C13-2378 TetraCDD *	%	63							4205485
C13-2378 TetraCDF **	%	65							4205485
C13-OCDD *	%	52							4205485
Confirmation C13-2378 TetraCDF **	%	53							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ614							
Sampling Date		2015/08/26 14:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW025-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.253	0.103	0.200	0.400	1.00	0.253		4205485
1,2,3,7,8-Penta CDD *	pg/g	2.08	0.101	0.998	0.400	1.00	2.08		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	3.77	0.101	0.998	0.400	0.100	0.377		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	12.2	0.108	0.998	0.400	0.100	1.22		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	9.28	0.108	0.998	0.400	0.100	0.928		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	207	0.110	0.998	0.400	0.0100	2.07		4205485
Octa CDD *	pg/g	1250	0.102	2.00	0.800	0.000300	0.375		4205485
Total Tetra CDD *	pg/g	1.16	0.103	0.200	0.400			5	4205485
Total Penta CDD *	pg/g	8.27	0.101	0.998	0.400			11	4205485
Total Hexa CDD *	pg/g	64.9	0.107	0.998	0.400			7	4205485
Total Hepta CDD *	pg/g	384	0.110	0.998	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.846	0.102	0.200	0.400	0.100	0.0846		4205485
1,2,3,7,8-Penta CDF **	pg/g	1.21	0.104	0.998	0.400	0.0300	0.0363		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.20	0.103	0.998	0.400	0.300	0.360		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	4.73	0.106	0.998	0.400	0.100	0.473		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	2.38	0.110	0.998	0.400	0.100	0.238		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	1.98	0.103	0.998	0.400	0.100	0.198		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.458	0.109	0.998	0.400	0.100	0.0458		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	34.9	0.104	0.998	0.400	0.0100	0.349		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.37	0.101	0.998	0.400	0.0100	0.0237		4205485
Octa CDF **	pg/g	58.6	0.115	2.00	0.800	0.000300	0.0176		4205485
Total Tetra CDF **	pg/g	3.99	0.102	0.200	0.400			11	4205485
Total Penta CDF **	pg/g	10.1	0.103	0.998	0.400			8	4205485
Total Hexa CDF **	pg/g	59.4	0.107	0.998	0.400			10	4205485
Total Hepta CDF **	pg/g	95.2	0.102	0.998	0.400			3	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.59	0.12	1.0	0.90	0.100	0.0590		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						9.10		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	102							4205485
C13-1234678 HeptaCDD *	%	94							4205485
EDL = Estimated Detection Limit									
RDL = Reportable Detection Limit									
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,									
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.									
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds									
QC Batch = Quality Control Batch									
* CDD = Chloro Dibenzo-p-Dioxin									
** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ614							
Sampling Date		2015/08/26 14:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW025-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	99							4205485
C13-123478 HexaCDD *	%	76							4205485
C13-123478 HexaCDF **	%	79							4205485
C13-1234789 HeptaCDF **	%	89							4205485
C13-123678 HexaCDD *	%	83							4205485
C13-123678 HexaCDF **	%	85							4205485
C13-12378 PentaCDD *	%	94							4205485
C13-12378 PentaCDF **	%	92							4205485
C13-123789 HexaCDF **	%	92							4205485
C13-234678 HexaCDF **	%	78							4205485
C13-23478 PentaCDF **	%	108							4205485
C13-2378 TetraCDD *	%	79							4205485
C13-2378 TetraCDF **	%	84							4205485
C13-OCDD *	%	73							4205485
Confirmation C13-2378 TetraCDF **	%	67							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ615							
Sampling Date		2015/08/26 15:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW026-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.451	0.104	0.200	0.400	1.00	0.451		4205485
1,2,3,7,8-Penta CDD *	pg/g	2.69	0.102	0.998	0.400	1.00	2.69		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	5.75	0.103	0.998	0.400	0.100	0.575		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	24.9	0.110	0.998	0.400	0.100	2.49		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	15.6	0.110	0.998	0.400	0.100	1.56		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	460	0.101	0.998	0.400	0.0100	4.60		4205485
Octa CDD *	pg/g	2640	0.112	2.00	0.800	0.000300	0.792		4205485
Total Tetra CDD *	pg/g	3.85	0.104	0.200	0.400			7	4205485
Total Penta CDD *	pg/g	17.5	0.102	0.998	0.400			12	4205485
Total Hexa CDD *	pg/g	131	0.110	0.998	0.400			7	4205485
Total Hepta CDD *	pg/g	845	0.101	0.998	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	2.22	0.106	0.200	0.400	0.100	0.222		4205485
1,2,3,7,8-Penta CDF **	pg/g	2.31	0.101	0.998	0.400	0.0300	0.0693		4205485
2,3,4,7,8-Penta CDF **	pg/g	3.19	0.100	0.998	0.400	0.300	0.957		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	15.2	0.101	0.998	0.400	0.100	1.52		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	6.62	0.105	0.998	0.400	0.100	0.662		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	3.88	0.0978	0.998	0.400	0.100	0.388		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.229	0.104	0.998	0.400	0.100	0.0229		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	83.5	0.102	0.998	0.400	0.0100	0.835		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.72	0.0993	0.998	0.400	0.0100	0.0472		4205485
Octa CDF **	pg/g	89.4	0.114	2.00	0.800	0.000300	0.0268		4205485
Total Tetra CDF **	pg/g	12.6	0.106	0.200	0.400			13	4205485
Total Penta CDF **	pg/g	29.2	0.101	0.998	0.400			10	4205485
Total Hexa CDF **	pg/g	179	0.102	0.998	0.400			11	4205485
Total Hepta CDF **	pg/g	223	0.100	0.998	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.16	0.13	1.0	0.90	0.100	0.116		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						17.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	103							4205485
C13-1234678 HeptaCDD *	%	86							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ615							
Sampling Date		2015/08/26 15:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW026-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	87							4205485
C13-123478 HexaCDD *	%	73							4205485
C13-123478 HexaCDF **	%	75							4205485
C13-1234789 HeptaCDF **	%	85							4205485
C13-123678 HexaCDD *	%	78							4205485
C13-123678 HexaCDF **	%	77							4205485
C13-12378 PentaCDD *	%	88							4205485
C13-12378 PentaCDF **	%	82							4205485
C13-123789 HexaCDF **	%	86							4205485
C13-234678 HexaCDF **	%	71							4205485
C13-23478 PentaCDF **	%	101							4205485
C13-2378 TetraCDD *	%	73							4205485
C13-2378 TetraCDF **	%	77							4205485
C13-OCDD *	%	72							4205485
Confirmation C13-2378 TetraCDF **	%	63							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ616							
Sampling Date		2015/08/26 14:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029B-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.206	0.102	0.199	0.400	1.00	0.206		4205485
1,2,3,7,8-Penta CDD *	pg/g	1.57	0.103	0.997	0.400	1.00	1.57		4205485
1,2,3,4,7,8-Hexa CDD *	pg/g	3.50	0.103	0.997	0.400	0.100	0.350		4205485
1,2,3,6,7,8-Hexa CDD *	pg/g	12.1	0.110	0.997	0.400	0.100	1.21		4205485
1,2,3,7,8,9-Hexa CDD *	pg/g	9.61	0.110	0.997	0.400	0.100	0.961		4205485
1,2,3,4,6,7,8-Hepta CDD *	pg/g	300	0.105	0.997	0.400	0.0100	3.00		4205485
Octa CDD *	pg/g	2010	0.110	1.99	0.800	0.000300	0.603		4205485
Total Tetra CDD *	pg/g	1.02	0.102	0.199	0.400			5	4205485
Total Penta CDD *	pg/g	9.66	0.103	0.997	0.400			11	4205485
Total Hexa CDD *	pg/g	80.9	0.109	0.997	0.400			7	4205485
Total Hepta CDD *	pg/g	579	0.105	0.997	0.400			2	4205485
2,3,7,8-Tetra CDF **	pg/g	0.819	0.104	0.199	0.400	0.100	0.0819		4205485
1,2,3,7,8-Penta CDF **	pg/g	0.786	0.109	0.997	0.400	0.0300	0.0236		4205485
2,3,4,7,8-Penta CDF **	pg/g	1.15	0.108	0.997	0.400	0.300	0.345		4205485
1,2,3,4,7,8-Hexa CDF **	pg/g	5.56	0.101	0.997	0.400	0.100	0.556		4205485
1,2,3,6,7,8-Hexa CDF **	pg/g	2.79	0.105	0.997	0.400	0.100	0.279		4205485
2,3,4,6,7,8-Hexa CDF **	pg/g	2.28	0.0985	0.997	0.400	0.100	0.228		4205485
1,2,3,7,8,9-Hexa CDF **	pg/g	0.132	0.104	0.997	0.400	0.100	0.0132		4205485
1,2,3,4,6,7,8-Hepta CDF **	pg/g	51.4	0.107	0.997	0.400	0.0100	0.514		4205485
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.36	0.104	0.997	0.400	0.0100	0.0336		4205485
Octa CDF **	pg/g	144	0.117	1.99	0.800	0.000300	0.0432		4205485
Total Tetra CDF **	pg/g	4.84	0.104	0.199	0.400			9	4205485
Total Penta CDF **	pg/g	19.2	0.109	0.997	0.400			9	4205485
Total Hexa CDF **	pg/g	92.8	0.102	0.997	0.400			10	4205485
Total Hepta CDF **	pg/g	161	0.106	0.997	0.400			4	4205485
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.61	0.12	1.0	0.90	0.100	0.0610		4209016
TOTAL TOXIC EQUIVALENCY	pg/g						10.0		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	88							4205485
C13-1234678 HeptaCDD *	%	62							4205485
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AYJ616							
Sampling Date		2015/08/26 14:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029B-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	69							4205485
C13-123478 HexaCDD *	%	58							4205485
C13-123478 HexaCDF **	%	62							4205485
C13-1234789 HeptaCDF **	%	61							4205485
C13-123678 HexaCDD *	%	63							4205485
C13-123678 HexaCDF **	%	65							4205485
C13-12378 PentaCDD *	%	75							4205485
C13-12378 PentaCDF **	%	73							4205485
C13-123789 HexaCDF **	%	70							4205485
C13-234678 HexaCDF **	%	58							4205485
C13-23478 PentaCDF **	%	86							4205485
C13-2378 TetraCDD *	%	67							4205485
C13-2378 TetraCDF **	%	71							4205485
C13-OCDD *	%	51							4205485
Confirmation C13-2378 TetraCDF **	%	60							4209016

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**TEST SUMMARY**

**Maxxam ID:** AYJ607  
**Sample ID:** SBS-ROW005-2.0  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/23	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4205624	N/A	2015/09/25	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ607 Dup  
**Sample ID:** SBS-ROW005-2.0  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/23	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4205624	N/A	2015/09/25	Leila Azzam

**Maxxam ID:** AYJ608  
**Sample ID:** SBS-ROW013-2.0  
**Matrix:** Soil

**Collected:** 2015/09/01  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ609  
**Sample ID:** SBS-ROW014-2.0  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ610  
**Sample ID:** SBS-ROW016-2.0  
**Matrix:** Soil

**Collected:** 2015/09/01  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ611  
**Sample ID:** SBS-ROW019-1.5  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

### TEST SUMMARY

**Maxxam ID:** AYJ612  
**Sample ID:** SBS-ROW022-1.5  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ613  
**Sample ID:** SBS-ROW023-2.0  
**Matrix:** Soil

**Collected:** 2015/09/01  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ614  
**Sample ID:** SBS-ROW025-1.5  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ615  
**Sample ID:** SBS-ROW026-1.5  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**Maxxam ID:** AYJ616  
**Sample ID:** SBS-ROW029B-1.5  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/09/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4205485	2015/09/15	2015/09/25	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4209016	N/A	2015/09/28	Leila Azzam
Moisture	BAL	4190489	N/A	2015/09/15	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.8°C
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**Results relate only to the items tested.**



**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4190489	NS3	RPD - Sample/Sample Dup	Moisture	2015/09/15	NC		%	20
4205485	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/09/23		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/09/23		72	%	23 - 140
			C13-1234678 HeptaCDF	2015/09/23		64	%	28 - 143
			C13-123478 HexaCDD	2015/09/23		65	%	32 - 141
			C13-123478 HexaCDF	2015/09/23		67	%	26 - 152
			C13-1234789 HeptaCDF	2015/09/23		69	%	26 - 138
			C13-123678 HexaCDD	2015/09/23		67	%	28 - 130
			C13-123678 HexaCDF	2015/09/23		69	%	26 - 123
			C13-12378 PentaCDD	2015/09/23		80	%	25 - 181
			C13-12378 PentaCDF	2015/09/23		72	%	24 - 185
			C13-123789 HexaCDF	2015/09/23		79	%	29 - 147
			C13-234678 HexaCDF	2015/09/23		61	%	28 - 136
			C13-23478 PentaCDF	2015/09/23		82	%	21 - 178
			C13-2378 TetraCDD	2015/09/23		63	%	25 - 164
			C13-2378 TetraCDF	2015/09/23		66	%	24 - 169
			C13-OCDD	2015/09/23		54	%	17 - 157
			2,3,7,8-Tetra CDD	2015/09/23		107	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/09/23		96	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/09/23		106	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/09/23		112	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/09/23		116	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/09/23		105	%	70 - 140
			Octa CDD	2015/09/23		110	%	78 - 144
			2,3,7,8-Tetra CDF	2015/09/23		111	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/09/23		112	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/09/23		95	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/09/23		114	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/09/23		111	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/09/23		116	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/09/23		105	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/09/23		122	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/09/23		111	%	78 - 138
			Octa CDF	2015/09/23		117	%	63 - 170
4205485	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/09/23		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/09/23		95	%	23 - 140
			C13-1234678 HeptaCDF	2015/09/23		101	%	28 - 143
			C13-123478 HexaCDD	2015/09/23		82	%	32 - 141
			C13-123478 HexaCDF	2015/09/23		86	%	26 - 152
			C13-1234789 HeptaCDF	2015/09/23		87	%	26 - 138
			C13-123678 HexaCDD	2015/09/23		88	%	28 - 130
			C13-123678 HexaCDF	2015/09/23		91	%	26 - 123
			C13-12378 PentaCDD	2015/09/23		94	%	25 - 181
			C13-12378 PentaCDF	2015/09/23		88	%	24 - 185
			C13-123789 HexaCDF	2015/09/23		97	%	29 - 147
			C13-234678 HexaCDF	2015/09/23		79	%	28 - 136
			C13-23478 PentaCDF	2015/09/23		102	%	21 - 178
			C13-2378 TetraCDD	2015/09/23		78	%	25 - 164
			C13-2378 TetraCDF	2015/09/23		83	%	24 - 169
			C13-OCDD	2015/09/23		74	%	17 - 157
			2,3,7,8-Tetra CDD	2015/09/23	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDD	2015/09/23	<0.0836, EDL=0.0836		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/09/23	<0.103, EDL=0.103		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/09/23	<0.109, EDL=0.109		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/09/23	<0.110, EDL=0.110		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/09/23	0.200, EDL=0.0834		pg/g	
			Octa CDD	2015/09/23	1.09, EDL=0.102		pg/g	
			Total Tetra CDD	2015/09/23	<0.103, EDL=0.103		pg/g	
			Total Penta CDD	2015/09/23	<0.0836, EDL=0.0836		pg/g	
			Total Hexa CDD	2015/09/23	<0.109, EDL=0.109		pg/g	
			Total Hepta CDD	2015/09/23	0.200, EDL=0.0834		pg/g	
			2,3,7,8-Tetra CDF	2015/09/23	<0.124, EDL=0.124		pg/g	
			1,2,3,7,8-Penta CDF	2015/09/23	<0.106, EDL=0.106		pg/g	
			2,3,4,7,8-Penta CDF	2015/09/23	<0.104, EDL=0.104		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/09/23	<0.0895, EDL=0.0895		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/09/23	<0.0932, EDL=0.0932		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/09/23	<0.0871, EDL=0.0871		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/09/23	<0.0923, EDL=0.0923		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/09/23	0.460, EDL=0.0992		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/09/23	<0.0970, EDL=0.0970		pg/g	
			Octa CDF	2015/09/23	0.214, EDL=0.108		pg/g	
			Total Tetra CDF	2015/09/23	<0.124, EDL=0.124		pg/g	
			Total Penta CDF	2015/09/23	<0.105, EDL=0.105		pg/g	
			Total Hexa CDF	2015/09/23	0.129, EDL=0.0905		pg/g	
			Total Hepta CDF	2015/09/23	0.730, EDL=0.0981		pg/g	
4205485	KKS	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/09/23	NC (1)		%	25
			1,2,3,7,8-Penta CDD	2015/09/23	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/09/23	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/09/23	12		%	25
			1,2,3,7,8,9-Hexa CDD	2015/09/23	20		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/09/23	19		%	25
			Octa CDD	2015/09/23	20		%	25
			Total Tetra CDD	2015/09/23	NC		%	25
			Total Penta CDD	2015/09/23	13		%	25
			Total Hexa CDD	2015/09/23	17		%	25
			Total Hepta CDD	2015/09/23	20		%	25
			2,3,7,8-Tetra CDF	2015/09/23	NC		%	25
			1,2,3,7,8-Penta CDF	2015/09/23	NC		%	25
			2,3,4,7,8-Penta CDF	2015/09/23	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/09/23	13		%	25
			1,2,3,6,7,8-Hexa CDF	2015/09/23	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/09/23	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/09/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/09/23	17		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/09/23	NC		%	25
			Octa CDF	2015/09/23	13		%	25
			Total Tetra CDF	2015/09/23	36 (2)		%	25
			Total Penta CDF	2015/09/23	6.4		%	25
			Total Hexa CDF	2015/09/23	15		%	25
			Total Hepta CDF	2015/09/23	19		%	25
4205624	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	<0.12, EDL=0.12		pg/g	
			Confirmation C13-2378 TetraCDF	2015/09/25		73	%	40 - 135
4205624	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/25	NC		%	100
4209016	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/09/28	<0.10, EDL=0.10		pg/g	
			Confirmation C13-2378 TetraCDF	2015/09/28		64	%	40 - 135
4209016	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/28	NC (1)		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(2) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5I0609  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/15**  
Report #: R3721857  
Version: 2 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5J7321**

**Received: 2015/09/29, 14:01**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2015/10/02	2015/10/08	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/10/09	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2015/09/30	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

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**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		BBM043			
<b>Sampling Date</b>		2015/09/21 11:00			
<b>COC Number</b>		na			
	<b>UNITS</b>	<b>ISM-AOI026-0.5- AFTER ISM A51069-02</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	2.9	1.0	0.50	4211239
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BBM043							
Sampling Date		2015/09/21 11:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI026-0.5- AFTER ISM A5I069-02	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.290 (1)	0.290	0.200	0.0400	1.00	0.290		4218456
1,2,3,7,8-Penta CDD *	pg/g	1.61	0.101	1.00	0.0400	1.00	1.61		4218456
1,2,3,4,7,8-Hexa CDD *	pg/g	2.66	0.0989	1.00	0.0400	0.100	0.266		4218456
1,2,3,6,7,8-Hexa CDD *	pg/g	14.2	0.106	1.00	0.0400	0.100	1.42		4218456
1,2,3,7,8,9-Hexa CDD *	pg/g	7.29	0.102	1.00	0.0400	0.100	0.729		4218456
1,2,3,4,6,7,8-Hepta CDD *	pg/g	273	0.115	1.00	0.0400	0.0100	2.73		4218456
Octa CDD *	pg/g	1900	0.113	2.00	0.0800	0.000300	0.570		4218456
Total Tetra CDD *	pg/g	1.03	0.109	0.200	0.0400			2	4218456
Total Penta CDD *	pg/g	8.84	0.101	1.00	0.0400			7	4218456
Total Hexa CDD *	pg/g	71.2	0.103	1.00	0.0400			6	4218456
Total Hepta CDD *	pg/g	453	0.115	1.00	0.0400			2	4218456
2,3,7,8-Tetra CDF **	pg/g	1.49	0.115	0.200	0.0400	0.100	0.149		4218456
1,2,3,7,8-Penta CDF **	pg/g	1.05	0.108	1.00	0.0400	0.0300	0.0315		4218456
2,3,4,7,8-Penta CDF **	pg/g	1.15	0.106	1.00	0.0400	0.300	0.345		4218456
1,2,3,4,7,8-Hexa CDF **	pg/g	4.46	0.102	1.00	0.0400	0.100	0.446		4218456
1,2,3,6,7,8-Hexa CDF **	pg/g	2.24	0.109	1.00	0.0400	0.100	0.224		4218456
2,3,4,6,7,8-Hexa CDF **	pg/g	1.95	0.0975	1.00	0.0400	0.100	0.195		4218456
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.135 (1)	0.135	1.00	0.0400	0.100	0.0135		4218456
1,2,3,4,6,7,8-Hepta CDF **	pg/g	37.1	0.105	1.00	0.0400	0.0100	0.371		4218456
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.09	0.105	1.00	0.0400	0.0100	0.0209		4218456
Octa CDF **	pg/g	71.6	0.0970	2.00	0.0800	0.000300	0.0215		4218456
Total Tetra CDF **	pg/g	4.87	0.115	0.200	0.0400			8	4218456
Total Penta CDF **	pg/g	9.72	0.107	1.00	0.0400			7	4218456
Total Hexa CDF **	pg/g	60.2	0.103	1.00	0.0400			9	4218456
Total Hepta CDF **	pg/g	98.2	0.105	1.00	0.0400			4	4218456
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.85	0.11	1.0	0.90	0.100	0.0850		4226791
TOTAL TOXIC EQUIVALENCY	pg/g						9.37		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		BBM043							
<b>Sampling Date</b>		2015/09/21 11:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI026-0.5- AFTER ISM A5I069-02</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	106							4218456
C13-1234678 HeptaCDD *	%	104							4218456
C13-1234678 HeptaCDF **	%	84							4218456
C13-123478 HexaCDD *	%	86							4218456
C13-123478 HexaCDF **	%	86							4218456
C13-1234789 HeptaCDF **	%	88							4218456
C13-123678 HexaCDD *	%	103							4218456
C13-123678 HexaCDF **	%	93							4218456
C13-12378 PentaCDD *	%	137							4218456
C13-12378 PentaCDF **	%	126							4218456
C13-123789 HexaCDF **	%	105							4218456
C13-234678 HexaCDF **	%	86							4218456
C13-23478 PentaCDF **	%	148							4218456
C13-2378 TetraCDD *	%	101							4218456
C13-2378 TetraCDF **	%	124							4218456
C13-OCDD *	%	93							4218456
Confirmation C13-2378 TetraCDF **	%	92							4226791

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**TEST SUMMARY**

**Maxxam ID:** BBM043  
**Sample ID:** ISM-AOI026-0.5-AFTER ISM A5I069-02  
**Matrix:** Soil

**Collected:** 2015/09/21  
**Shipped:**  
**Received:** 2015/09/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4218456	2015/10/02	2015/10/08	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4226791	N/A	2015/10/09	Leila Azzam
Moisture	BAL	4211239	N/A	2015/09/30	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	14.9°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4211239	NS3	RPD - Sample/Sample Dup	Moisture	2015/09/30	1.5		%	20
4218456	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/10/08		107	%	35 - 197
			C13-1234678 HeptaCDD	2015/10/08		81	%	23 - 140
			C13-1234678 HeptaCDF	2015/10/08		74	%	28 - 143
			C13-123478 HexaCDD	2015/10/08		71	%	32 - 141
			C13-123478 HexaCDF	2015/10/08		70	%	26 - 152
			C13-1234789 HeptaCDF	2015/10/08		71	%	26 - 138
			C13-123678 HexaCDD	2015/10/08		90	%	28 - 130
			C13-123678 HexaCDF	2015/10/08		84	%	26 - 123
			C13-12378 PentaCDD	2015/10/08		115	%	25 - 181
			C13-12378 PentaCDF	2015/10/08		105	%	24 - 185
			C13-123789 HexaCDF	2015/10/08		90	%	29 - 147
			C13-234678 HexaCDF	2015/10/08		72	%	28 - 136
			C13-23478 PentaCDF	2015/10/08		134	%	21 - 178
			C13-2378 TetraCDD	2015/10/08		79	%	25 - 164
			C13-2378 TetraCDF	2015/10/08		93	%	24 - 169
			C13-OCDD	2015/10/08		69	%	17 - 157
			2,3,7,8-Tetra CDD	2015/10/08		110	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/10/08		95	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/10/08		102	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/10/08		101	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/10/08		108	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/10/08		89	%	70 - 140
			Octa CDD	2015/10/08		98	%	78 - 144
			2,3,7,8-Tetra CDF	2015/10/08		104	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/10/08		100	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/10/08		84	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/10/08		102	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/10/08		93	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/10/08		103	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/10/08		89	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/10/08		104	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/10/08		99	%	78 - 138
			Octa CDF	2015/10/08		96	%	63 - 170
4218456	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/10/08		107	%	35 - 197
			C13-1234678 HeptaCDD	2015/10/08		95	%	23 - 140
			C13-1234678 HeptaCDF	2015/10/08		89	%	28 - 143
			C13-123478 HexaCDD	2015/10/08		86	%	32 - 141
			C13-123478 HexaCDF	2015/10/08		80	%	26 - 152
			C13-1234789 HeptaCDF	2015/10/08		90	%	26 - 138
			C13-123678 HexaCDD	2015/10/08		107	%	28 - 130
			C13-123678 HexaCDF	2015/10/08		93	%	26 - 123
			C13-12378 PentaCDD	2015/10/08		146	%	25 - 181
			C13-12378 PentaCDF	2015/10/08		135	%	24 - 185
			C13-123789 HexaCDF	2015/10/08		107	%	29 - 147
			C13-234678 HexaCDF	2015/10/08		88	%	28 - 136
			C13-23478 PentaCDF	2015/10/08		160	%	21 - 178
			C13-2378 TetraCDD	2015/10/08		97	%	25 - 164
			C13-2378 TetraCDF	2015/10/08		119	%	24 - 169
			C13-OCDD	2015/10/08		82	%	17 - 157
			2,3,7,8-Tetra CDD	2015/10/08	<0.150, EDL=0.150		pg/g	
			1,2,3,7,8-Penta CDD	2015/10/08	<0.107, EDL=0.107		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/10/08	<0.0970, EDL=0.0970		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/10/08	<0.104, EDL=0.104		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/10/08	<0.0999, EDL=0.0999		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/10/08	0.665, EDL=0.136		pg/g	
			Octa CDD	2015/10/08	2.15, EDL=0.122		pg/g	
			Total Tetra CDD	2015/10/08	<0.150, EDL=0.150		pg/g	
			Total Penta CDD	2015/10/08	<0.107, EDL=0.107		pg/g	
			Total Hexa CDD	2015/10/08	<0.101, EDL=0.101		pg/g	
			Total Hepta CDD	2015/10/08	0.665, EDL=0.136		pg/g	
			2,3,7,8-Tetra CDF	2015/10/08	<0.120, EDL=0.120		pg/g	
			1,2,3,7,8-Penta CDF	2015/10/08	<0.111, EDL=0.111		pg/g	
			2,3,4,7,8-Penta CDF	2015/10/08	<0.109, EDL=0.109		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/10/08	<0.118, EDL=0.118		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/10/08	<0.126, EDL=0.126		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/10/08	<0.113, EDL=0.113		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/10/08	<0.119, EDL=0.119		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/10/08	<0.106, EDL=0.106		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/10/08	<0.105, EDL=0.105		pg/g	
			Octa CDF	2015/10/08	<0.147, EDL=0.147		pg/g	
			Total Tetra CDF	2015/10/08	<0.120, EDL=0.120		pg/g	
			Total Penta CDF	2015/10/08	<0.110, EDL=0.110		pg/g	
			Total Hexa CDF	2015/10/08	<0.119, EDL=0.119		pg/g	
			Total Hepta CDF	2015/10/08	<0.106, EDL=0.106		pg/g	
4226791	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/10/09	<0.13, EDL=0.13		pg/g	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date		%		
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
			Confirmation C13-2378 TetraCDF	2015/10/09		88	%	40 - 135
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p>								

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Your Project #: A5I0106  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/23**  
Report #: R3731342  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5K5043**

**Received: 2015/10/08, 13:35**

Sample Matrix: Soil  
# Samples Received: 3

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	3	2015/10/15	2015/10/20	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	3	N/A	2015/10/20	BRL SOP-00406	EPA M8290A / M1613
Moisture	3	N/A	2015/10/09	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		BCZ144	BCZ145	BCZ146			
Sampling Date		2015/08/26 15:45	2015/09/01 16:00	2015/09/01 14:15			
COC Number		na	na	na			
	<b>UNITS</b>	<b>SBS-ROW026-2.0</b>	<b>SBS-ROW019-2.0</b>	<b>SBS-ROW023-1.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	15	8.1	8.2	1.0	0.50	4224303
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ144							
Sampling Date		2015/08/26 15:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW026-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.213	0.108	0.200	0.400	1.00	0.213		4235084
1,2,3,7,8-Penta CDD *	pg/g	1.11	0.101	0.999	0.400	1.00	1.11		4235084
1,2,3,4,7,8-Hexa CDD *	pg/g	2.68	0.0950	0.999	0.400	0.100	0.268		4235084
1,2,3,6,7,8-Hexa CDD *	pg/g	11.9	0.101	0.999	0.400	0.100	1.19		4235084
1,2,3,7,8,9-Hexa CDD *	pg/g	7.87	0.101	0.999	0.400	0.100	0.787		4235084
1,2,3,4,6,7,8-Hepta CDD *	pg/g	232	0.107	0.999	0.400	0.0100	2.32		4235084
Octa CDD *	pg/g	1610	0.102	2.00	0.800	0.000300	0.483		4235084
Total Tetra CDD *	pg/g	1.83	0.108	0.200	0.400			6	4235084
Total Penta CDD *	pg/g	6.98	0.101	0.999	0.400			10	4235084
Total Hexa CDD *	pg/g	60.7	0.101	0.999	0.400			7	4235084
Total Hepta CDD *	pg/g	389	0.107	0.999	0.400			2	4235084
2,3,7,8-Tetra CDF **	pg/g	0.873	0.108	0.200	0.400	0.100	0.0873		4235084
1,2,3,7,8-Penta CDF **	pg/g	1.18	0.106	0.999	0.400	0.0300	0.0354		4235084
2,3,4,7,8-Penta CDF **	pg/g	1.68	0.105	0.999	0.400	0.300	0.504		4235084
1,2,3,4,7,8-Hexa CDF **	pg/g	8.03	0.0991	0.999	0.400	0.100	0.803		4235084
1,2,3,6,7,8-Hexa CDF **	pg/g	3.44	0.103	0.999	0.400	0.100	0.344		4235084
2,3,4,6,7,8-Hexa CDF **	pg/g	1.93	0.0964	0.999	0.400	0.100	0.193		4235084
1,2,3,7,8,9-Hexa CDF **	pg/g	0.218	0.102	0.999	0.400	0.100	0.0218		4235084
1,2,3,4,6,7,8-Hepta CDF **	pg/g	44.1	0.104	0.999	0.400	0.0100	0.441		4235084
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.47	0.101	0.999	0.400	0.0100	0.0247		4235084
Octa CDF **	pg/g	43.7	0.100	2.00	0.800	0.000300	0.0131		4235084
Total Tetra CDF **	pg/g	5.34	0.108	0.200	0.400			12	4235084
Total Penta CDF **	pg/g	16.5	0.105	0.999	0.400			9	4235084
Total Hexa CDF **	pg/g	82.5	0.100	0.999	0.400			10	4235084
Total Hepta CDF **	pg/g	107	0.102	0.999	0.400			4	4235084
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.62	0.13	1.0	0.90	0.100	0.0620		4238801
TOTAL TOXIC EQUIVALENCY	pg/g						8.81		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	77							4235084
C13-1234678 HeptaCDD *	%	101							4235084
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ144							
Sampling Date		2015/08/26 15:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW026-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	83							4235084
C13-123478 HexaCDD *	%	68							4235084
C13-123478 HexaCDF **	%	74							4235084
C13-1234789 HeptaCDF **	%	88							4235084
C13-123678 HexaCDD *	%	71							4235084
C13-123678 HexaCDF **	%	72							4235084
C13-12378 PentaCDD *	%	86							4235084
C13-12378 PentaCDF **	%	86							4235084
C13-123789 HexaCDF **	%	84							4235084
C13-234678 HexaCDF **	%	68							4235084
C13-23478 PentaCDF **	%	90							4235084
C13-2378 TetraCDD *	%	66							4235084
C13-2378 TetraCDF **	%	77							4235084
C13-OCDD *	%	82							4235084
Confirmation C13-2378 TetraCDF **	%	76							4238801

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ145							
Sampling Date		2015/09/01 16:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.100	0.100	0.199	0.400	1.00	0.100		4235084
1,2,3,7,8-Penta CDD *	pg/g	0.749	0.103	0.995	0.400	1.00	0.749		4235084
1,2,3,4,7,8-Hexa CDD *	pg/g	2.18	0.0958	0.995	0.400	0.100	0.218		4235084
1,2,3,6,7,8-Hexa CDD *	pg/g	11.3	0.102	0.995	0.400	0.100	1.13		4235084
1,2,3,7,8,9-Hexa CDD *	pg/g	5.91	0.102	0.995	0.400	0.100	0.591		4235084
1,2,3,4,6,7,8-Hepta CDD *	pg/g	229	0.101	0.995	0.400	0.0100	2.29		4235084
Octa CDD *	pg/g	1660	0.104	1.99	0.800	0.000300	0.498		4235084
Total Tetra CDD *	pg/g	0.140	0.100	0.199	0.400			1	4235084
Total Penta CDD *	pg/g	2.52	0.103	0.995	0.400			5	4235084
Total Hexa CDD *	pg/g	50.5	0.102	0.995	0.400			7	4235084
Total Hepta CDD *	pg/g	391	0.101	0.995	0.400			2	4235084
2,3,7,8-Tetra CDF **	pg/g	0.444	0.109	0.199	0.400	0.100	0.0444		4235084
1,2,3,7,8-Penta CDF **	pg/g	1.02	0.104	0.995	0.400	0.0300	0.0306		4235084
2,3,4,7,8-Penta CDF **	pg/g	1.54	0.103	0.995	0.400	0.300	0.462		4235084
1,2,3,4,7,8-Hexa CDF **	pg/g	9.10	0.104	0.995	0.400	0.100	0.910		4235084
1,2,3,6,7,8-Hexa CDF **	pg/g	3.39	0.108	0.995	0.400	0.100	0.339		4235084
2,3,4,6,7,8-Hexa CDF **	pg/g	1.92	0.101	0.995	0.400	0.100	0.192		4235084
1,2,3,7,8,9-Hexa CDF **	pg/g	0.194	0.107	0.995	0.400	0.100	0.0194		4235084
1,2,3,4,6,7,8-Hepta CDF **	pg/g	40.2	0.106	0.995	0.400	0.0100	0.402		4235084
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.14	0.103	0.995	0.400	0.0100	0.0214		4235084
Octa CDF **	pg/g	28.4	0.101	1.99	0.800	0.000300	0.00852		4235084
Total Tetra CDF **	pg/g	2.63	0.109	0.199	0.400			7	4235084
Total Penta CDF **	pg/g	15.5	0.103	0.995	0.400			9	4235084
Total Hexa CDF **	pg/g	95.0	0.105	0.995	0.400			11	4235084
Total Hepta CDF **	pg/g	96.9	0.104	0.995	0.400			4	4235084
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.28	0.11	0.99	0.89	0.100	0.0280		4238801
TOTAL TOXIC EQUIVALENCY	pg/g						7.99		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	92							4235084
C13-1234678 HeptaCDD *	%	101							4235084
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ145							
Sampling Date		2015/09/01 16:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW019-2.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	86							4235084
C13-123478 HexaCDD *	%	72							4235084
C13-123478 HexaCDF **	%	77							4235084
C13-1234789 HeptaCDF **	%	87							4235084
C13-123678 HexaCDD *	%	73							4235084
C13-123678 HexaCDF **	%	75							4235084
C13-12378 PentaCDD *	%	88							4235084
C13-12378 PentaCDF **	%	84							4235084
C13-123789 HexaCDF **	%	86							4235084
C13-234678 HexaCDF **	%	71							4235084
C13-23478 PentaCDF **	%	90							4235084
C13-2378 TetraCDD *	%	75							4235084
C13-2378 TetraCDF **	%	84							4235084
C13-OCDD *	%	81							4235084
Confirmation C13-2378 TetraCDF **	%	82							4238801

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ146							
Sampling Date		2015/09/01 14:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.106	0.106	0.198	0.400	1.00	0.106		4235084
1,2,3,7,8-Penta CDD *	pg/g	1.02	0.104	0.992	0.400	1.00	1.02		4235084
1,2,3,4,7,8-Hexa CDD *	pg/g	2.97	0.0954	0.992	0.400	0.100	0.297		4235084
1,2,3,6,7,8-Hexa CDD *	pg/g	11.9	0.102	0.992	0.400	0.100	1.19		4235084
1,2,3,7,8,9-Hexa CDD *	pg/g	8.04	0.102	0.992	0.400	0.100	0.804		4235084
1,2,3,4,6,7,8-Hepta CDD *	pg/g	263	0.101	0.992	0.400	0.0100	2.63		4235084
Octa CDD *	pg/g	1880	0.105	1.98	0.800	0.000300	0.564		4235084
Total Tetra CDD *	pg/g	1.41	0.106	0.198	0.400			2	4235084
Total Penta CDD *	pg/g	4.41	0.104	0.992	0.400			7	4235084
Total Hexa CDD *	pg/g	57.4	0.101	0.992	0.400			7	4235084
Total Hepta CDD *	pg/g	411	0.101	0.992	0.400			2	4235084
2,3,7,8-Tetra CDF **	pg/g	0.380	0.107	0.198	0.400	0.100	0.0380		4235084
1,2,3,7,8-Penta CDF **	pg/g	0.617	0.100	0.992	0.400	0.0300	0.0185		4235084
2,3,4,7,8-Penta CDF **	pg/g	0.950	0.0992	0.992	0.400	0.300	0.285		4235084
1,2,3,4,7,8-Hexa CDF **	pg/g	6.21	0.101	0.992	0.400	0.100	0.621		4235084
1,2,3,6,7,8-Hexa CDF **	pg/g	2.62	0.105	0.992	0.400	0.100	0.262		4235084
2,3,4,6,7,8-Hexa CDF **	pg/g	1.95	0.0978	0.992	0.400	0.100	0.195		4235084
1,2,3,7,8,9-Hexa CDF **	pg/g	0.136	0.104	0.992	0.400	0.100	0.0136		4235084
1,2,3,4,6,7,8-Hepta CDF **	pg/g	101	0.102	0.992	0.400	0.0100	1.01		4235084
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.57	0.0997	0.992	0.400	0.0100	0.0657		4235084
Octa CDF **	pg/g	346	0.101	1.98	0.800	0.000300	0.104		4235084
Total Tetra CDF **	pg/g	3.72	0.107	0.198	0.400			9	4235084
Total Penta CDF **	pg/g	12.3	0.0997	0.992	0.400			9	4235084
Total Hexa CDF **	pg/g	113	0.102	0.992	0.400			11	4235084
Total Hepta CDF **	pg/g	365	0.101	0.992	0.400			4	4235084
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.18	0.18	0.99	0.89	0.100	0.0180		4238801
TOTAL TOXIC EQUIVALENCY	pg/g						9.20		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	71							4235084
C13-1234678 HeptaCDD *	%	78							4235084
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BCZ146							
Sampling Date		2015/09/01 14:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW023-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	65							4235084
C13-123478 HexaCDD *	%	54							4235084
C13-123478 HexaCDF **	%	60							4235084
C13-1234789 HeptaCDF **	%	68							4235084
C13-123678 HexaCDD *	%	55							4235084
C13-123678 HexaCDF **	%	58							4235084
C13-12378 PentaCDD *	%	67							4235084
C13-12378 PentaCDF **	%	65							4235084
C13-123789 HexaCDF **	%	65							4235084
C13-234678 HexaCDF **	%	49							4235084
C13-23478 PentaCDF **	%	64							4235084
C13-2378 TetraCDD *	%	54							4235084
C13-2378 TetraCDF **	%	58							4235084
C13-OCDD *	%	64							4235084
Confirmation C13-2378 TetraCDF **	%	59							4238801

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**TEST SUMMARY**

**Maxxam ID:** BCZ144  
**Sample ID:** SBS-ROW026-2.0  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4235084	2015/10/15	2015/10/20	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4238801	N/A	2015/10/20	Leila Azzam
Moisture	BAL	4224303	N/A	2015/10/09	Chun Yan

**Maxxam ID:** BCZ144 Dup  
**Sample ID:** SBS-ROW026-2.0  
**Matrix:** Soil

**Collected:** 2015/08/26  
**Shipped:**  
**Received:** 2015/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4235084	2015/10/15	2015/10/20	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4238801	N/A	2015/10/20	Leila Azzam

**Maxxam ID:** BCZ145  
**Sample ID:** SBS-ROW019-2.0  
**Matrix:** Soil

**Collected:** 2015/09/01  
**Shipped:**  
**Received:** 2015/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4235084	2015/10/15	2015/10/20	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4238801	N/A	2015/10/20	Leila Azzam
Moisture	BAL	4224303	N/A	2015/10/09	Chun Yan

**Maxxam ID:** BCZ146  
**Sample ID:** SBS-ROW023-1.5  
**Matrix:** Soil

**Collected:** 2015/09/01  
**Shipped:**  
**Received:** 2015/10/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4235084	2015/10/15	2015/10/20	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4238801	N/A	2015/10/20	Leila Azzam
Moisture	BAL	4224303	N/A	2015/10/09	Chun Yan

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.0°C
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**Results relate only to the items tested.**



**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4224303	NS3	RPD - Sample/Sample Dup	Moisture	2015/10/09	0.61		%	20
4235084	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/10/19		85	%	35 - 197
			C13-1234678 HeptaCDD	2015/10/19		97	%	23 - 140
			C13-1234678 HeptaCDF	2015/10/19		81	%	28 - 143
			C13-123478 HexaCDD	2015/10/19		75	%	32 - 141
			C13-123478 HexaCDF	2015/10/19		77	%	26 - 152
			C13-1234789 HeptaCDF	2015/10/19		85	%	26 - 138
			C13-123678 HexaCDD	2015/10/19		75	%	28 - 130
			C13-123678 HexaCDF	2015/10/19		76	%	26 - 123
			C13-12378 PentaCDD	2015/10/19		93	%	25 - 181
			C13-12378 PentaCDF	2015/10/19		90	%	24 - 185
			C13-123789 HexaCDF	2015/10/19		88	%	29 - 147
			C13-234678 HexaCDF	2015/10/19		73	%	28 - 136
			C13-23478 PentaCDF	2015/10/19		95	%	21 - 178
			C13-2378 TetraCDD	2015/10/19		74	%	25 - 164
			C13-2378 TetraCDF	2015/10/19		85	%	24 - 169
			C13-OCDD	2015/10/19		72	%	17 - 157
			2,3,7,8-Tetra CDD	2015/10/19		100	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/10/19		88	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/10/19		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/10/19		98	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/10/19		114	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/10/19		83	%	70 - 140
			Octa CDD	2015/10/19		96	%	78 - 144
			2,3,7,8-Tetra CDF	2015/10/19		107	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/10/19		105	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/10/19		97	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/10/19		106	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/10/19		104	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/10/19		107	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/10/19		97	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/10/19		110	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/10/19		104	%	78 - 138
			Octa CDF	2015/10/19		102	%	63 - 170
4235084	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/10/19		83	%	35 - 197
			C13-1234678 HeptaCDD	2015/10/19		92	%	23 - 140
			C13-1234678 HeptaCDF	2015/10/19		78	%	28 - 143
			C13-123478 HexaCDD	2015/10/19		70	%	32 - 141
			C13-123478 HexaCDF	2015/10/19		74	%	26 - 152
			C13-1234789 HeptaCDF	2015/10/19		81	%	26 - 138
			C13-123678 HexaCDD	2015/10/19		72	%	28 - 130
			C13-123678 HexaCDF	2015/10/19		72	%	26 - 123
			C13-12378 PentaCDD	2015/10/19		83	%	25 - 181
			C13-12378 PentaCDF	2015/10/19		84	%	24 - 185
			C13-123789 HexaCDF	2015/10/19		82	%	29 - 147
			C13-234678 HexaCDF	2015/10/19		62	%	28 - 136
			C13-23478 PentaCDF	2015/10/19		82	%	21 - 178
			C13-2378 TetraCDD	2015/10/19		67	%	25 - 164
			C13-2378 TetraCDF	2015/10/19		73	%	24 - 169
			C13-OCDD	2015/10/19		76	%	17 - 157
			2,3,7,8-Tetra CDD	2015/10/19	<0.104, EDL=0.104		pg/g	
			1,2,3,7,8-Penta CDD	2015/10/19	<0.0837, EDL=0.0837		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/10/19	<0.103, EDL=0.103		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/10/19	<0.110, EDL=0.110		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/10/19	<0.110, EDL=0.110		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/10/19	0.149, EDL=0.104		pg/g	
			Octa CDD	2015/10/19	1.42, EDL=0.107		pg/g	
			Total Tetra CDD	2015/10/19	<0.104, EDL=0.104		pg/g	
			Total Penta CDD	2015/10/19	<0.0837, EDL=0.0837		pg/g	
			Total Hexa CDD	2015/10/19	<0.109, EDL=0.109		pg/g	
			Total Hepta CDD	2015/10/19	0.293, EDL=0.104		pg/g	
			2,3,7,8-Tetra CDF	2015/10/19	<0.102, EDL=0.102		pg/g	
			1,2,3,7,8-Penta CDF	2015/10/19	<0.112, EDL=0.112		pg/g	
			2,3,4,7,8-Penta CDF	2015/10/19	<0.111, EDL=0.111		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/10/19	<0.104, EDL=0.104		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/10/19	<0.108, EDL=0.108		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/10/19	<0.101, EDL=0.101		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/10/19	<0.107, EDL=0.107		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/10/19	<0.112, EDL=0.112		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/10/19	<0.109, EDL=0.109		pg/g	
			Octa CDF	2015/10/19	<0.113, EDL=0.113		pg/g	
			Total Tetra CDF	2015/10/19	<0.102, EDL=0.102		pg/g	
			Total Penta CDF	2015/10/19	<0.111, EDL=0.111		pg/g	
			Total Hexa CDF	2015/10/19	<0.105, EDL=0.105		pg/g	
			Total Hepta CDF	2015/10/19	<0.110, EDL=0.110		pg/g	
4235084	KKS	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/10/20	NC		%	25
			1,2,3,7,8-Penta CDD	2015/10/20	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/10/20	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/10/20	4.6		%	25
			1,2,3,7,8,9-Hexa CDD	2015/10/20	6.3		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/10/20	2.3		%	25
			Octa CDD	2015/10/20	2.8		%	25
			Total Tetra CDD	2015/10/20	9.7		%	25
			Total Penta CDD	2015/10/20	3.7		%	25
			Total Hexa CDD	2015/10/20	4.3		%	25
			Total Hepta CDD	2015/10/20	4.4		%	25
			2,3,7,8-Tetra CDF	2015/10/20	NC		%	25
			1,2,3,7,8-Penta CDF	2015/10/20	NC		%	25
			2,3,4,7,8-Penta CDF	2015/10/20	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/10/20	3.5		%	25
			1,2,3,6,7,8-Hexa CDF	2015/10/20	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/10/20	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/10/20	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/10/20	3.1		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/10/20	NC		%	25
			Octa CDF	2015/10/20	3.6		%	25
			Total Tetra CDF	2015/10/20	12		%	25
			Total Penta CDF	2015/10/20	15		%	25
			Total Hexa CDF	2015/10/20	10		%	25
			Total Hepta CDF	2015/10/20	3.6		%	25
4238801	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/10/20	<0.10, EDL=0.10		pg/g	
			Confirmation C13-2378 TetraCDF	2015/10/20		96	%	40 - 135
4238801	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/10/20	NC		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5K0059  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/12/03**  
Report #: R3792706  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5M6002**

**Received: 2015/11/04, 14:05**

Sample Matrix: Soil  
# Samples Received: 5

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	2	2015/11/17	2015/11/29	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	3	2015/11/17	2015/11/30	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	3	N/A	2015/11/30	BRL SOP-00406	EPA M8290A / M1613
Moisture	5	N/A	2015/11/06	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		BHC912	BHC913	BHC914	BHC915				
Sampling Date		2015/11/02 08:55	2015/11/02 09:40	2015/11/02 10:30	2015/11/02 12:15				
COC Number		NA	NA	NA	NA				
		UNITS	SS-ROW038S-0.5	SS-ROW029BS-0.5	SS-ROW010W-0.5	SS-ROW022W-0.5	RDL	MDL	QC Batch
Moisture	%	20	21	22	18	1.0	0.50	4262279	
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

Maxxam ID		BHC916				
Sampling Date		2015/11/02 14:10				
COC Number		NA				
		UNITS	SS-ROW033W-0.5	RDL	MDL	QC Batch
Moisture	%	22	1.0	0.50	4262279	
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC912							
Sampling Date		2015/11/02 08:55							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW038S-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.186	0.186	2.00	0.0800	1.00	0.186		4286499
1,2,3,7,8-Penta CDD *	pg/g	0.638	0.207	10.0	0.0800	1.00	0.638		4286499
1,2,3,4,7,8-Hexa CDD *	pg/g	1.52	0.180	10.0	0.0800	0.100	0.152		4286499
1,2,3,6,7,8-Hexa CDD *	pg/g	4.90	0.193	10.0	0.0800	0.100	0.490		4286499
1,2,3,7,8,9-Hexa CDD *	pg/g	4.65	0.192	10.0	0.0800	0.100	0.465		4286499
1,2,3,4,6,7,8-Hepta CDD *	pg/g	107	0.182	10.0	0.0800	0.0100	1.07		4286499
Octa CDD *	pg/g	803	0.367	20.0	0.160	0.000300	0.241		4286499
Total Tetra CDD *	pg/g	0.253	0.186	2.00	0.0800			1	4286499
Total Penta CDD *	pg/g	1.76	0.207	10.0	0.0800			3	4286499
Total Hexa CDD *	pg/g	30.1	0.192	10.0	0.0800			7	4286499
Total Hepta CDD *	pg/g	190	0.182	10.0	0.0800			2	4286499
2,3,7,8-Tetra CDF **	pg/g	0.302	0.235	2.00	0.0800	0.100	0.0302		4286499
1,2,3,7,8-Penta CDF **	pg/g	<0.210	0.210	10.0	0.0800	0.0300	0.00630		4286499
2,3,4,7,8-Penta CDF **	pg/g	<0.261 (1)	0.261	10.0	0.0800	0.300	0.0783		4286499
1,2,3,4,7,8-Hexa CDF **	pg/g	1.80	0.215	10.0	0.0800	0.100	0.180		4286499
1,2,3,6,7,8-Hexa CDF **	pg/g	0.840	0.226	10.0	0.0800	0.100	0.0840		4286499
2,3,4,6,7,8-Hexa CDF **	pg/g	0.672	0.207	10.0	0.0800	0.100	0.0672		4286499
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.221	0.221	10.0	0.0800	0.100	0.0221		4286499
1,2,3,4,6,7,8-Hepta CDF **	pg/g	19.1	0.160	10.0	0.0800	0.0100	0.191		4286499
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.00	0.162	10.0	0.0800	0.0100	0.0100		4286499
Octa CDF **	pg/g	45.1	0.195	20.0	0.160	0.000300	0.0135		4286499
Total Tetra CDF **	pg/g	1.07	0.235	2.00	0.0800			3	4286499
Total Penta CDF **	pg/g	5.69	0.208	10.0	0.0800			5	4286499
Total Hexa CDF **	pg/g	23.7	0.217	10.0	0.0800			8	4286499
Total Hepta CDF **	pg/g	51.7	0.161	10.0	0.0800			4	4286499
TOTAL TOXIC EQUIVALENCY	pg/g						3.92		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	91							4286499
C13-1234678 HeptaCDD *	%	122							4286499
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC912							
Sampling Date		2015/11/02 08:55							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW038S-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	99							4286499
C13-123478 HexaCDD *	%	93							4286499
C13-123478 HexaCDF **	%	91							4286499
C13-1234789 HeptaCDF **	%	107							4286499
C13-123678 HexaCDD *	%	93							4286499
C13-123678 HexaCDF **	%	91							4286499
C13-12378 PentaCDD *	%	115							4286499
C13-12378 PentaCDF **	%	102							4286499
C13-123789 HexaCDF **	%	111							4286499
C13-234678 HexaCDF **	%	95							4286499
C13-23478 PentaCDF **	%	125							4286499
C13-2378 TetraCDD *	%	92							4286499
C13-2378 TetraCDF **	%	105							4286499
C13-OCDD *	%	99							4286499

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC913							
Sampling Date		2015/11/02 09:40							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW029BS-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.31	0.202	2.00	0.0800	1.00	1.31		4286499
1,2,3,7,8-Penta CDD *	pg/g	4.78	0.190	10.0	0.0800	1.00	4.78		4286499
1,2,3,4,7,8-Hexa CDD *	pg/g	13.3	0.137	10.0	0.0800	0.100	1.33		4286499
1,2,3,6,7,8-Hexa CDD *	pg/g	50.3	0.146	10.0	0.0800	0.100	5.03		4286499
1,2,3,7,8,9-Hexa CDD *	pg/g	33.8	0.145	10.0	0.0800	0.100	3.38		4286499
1,2,3,4,6,7,8-Hepta CDD *	pg/g	990	0.175	10.0	0.0800	0.0100	9.90		4286499
Octa CDD *	pg/g	7820	0.247	20.0	0.160	0.000300	2.35		4286499
Total Tetra CDD *	pg/g	6.54	0.202	2.00	0.0800			7	4286499
Total Penta CDD *	pg/g	21.5	0.190	10.0	0.0800			11	4286499
Total Hexa CDD *	pg/g	242	0.146	10.0	0.0800			7	4286499
Total Hepta CDD *	pg/g	1610	0.175	10.0	0.0800			2	4286499
2,3,7,8-Tetra CDF **	pg/g	1.82	0.197	2.00	0.0800	0.100	0.182		4286499
1,2,3,7,8-Penta CDF **	pg/g	2.60	0.212	10.0	0.0800	0.0300	0.0780		4286499
2,3,4,7,8-Penta CDF **	pg/g	3.81	0.208	10.0	0.0800	0.300	1.14		4286499
1,2,3,4,7,8-Hexa CDF **	pg/g	26.3	0.159	10.0	0.0800	0.100	2.63		4286499
1,2,3,6,7,8-Hexa CDF **	pg/g	9.76	0.167	10.0	0.0800	0.100	0.976		4286499
2,3,4,6,7,8-Hexa CDF **	pg/g	7.11	0.153	10.0	0.0800	0.100	0.711		4286499
1,2,3,7,8,9-Hexa CDF **	pg/g	0.409	0.163	10.0	0.0800	0.100	0.0409		4286499
1,2,3,4,6,7,8-Hepta CDF **	pg/g	197	0.170	10.0	0.0800	0.0100	1.97		4286499
1,2,3,4,7,8,9-Hepta CDF **	pg/g	14.5	0.171	10.0	0.0800	0.0100	0.145		4286499
Octa CDF **	pg/g	467	0.246	20.0	0.160	0.000300	0.140		4286499
Total Tetra CDF **	pg/g	18.2	0.197	2.00	0.0800			13	4286499
Total Penta CDF **	pg/g	84.1	0.210	10.0	0.0800			10	4286499
Total Hexa CDF **	pg/g	281	0.160	10.0	0.0800			12	4286499
Total Hepta CDF **	pg/g	580	0.171	10.0	0.0800			4	4286499
TOTAL TOXIC EQUIVALENCY	pg/g						36.1		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	88							4286499
C13-1234678 HeptaCDD *	%	154 (1)							4286499
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) Recovery exceeds method criteria due to matrix effects									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC913							
Sampling Date		2015/11/02 09:40							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW029BS-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	114							4286499
C13-123478 HexaCDD *	%	102							4286499
C13-123478 HexaCDF **	%	103							4286499
C13-1234789 HeptaCDF **	%	126							4286499
C13-123678 HexaCDD *	%	107							4286499
C13-123678 HexaCDF **	%	106							4286499
C13-12378 PentaCDD *	%	126							4286499
C13-12378 PentaCDF **	%	103							4286499
C13-123789 HexaCDF **	%	122							4286499
C13-234678 HexaCDF **	%	105							4286499
C13-23478 PentaCDF **	%	148							4286499
C13-2378 TetraCDD *	%	90							4286499
C13-2378 TetraCDF **	%	103							4286499
C13-OCDD *	%	142							4286499

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC914							
Sampling Date		2015/11/02 10:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW010W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.392	0.180	2.00	0.0800	1.00	0.392		4286499
1,2,3,7,8-Penta CDD *	pg/g	2.53	0.179	10.0	0.0800	1.00	2.53		4286499
1,2,3,4,7,8-Hexa CDD *	pg/g	6.91	0.179	10.0	0.0800	0.100	0.691		4286499
1,2,3,6,7,8-Hexa CDD *	pg/g	28.0	0.191	10.0	0.0800	0.100	2.80		4286499
1,2,3,7,8,9-Hexa CDD *	pg/g	17.2	0.190	10.0	0.0800	0.100	1.72		4286499
1,2,3,4,6,7,8-Hepta CDD *	pg/g	533	0.141	10.0	0.0800	0.0100	5.33		4286499
Octa CDD *	pg/g	3740	0.615	20.0	0.160	0.000300	1.12		4286499
Total Tetra CDD *	pg/g	4.97	0.180	2.00	0.0800			6	4286499
Total Penta CDD *	pg/g	15.5	0.179	10.0	0.0800			10	4286499
Total Hexa CDD *	pg/g	152	0.191	10.0	0.0800			7	4286499
Total Hepta CDD *	pg/g	906	0.141	10.0	0.0800			2	4286499
2,3,7,8-Tetra CDF **	pg/g	1.99	0.267	2.00	0.0800	0.100	0.199		4286499
1,2,3,7,8-Penta CDF **	pg/g	1.81	0.233	10.0	0.0800	0.0300	0.0543		4286499
2,3,4,7,8-Penta CDF **	pg/g	3.54	0.229	10.0	0.0800	0.300	1.06		4286499
1,2,3,4,7,8-Hexa CDF **	pg/g	19.1	0.170	10.0	0.0800	0.100	1.91		4286499
1,2,3,6,7,8-Hexa CDF **	pg/g	8.00	0.178	10.0	0.0800	0.100	0.800		4286499
2,3,4,6,7,8-Hexa CDF **	pg/g	6.04	0.163	10.0	0.0800	0.100	0.604		4286499
1,2,3,7,8,9-Hexa CDF **	pg/g	0.314	0.174	10.0	0.0800	0.100	0.0314		4286499
1,2,3,4,6,7,8-Hepta CDF **	pg/g	114	0.160	10.0	0.0800	0.0100	1.14		4286499
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.24	0.161	10.0	0.0800	0.0100	0.0624		4286499
Octa CDF **	pg/g	204	0.202	20.0	0.160	0.000300	0.0612		4286499
Total Tetra CDF **	pg/g	30.0	0.267	2.00	0.0800			12	4286499
Total Penta CDF **	pg/g	114	0.231	10.0	0.0800			9	4286499
Total Hexa CDF **	pg/g	227	0.171	10.0	0.0800			11	4286499
Total Hepta CDF **	pg/g	309	0.161	10.0	0.0800			4	4286499
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.18	0.11	2.0	1.8	0.100	0.118		4292733
TOTAL TOXIC EQUIVALENCY	pg/g						20.4		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	87							4286499
C13-1234678 HeptaCDD *	%	137							4286499
EDL = Estimated Detection Limit									
RDL = Reportable Detection Limit									
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,									
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.									
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds									
QC Batch = Quality Control Batch									
* CDD = Chloro Dibenzo-p-Dioxin									
** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC914							
Sampling Date		2015/11/02 10:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW010W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	103							4286499
C13-123478 HexaCDD *	%	98							4286499
C13-123478 HexaCDF **	%	101							4286499
C13-1234789 HeptaCDF **	%	120							4286499
C13-123678 HexaCDD *	%	100							4286499
C13-123678 HexaCDF **	%	102							4286499
C13-12378 PentaCDD *	%	120							4286499
C13-12378 PentaCDF **	%	102							4286499
C13-123789 HexaCDF **	%	113							4286499
C13-234678 HexaCDF **	%	98							4286499
C13-23478 PentaCDF **	%	143							4286499
C13-2378 TetraCDD *	%	85							4286499
C13-2378 TetraCDF **	%	96							4286499
C13-OCDD *	%	121							4286499
Confirmation C13-2378 TetraCDF **	%	89							4292733

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC915							
Sampling Date		2015/11/02 12:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW022W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.32	0.161	2.00	0.0800	1.00	1.32		4286499
1,2,3,7,8-Penta CDD *	pg/g	5.60	0.276	10.0	0.0800	1.00	5.60		4286499
1,2,3,4,7,8-Hexa CDD *	pg/g	21.4	0.208	10.0	0.0800	0.100	2.14		4286499
1,2,3,6,7,8-Hexa CDD *	pg/g	84.4	0.222	10.0	0.0800	0.100	8.44		4286499
1,2,3,7,8,9-Hexa CDD *	pg/g	44.6	0.221	10.0	0.0800	0.100	4.46		4286499
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1750	0.278	10.0	0.0800	0.0100	17.5		4286499
Octa CDD *	pg/g	13300 (1)	1.02	100	0.160	0.000300	3.99		4286499
Total Tetra CDD *	pg/g	9.47	0.161	2.00	0.0800			9	4286499
Total Penta CDD *	pg/g	35.6	0.276	10.0	0.0800			11	4286499
Total Hexa CDD *	pg/g	418	0.222	10.0	0.0800			7	4286499
Total Hepta CDD *	pg/g	2900	0.278	10.0	0.0800			2	4286499
2,3,7,8-Tetra CDF **	pg/g	3.10	0.245	2.00	0.0800	0.100	0.310		4286499
1,2,3,7,8-Penta CDF **	pg/g	5.24	0.204	10.0	0.0800	0.0300	0.157		4286499
2,3,4,7,8-Penta CDF **	pg/g	8.53	0.200	10.0	0.0800	0.300	2.56		4286499
1,2,3,4,7,8-Hexa CDF **	pg/g	47.7	0.197	10.0	0.0800	0.100	4.77		4286499
1,2,3,6,7,8-Hexa CDF **	pg/g	23.3	0.207	10.0	0.0800	0.100	2.33		4286499
2,3,4,6,7,8-Hexa CDF **	pg/g	15.3	0.190	10.0	0.0800	0.100	1.53		4286499
1,2,3,7,8,9-Hexa CDF **	pg/g	0.755	0.202	10.0	0.0800	0.100	0.0755		4286499
1,2,3,4,6,7,8-Hepta CDF **	pg/g	342	0.244	10.0	0.0800	0.0100	3.42		4286499
1,2,3,4,7,8,9-Hepta CDF **	pg/g	20.1	0.246	10.0	0.0800	0.0100	0.201		4286499
Octa CDF **	pg/g	920	0.241	20.0	0.160	0.000300	0.276		4286499
Total Tetra CDF **	pg/g	62.9	0.245	2.00	0.0800			14	4286499
Total Penta CDF **	pg/g	288	0.202	10.0	0.0800			10	4286499
Total Hexa CDF **	pg/g	617	0.199	10.0	0.0800			11	4286499
Total Hepta CDF **	pg/g	1010	0.245	10.0	0.0800			4	4286499
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.66	0.099	2.0	1.8	0.100	0.166		4292733
TOTAL TOXIC EQUIVALENCY	pg/g						58.9		

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	90							4286499

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1)  
\*\* From 5X Dilution \*\*

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC915							
Sampling Date		2015/11/02 12:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW022W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	131							4286499
C13-1234678 HeptaCDF **	%	97							4286499
C13-123478 HexaCDD *	%	91							4286499
C13-123478 HexaCDF **	%	104							4286499
C13-1234789 HeptaCDF **	%	109							4286499
C13-123678 HexaCDD *	%	97							4286499
C13-123678 HexaCDF **	%	106							4286499
C13-12378 PentaCDD *	%	117							4286499
C13-12378 PentaCDF **	%	102							4286499
C13-123789 HexaCDF **	%	107							4286499
C13-234678 HexaCDF **	%	90							4286499
C13-23478 PentaCDF **	%	158							4286499
C13-2378 TetraCDD *	%	86							4286499
C13-2378 TetraCDF **	%	93							4286499
C13-OCDD *	%	114 (1)							4286499
Confirmation C13-2378 TetraCDF **	%	86							4292733

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1)  
\*\* From 5X Dilution \*\*

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC916							
Sampling Date		2015/11/02 14:10							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW033W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.15	0.203	2.00	0.0800	1.00	1.15		4286499
1,2,3,7,8-Penta CDD *	pg/g	8.08	0.197	10.0	0.0800	1.00	8.08		4286499
1,2,3,4,7,8-Hexa CDD *	pg/g	14.7	0.175	10.0	0.0800	0.100	1.47		4286499
1,2,3,6,7,8-Hexa CDD *	pg/g	58.3	0.187	10.0	0.0800	0.100	5.83		4286499
1,2,3,7,8,9-Hexa CDD *	pg/g	36.3	0.186	10.0	0.0800	0.100	3.63		4286499
1,2,3,4,6,7,8-Hepta CDD *	pg/g	999	0.157	10.0	0.0800	0.0100	9.99		4286499
Octa CDD *	pg/g	7780	0.293	20.0	0.160	0.000300	2.33		4286499
Total Tetra CDD *	pg/g	18.5	0.203	2.00	0.0800			11	4286499
Total Penta CDD *	pg/g	59.3	0.197	10.0	0.0800			12	4286499
Total Hexa CDD *	pg/g	335	0.187	10.0	0.0800			7	4286499
Total Hepta CDD *	pg/g	1720	0.157	10.0	0.0800			2	4286499
2,3,7,8-Tetra CDF **	pg/g	8.47	0.209	2.00	0.0800	0.100	0.847		4286499
1,2,3,7,8-Penta CDF **	pg/g	5.13	0.321	10.0	0.0800	0.0300	0.154		4286499
2,3,4,7,8-Penta CDF **	pg/g	16.2	0.315	10.0	0.0800	0.300	4.86		4286499
1,2,3,4,7,8-Hexa CDF **	pg/g	36.5	0.168	10.0	0.0800	0.100	3.65		4286499
1,2,3,6,7,8-Hexa CDF **	pg/g	32.0	0.176	10.0	0.0800	0.100	3.20		4286499
2,3,4,6,7,8-Hexa CDF **	pg/g	34.7	0.161	10.0	0.0800	0.100	3.47		4286499
1,2,3,7,8,9-Hexa CDF **	pg/g	0.586	0.172	10.0	0.0800	0.100	0.0586		4286499
1,2,3,4,6,7,8-Hepta CDF **	pg/g	248	0.191	10.0	0.0800	0.0100	2.48		4286499
1,2,3,4,7,8,9-Hepta CDF **	pg/g	15.1	0.192	10.0	0.0800	0.0100	0.151		4286499
Octa CDF **	pg/g	637	0.219	20.0	0.160	0.000300	0.191		4286499
Total Tetra CDF **	pg/g	373	0.209	2.00	0.0800			15	4286499
Total Penta CDF **	pg/g	1270	0.318	10.0	0.0800			11	4286499
Total Hexa CDF **	pg/g	1040	0.169	10.0	0.0800			11	4286499
Total Hepta CDF **	pg/g	763	0.191	10.0	0.0800			4	4286499
Confirmation 2,3,7,8-Tetra CDF **	pg/g	3.27	0.10	2.0	1.8	0.100	0.327		4292733
TOTAL TOXIC EQUIVALENCY	pg/g						51.0		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	95							4286499
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BHC916							
Sampling Date		2015/11/02 14:10							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW033W-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	147 (1)							4286499
C13-1234678 HeptaCDF **	%	111							4286499
C13-123478 HexaCDD *	%	102							4286499
C13-123478 HexaCDF **	%	103							4286499
C13-1234789 HeptaCDF **	%	122							4286499
C13-123678 HexaCDD *	%	100							4286499
C13-123678 HexaCDF **	%	106							4286499
C13-12378 PentaCDD *	%	122							4286499
C13-12378 PentaCDF **	%	106							4286499
C13-123789 HexaCDF **	%	120							4286499
C13-234678 HexaCDF **	%	102							4286499
C13-23478 PentaCDF **	%	147							4286499
C13-2378 TetraCDD *	%	93							4286499
C13-2378 TetraCDF **	%	104							4286499
C13-OCDD *	%	136							4286499
Confirmation C13-2378 TetraCDF **	%	98							4292733

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Recovery exceeds method criteria due to matrix effects



**TEST SUMMARY**

**Maxxam ID:** BHC912  
**Sample ID:** SS-ROW038S-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/29	Kay Shaw
Moisture	BAL	4262279	N/A	2015/11/06	Chun Yan

**Maxxam ID:** BHC913  
**Sample ID:** SS-ROW029BS-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/29	Kay Shaw
Moisture	BAL	4262279	N/A	2015/11/06	Chun Yan

**Maxxam ID:** BHC913 Dup  
**Sample ID:** SS-ROW029BS-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/30	Kay Shaw

**Maxxam ID:** BHC914  
**Sample ID:** SS-ROW010W-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/30	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4292733	N/A	2015/11/30	Vica Cioranic
Moisture	BAL	4262279	N/A	2015/11/06	Chun Yan

**Maxxam ID:** BHC915  
**Sample ID:** SS-ROW022W-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/30	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4292733	N/A	2015/11/30	Vica Cioranic
Moisture	BAL	4262279	N/A	2015/11/06	Chun Yan

**Maxxam ID:** BHC916  
**Sample ID:** SS-ROW033W-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/11/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4286499	2015/11/17	2015/11/30	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4292733	N/A	2015/11/30	Vica Cioranic
Moisture	BAL	4262279	N/A	2015/11/06	Chun Yan

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
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**Results relate only to the items tested.**

### QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4262279	NS3	RPD - Sample/Sample Dup	Moisture	2015/11/06	1.6		%	20
4286499	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/11/28		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/11/28		68	%	23 - 140
			C13-1234678 HeptaCDF	2015/11/28		58	%	28 - 143
			C13-123478 HexaCDD	2015/11/28		64	%	32 - 141
			C13-123478 HexaCDF	2015/11/28		66	%	26 - 152
			C13-1234789 HeptaCDF	2015/11/28		63	%	26 - 138
			C13-123678 HexaCDD	2015/11/28		66	%	28 - 130
			C13-123678 HexaCDF	2015/11/28		66	%	26 - 123
			C13-12378 PentaCDD	2015/11/28		84	%	25 - 181
			C13-12378 PentaCDF	2015/11/28		76	%	24 - 185
			C13-123789 HexaCDF	2015/11/28		70	%	29 - 147
			C13-234678 HexaCDF	2015/11/28		54	%	28 - 136
			C13-23478 PentaCDF	2015/11/28		92	%	21 - 178
			C13-2378 TetraCDD	2015/11/28		75	%	25 - 164
			C13-2378 TetraCDF	2015/11/28		80	%	24 - 169
			C13-OCDD	2015/11/28		36	%	17 - 157
			2,3,7,8-Tetra CDD	2015/11/28		101	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/11/28		87	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/11/28		102	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/11/28		93	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/11/28		96	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/11/28		76	%	70 - 140
			Octa CDD	2015/11/28		95	%	78 - 144
			2,3,7,8-Tetra CDF	2015/11/28		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/11/28		97	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/11/28		87	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/11/28		102	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/11/28		100	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/11/28		99	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/11/28		91	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/11/28		102	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/11/28		93	%	78 - 138
			Octa CDF	2015/11/28		111	%	63 - 170
4286499	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/11/29		92	%	35 - 197
			C13-1234678 HeptaCDD	2015/11/29		112	%	23 - 140
			C13-1234678 HeptaCDF	2015/11/29		92	%	28 - 143
			C13-123478 HexaCDD	2015/11/29		89	%	32 - 141
			C13-123478 HexaCDF	2015/11/29		86	%	26 - 152
			C13-1234789 HeptaCDF	2015/11/29		97	%	26 - 138
			C13-123678 HexaCDD	2015/11/29		88	%	28 - 130
			C13-123678 HexaCDF	2015/11/29		87	%	26 - 123
			C13-12378 PentaCDD	2015/11/29		122	%	25 - 181
			C13-12378 PentaCDF	2015/11/29		102	%	24 - 185
			C13-123789 HexaCDF	2015/11/29		103	%	29 - 147
			C13-234678 HexaCDF	2015/11/29		90	%	28 - 136
			C13-23478 PentaCDF	2015/11/29		127	%	21 - 178
			C13-2378 TetraCDD	2015/11/29		88	%	25 - 164
			C13-2378 TetraCDF	2015/11/29		99	%	24 - 169
			C13-OCDD	2015/11/29		83	%	17 - 157
			2,3,7,8-Tetra CDD	2015/11/29	<0.214, EDL=0.214		pg/g	
			1,2,3,7,8-Penta CDD	2015/11/29	<0.154, EDL=0.154		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/11/29	<0.190, EDL=0.190		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/11/29	<0.203, EDL=0.203		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/11/29	<0.203, EDL=0.203		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/11/29	<0.210, EDL=0.210		pg/g	
			Octa CDD	2015/11/29	0.384, EDL=0.217		pg/g	
			Total Tetra CDD	2015/11/29	<0.214, EDL=0.214		pg/g	
			Total Penta CDD	2015/11/29	<0.154, EDL=0.154		pg/g	
			Total Hexa CDD	2015/11/29	<0.203, EDL=0.203		pg/g	
			Total Hepta CDD	2015/11/29	<0.210, EDL=0.210		pg/g	
			2,3,7,8-Tetra CDF	2015/11/29	<0.128, EDL=0.128		pg/g	
			1,2,3,7,8-Penta CDF	2015/11/29	<0.149, EDL=0.149		pg/g	
			2,3,4,7,8-Penta CDF	2015/11/29	<0.146, EDL=0.146		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/11/29	<0.213, EDL=0.213		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/11/29	<0.224, EDL=0.224		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/11/29	<0.205, EDL=0.205		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/11/29	<0.219, EDL=0.219		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/11/29	0.289, EDL=0.214		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/11/29	<0.216, EDL=0.216		pg/g	
			Octa CDF	2015/11/29	<0.206, EDL=0.206		pg/g	
			Total Tetra CDF	2015/11/29	<0.128, EDL=0.128		pg/g	
			Total Penta CDF	2015/11/29	<0.147, EDL=0.147		pg/g	
			Total Hexa CDF	2015/11/29	<0.215, EDL=0.215		pg/g	
			Total Hepta CDF	2015/11/29	0.289, EDL=0.215		pg/g	
4286499	KKS	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/11/30	NC		%	25
			1,2,3,7,8-Penta CDD	2015/11/30	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/11/30	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/11/30	0.37		%	25
			1,2,3,7,8,9-Hexa CDD	2015/11/30	NC		%	25



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/11/30	4.5		%	25
			Octa CDD	2015/11/30	4.7		%	25
			Total Tetra CDD	2015/11/30	NC		%	25
			Total Penta CDD	2015/11/30	NC		%	25
			Total Hexa CDD	2015/11/30	2.9		%	25
			Total Hepta CDD	2015/11/30	5.0		%	25
			2,3,7,8-Tetra CDF	2015/11/30	NC		%	25
			1,2,3,7,8-Penta CDF	2015/11/30	NC		%	25
			2,3,4,7,8-Penta CDF	2015/11/30	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/11/30	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/11/30	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/11/30	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/11/30	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/11/30	3.8		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/11/30	NC		%	25
			Octa CDF	2015/11/30	2.4		%	25
			Total Tetra CDF	2015/11/30	3.0		%	25
			Total Penta CDF	2015/11/30	2.1		%	25
			Total Hexa CDF	2015/11/30	7.4		%	25
			Total Hepta CDF	2015/11/30	5.7		%	25
4292733	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/11/30	<0.11, EDL=0.11		pg/g	
			Confirmation C13-2378 TetraCDF	2015/11/30		49	%	40 - 135
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).</p>								

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

*Ewa P.*  


\_\_\_\_\_  
Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

*Owen C.*  


\_\_\_\_\_  
Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5K0735  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/01/04**  
Report #: R3839192  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B501368**  
**Received: 2015/11/24, 15:15**

Sample Matrix: Water  
# Samples Received: 1

Analyses	Date		Laboratory Method	Reference
	Quantity Extracted	Date Analyzed		
Dioxins/Furans in Water (1613B) (1)	1	2015/12/04	2015/12/12 BRL SOP-00410	EPA 1613B m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		BKG622							
Sampling Date		2015/11/20 15:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	RINSATE-SA-3	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	<1.19	1.19	12.7	4.00	1.00	1.19		4305340
1,2,3,7,8-Penta CDD *	pg/L	<1.25	1.25	63.3	4.00	1.00	1.25		4305340
1,2,3,4,7,8-Hexa CDD *	pg/L	<1.01	1.01	63.3	4.00	0.100	0.101		4305340
1,2,3,6,7,8-Hexa CDD *	pg/L	<1.06	1.06	63.3	4.00	0.100	0.106		4305340
1,2,3,7,8,9-Hexa CDD *	pg/L	<0.968	0.968	63.3	4.00	0.100	0.0968		4305340
1,2,3,4,6,7,8-Hepta CDD *	pg/L	<1.28	1.28	63.3	4.00	0.0100	0.0128		4305340
Octa CDD *	pg/L	<1.61	1.61	127	8.00	0.000300	0.000483		4305340
Total Tetra CDD *	pg/L	<3.77 (1)	3.77	12.7	4.00			0	4305340
Total Penta CDD *	pg/L	<1.54 (1)	1.54	63.3	4.00			0	4305340
Total Hexa CDD *	pg/L	<3.69 (1)	3.69	63.3	4.00			0	4305340
Total Hepta CDD *	pg/L	<1.28	1.28	63.3	4.00			0	4305340
2,3,7,8-Tetra CDF **	pg/L	<1.49	1.49	12.7	4.00	0.100	0.149		4305340
1,2,3,7,8-Penta CDF **	pg/L	<1.20	1.20	63.3	4.00	0.0300	0.0360		4305340
2,3,4,7,8-Penta CDF **	pg/L	<1.18	1.18	63.3	4.00	0.300	0.354		4305340
1,2,3,4,7,8-Hexa CDF **	pg/L	<1.05	1.05	63.3	4.00	0.100	0.105		4305340
1,2,3,6,7,8-Hexa CDF **	pg/L	<1.08	1.08	63.3	4.00	0.100	0.108		4305340
2,3,4,6,7,8-Hexa CDF **	pg/L	<1.01	1.01	63.3	4.00	0.100	0.101		4305340
1,2,3,7,8,9-Hexa CDF **	pg/L	<1.05	1.05	63.3	4.00	0.100	0.105		4305340
1,2,3,4,6,7,8-Hepta CDF **	pg/L	<0.999	0.999	63.3	4.00	0.0100	0.00999		4305340
1,2,3,4,7,8,9-Hepta CDF **	pg/L	<0.979	0.979	63.3	4.00	0.0100	0.00979		4305340
Octa CDF **	pg/L	<1.22	1.22	127	8.00	0.000300	0.000366		4305340
Total Tetra CDF **	pg/L	<1.49	1.49	12.7	4.00			0	4305340
Total Penta CDF **	pg/L	<1.19	1.19	63.3	4.00			0	4305340
Total Hexa CDF **	pg/L	<1.04	1.04	63.3	4.00			0	4305340
Total Hepta CDF **	pg/L	<0.989	0.989	63.3	4.00			0	4305340
TOTAL TOXIC EQUIVALENCY	pg/L						3.74		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	61							4305340
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									



**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		BKG622							
Sampling Date		2015/11/20 15:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	RINSATE-SA-3	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	64							4305340
C13-1234678 HeptaCDF **	%	67							4305340
C13-123478 HexaCDD *	%	67							4305340
C13-123478 HexaCDF **	%	78							4305340
C13-1234789 HeptaCDF **	%	68							4305340
C13-123678 HexaCDD *	%	70							4305340
C13-123678 HexaCDF **	%	82							4305340
C13-12378 PentaCDD *	%	83							4305340
C13-12378 PentaCDF **	%	73							4305340
C13-123789 HexaCDF **	%	84							4305340
C13-234678 HexaCDF **	%	71							4305340
C13-23478 PentaCDF **	%	80							4305340
C13-2378 TetraCDD *	%	59							4305340
C13-2378 TetraCDF **	%	67							4305340
C13-OCDD *	%	68							4305340

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** BKG622  
**Sample ID:** RINSATE-SA-3  
**Matrix:** Water

**Collected:** 2015/11/20  
**Shipped:**  
**Received:** 2015/11/24

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	4305340	2015/12/04	2015/12/12	Owen Cosby

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC				Date		%			
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits	
4305340	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/12/10		54	%	35 - 197	
			C13-1234678 HeptaCDD	2015/12/10		44	%	23 - 140	
			C13-1234678 HeptaCDF	2015/12/10		46	%	28 - 143	
			C13-123478 HexaCDD	2015/12/10		44	%	32 - 141	
			C13-123478 HexaCDF	2015/12/10		53	%	26 - 152	
			C13-1234789 HeptaCDF	2015/12/10		46	%	28 - 143	
			C13-123678 HexaCDD	2015/12/10		52	%	28 - 130	
			C13-123678 HexaCDF	2015/12/10		49	%	26 - 123	
			C13-12378 PentaCDD	2015/12/10		50	%	25 - 181	
			C13-12378 PentaCDF	2015/12/10		45	%	24 - 185	
			C13-123789 HexaCDF	2015/12/10		66	%	28 - 136	
			C13-234678 HexaCDF	2015/12/10		42	%	29 - 147	
			C13-23478 PentaCDF	2015/12/10		50	%	21 - 178	
			C13-2378 TetraCDD	2015/12/10		43	%	24 - 164	
			C13-2378 TetraCDF	2015/12/10		43	%	24 - 169	
			C13-OCDD	2015/12/10		44	%	17 - 157	
			2,3,7,8-Tetra CDD	2015/12/10		98	%	67 - 158	
			1,2,3,7,8-Penta CDD	2015/12/10		80	%	25 - 181	
			1,2,3,4,7,8-Hexa CDD	2015/12/10		104	%	70 - 164	
			1,2,3,6,7,8-Hexa CDD	2015/12/10		110	%	76 - 134	
			1,2,3,7,8,9-Hexa CDD	2015/12/10		117	%	64 - 162	
			1,2,3,4,6,7,8-Hepta CDD	2015/12/10		99	%	70 - 140	
			Octa CDD	2015/12/10		102	%	78 - 144	
			2,3,7,8-Tetra CDF	2015/12/10		101	%	75 - 158	
			1,2,3,7,8-Penta CDF	2015/12/10		94	%	80 - 134	
			2,3,4,7,8-Penta CDF	2015/12/10		81	%	68 - 160	
			1,2,3,4,7,8-Hexa CDF	2015/12/10		102	%	72 - 134	
			1,2,3,6,7,8-Hexa CDF	2015/12/10		105	%	84 - 130	
			2,3,4,6,7,8-Hexa CDF	2015/12/10		98	%	70 - 156	
			1,2,3,7,8,9-Hexa CDF	2015/12/10		91	%	78 - 130	
			1,2,3,4,6,7,8-Hepta CDF	2015/12/10		106	%	82 - 122	
			1,2,3,4,7,8,9-Hepta CDF	2015/12/10		99	%	78 - 138	
			Octa CDF	2015/12/10		106	%	63 - 170	
4305340	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/12/10		62	%	35 - 197	
			C13-1234678 HeptaCDD	2015/12/10		51	%	23 - 140	
			C13-1234678 HeptaCDF	2015/12/10		56	%	28 - 143	
			C13-123478 HexaCDD	2015/12/10		56	%	32 - 141	
			C13-123478 HexaCDF	2015/12/10		67	%	26 - 152	
			C13-1234789 HeptaCDF	2015/12/10		52	%	28 - 143	
			C13-123678 HexaCDD	2015/12/10		63	%	28 - 130	
			C13-123678 HexaCDF	2015/12/10		66	%	26 - 123	
			C13-12378 PentaCDD	2015/12/10		70	%	25 - 181	
			C13-12378 PentaCDF	2015/12/10		62	%	24 - 185	
			C13-123789 HexaCDF	2015/12/10		77	%	28 - 136	
			C13-234678 HexaCDF	2015/12/10		58	%	29 - 147	
			C13-23478 PentaCDF	2015/12/10		70	%	21 - 178	
			C13-2378 TetraCDD	2015/12/10		57	%	24 - 164	
			C13-2378 TetraCDF	2015/12/10		65	%	24 - 169	
			C13-OCDD	2015/12/10		48	%	17 - 157	
			2,3,7,8-Tetra CDD	2015/12/10		<1.23, EDL=1.23			pg/L
			1,2,3,7,8-Penta CDD	2015/12/10		<1.31, EDL=1.31			pg/L



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/12/10	<1.30, EDL=1.30		pg/L	
			1,2,3,6,7,8-Hexa CDD	2015/12/10	<1.36, EDL=1.36		pg/L	
			1,2,3,7,8,9-Hexa CDD	2015/12/10	<1.24, EDL=1.24		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2015/12/10	<1.24, EDL=1.24		pg/L	
			Octa CDD	2015/12/10	<1.78, EDL=1.78 (1)		pg/L	
			Total Tetra CDD	2015/12/10	<2.91, EDL=2.91 (1)		pg/L	
			Total Penta CDD	2015/12/10	<1.31, EDL=1.31		pg/L	
			Total Hexa CDD	2015/12/10	<2.76, EDL=2.76 (1)		pg/L	
			Total Hepta CDD	2015/12/10	<1.24, EDL=1.24		pg/L	
			2,3,7,8-Tetra CDF	2015/12/10	<1.14, EDL=1.14		pg/L	
			1,2,3,7,8-Penta CDF	2015/12/10	<1.32, EDL=1.32		pg/L	
			2,3,4,7,8-Penta CDF	2015/12/10	<1.28, EDL=1.28		pg/L	
			1,2,3,4,7,8-Hexa CDF	2015/12/10	<1.25, EDL=1.25		pg/L	
			1,2,3,6,7,8-Hexa CDF	2015/12/10	<1.29, EDL=1.29		pg/L	
			2,3,4,6,7,8-Hexa CDF	2015/12/10	<1.20, EDL=1.20		pg/L	
			1,2,3,7,8,9-Hexa CDF	2015/12/10	<1.25, EDL=1.25		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2015/12/10	<1.14, EDL=1.14		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2015/12/10	<1.12, EDL=1.12		pg/L	
			Octa CDF	2015/12/10	<1.32, EDL=1.32		pg/L	
			Total Tetra CDF	2015/12/10	<1.14, EDL=1.14		pg/L	
			Total Penta CDF	2015/12/10	<1.30, EDL=1.30		pg/L	
			Total Hexa CDF	2015/12/10	<1.25, EDL=1.25		pg/L	
			Total Hepta CDF	2015/12/10	<1.13, EDL=1.13		pg/L	
4305340	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/12/22	NC		%	25
			1,2,3,7,8-Penta CDD	2015/12/22	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/22	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/22	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/22	NC		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2015/12/22	NC		%	25
			Octa CDD	2015/12/22	NC		%	25
			Total Tetra CDD	2015/12/22	NC		%	25
			Total Penta CDD	2015/12/22	NC		%	25
			Total Hexa CDD	2015/12/22	NC		%	25
			Total Hepta CDD	2015/12/22	NC		%	25
			2,3,7,8-Tetra CDF	2015/12/22	NC		%	25
			1,2,3,7,8-Penta CDF	2015/12/22	NC		%	25
			2,3,4,7,8-Penta CDF	2015/12/22	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/22	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/22	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/22	NC		%	25
			Octa CDF	2015/12/22	NC		%	25
			Total Tetra CDF	2015/12/22	NC		%	25
			Total Penta CDF	2015/12/22	NC		%	25
			Total Hexa CDF	2015/12/22	NC		%	25
			Total Hepta CDF	2015/12/22	NC		%	25
			2,3,7,8-Tetra CDD	2015/12/22	NC		%	25
			1,2,3,7,8-Penta CDD	2015/12/22	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/22	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/22	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/22	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/22	NC		%	25
			Octa CDD	2015/12/22	NC		%	25
			Total Tetra CDD	2015/12/22	NC		%	25
			Total Penta CDD	2015/12/22	NC		%	25
			Total Hexa CDD	2015/12/22	22		%	25
			Total Hepta CDD	2015/12/22	NC		%	25
			2,3,7,8-Tetra CDF	2015/12/22	NC		%	25
			1,2,3,7,8-Penta CDF	2015/12/22	NC		%	25
			2,3,4,7,8-Penta CDF	2015/12/22	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/22	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/22	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/22	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/22	NC		%	25
			Octa CDF	2015/12/22	NC		%	25
			Total Tetra CDF	2015/12/22	NC		%	25
			Total Penta CDF	2015/12/22	NC		%	25
			Total Hexa CDF	2015/12/22	15		%	25
			Total Hepta CDF	2015/12/22	NC		%	25

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.


Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5K0059  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/01/13**  
Report #: R3850104  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5P4731**

**Received: 2015/12/10, 15:15**

Sample Matrix: Soil  
# Samples Received: 7

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	7	2015/12/14	2015/12/23	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	4	N/A	2015/12/24	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	3	N/A	2016/01/12	BRL SOP-00406	EPA M8290A / M1613
Moisture	7	N/A	2015/12/14	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		BMU551	BMU552	BMU553	BMU554			
Sampling Date		2015/11/02 09:50	2015/11/02 10:40	2015/11/02 11:30	2015/11/02 12:25			
COC Number		na	na	na	na			
	UNITS	SBS-ROW029BS-1.5	SBS-ROW010W-1.5	SBS-ROW010E-0.5	SBS-ROW022W-1.5	RDL	MDL	QC Batch
Moisture	%	23	18	9.4	19	1.0	0.50	4312435
RDL = Reportable Detection Limit								
QC Batch = Quality Control Batch								

Maxxam ID		BMU555	BMU556	BMU557			
Sampling Date		2015/11/02 12:45	2015/11/02 12:45	2015/11/02 14:20			
COC Number		na	na	na			
	UNITS	SBS-ROW022E-0.5	SBS-ROW022E-0.5-DUP	SBS-ROW033W-1.5	RDL	MDL	QC Batch
Moisture	%	19	32	21	1.0	0.50	4312435
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU551							
Sampling Date		2015/11/02 09:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029BS-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.304	0.106	0.200	0.0400	1.00	0.304		4321122
1,2,3,7,8-Penta CDD *	pg/g	0.271	0.0931	1.00	0.0400	1.00	0.271		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	0.608	0.103	1.00	0.0400	0.100	0.0608		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	2.37	0.108	1.00	0.0400	0.100	0.237		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	1.69	0.0988	1.00	0.0400	0.100	0.169		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	55.6	0.107	1.00	0.0400	0.0100	0.556		4321122
Octa CDD *	pg/g	365	0.0988	2.00	0.0800	0.000300	0.110		4321122
Total Tetra CDD *	pg/g	0.663	0.106	0.200	0.0400			3	4321122
Total Penta CDD *	pg/g	0.753	0.0931	1.00	0.0400			4	4321122
Total Hexa CDD *	pg/g	11.9	0.103	1.00	0.0400			6	4321122
Total Hepta CDD *	pg/g	94.8	0.107	1.00	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	<0.213 (1)	0.213	0.200	0.0400	0.100	0.0213		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.261	0.101	1.00	0.0400	0.0300	0.00783		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.276	0.0992	1.00	0.0400	0.300	0.0828		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	1.31	0.104	1.00	0.0400	0.100	0.131		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	0.540	0.108	1.00	0.0400	0.100	0.0540		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	0.371	0.101	1.00	0.0400	0.100	0.0371		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.124	0.104	1.00	0.0400	0.100	0.0124		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	8.46	0.107	1.00	0.0400	0.0100	0.0846		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.797	0.106	1.00	0.0400	0.0100	0.00797		4321122
Octa CDF **	pg/g	20.9	0.105	2.00	0.0800	0.000300	0.00627		4321122
Total Tetra CDF **	pg/g	1.46	0.0998	0.200	0.0400			6	4321122
Total Penta CDF **	pg/g	4.86	0.100	1.00	0.0400			7	4321122
Total Hexa CDF **	pg/g	12.5	0.104	1.00	0.0400			9	4321122
Total Hepta CDF **	pg/g	24.6	0.107	1.00	0.0400			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.19	0.11	1.0	0.90	0.100	0.0190		4341388
TOTAL TOXIC EQUIVALENCY	pg/g						2.15		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	84							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU551							
Sampling Date		2015/11/02 09:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW029BS-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	78							4321122
C13-1234678 HeptaCDF **	%	78							4321122
C13-123478 HexaCDD *	%	88							4321122
C13-123478 HexaCDF **	%	93							4321122
C13-1234789 HeptaCDF **	%	74							4321122
C13-123678 HexaCDD *	%	91							4321122
C13-123678 HexaCDF **	%	92							4321122
C13-12378 PentaCDD *	%	94							4321122
C13-12378 PentaCDF **	%	73							4321122
C13-123789 HexaCDF **	%	104							4321122
C13-234678 HexaCDF **	%	87							4321122
C13-23478 PentaCDF **	%	91							4321122
C13-2378 TetraCDD *	%	82							4321122
C13-2378 TetraCDF **	%	82							4321122
C13-OCDD *	%	78							4321122
Confirmation C13-2378 TetraCDF **	%	45							4341388

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU552							
Sampling Date		2015/11/02 10:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW010W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.0968	0.0968	0.200	0.0400	1.00	0.0968		4321122
1,2,3,7,8-Penta CDD *	pg/g	0.163	0.0996	0.999	0.0400	1.00	0.163		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	0.351	0.107	0.999	0.0400	0.100	0.0351		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	1.19	0.113	0.999	0.0400	0.100	0.119		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	0.847	0.103	0.999	0.0400	0.100	0.0847		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	27.5	0.0980	0.999	0.0400	0.0100	0.275		4321122
Octa CDD *	pg/g	157	0.0986	2.00	0.0800	0.000300	0.0471		4321122
Total Tetra CDD *	pg/g	0.245	0.0968	0.200	0.0400			1	4321122
Total Penta CDD *	pg/g	0.505	0.0996	0.999	0.0400			3	4321122
Total Hexa CDD *	pg/g	6.26	0.108	0.999	0.0400			6	4321122
Total Hepta CDD *	pg/g	46.3	0.0980	0.999	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	0.210	0.0940	0.200	0.0400	0.100	0.0210		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.185	0.0999	0.999	0.0400	0.0300	0.00555		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.209	0.0985	0.999	0.0400	0.300	0.0627		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	0.784	0.0973	0.999	0.0400	0.100	0.0784		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	0.419	0.101	0.999	0.0400	0.100	0.0419		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	0.448	0.0940	0.999	0.0400	0.100	0.0448		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.106	0.0975	0.999	0.0400	0.100	0.0106		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	5.45	0.108	0.999	0.0400	0.0100	0.0545		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.393	0.106	0.999	0.0400	0.0100	0.00393		4321122
Octa CDF **	pg/g	11.1	0.110	2.00	0.0800	0.000300	0.00333		4321122
Total Tetra CDF **	pg/g	2.30	0.0940	0.200	0.0400			6	4321122
Total Penta CDF **	pg/g	7.29	0.0992	0.999	0.0400			7	4321122
Total Hexa CDF **	pg/g	10.7	0.0973	0.999	0.0400			9	4321122
Total Hepta CDF **	pg/g	14.2	0.107	0.999	0.0400			3	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.15	0.13	1.0	0.90	0.100	0.0150		4341388
TOTAL TOXIC EQUIVALENCY	pg/g						1.14		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4321122
C13-1234678 HeptaCDD *	%	85							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU552							
Sampling Date		2015/11/02 10:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW010W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	85							4321122
C13-123478 HexaCDD *	%	101							4321122
C13-123478 HexaCDF **	%	102							4321122
C13-1234789 HeptaCDF **	%	84							4321122
C13-123678 HexaCDD *	%	107							4321122
C13-123678 HexaCDF **	%	114							4321122
C13-12378 PentaCDD *	%	106							4321122
C13-12378 PentaCDF **	%	83							4321122
C13-123789 HexaCDF **	%	116							4321122
C13-234678 HexaCDF **	%	99							4321122
C13-23478 PentaCDF **	%	104							4321122
C13-2378 TetraCDD *	%	93							4321122
C13-2378 TetraCDF **	%	91							4321122
C13-OCDD *	%	84							4321122
Confirmation C13-2378 TetraCDF **	%	100							4341388

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU553							
Sampling Date		2015/11/02 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW010E-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.66	0.105	0.200	0.0400	1.00	1.66		4321122
1,2,3,7,8-Penta CDD *	pg/g	3.17	0.101	0.999	0.0400	1.00	3.17		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	6.84	0.0923	0.999	0.0400	0.100	0.684		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	29.8	0.0971	0.999	0.0400	0.100	2.98		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	16.3	0.0887	0.999	0.0400	0.100	1.63		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	561	0.105	0.999	0.0400	0.0100	5.61		4321122
Octa CDD *	pg/g	2580	0.0913	2.00	0.0800	0.000300	0.774		4321122
Total Tetra CDD *	pg/g	7.33	0.105	0.200	0.0400			11	4321122
Total Penta CDD *	pg/g	20.3	0.101	0.999	0.0400			12	4321122
Total Hexa CDD *	pg/g	150	0.0928	0.999	0.0400			7	4321122
Total Hepta CDD *	pg/g	974	0.105	0.999	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	3.28	0.102	0.200	0.0400	0.100	0.328		4321122
1,2,3,7,8-Penta CDF **	pg/g	3.08	0.0972	0.999	0.0400	0.0300	0.0924		4321122
2,3,4,7,8-Penta CDF **	pg/g	5.85	0.0958	0.999	0.0400	0.300	1.76		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	19.9	0.0963	0.999	0.0400	0.100	1.99		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	10.7	0.0995	0.999	0.0400	0.100	1.07		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	8.94	0.0930	0.999	0.0400	0.100	0.894		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.512	0.0964	0.999	0.0400	0.100	0.0512		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	101	0.100	0.999	0.0400	0.0100	1.01		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.69	0.0990	0.999	0.0400	0.0100	0.0669		4321122
Octa CDF **	pg/g	134	0.101	2.00	0.0800	0.000300	0.0402		4321122
Total Tetra CDF **	pg/g	66.8	0.102	0.200	0.0400			17	4321122
Total Penta CDF **	pg/g	248	0.0965	0.999	0.0400			11	4321122
Total Hexa CDF **	pg/g	294	0.0962	0.999	0.0400			12	4321122
Total Hepta CDF **	pg/g	290	0.0996	0.999	0.0400			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.42	0.12	1.0	0.90	0.100	0.142		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						23.6		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	98							4321122
C13-1234678 HeptaCDD *	%	97							4321122

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU553							
Sampling Date		2015/11/02 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW010E-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	82							4321122
C13-123478 HexaCDD *	%	95							4321122
C13-123478 HexaCDF **	%	98							4321122
C13-1234789 HeptaCDF **	%	83							4321122
C13-123678 HexaCDD *	%	104							4321122
C13-123678 HexaCDF **	%	103							4321122
C13-12378 PentaCDD *	%	112							4321122
C13-12378 PentaCDF **	%	89							4321122
C13-123789 HexaCDF **	%	110							4321122
C13-234678 HexaCDF **	%	99							4321122
C13-23478 PentaCDF **	%	113							4321122
C13-2378 TetraCDD *	%	95							4321122
C13-2378 TetraCDF **	%	92							4321122
C13-OCDD *	%	86							4321122
Confirmation C13-2378 TetraCDF **	%	92							4330862

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\*\* CDF = Chloro Dibenzo-p-Furan

\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU554							
Sampling Date		2015/11/02 12:25							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.161	0.103	0.200	0.0400	1.00	0.161		4321122
1,2,3,7,8-Penta CDD *	pg/g	0.505	0.0978	1.00	0.0400	1.00	0.505		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	1.44	0.105	1.00	0.0400	0.100	0.144		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	6.35	0.110	1.00	0.0400	0.100	0.635		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	3.51	0.101	1.00	0.0400	0.100	0.351		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	154	0.0971	1.00	0.0400	0.0100	1.54		4321122
Octa CDD *	pg/g	1130	0.0936	2.00	0.0800	0.000300	0.339		4321122
Total Tetra CDD *	pg/g	1.07	0.103	0.200	0.0400			3	4321122
Total Penta CDD *	pg/g	2.70	0.0978	1.00	0.0400			7	4321122
Total Hexa CDD *	pg/g	31.5	0.106	1.00	0.0400			7	4321122
Total Hepta CDD *	pg/g	265	0.0971	1.00	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	0.503	0.105	0.200	0.0400	0.100	0.0503		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.471	0.105	1.00	0.0400	0.0300	0.0141		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.975	0.103	1.00	0.0400	0.300	0.293		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	3.41	0.105	1.00	0.0400	0.100	0.341		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	1.85	0.108	1.00	0.0400	0.100	0.185		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	1.44	0.101	1.00	0.0400	0.100	0.144		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.105	0.105	1.00	0.0400	0.100	0.0105		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	27.6	0.109	1.00	0.0400	0.0100	0.276		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.83	0.107	1.00	0.0400	0.0100	0.0183		4321122
Octa CDF **	pg/g	73.3	0.107	2.00	0.0800	0.000300	0.0220		4321122
Total Tetra CDF **	pg/g	8.05	0.105	0.200	0.0400			10	4321122
Total Penta CDF **	pg/g	31.8	0.104	1.00	0.0400			10	4321122
Total Hexa CDF **	pg/g	52.4	0.105	1.00	0.0400			9	4321122
Total Hepta CDF **	pg/g	78.6	0.108	1.00	0.0400			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.21 (1)	0.21	1.0	0.90	0.100	0.0210		4341388
TOTAL TOXIC EQUIVALENCY	pg/g						5.00		

**Surrogate Recovery (%)**

37CL4 2378 Tetra CDD *	%	91							4321122
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EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin

\*\* CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU554							
Sampling Date		2015/11/02 12:25							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	73							4321122
C13-1234678 HeptaCDF **	%	73							4321122
C13-123478 HexaCDD *	%	87							4321122
C13-123478 HexaCDF **	%	89							4321122
C13-1234789 HeptaCDF **	%	72							4321122
C13-123678 HexaCDD *	%	90							4321122
C13-123678 HexaCDF **	%	89							4321122
C13-12378 PentaCDD *	%	91							4321122
C13-12378 PentaCDF **	%	71							4321122
C13-123789 HexaCDF **	%	98							4321122
C13-234678 HexaCDF **	%	86							4321122
C13-23478 PentaCDF **	%	89							4321122
C13-2378 TetraCDD *	%	80							4321122
C13-2378 TetraCDF **	%	80							4321122
C13-OCDD *	%	74							4321122
Confirmation C13-2378 TetraCDF **	%	87							4341388

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 \*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU555							
Sampling Date		2015/11/02 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022E-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.432	0.0962	0.200	0.0400	1.00	0.432		4321122
1,2,3,7,8-Penta CDD *	pg/g	4.13	0.0983	1.00	0.0400	1.00	4.13		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	14.9	0.103	1.00	0.0400	0.100	1.49		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	67.5	0.108	1.00	0.0400	0.100	6.75		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	34.9	0.0989	1.00	0.0400	0.100	3.49		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1250	0.0933	1.00	0.0400	0.0100	12.5		4321122
Octa CDD *	pg/g	3690	0.101	2.00	0.0800	0.000300	1.11		4321122
Total Tetra CDD *	pg/g	5.28	0.0962	0.200	0.0400			9	4321122
Total Penta CDD *	pg/g	21.9	0.0983	1.00	0.0400			11	4321122
Total Hexa CDD *	pg/g	310	0.104	1.00	0.0400			7	4321122
Total Hepta CDD *	pg/g	2060	0.0933	1.00	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	2.34	0.101	0.200	0.0400	0.100	0.234		4321122
1,2,3,7,8-Penta CDF **	pg/g	4.69	0.0963	1.00	0.0400	0.0300	0.141		4321122
2,3,4,7,8-Penta CDF **	pg/g	7.66	0.0949	1.00	0.0400	0.300	2.30		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	39.5	0.0955	1.00	0.0400	0.100	3.95		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	17.0	0.0987	1.00	0.0400	0.100	1.70		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	11.2	0.0923	1.00	0.0400	0.100	1.12		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.560	0.0957	1.00	0.0400	0.100	0.0560		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	224	0.0987	1.00	0.0400	0.0100	2.24		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	13.6	0.0975	1.00	0.0400	0.0100	0.136		4321122
Octa CDF **	pg/g	324	0.0995	2.00	0.0800	0.000300	0.0972		4321122
Total Tetra CDF **	pg/g	38.1	0.101	0.200	0.0400			15	4321122
Total Penta CDF **	pg/g	220	0.0956	1.00	0.0400			12	4321122
Total Hexa CDF **	pg/g	459	0.0955	1.00	0.0400			11	4321122
Total Hepta CDF **	pg/g	624	0.0981	1.00	0.0400			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.42	0.11	1.0	0.90	0.100	0.142		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						41.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	104							4321122
C13-1234678 HeptaCDD *	%	98							4321122

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU555							
Sampling Date		2015/11/02 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022E-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	80							4321122
C13-123478 HexaCDD *	%	92							4321122
C13-123478 HexaCDF **	%	96							4321122
C13-1234789 HeptaCDF **	%	82							4321122
C13-123678 HexaCDD *	%	100							4321122
C13-123678 HexaCDF **	%	108							4321122
C13-12378 PentaCDD *	%	104							4321122
C13-12378 PentaCDF **	%	78							4321122
C13-123789 HexaCDF **	%	108							4321122
C13-234678 HexaCDF **	%	93							4321122
C13-23478 PentaCDF **	%	98							4321122
C13-2378 TetraCDD *	%	88							4321122
C13-2378 TetraCDF **	%	86							4321122
C13-OCDD *	%	85							4321122
Confirmation C13-2378 TetraCDF **	%	87							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU556							
Sampling Date		2015/11/02 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022E-0.5-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.449	0.0998	0.200	0.0400	1.00	0.449		4321122
1,2,3,7,8-Penta CDD *	pg/g	4.62	0.102	0.999	0.0400	1.00	4.62		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	14.3	0.0996	0.999	0.0400	0.100	1.43		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	72.6	0.105	0.999	0.0400	0.100	7.26		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	35.1	0.0958	0.999	0.0400	0.100	3.51		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1600	0.103	0.999	0.0400	0.0100	16.0		4321122
Octa CDD *	pg/g	3210	0.0971	2.00	0.0799	0.000300	0.963		4321122
Total Tetra CDD *	pg/g	5.41	0.0998	0.200	0.0400			9	4321122
Total Penta CDD *	pg/g	18.1	0.102	0.999	0.0400			10	4321122
Total Hexa CDD *	pg/g	319	0.100	0.999	0.0400			7	4321122
Total Hepta CDD *	pg/g	2760	0.103	0.999	0.0400			2	4321122
2,3,7,8-Tetra CDF **	pg/g	2.68	0.100	0.200	0.0400	0.100	0.268		4321122
1,2,3,7,8-Penta CDF **	pg/g	5.02	0.0979	0.999	0.0400	0.0300	0.151		4321122
2,3,4,7,8-Penta CDF **	pg/g	8.08	0.0965	0.999	0.0400	0.300	2.42		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	41.1	0.102	0.999	0.0400	0.100	4.11		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	19.6	0.105	0.999	0.0400	0.100	1.96		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	12.7	0.0984	0.999	0.0400	0.100	1.27		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.717	0.102	0.999	0.0400	0.100	0.0717		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	218	0.105	0.999	0.0400	0.0100	2.18		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	14.3	0.104	0.999	0.0400	0.0100	0.143		4321122
Octa CDF **	pg/g	325	0.108	2.00	0.0799	0.000300	0.0975		4321122
Total Tetra CDF **	pg/g	28.7	0.100	0.200	0.0400			13	4321122
Total Penta CDF **	pg/g	199	0.0972	0.999	0.0400			10	4321122
Total Hexa CDF **	pg/g	483	0.102	0.999	0.0400			11	4321122
Total Hepta CDF **	pg/g	597	0.105	0.999	0.0400			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.35	0.11	1.0	0.90	0.100	0.135		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						46.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	102							4321122
C13-1234678 HeptaCDD *	%	92							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU556							
Sampling Date		2015/11/02 12:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW022E-0.5-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	94							4321122
C13-123478 HexaCDD *	%	110							4321122
C13-123478 HexaCDF **	%	110							4321122
C13-1234789 HeptaCDF **	%	94							4321122
C13-123678 HexaCDD *	%	112							4321122
C13-123678 HexaCDF **	%	111							4321122
C13-12378 PentaCDD *	%	113							4321122
C13-12378 PentaCDF **	%	89							4321122
C13-123789 HexaCDF **	%	125							4321122
C13-234678 HexaCDF **	%	106							4321122
C13-23478 PentaCDF **	%	110							4321122
C13-2378 TetraCDD *	%	98							4321122
C13-2378 TetraCDF **	%	97							4321122
C13-OCDD *	%	100							4321122
Confirmation C13-2378 TetraCDF **	%	99							4330862

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\*\* CDF = Chloro Dibenzo-p-Furan

\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU557							
Sampling Date		2015/11/02 14:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW033W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.604	0.109	0.199	0.0399	1.00	0.604		4321122
1,2,3,7,8-Penta CDD *	pg/g	3.81	0.109	0.997	0.0399	1.00	3.81		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	6.10	0.0962	0.997	0.0399	0.100	0.610		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	25.5	0.101	0.997	0.0399	0.100	2.55		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	13.5	0.0925	0.997	0.0399	0.100	1.35		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	463	0.101	0.997	0.0399	0.0100	4.63		4321122
Octa CDD *	pg/g	2880	0.0999	1.99	0.0797	0.000300	0.864		4321122
Total Tetra CDD *	pg/g	12.7	0.109	0.199	0.0399			12	4321122
Total Penta CDD *	pg/g	38.4	0.109	0.997	0.0399			12	4321122
Total Hexa CDD *	pg/g	154	0.0967	0.997	0.0399			7	4321122
Total Hepta CDD *	pg/g	849	0.101	0.997	0.0399			2	4321122
2,3,7,8-Tetra CDF **	pg/g	6.32	0.109	0.199	0.0399	0.100	0.632		4321122
1,2,3,7,8-Penta CDF **	pg/g	3.17	0.140	0.997	0.0399	0.0300	0.0951		4321122
2,3,4,7,8-Penta CDF **	pg/g	12.0	0.138	0.997	0.0399	0.300	3.60		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	22.4	0.109	0.997	0.0399	0.100	2.24		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	22.3	0.113	0.997	0.0399	0.100	2.23		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	25.7	0.106	0.997	0.0399	0.100	2.57		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.278	0.110	0.997	0.0399	0.100	0.0278		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	107	0.105	0.997	0.0399	0.0100	1.07		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	8.10	0.104	0.997	0.0399	0.0100	0.0810		4321122
Octa CDF **	pg/g	202	0.102	1.99	0.0797	0.000300	0.0606		4321122
Total Tetra CDF **	pg/g	277	0.109	0.199	0.0399			16	4321122
Total Penta CDF **	pg/g	1010	0.139	0.997	0.0399			11	4321122
Total Hexa CDF **	pg/g	780	0.109	0.997	0.0399			11	4321122
Total Hepta CDF **	pg/g	304	0.104	0.997	0.0399			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.82	0.10	1.0	0.90	0.100	0.182		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						26.6		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	74							4321122
C13-1234678 HeptaCDD *	%	63							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU557							
Sampling Date		2015/11/02 14:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW033W-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	64							4321122
C13-123478 HexaCDD *	%	75							4321122
C13-123478 HexaCDF **	%	79							4321122
C13-1234789 HeptaCDF **	%	66							4321122
C13-123678 HexaCDD *	%	83							4321122
C13-123678 HexaCDF **	%	88							4321122
C13-12378 PentaCDD *	%	82							4321122
C13-12378 PentaCDF **	%	63							4321122
C13-123789 HexaCDF **	%	87							4321122
C13-234678 HexaCDF **	%	75							4321122
C13-23478 PentaCDF **	%	80							4321122
C13-2378 TetraCDD *	%	69							4321122
C13-2378 TetraCDF **	%	67							4321122
C13-OCDD *	%	67							4321122
Confirmation C13-2378 TetraCDF **	%	69							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin

**TEST SUMMARY**

**Maxxam ID:** BMU551  
**Sample ID:** SBS-ROW029BS-1.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4341388	N/A	2016/01/12	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU552  
**Sample ID:** SBS-ROW010W-1.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4341388	N/A	2016/01/12	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU552 Dup  
**Sample ID:** SBS-ROW010W-1.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4341388	N/A	2016/01/12	Vica Cioranic

**Maxxam ID:** BMU553  
**Sample ID:** SBS-ROW010E-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU554  
**Sample ID:** SBS-ROW022W-1.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4341388	N/A	2016/01/12	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU555  
**Sample ID:** SBS-ROW022E-0.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani



**TEST SUMMARY**

**Maxxam ID:** BMU556  
**Sample ID:** SBS-ROW022E-0.5-DUP  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU557  
**Sample ID:** SBS-ROW033W-1.5  
**Matrix:** Soil

**Collected:** 2015/11/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312435	N/A	2015/12/14	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.6°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4312435	VGS	RPD - Sample/Sample Dup	Moisture	2015/12/14	0.74		%	20
4321122	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/12/18		92	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		74	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		82	%	28 - 143
			C13-123478 HexaCDD	2015/12/18		85	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		89	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		79	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		84	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		107	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		92	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		104	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		91	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		114	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		89	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		96	%	24 - 169
			C13-OCDD	2015/12/18		78	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18		102	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/12/18		86	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/12/18		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/12/18		108	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/12/18		121	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18		116	%	70 - 140
			Octa CDD	2015/12/18		105	%	78 - 144
			2,3,7,8-Tetra CDF	2015/12/18		99	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/12/18		96	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/12/18		85	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/12/18		105	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/12/18		100	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/12/18		114	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/12/18		88	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18		113	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18		103	%	78 - 138
			Octa CDF	2015/12/18		114	%	63 - 170
4321122	OBC	RPD	2,3,7,8-Tetra CDD	2015/12/18	7.5		%	25
			1,2,3,7,8-Penta CDD	2015/12/18	5.6		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/18	5.7		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/18	5.4		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/18	9.4		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	3.4		%	25
			Octa CDD	2015/12/18	3.7		%	25
			2,3,7,8-Tetra CDF	2015/12/18	4.9		%	25
			1,2,3,7,8-Penta CDF	2015/12/18	5.1		%	25
			2,3,4,7,8-Penta CDF	2015/12/18	4.6		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/18	4.7		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/18	9.5		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/18	2.6		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/18	3.4		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	8.5 (1)		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	4.7		%	25
			Octa CDF	2015/12/18	2.6		%	25
4321122	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/12/18		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		77	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		78	%	28 - 143

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2015/12/18		76	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		85	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		68	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		85	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		99	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		83	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		96	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		85	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		107	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		91	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		94	%	24 - 169
			C13-OCDD	2015/12/18		64	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDD	2015/12/18	<0.0653, EDL=0.0653		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/12/18	<0.0720, EDL=0.0720		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/12/18	0.0940, EDL=0.0757		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/12/18	0.112, EDL=0.0692		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	0.156, EDL=0.0689		pg/g	
			Octa CDD	2015/12/18	0.427, EDL=0.123		pg/g	
			Total Tetra CDD	2015/12/18	<0.211, EDL=0.211 (2)		pg/g	
			Total Penta CDD	2015/12/18	<0.123, EDL=0.123 (2)		pg/g	
			Total Hexa CDD	2015/12/18	0.206, EDL=0.0724		pg/g	
			Total Hepta CDD	2015/12/18	0.256, EDL=0.0689		pg/g	
			2,3,7,8-Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			1,2,3,7,8-Penta CDF	2015/12/18	0.147, EDL=0.0948		pg/g	
			2,3,4,7,8-Penta CDF	2015/12/18	<0.0934, EDL=0.0934		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/12/18	0.166, EDL=0.0822		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/12/18	0.120, EDL=0.0849		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/12/18	0.112, EDL=0.0794		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/12/18	0.151, EDL=0.0823		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	0.239, EDL=0.0655		pg/g	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	0.134, EDL=0.0648		pg/g	
			Octa CDF	2015/12/18	0.265, EDL=0.117		pg/g	
			Total Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			Total Penta CDF	2015/12/18	0.147, EDL=0.0941		pg/g	
			Total Hexa CDF	2015/12/18	0.549, EDL=0.0821		pg/g	
			Total Hepta CDF	2015/12/18	0.373, EDL=0.0652		pg/g	
4321122	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDD	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/23	4.0		%	25
			Octa CDD	2015/12/23	5.4		%	25
			Total Tetra CDD	2015/12/23	NC		%	25
			Total Penta CDD	2015/12/23	NC		%	25
			Total Hexa CDD	2015/12/23	1.2		%	25
			Total Hepta CDD	2015/12/23	0.40		%	25
			2,3,7,8-Tetra CDF	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDF	2015/12/23	NC		%	25
			2,3,4,7,8-Penta CDF	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/23	3.7		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/23	NC		%	25
			Octa CDF	2015/12/23	4.5		%	25
			Total Tetra CDF	2015/12/23	14		%	25
			Total Penta CDF	2015/12/23	5.1		%	25
			Total Hexa CDF	2015/12/23	4.9		%	25
			Total Hepta CDF	2015/12/23	6.4		%	25
4330862	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/12/24	<0.094, EDL=0.094		pg/g	
			Confirmation C13-2378 TetraCDF	2015/12/24		79	%	40 - 135
4341388	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/01/12	<0.087, EDL=0.087		pg/g	
			Confirmation C13-2378 TetraCDF	2016/01/12		107	%	40 - 135

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4341388	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/01/12	NC		%	100

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery meets EPA 1613B acceptance criteria

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



\_\_\_\_\_  
Cristina Carriere, Scientific Services



\_\_\_\_\_  
Cathy Xu, Senior Analyst, HRMS Services, Senior Analyst, HRMS Services



\_\_\_\_\_  
Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5K0831  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/01/12**  
Report #: R3847667  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5P4754**

**Received: 2015/12/10, 15:15**

Sample Matrix: Soil  
# Samples Received: 4

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	2	2015/12/14	2015/12/23	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	2	2015/12/14	2015/12/24	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	4	N/A	2015/12/24	BRL SOP-00406	EPA M8290A / M1613
Moisture	4	N/A	2015/12/14	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		BMU623	BMU624	BMU625			
Sampling Date		2015/11/20 09:15	2015/11/20 10:20	2015/11/20 11:00			
COC Number		na	na	na			
	UNITS	ISM-A0I009-0.5-AFTER ISM	COMP-A0I001-0.5	ISM-A0I002-0.5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	2.5	24	2.1	1.0	0.50	4312642
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

Maxxam ID		BMU626			
Sampling Date		2015/11/20 11:30			
COC Number		na			
	UNITS	ISM-A0I037-0.5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	2.0	1.0	0.50	4312642
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU623							
Sampling Date		2015/11/20 09:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01009-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.12	0.0705	0.130	0.0261	1.00	1.12		4321122
1,2,3,7,8-Penta CDD *	pg/g	0.627	0.0699	0.652	0.0261	1.00	0.627		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	1.55	0.0684	0.652	0.0261	0.100	0.155		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	5.35	0.0719	0.652	0.0261	0.100	0.535		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	3.75	0.0657	0.652	0.0261	0.100	0.375		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	124	0.0672	0.652	0.0261	0.0100	1.24		4321122
Octa CDD *	pg/g	841	0.0736	1.30	0.0522	0.000300	0.252		4321122
Total Tetra CDD *	pg/g	2.82	0.0705	0.130	0.0261			6	4321122
Total Penta CDD *	pg/g	4.06	0.0699	0.652	0.0261			11	4321122
Total Hexa CDD *	pg/g	31.1	0.0688	0.652	0.0261			7	4321122
Total Hepta CDD *	pg/g	216	0.0672	0.652	0.0261			2	4321122
2,3,7,8-Tetra CDF **	pg/g	0.612	0.0669	0.130	0.0261	0.100	0.0612		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.414	0.0688	0.652	0.0261	0.0300	0.0124		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.814	0.0678	0.652	0.0261	0.300	0.244		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	6.79	0.0679	0.652	0.0261	0.100	0.679		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	1.54	0.0702	0.652	0.0261	0.100	0.154		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	1.05	0.0656	0.652	0.0261	0.100	0.105		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.118	0.0680	0.652	0.0261	0.100	0.0118		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	28.8	0.0692	0.652	0.0261	0.0100	0.288		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.33	0.0684	0.652	0.0261	0.0100	0.0233		4321122
Octa CDF **	pg/g	62.2	0.0775	1.30	0.0522	0.000300	0.0187		4321122
Total Tetra CDF **	pg/g	5.27	0.0669	0.130	0.0261			16	4321122
Total Penta CDF **	pg/g	12.9	0.0683	0.652	0.0261			8	4321122
Total Hexa CDF **	pg/g	46.0	0.0679	0.652	0.0261			10	4321122
Total Hepta CDF **	pg/g	81.1	0.0688	0.652	0.0261			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.404	0.072	0.65	0.59	0.100	0.0404		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						5.88		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	85							4321122
C13-1234678 HeptaCDD *	%	73							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU623							
Sampling Date		2015/11/20 09:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01009-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	70							4321122
C13-123478 HexaCDD *	%	83							4321122
C13-123478 HexaCDF **	%	84							4321122
C13-1234789 HeptaCDF **	%	68							4321122
C13-123678 HexaCDD *	%	91							4321122
C13-123678 HexaCDF **	%	96							4321122
C13-12378 PentaCDD *	%	88							4321122
C13-12378 PentaCDF **	%	68							4321122
C13-123789 HexaCDF **	%	95							4321122
C13-234678 HexaCDF **	%	81							4321122
C13-23478 PentaCDF **	%	84							4321122
C13-2378 TetraCDD *	%	80							4321122
C13-2378 TetraCDF **	%	79							4321122
C13-OCDD *	%	78							4321122
Confirmation C13-2378 TetraCDF **	%	81							4330862

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\*\* CDF = Chloro Dibenzo-p-Furan

\* CDD = Chloro Dibenzo-p-Dioxin

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU624							
Sampling Date		2015/11/20 10:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	COMP-A01001-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.09	0.0406	0.0777	0.0155	1.00	1.09		4321122
1,2,3,7,8-Penta CDD *	pg/g	11.8	0.0410	0.389	0.0155	1.00	11.8		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	25.5	0.0408	0.389	0.0155	0.100	2.55		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	110	0.0429	0.389	0.0155	0.100	11.0		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	63.7	0.0392	0.389	0.0155	0.100	6.37		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	992	0.0416	0.389	0.0155	0.0100	9.92		4321122
Octa CDD *	pg/g	2130 (1)	0.0428	0.777	0.0311	0.000300	0.639		4321122
Total Tetra CDD *	pg/g	11.6	0.0406	0.0777	0.0155			15	4321122
Total Penta CDD *	pg/g	44.6	0.0410	0.389	0.0155			12	4321122
Total Hexa CDD *	pg/g	451	0.0410	0.389	0.0155			7	4321122
Total Hepta CDD *	pg/g	1830	0.0416	0.389	0.0155			2	4321122
2,3,7,8-Tetra CDF **	pg/g	3.56	0.0395	0.0777	0.0155	0.100	0.356		4321122
1,2,3,7,8-Penta CDF **	pg/g	4.53	0.0411	0.389	0.0155	0.0300	0.136		4321122
2,3,4,7,8-Penta CDF **	pg/g	5.48	0.0405	0.389	0.0155	0.300	1.64		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	29.4	0.0413	0.389	0.0155	0.100	2.94		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	<15.1 (2)	15.1	0.389	0.0155	0.100	1.51		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	9.61	0.0399	0.389	0.0155	0.100	0.961		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.615	0.0414	0.389	0.0155	0.100	0.0615		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	241	0.0409	0.389	0.0155	0.0100	2.41		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	16.3	0.0404	0.389	0.0155	0.0100	0.163		4321122
Octa CDF **	pg/g	349	0.0448	0.777	0.0311	0.000300	0.105		4321122
Total Tetra CDF **	pg/g	28.8	0.0395	0.0777	0.0155			16	4321122
Total Penta CDF **	pg/g	122	0.0408	0.389	0.0155			12	4321122
Total Hexa CDF **	pg/g	402	0.0413	0.389	0.0155			12	4321122
Total Hepta CDF **	pg/g	644	0.0407	0.389	0.0155			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.43	0.049	0.25	0.23	0.100	0.143		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						53.4		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin

\*\* CDF = Chloro Dibenzo-p-Furan

(1) EMCL - PCDD/DF analysis - Exceeds Maximum Calibration Limit

(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.



**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		BMU624							
<b>Sampling Date</b>		2015/11/20 10:20							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		# of	
	<b>UNITS</b>	<b>COMP-A0I001-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	103							4321122
C13-1234678 HeptaCDD *	%	78							4321122
C13-1234678 HeptaCDF **	%	73							4321122
C13-123478 HexaCDD *	%	98							4321122
C13-123478 HexaCDF **	%	90							4321122
C13-1234789 HeptaCDF **	%	72							4321122
C13-123678 HexaCDD *	%	94							4321122
C13-123678 HexaCDF **	%	92							4321122
C13-12378 PentaCDD *	%	108							4321122
C13-12378 PentaCDF **	%	84							4321122
C13-123789 HexaCDF **	%	101							4321122
C13-234678 HexaCDF **	%	91							4321122
C13-23478 PentaCDF **	%	101							4321122
C13-2378 TetraCDD *	%	98							4321122
C13-2378 TetraCDF **	%	97							4321122
C13-OCDD *	%	78							4321122
Confirmation C13-2378 TetraCDF **	%	97							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU625							
Sampling Date		2015/11/20 11:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01002-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.549	0.0703	0.131	0.0262	1.00	0.549		4321122
1,2,3,7,8-Penta CDD *	pg/g	2.24	0.0663	0.656	0.0262	1.00	2.24		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	4.89	0.0694	0.656	0.0262	0.100	0.489		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	20.2	0.0730	0.656	0.0262	0.100	2.02		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	12.6	0.0667	0.656	0.0262	0.100	1.26		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	322	0.0680	0.656	0.0262	0.0100	3.22		4321122
Octa CDD *	pg/g	2210	0.0674	1.31	0.0524	0.000300	0.663		4321122
Total Tetra CDD *	pg/g	6.82	0.0703	0.131	0.0262			13	4321122
Total Penta CDD *	pg/g	10.1	0.0663	0.656	0.0262			11	4321122
Total Hexa CDD *	pg/g	100	0.0698	0.656	0.0262			7	4321122
Total Hepta CDD *	pg/g	541	0.0680	0.656	0.0262			2	4321122
2,3,7,8-Tetra CDF **	pg/g	2.99	0.0762	0.131	0.0262	0.100	0.299		4321122
1,2,3,7,8-Penta CDF **	pg/g	1.29	0.0723	0.656	0.0262	0.0300	0.0387		4321122
2,3,4,7,8-Penta CDF **	pg/g	3.37	0.0713	0.656	0.0262	0.300	1.01		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	9.82	0.0687	0.656	0.0262	0.100	0.982		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	4.64	0.0710	0.656	0.0262	0.100	0.464		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	4.68	0.0664	0.656	0.0262	0.100	0.468		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.236	0.0688	0.656	0.0262	0.100	0.0236		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	157	0.0688	0.656	0.0262	0.0100	1.57		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.98	0.0680	0.656	0.0262	0.0100	0.0398		4321122
Octa CDF **	pg/g	108	0.0754	1.31	0.0524	0.000300	0.0324		4321122
Total Tetra CDF **	pg/g	23.2	0.0762	0.131	0.0262			16	4321122
Total Penta CDF **	pg/g	65.5	0.0718	0.656	0.0262			13	4321122
Total Hexa CDF **	pg/g	141	0.0687	0.656	0.0262			11	4321122
Total Hepta CDF **	pg/g	295	0.0684	0.656	0.0262			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.703	0.076	0.66	0.59	0.100	0.0703		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						15.1		
<b>Surrogate Recovery (%)</b>									
37Cl4 2378 Tetra CDD *	%	78							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU625							
Sampling Date		2015/11/20 11:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01002-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	72							4321122
C13-1234678 HeptaCDF **	%	60							4321122
C13-123478 HexaCDD *	%	75							4321122
C13-123478 HexaCDF **	%	73							4321122
C13-1234789 HeptaCDF **	%	59							4321122
C13-123678 HexaCDD *	%	80							4321122
C13-123678 HexaCDF **	%	82							4321122
C13-12378 PentaCDD *	%	81							4321122
C13-12378 PentaCDF **	%	61							4321122
C13-123789 HexaCDF **	%	81							4321122
C13-234678 HexaCDF **	%	68							4321122
C13-23478 PentaCDF **	%	80							4321122
C13-2378 TetraCDD *	%	72							4321122
C13-2378 TetraCDF **	%	70							4321122
C13-OCDD *	%	67							4321122
Confirmation C13-2378 TetraCDF **	%	72							4330862

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin

\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU626							
Sampling Date		2015/11/20 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01037-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	3.63	0.0653	0.128	0.0256	1.00	3.63		4321122
1,2,3,7,8-Penta CDD *	pg/g	1.95	0.0677	0.639	0.0256	1.00	1.95		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	4.54	0.0659	0.639	0.0256	0.100	0.454		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	20.6	0.0693	0.639	0.0256	0.100	2.06		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	12.1	0.0633	0.639	0.0256	0.100	1.21		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	417	0.0674	0.639	0.0256	0.0100	4.17		4321122
Octa CDD *	pg/g	2460	0.0666	1.28	0.0511	0.000300	0.738		4321122
Total Tetra CDD *	pg/g	10.1	0.0653	0.128	0.0256			13	4321122
Total Penta CDD *	pg/g	13.5	0.0677	0.639	0.0256			12	4321122
Total Hexa CDD *	pg/g	103	0.0662	0.639	0.0256			7	4321122
Total Hepta CDD *	pg/g	717	0.0674	0.639	0.0256			2	4321122
2,3,7,8-Tetra CDF **	pg/g	2.01	0.0679	0.128	0.0256	0.100	0.201		4321122
1,2,3,7,8-Penta CDF **	pg/g	1.24	0.0684	0.639	0.0256	0.0300	0.0372		4321122
2,3,4,7,8-Penta CDF **	pg/g	1.97	0.0674	0.639	0.0256	0.300	0.591		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	11.5	0.0668	0.639	0.0256	0.100	1.15		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	4.34	0.0690	0.639	0.0256	0.100	0.434		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	3.16	0.0645	0.639	0.0256	0.100	0.316		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.205	0.0669	0.639	0.0256	0.100	0.0205		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	75.7	0.0673	0.639	0.0256	0.0100	0.757		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.69	0.0665	0.639	0.0256	0.0100	0.0469		4321122
Octa CDF **	pg/g	145	0.0646	1.28	0.0511	0.000300	0.0435		4321122
Total Tetra CDF **	pg/g	16.2	0.0679	0.128	0.0256			16	4321122
Total Penta CDF **	pg/g	45.1	0.0679	0.639	0.0256			12	4321122
Total Hexa CDF **	pg/g	121	0.0667	0.639	0.0256			10	4321122
Total Hepta CDF **	pg/g	211	0.0669	0.639	0.0256			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.99	0.10	0.64	0.58	0.100	0.0990		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						17.7		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	61							4321122

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU626							
Sampling Date		2015/11/20 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A0I037-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	51							4321122
C13-1234678 HeptaCDF **	%	50							4321122
C13-123478 HexaCDD *	%	64							4321122
C13-123478 HexaCDF **	%	62							4321122
C13-1234789 HeptaCDF **	%	50							4321122
C13-123678 HexaCDD *	%	66							4321122
C13-123678 HexaCDF **	%	64							4321122
C13-12378 PentaCDD *	%	66							4321122
C13-12378 PentaCDF **	%	50							4321122
C13-123789 HexaCDF **	%	68							4321122
C13-234678 HexaCDF **	%	59							4321122
C13-23478 PentaCDF **	%	62							4321122
C13-2378 TetraCDD *	%	58							4321122
C13-2378 TetraCDF **	%	60							4321122
C13-OCDD *	%	56							4321122
Confirmation C13-2378 TetraCDF **	%	61							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** BMU623  
**Sample ID:** ISM-A0I009-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/11/20  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU624  
**Sample ID:** COMP-A0I001-0.5  
**Matrix:** Soil

**Collected:** 2015/11/20  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/23	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU625  
**Sample ID:** ISM-A0I002-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/11/20  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU626  
**Sample ID:** ISM-A0I037-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/11/20  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.6°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4312642	NS3	RPD - Sample/Sample Dup	Moisture	2015/12/14	0		%	20
4321122	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/12/18		92	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		74	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		82	%	28 - 143
			C13-123478 HexaCDD	2015/12/18		85	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		89	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		79	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		84	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		107	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		92	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		104	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		91	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		114	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		89	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		96	%	24 - 169
			C13-OCDD	2015/12/18		78	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18		102	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/12/18		86	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/12/18		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/12/18		108	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/12/18		121	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18		116	%	70 - 140
			Octa CDD	2015/12/18		105	%	78 - 144
			2,3,7,8-Tetra CDF	2015/12/18		99	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/12/18		96	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/12/18		85	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/12/18		105	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/12/18		100	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/12/18		114	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/12/18		88	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18		113	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18		103	%	78 - 138
			Octa CDF	2015/12/18		114	%	63 - 170
4321122	OBC	RPD	2,3,7,8-Tetra CDD	2015/12/18	7.5		%	25
			1,2,3,7,8-Penta CDD	2015/12/18	5.6		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/18	5.7		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/18	5.4		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/18	9.4		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	3.4		%	25
			Octa CDD	2015/12/18	3.7		%	25
			2,3,7,8-Tetra CDF	2015/12/18	4.9		%	25
			1,2,3,7,8-Penta CDF	2015/12/18	5.1		%	25
			2,3,4,7,8-Penta CDF	2015/12/18	4.6		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/18	4.7		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/18	9.5		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/18	2.6		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/18	3.4		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	8.5 (1)		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	4.7		%	25
			Octa CDF	2015/12/18	2.6		%	25
4321122	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/12/18		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		77	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		78	%	28 - 143



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2015/12/18		76	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		85	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		68	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		85	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		99	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		83	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		96	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		85	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		107	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		91	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		94	%	24 - 169
			C13-OCDD	2015/12/18		64	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDD	2015/12/18	<0.0653, EDL=0.0653		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/12/18	<0.0720, EDL=0.0720		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/12/18	0.0940, EDL=0.0757		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/12/18	0.112, EDL=0.0692		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	0.156, EDL=0.0689		pg/g	
			Octa CDD	2015/12/18	0.427, EDL=0.123		pg/g	
			Total Tetra CDD	2015/12/18	<0.211, EDL=0.211 (2)		pg/g	
			Total Penta CDD	2015/12/18	<0.123, EDL=0.123 (2)		pg/g	
			Total Hexa CDD	2015/12/18	0.206, EDL=0.0724		pg/g	
			Total Hepta CDD	2015/12/18	0.256, EDL=0.0689		pg/g	
			2,3,7,8-Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			1,2,3,7,8-Penta CDF	2015/12/18	0.147, EDL=0.0948		pg/g	
			2,3,4,7,8-Penta CDF	2015/12/18	<0.0934, EDL=0.0934		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/12/18	0.166, EDL=0.0822		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/12/18	0.120, EDL=0.0849		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/12/18	0.112, EDL=0.0794		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/12/18	0.151, EDL=0.0823		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	0.239, EDL=0.0655		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	0.134, EDL=0.0648		pg/g	
			Octa CDF	2015/12/18	0.265, EDL=0.117		pg/g	
			Total Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			Total Penta CDF	2015/12/18	0.147, EDL=0.0941		pg/g	
			Total Hexa CDF	2015/12/18	0.549, EDL=0.0821		pg/g	
			Total Hepta CDF	2015/12/18	0.373, EDL=0.0652		pg/g	
4321122	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDD	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/23	4.0		%	25
			Octa CDD	2015/12/23	5.4		%	25
			Total Tetra CDD	2015/12/23	NC		%	25
			Total Penta CDD	2015/12/23	NC		%	25
			Total Hexa CDD	2015/12/23	1.2		%	25
			Total Hepta CDD	2015/12/23	0.40		%	25
			2,3,7,8-Tetra CDF	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDF	2015/12/23	NC		%	25
			2,3,4,7,8-Penta CDF	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/23	3.7		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/23	NC		%	25
			Octa CDF	2015/12/23	4.5		%	25
			Total Tetra CDF	2015/12/23	14		%	25
			Total Penta CDF	2015/12/23	5.1		%	25
			Total Hexa CDF	2015/12/23	4.9		%	25
			Total Hepta CDF	2015/12/23	6.4		%	25
4330862	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/12/24	<0.094, EDL=0.094		pg/g	
			Confirmation C13-2378 TetraCDF	2015/12/24		79	%	40 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery meets EPA 1613B acceptance criteria

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



\_\_\_\_\_  
Cristina Carriere, Scientific Services



\_\_\_\_\_  
Cathy Xu, Senior Analyst, HRMS Services, Senior Analyst, HRMS Services



\_\_\_\_\_  
Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5L0163  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/01/12**  
Report #: R3847668  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B5P4765**

**Received: 2015/12/10, 15:15**

Sample Matrix: Soil  
# Samples Received: 5

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	5	2015/12/14	2015/12/24	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	5	N/A	2015/12/24	BRL SOP-00406	EPA M8290A / M1613
Moisture	5	N/A	2015/12/14	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		BMU670	BMU671	BMU672	BMU673	BMU674			
Sampling Date		2015/12/02 10:40	2015/12/02 11:00	2015/12/02 11:50	2015/12/02 12:30	2015/12/02 13:40			
COC Number		na	na	na	na	na			
	UNITS	ISM-AOI028B-0 .5-AFTER ISM	ISM-AOI034-0. 5-AFTER ISM	ISM-AOI028A-0 .5-AFTER ISM	ISM-AOI022-0. 5-AFTER ISM	ISM-AOI010-0. 5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	2.8	3.0	2.7	2.5	2.9	1.0	0.50	4312642
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU670							
Sampling Date		2015/12/02 10:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI028B-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.859	0.0703	0.132	0.0264	1.00	0.859		4321122
1,2,3,7,8-Penta CDD *	pg/g	2.32	0.0706	0.660	0.0264	1.00	2.32		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	5.24	0.0715	0.660	0.0264	0.100	0.524		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	24.6	0.0752	0.660	0.0264	0.100	2.46		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	13.6	0.0687	0.660	0.0264	0.100	1.36		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	424	0.0703	0.660	0.0264	0.0100	4.24		4321122
Octa CDD *	pg/g	2190	0.0691	1.32	0.0528	0.000300	0.657		4321122
Total Tetra CDD *	pg/g	7.19	0.0703	0.132	0.0264			15	4321122
Total Penta CDD *	pg/g	15.0	0.0706	0.660	0.0264			12	4321122
Total Hexa CDD *	pg/g	119	0.0719	0.660	0.0264			7	4321122
Total Hepta CDD *	pg/g	744	0.0703	0.660	0.0264			2	4321122
2,3,7,8-Tetra CDF **	pg/g	2.45	0.0718	0.132	0.0264	0.100	0.245		4321122
1,2,3,7,8-Penta CDF **	pg/g	1.44	0.0695	0.660	0.0264	0.0300	0.0432		4321122
2,3,4,7,8-Penta CDF **	pg/g	2.13	0.0685	0.660	0.0264	0.300	0.639		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	8.10	0.0688	0.660	0.0264	0.100	0.810		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	4.48	0.0711	0.660	0.0264	0.100	0.448		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	3.76	0.0665	0.660	0.0264	0.100	0.376		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.247	0.0689	0.660	0.0264	0.100	0.0247		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	89.4	0.0694	0.660	0.0264	0.0100	0.894		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.22	0.0685	0.660	0.0264	0.0100	0.0422		4321122
Octa CDF **	pg/g	168	0.0723	1.32	0.0528	0.000300	0.0504		4321122
Total Tetra CDF **	pg/g	30.7	0.0718	0.132	0.0264			15	4321122
Total Penta CDF **	pg/g	81.0	0.0690	0.660	0.0264			11	4321122
Total Hexa CDF **	pg/g	132	0.0688	0.660	0.0264			12	4321122
Total Hepta CDF **	pg/g	235	0.0690	0.660	0.0264			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.25	0.076	0.66	0.59	0.100	0.125		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						15.9		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU670							
Sampling Date		2015/12/02 10:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI028B-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	94							4321122
C13-1234678 HeptaCDF **	%	78							4321122
C13-123478 HexaCDD *	%	99							4321122
C13-123478 HexaCDF **	%	97							4321122
C13-1234789 HeptaCDF **	%	79							4321122
C13-123678 HexaCDD *	%	106							4321122
C13-123678 HexaCDF **	%	104							4321122
C13-12378 PentaCDD *	%	100							4321122
C13-12378 PentaCDF **	%	80							4321122
C13-123789 HexaCDF **	%	109							4321122
C13-234678 HexaCDF **	%	98							4321122
C13-23478 PentaCDF **	%	99							4321122
C13-2378 TetraCDD *	%	91							4321122
C13-2378 TetraCDF **	%	91							4321122
C13-OCDD *	%	90							4321122
Confirmation C13-2378 TetraCDF **	%	96							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU671							
Sampling Date		2015/12/02 11:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI034-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.02	0.0705	0.130	0.0259	1.00	1.02		4321122
1,2,3,7,8-Penta CDD *	pg/g	1.58	0.0695	0.648	0.0259	1.00	1.58		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	2.67	0.0658	0.648	0.0259	0.100	0.267		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	10.6	0.0692	0.648	0.0259	0.100	1.06		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	7.63	0.0632	0.648	0.0259	0.100	0.763		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	215	0.0656	0.648	0.0259	0.0100	2.15		4321122
Octa CDD *	pg/g	1330	0.0692	1.30	0.0518	0.000300	0.399		4321122
Total Tetra CDD *	pg/g	7.58	0.0705	0.130	0.0259			13	4321122
Total Penta CDD *	pg/g	8.02	0.0695	0.648	0.0259			10	4321122
Total Hexa CDD *	pg/g	64.0	0.0661	0.648	0.0259			7	4321122
Total Hepta CDD *	pg/g	393	0.0656	0.648	0.0259			2	4321122
2,3,7,8-Tetra CDF **	pg/g	3.53	0.0689	0.130	0.0259	0.100	0.353		4321122
1,2,3,7,8-Penta CDF **	pg/g	1.04	0.0668	0.648	0.0259	0.0300	0.0312		4321122
2,3,4,7,8-Penta CDF **	pg/g	1.71	0.0659	0.648	0.0259	0.300	0.513		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	7.17	0.0665	0.648	0.0259	0.100	0.717		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	3.01	0.0688	0.648	0.0259	0.100	0.301		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	2.94	0.0643	0.648	0.0259	0.100	0.294		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.130	0.0667	0.648	0.0259	0.100	0.0130		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	40.5	0.0674	0.648	0.0259	0.0100	0.405		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.36	0.0666	0.648	0.0259	0.0100	0.0236		4321122
Octa CDF **	pg/g	62.6	0.0696	1.30	0.0518	0.000300	0.0188		4321122
Total Tetra CDF **	pg/g	23.3	0.0689	0.130	0.0259			16	4321122
Total Penta CDF **	pg/g	28.8	0.0663	0.648	0.0259			13	4321122
Total Hexa CDF **	pg/g	60.4	0.0665	0.648	0.0259			13	4321122
Total Hepta CDF **	pg/g	95.4	0.0670	0.648	0.0259			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.25	0.072	0.65	0.59	0.100	0.125		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						9.68		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	91							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU671							
Sampling Date		2015/12/02 11:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI034-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	77							4321122
C13-1234678 HeptaCDF **	%	72							4321122
C13-123478 HexaCDD *	%	95							4321122
C13-123478 HexaCDF **	%	90							4321122
C13-1234789 HeptaCDF **	%	74							4321122
C13-123678 HexaCDD *	%	105							4321122
C13-123678 HexaCDF **	%	91							4321122
C13-12378 PentaCDD *	%	96							4321122
C13-12378 PentaCDF **	%	75							4321122
C13-123789 HexaCDF **	%	103							4321122
C13-234678 HexaCDF **	%	87							4321122
C13-23478 PentaCDF **	%	96							4321122
C13-2378 TetraCDD *	%	88							4321122
C13-2378 TetraCDF **	%	83							4321122
C13-OCDD *	%	82							4321122
Confirmation C13-2378 TetraCDF **	%	99							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU672							
Sampling Date		2015/12/02 11:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI028A-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.382	0.107	0.195	0.0390	1.00	0.382		4321122
1,2,3,7,8-Penta CDD *	pg/g	1.27	0.102	0.975	0.0390	1.00	1.27		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	2.72	0.103	0.975	0.0390	0.100	0.272		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	10.9	0.108	0.975	0.0390	0.100	1.09		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	7.26	0.0989	0.975	0.0390	0.100	0.726		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	227	0.102	0.975	0.0390	0.0100	2.27		4321122
Octa CDD *	pg/g	1470	0.101	1.95	0.0780	0.000300	0.441		4321122
Total Tetra CDD *	pg/g	2.77	0.107	0.195	0.0390			7	4321122
Total Penta CDD *	pg/g	7.14	0.102	0.975	0.0390			10	4321122
Total Hexa CDD *	pg/g	58.2	0.103	0.975	0.0390			7	4321122
Total Hepta CDD *	pg/g	404	0.102	0.975	0.0390			2	4321122
2,3,7,8-Tetra CDF **	pg/g	1.04	0.102	0.195	0.0390	0.100	0.104		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.678	0.104	0.975	0.0390	0.0300	0.0203		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.899	0.103	0.975	0.0390	0.300	0.270		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	3.75	0.103	0.975	0.0390	0.100	0.375		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	1.82	0.106	0.975	0.0390	0.100	0.182		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	1.45	0.0991	0.975	0.0390	0.100	0.145		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.122	0.103	0.975	0.0390	0.100	0.0122		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	31.8	0.102	0.975	0.0390	0.0100	0.318		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.86	0.101	0.975	0.0390	0.0100	0.0186		4321122
Octa CDF **	pg/g	50.8	0.105	1.95	0.0780	0.000300	0.0152		4321122
Total Tetra CDF **	pg/g	7.40	0.102	0.195	0.0390			18	4321122
Total Penta CDF **	pg/g	14.6	0.104	0.975	0.0390			8	4321122
Total Hexa CDF **	pg/g	46.7	0.103	0.975	0.0390			11	4321122
Total Hepta CDF **	pg/g	82.1	0.102	0.975	0.0390			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.06	0.10	0.97	0.87	0.100	0.106		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						7.91		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU672							
Sampling Date		2015/12/02 11:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI028A-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	66							4321122
C13-1234678 HeptaCDF **	%	62							4321122
C13-123478 HexaCDD *	%	76							4321122
C13-123478 HexaCDF **	%	75							4321122
C13-1234789 HeptaCDF **	%	64							4321122
C13-123678 HexaCDD *	%	82							4321122
C13-123678 HexaCDF **	%	78							4321122
C13-12378 PentaCDD *	%	77							4321122
C13-12378 PentaCDF **	%	61							4321122
C13-123789 HexaCDF **	%	86							4321122
C13-234678 HexaCDF **	%	73							4321122
C13-23478 PentaCDF **	%	78							4321122
C13-2378 TetraCDD *	%	71							4321122
C13-2378 TetraCDF **	%	69							4321122
C13-OCDD *	%	69							4321122
Confirmation C13-2378 TetraCDF **	%	81							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU673							
Sampling Date		2015/12/02 12:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI022-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.895	0.0687	0.125	0.0251	1.00	0.895		4321122
1,2,3,7,8-Penta CDD *	pg/g	1.01	0.0659	0.627	0.0251	1.00	1.01		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	2.33	0.0664	0.627	0.0251	0.100	0.233		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	12.4	0.0698	0.627	0.0251	0.100	1.24		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	6.39	0.0638	0.627	0.0251	0.100	0.639		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	252	0.0654	0.627	0.0251	0.0100	2.52		4321122
Octa CDD *	pg/g	1510	0.0672	1.25	0.0501	0.000300	0.453		4321122
Total Tetra CDD *	pg/g	2.55	0.0687	0.125	0.0251			7	4321122
Total Penta CDD *	pg/g	5.09	0.0659	0.627	0.0251			9	4321122
Total Hexa CDD *	pg/g	56.6	0.0668	0.627	0.0251			8	4321122
Total Hepta CDD *	pg/g	437	0.0654	0.627	0.0251			2	4321122
2,3,7,8-Tetra CDF **	pg/g	0.931	0.0686	0.125	0.0251	0.100	0.0931		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.726	0.0654	0.627	0.0251	0.0300	0.0218		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.956	0.0645	0.627	0.0251	0.300	0.287		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	4.94	0.0685	0.627	0.0251	0.100	0.494		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	2.20	0.0708	0.627	0.0251	0.100	0.220		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	1.55	0.0662	0.627	0.0251	0.100	0.155		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.101	0.0686	0.627	0.0251	0.100	0.0101		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	34.4	0.0690	0.627	0.0251	0.0100	0.344		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.12	0.0681	0.627	0.0251	0.0100	0.0212		4321122
Octa CDF **	pg/g	63.7	0.0637	1.25	0.0501	0.000300	0.0191		4321122
Total Tetra CDF **	pg/g	6.99	0.0686	0.125	0.0251			16	4321122
Total Penta CDF **	pg/g	19.3	0.0650	0.627	0.0251			11	4321122
Total Hexa CDF **	pg/g	58.5	0.0685	0.627	0.0251			10	4321122
Total Hepta CDF **	pg/g	91.8	0.0686	0.627	0.0251			4	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.863	0.068	0.63	0.57	0.100	0.0863		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						8.65		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	91							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU673							
Sampling Date		2015/12/02 12:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI022-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	75							4321122
C13-1234678 HeptaCDF **	%	72							4321122
C13-123478 HexaCDD *	%	93							4321122
C13-123478 HexaCDF **	%	88							4321122
C13-1234789 HeptaCDF **	%	74							4321122
C13-123678 HexaCDD *	%	96							4321122
C13-123678 HexaCDF **	%	88							4321122
C13-12378 PentaCDD *	%	91							4321122
C13-12378 PentaCDF **	%	72							4321122
C13-123789 HexaCDF **	%	99							4321122
C13-234678 HexaCDF **	%	86							4321122
C13-23478 PentaCDF **	%	90							4321122
C13-2378 TetraCDD *	%	79							4321122
C13-2378 TetraCDF **	%	76							4321122
C13-OCDD *	%	84							4321122
Confirmation C13-2378 TetraCDF **	%	95							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU674							
Sampling Date		2015/12/02 13:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOIO10-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.359	0.0660	0.131	0.0262	1.00	0.359		4321122
1,2,3,7,8-Penta CDD *	pg/g	0.396	0.0687	0.656	0.0262	1.00	0.396		4321122
1,2,3,4,7,8-Hexa CDD *	pg/g	0.974	0.0692	0.656	0.0262	0.100	0.0974		4321122
1,2,3,6,7,8-Hexa CDD *	pg/g	4.38	0.0727	0.656	0.0262	0.100	0.438		4321122
1,2,3,7,8,9-Hexa CDD *	pg/g	2.69	0.0665	0.656	0.0262	0.100	0.269		4321122
1,2,3,4,6,7,8-Hepta CDD *	pg/g	142	0.0661	0.656	0.0262	0.0100	1.42		4321122
Octa CDD *	pg/g	1410	0.0679	1.31	0.0525	0.000300	0.423		4321122
Total Tetra CDD *	pg/g	1.48	0.0660	0.131	0.0262			4	4321122
Total Penta CDD *	pg/g	2.03	0.0687	0.656	0.0262			9	4321122
Total Hexa CDD *	pg/g	29.2	0.0696	0.656	0.0262			7	4321122
Total Hepta CDD *	pg/g	284	0.0661	0.656	0.0262			2	4321122
2,3,7,8-Tetra CDF **	pg/g	0.400	0.0706	0.131	0.0262	0.100	0.0400		4321122
1,2,3,7,8-Penta CDF **	pg/g	0.236	0.0681	0.656	0.0262	0.0300	0.00708		4321122
2,3,4,7,8-Penta CDF **	pg/g	0.371	0.0671	0.656	0.0262	0.300	0.111		4321122
1,2,3,4,7,8-Hexa CDF **	pg/g	1.90	0.0688	0.656	0.0262	0.100	0.190		4321122
1,2,3,6,7,8-Hexa CDF **	pg/g	0.694	0.0712	0.656	0.0262	0.100	0.0694		4321122
2,3,4,6,7,8-Hexa CDF **	pg/g	0.670	0.0665	0.656	0.0262	0.100	0.0670		4321122
1,2,3,7,8,9-Hexa CDF **	pg/g	0.0691	0.0690	0.656	0.0262	0.100	0.00691		4321122
1,2,3,4,6,7,8-Hepta CDF **	pg/g	18.1	0.0695	0.656	0.0262	0.0100	0.181		4321122
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.03	0.0686	0.656	0.0262	0.0100	0.0103		4321122
Octa CDF **	pg/g	42.1	0.0683	1.31	0.0525	0.000300	0.0126		4321122
Total Tetra CDF **	pg/g	3.14	0.0706	0.131	0.0262			11	4321122
Total Penta CDF **	pg/g	7.72	0.0676	0.656	0.0262			9	4321122
Total Hexa CDF **	pg/g	23.5	0.0688	0.656	0.0262			10	4321122
Total Hepta CDF **	pg/g	53.0	0.0690	0.656	0.0262			3	4321122
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.636	0.075	0.66	0.59	0.100	0.0636		4330862
TOTAL TOXIC EQUIVALENCY	pg/g						4.12		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4321122
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BMU674							
Sampling Date		2015/12/02 13:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI010-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	79							4321122
C13-1234678 HeptaCDF **	%	75							4321122
C13-123478 HexaCDD *	%	92							4321122
C13-123478 HexaCDF **	%	92							4321122
C13-1234789 HeptaCDF **	%	77							4321122
C13-123678 HexaCDD *	%	103							4321122
C13-123678 HexaCDF **	%	100							4321122
C13-12378 PentaCDD *	%	101							4321122
C13-12378 PentaCDF **	%	81							4321122
C13-123789 HexaCDF **	%	106							4321122
C13-234678 HexaCDF **	%	88							4321122
C13-23478 PentaCDF **	%	100							4321122
C13-2378 TetraCDD *	%	93							4321122
C13-2378 TetraCDF **	%	95							4321122
C13-OCDD *	%	85							4321122
Confirmation C13-2378 TetraCDF **	%	103							4330862

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** BMU670  
**Sample ID:** ISM-AOI028B-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU671  
**Sample ID:** ISM-AOI034-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU672  
**Sample ID:** ISM-AOI028A-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU673  
**Sample ID:** ISM-AOI022-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani

**Maxxam ID:** BMU674  
**Sample ID:** ISM-AOI010-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/02  
**Shipped:**  
**Received:** 2015/12/10

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4321122	2015/12/14	2015/12/24	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4330862	N/A	2015/12/24	Vica Cioranic
Moisture	BAL	4312642	N/A	2015/12/14	Valentina Kaftani



**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4312642	NS3	RPD - Sample/Sample Dup	Moisture	2015/12/14	0		%	20
4321122	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/12/18		92	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		74	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		82	%	28 - 143
			C13-123478 HexaCDD	2015/12/18		85	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		89	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		79	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		84	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		107	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		92	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		104	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		91	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		114	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		89	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		96	%	24 - 169
			C13-OCDD	2015/12/18		78	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18		102	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/12/18		86	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/12/18		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/12/18		108	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/12/18		121	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18		116	%	70 - 140
			Octa CDD	2015/12/18		105	%	78 - 144
			2,3,7,8-Tetra CDF	2015/12/18		99	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/12/18		96	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/12/18		85	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/12/18		105	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/12/18		100	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/12/18		114	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/12/18		88	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18		113	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18		103	%	78 - 138
			Octa CDF	2015/12/18		114	%	63 - 170
4321122	OBC	RPD	2,3,7,8-Tetra CDD	2015/12/18	7.5		%	25
			1,2,3,7,8-Penta CDD	2015/12/18	5.6		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/18	5.7		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/18	5.4		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/18	9.4		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	3.4		%	25
			Octa CDD	2015/12/18	3.7		%	25
			2,3,7,8-Tetra CDF	2015/12/18	4.9		%	25
			1,2,3,7,8-Penta CDF	2015/12/18	5.1		%	25
			2,3,4,7,8-Penta CDF	2015/12/18	4.6		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/18	4.7		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/18	9.5		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/18	2.6		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/18	3.4		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	8.5 (1)		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	4.7		%	25
			Octa CDF	2015/12/18	2.6		%	25
4321122	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/12/18		87	%	35 - 197
			C13-1234678 HeptaCDD	2015/12/18		77	%	23 - 140
			C13-1234678 HeptaCDF	2015/12/18		78	%	28 - 143

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2015/12/18		76	%	32 - 141
			C13-123478 HexaCDF	2015/12/18		85	%	26 - 152
			C13-1234789 HeptaCDF	2015/12/18		68	%	26 - 138
			C13-123678 HexaCDD	2015/12/18		85	%	28 - 130
			C13-123678 HexaCDF	2015/12/18		89	%	26 - 123
			C13-12378 PentaCDD	2015/12/18		99	%	25 - 181
			C13-12378 PentaCDF	2015/12/18		83	%	24 - 185
			C13-123789 HexaCDF	2015/12/18		96	%	29 - 147
			C13-234678 HexaCDF	2015/12/18		85	%	28 - 136
			C13-23478 PentaCDF	2015/12/18		107	%	21 - 178
			C13-2378 TetraCDD	2015/12/18		91	%	25 - 164
			C13-2378 TetraCDF	2015/12/18		94	%	24 - 169
			C13-OCDD	2015/12/18		64	%	17 - 157
			2,3,7,8-Tetra CDD	2015/12/18	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDD	2015/12/18	<0.0653, EDL=0.0653		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/12/18	<0.0720, EDL=0.0720		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/12/18	0.0940, EDL=0.0757		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/12/18	0.112, EDL=0.0692		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/12/18	0.156, EDL=0.0689		pg/g	
			Octa CDD	2015/12/18	0.427, EDL=0.123		pg/g	
			Total Tetra CDD	2015/12/18	<0.211, EDL=0.211 (2)		pg/g	
			Total Penta CDD	2015/12/18	<0.123, EDL=0.123 (2)		pg/g	
			Total Hexa CDD	2015/12/18	0.206, EDL=0.0724		pg/g	
			Total Hepta CDD	2015/12/18	0.256, EDL=0.0689		pg/g	
			2,3,7,8-Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			1,2,3,7,8-Penta CDF	2015/12/18	0.147, EDL=0.0948		pg/g	
			2,3,4,7,8-Penta CDF	2015/12/18	<0.0934, EDL=0.0934		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/12/18	0.166, EDL=0.0822		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/12/18	0.120, EDL=0.0849		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/12/18	0.112, EDL=0.0794		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/12/18	0.151, EDL=0.0823		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/12/18	0.239, EDL=0.0655		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2015/12/18	0.134, EDL=0.0648		pg/g	
			Octa CDF	2015/12/18	0.265, EDL=0.117		pg/g	
			Total Tetra CDF	2015/12/18	<0.0757, EDL=0.0757		pg/g	
			Total Penta CDF	2015/12/18	0.147, EDL=0.0941		pg/g	
			Total Hexa CDF	2015/12/18	0.549, EDL=0.0821		pg/g	
			Total Hepta CDF	2015/12/18	0.373, EDL=0.0652		pg/g	
4321122	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDD	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/12/23	4.0		%	25
			Octa CDD	2015/12/23	5.4		%	25
			Total Tetra CDD	2015/12/23	NC		%	25
			Total Penta CDD	2015/12/23	NC		%	25
			Total Hexa CDD	2015/12/23	1.2		%	25
			Total Hepta CDD	2015/12/23	0.40		%	25
			2,3,7,8-Tetra CDF	2015/12/23	NC		%	25
			1,2,3,7,8-Penta CDF	2015/12/23	NC		%	25
			2,3,4,7,8-Penta CDF	2015/12/23	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/12/23	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/12/23	3.7		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/12/23	NC		%	25
			Octa CDF	2015/12/23	4.5		%	25
			Total Tetra CDF	2015/12/23	14		%	25
			Total Penta CDF	2015/12/23	5.1		%	25
			Total Hexa CDF	2015/12/23	4.9		%	25
			Total Hepta CDF	2015/12/23	6.4		%	25
4330862	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/12/24	<0.094, EDL=0.094		pg/g	
			Confirmation C13-2378 TetraCDF	2015/12/24		79	%	40 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery meets EPA 1613B acceptance criteria

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



\_\_\_\_\_  
Cristina Carriere, Scientific Services



\_\_\_\_\_  
Cathy Xu, Senior Analyst, HRMS Services, Senior Analyst, HRMS Services



\_\_\_\_\_  
Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5C0369  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/03/27**  
Report #: R3374684  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B546521**

**Received: 2015/03/17, 13:00**

Sample Matrix: Water  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Water (1613B) (1)	1	2015/03/20	2015/03/25	BRL SOP-00410	EPA 1613B m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

U = Undetected at the limit of quantitation.

J = Estimated concentration between the EDL & RDL.

B = Blank Contamination.

Q = One or more quality control criteria failed.

E = Analyte concentration exceeds the maximum concentration level.

K = Estimated maximum possible concentration due to ion abundance ratio failure.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Mike Challis, CET, B.Sc, C.Chem, Customer Service Manager, US Air Toxics

Email: MChallis@maxxam.ca

Phone# (905)817-5790

=====  
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Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		ZX0868							
Sampling Date		2015/03/12 15:10							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	Units	RINSATE-SA	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	1.28 U	1.28	8.24	4.00	1.00	1.28		3959679
1,2,3,7,8-Penta CDD *	pg/L	1.11 U	1.11	41.2	4.00	1.00	1.11		3959679
1,2,3,4,7,8-Hexa CDD *	pg/L	1.17 U	1.17	41.2	4.00	0.100	0.117		3959679
1,2,3,6,7,8-Hexa CDD *	pg/L	1.19 U	1.19	41.2	4.00	0.100	0.119		3959679
1,2,3,7,8,9-Hexa CDD *	pg/L	1.10 U	1.10	41.2	4.00	0.100	0.110		3959679
1,2,3,4,6,7,8-Hepta CDD *	pg/L	1.13 U	1.13	41.2	4.00	0.0100	0.0113		3959679
Octa CDD *	pg/L	1.17 U (1)	1.17	82.4	8.00	0.000300	0.000351		3959679
Total Tetra CDD *	pg/L	4.20 U (1)	4.20	8.24	4.00				3959679
Total Penta CDD *	pg/L	2.25 U (1)	2.25	41.2	4.00				3959679
Total Hexa CDD *	pg/L	4.07 U (1)	4.07	41.2	4.00				3959679
Total Hepta CDD *	pg/L	1.13 U	1.13	41.2	4.00				3959679
2,3,7,8-Tetra CDF **	pg/L	1.17 U	1.17	8.24	4.00	0.100	0.117		3959679
1,2,3,7,8-Penta CDF **	pg/L	1.11 U	1.11	41.2	4.00	0.0300	0.0333		3959679
2,3,4,7,8-Penta CDF **	pg/L	1.09 U	1.09	41.2	4.00	0.300	0.327		3959679
1,2,3,4,7,8-Hexa CDF **	pg/L	1.06 U	1.06	41.2	4.00	0.100	0.106		3959679
1,2,3,6,7,8-Hexa CDF **	pg/L	1.07 U	1.07	41.2	4.00	0.100	0.107		3959679
2,3,4,6,7,8-Hexa CDF **	pg/L	0.999 U	0.999	41.2	4.00	0.100	0.0999		3959679
1,2,3,7,8,9-Hexa CDF **	pg/L	1.05 U	1.05	41.2	4.00	0.100	0.105		3959679
1,2,3,4,6,7,8-Hepta CDF **	pg/L	0.376 U	0.376	41.2	4.00	0.0100	0.00376		3959679
1,2,3,4,7,8,9-Hepta CDF **	pg/L	0.371 U	0.371	41.2	4.00	0.0100	0.00371		3959679
Octa CDF **	pg/L	0.598 U	0.598	82.4	8.00	0.000300	0.000179		3959679
Total Tetra CDF **	pg/L	1.17 U	1.17	8.24	4.00				3959679
Total Penta CDF **	pg/L	1.10 U	1.10	41.2	4.00				3959679
Total Hexa CDF **	pg/L	1.04 U	1.04	41.2	4.00				3959679
Total Hepta CDF **	pg/L	0.374 U	0.374	41.2	4.00				3959679
TOTAL TOXIC EQUIVALENCY	pg/L						3.65		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		ZX0868							
Sampling Date		2015/03/12 15:10							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	Units	RINSATE-SA	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	118							3959679
C13-1234678 HeptaCDD *	%	87							3959679
C13-1234678 HeptaCDF **	%	89							3959679
C13-123478 HexaCDD *	%	97							3959679
C13-123478 HexaCDF **	%	103							3959679
C13-1234789 HeptaCDF **	%	90							3959679
C13-123678 HexaCDD *	%	101							3959679
C13-123678 HexaCDF **	%	94							3959679
C13-12378 PentaCDD *	%	97							3959679
C13-12378 PentaCDF **	%	94							3959679
C13-123789 HexaCDF **	%	97							3959679
C13-234678 HexaCDF **	%	98							3959679
C13-23478 PentaCDF **	%	105							3959679
C13-2378 TetraCDD *	%	100							3959679
C13-2378 TetraCDF **	%	98							3959679
C13-OCDD *	%	88							3959679
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**TEST SUMMARY**

**Maxxam ID:** ZX0868  
**Sample ID:** RINSATE-SA  
**Matrix:** Water

**Collected:** 2015/03/12  
**Shipped:**  
**Received:** 2015/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	3959679	2015/03/20	2015/03/25	Kay Shaw

Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
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**Results relate only to the items tested.**

Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits		
3959679	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/03/25		111	%	35 - 197		
			C13-1234678 HeptaCDD	2015/03/25		85	%	23 - 140		
			C13-1234678 HeptaCDF	2015/03/25		91	%	28 - 143		
			C13-123478 HexaCDD	2015/03/25		93	%	32 - 141		
			C13-123478 HexaCDF	2015/03/25		98	%	26 - 152		
			C13-1234789 HeptaCDF	2015/03/25		86	%	28 - 143		
			C13-123678 HexaCDD	2015/03/25		101	%	28 - 130		
			C13-123678 HexaCDF	2015/03/25		94	%	26 - 123		
			C13-12378 PentaCDD	2015/03/25		84	%	25 - 181		
			C13-12378 PentaCDF	2015/03/25		86	%	24 - 185		
			C13-123789 HexaCDF	2015/03/25		95	%	28 - 136		
			C13-234678 HexaCDF	2015/03/25		99	%	29 - 147		
			C13-23478 PentaCDF	2015/03/25		94	%	21 - 178		
			C13-2378 TetraCDD	2015/03/25		89	%	24 - 164		
			C13-2378 TetraCDF	2015/03/25		89	%	24 - 169		
			C13-OCDD	2015/03/25		84	%	17 - 157		
			2,3,7,8-Tetra CDD	2015/03/25		98	%	67 - 158		
			1,2,3,7,8-Penta CDD	2015/03/25		97	%	25 - 181		
			1,2,3,4,7,8-Hexa CDD	2015/03/25		106	%	70 - 164		
			1,2,3,6,7,8-Hexa CDD	2015/03/25		101	%	76 - 134		
			1,2,3,7,8,9-Hexa CDD	2015/03/25		101	%	64 - 162		
			1,2,3,4,6,7,8-Hepta CDD	2015/03/25		100	%	70 - 140		
			Octa CDD	2015/03/25		98	%	78 - 144		
			2,3,7,8-Tetra CDF	2015/03/25		99	%	75 - 158		
			1,2,3,7,8-Penta CDF	2015/03/25		100	%	80 - 134		
			2,3,4,7,8-Penta CDF	2015/03/25		88	%	68 - 160		
			1,2,3,4,7,8-Hexa CDF	2015/03/25		105	%	72 - 134		
			1,2,3,6,7,8-Hexa CDF	2015/03/25		101	%	84 - 130		
			2,3,4,6,7,8-Hexa CDF	2015/03/25		99	%	70 - 156		
			1,2,3,7,8,9-Hexa CDF	2015/03/25		99	%	78 - 130		
			1,2,3,4,6,7,8-Hepta CDF	2015/03/25		105	%	82 - 122		
			1,2,3,4,7,8,9-Hepta CDF	2015/03/25		101	%	78 - 138		
			Octa CDF	2015/03/25		101	%	63 - 170		
3959679	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/03/25		111	%	35 - 197		
			C13-1234678 HeptaCDD	2015/03/25		77	%	23 - 140		
			C13-1234678 HeptaCDF	2015/03/25		80	%	28 - 143		
			C13-123478 HexaCDD	2015/03/25		85	%	32 - 141		
			C13-123478 HexaCDF	2015/03/25		89	%	26 - 152		
			C13-1234789 HeptaCDF	2015/03/25		82	%	28 - 143		
			C13-123678 HexaCDD	2015/03/25		85	%	28 - 130		
			C13-123678 HexaCDF	2015/03/25		85	%	26 - 123		
			C13-12378 PentaCDD	2015/03/25		92	%	25 - 181		
			C13-12378 PentaCDF	2015/03/25		92	%	24 - 185		
			C13-123789 HexaCDF	2015/03/25		87	%	28 - 136		
			C13-234678 HexaCDF	2015/03/25		86	%	29 - 147		
			C13-23478 PentaCDF	2015/03/25		102	%	21 - 178		
			C13-2378 TetraCDD	2015/03/25		94	%	24 - 164		
			C13-2378 TetraCDF	2015/03/25		96	%	24 - 169		
			C13-OCDD	2015/03/25		80	%	17 - 157		
			2,3,7,8-Tetra CDD	2015/03/25			1.18 U, EDL=1.18		pg/L	
			1,2,3,7,8-Penta CDD	2015/03/25			1.19 U, EDL=1.19		pg/L	

Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/03/25	1.14 U, EDL=1.14		pg/L	
			1,2,3,6,7,8-Hexa CDD	2015/03/25	1.16 U, EDL=1.16		pg/L	
			1,2,3,7,8,9-Hexa CDD	2015/03/25	1.08 U, EDL=1.08		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2015/03/25	1.12 U, EDL=1.12		pg/L	
			Octa CDD	2015/03/25	1.56 J, EDL=1.17		pg/L	
			Total Tetra CDD	2015/03/25	4.18 U, EDL=4.18 (1)		pg/L	
			Total Penta CDD	2015/03/25	1.95 U, EDL=1.95 (1)		pg/L	
			Total Hexa CDD	2015/03/25	3.79 U, EDL=3.79 (1)		pg/L	
			Total Hepta CDD	2015/03/25	1.12 U, EDL=1.12		pg/L	
			2,3,7,8-Tetra CDF	2015/03/25	1.14 U, EDL=1.14		pg/L	
			1,2,3,7,8-Penta CDF	2015/03/25	1.27 U, EDL=1.27		pg/L	
			2,3,4,7,8-Penta CDF	2015/03/25	1.24 U, EDL=1.24		pg/L	
			1,2,3,4,7,8-Hexa CDF	2015/03/25	1.39 U, EDL=1.39		pg/L	
			1,2,3,6,7,8-Hexa CDF	2015/03/25	1.40 U, EDL=1.40		pg/L	
			2,3,4,6,7,8-Hexa CDF	2015/03/25	1.31 U, EDL=1.31		pg/L	
			1,2,3,7,8,9-Hexa CDF	2015/03/25	1.38 U, EDL=1.38		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2015/03/25	0.857 U, EDL=0.857		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2015/03/25	0.844 U, EDL=0.844		pg/L	
			Octa CDF	2015/03/25	0.978 U, EDL=0.978		pg/L	
			Total Tetra CDF	2015/03/25	1.14 U, EDL=1.14		pg/L	
			Total Penta CDF	2015/03/25	1.25 U, EDL=1.25		pg/L	
			Total Hexa CDF	2015/03/25	1.37 U, EDL=1.37		pg/L	



Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

**QUALITY ASSURANCE REPORT(CONT'D)**

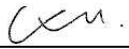
QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			Total Hepta CDF	2015/03/25	0.850 U, EDL=0.850		pg/L	
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.</p>								

Maxxam Job #: B546521  
Report Date: 2015/03/27

Apex Laboratories  
Client Project #: A5C0369

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cathy Xu

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Your Project #: A5D0549  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/09/29**  
Report #: R3701914  
Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B576705**

**Received: 2015/04/28, 13:25**

Sample Matrix: Soil  
# Samples Received: 15

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	5	2015/05/01	2015/05/05	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	10	2015/05/01	2015/05/06	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	10	N/A	2015/05/06	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	4	N/A	2015/09/22	BRL SOP-00406	EPA M8290A / M1613
Moisture	15	N/A	2015/04/30	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AEK241	AEK242	AEK243	AEK244	AEK245			
Sampling Date		2015/04/16 13:45	2015/04/16 16:00	2015/04/16 14:30	2015/04/16 17:30	2015/04/16 16:45			
COC Number		na	na	na	na	na			
	UNITS	ISM-AOI007-0. 5-AFTER ISM	ISM-AOI011-0. 5-AFTER ISM	ISM-AOI031-0. 5-AFTER ISM	ISM-AOI018-0. 5-B-C-AFTER ISM	ISM-AOI018-0. 5-B-A-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	3.5	<1.0	2.8	2.7	<1.0	1.0	0.50	4004368
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

Maxxam ID		AEK246	AEK247	AEK248	AEK249	AEK250			
Sampling Date		2015/04/16 17:00	2015/04/16 13:00	2015/04/16 11:30	2015/04/16 18:00	2015/04/16 10:00			
COC Number		na	na	na	na	na			
	UNITS	ISM-AOI018-0. 5-B-B-AFTER ISM	ISM-AOI006-0. 5-AFTER ISM	ISM-AOI013-0. 5-F-AFTER ISM	ISM-AOI018-0. 5-F-AFTER ISM	ISM-AOI005-0. 5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	1.7	<1.0	2.3	<1.0	<1.0	1.0	0.50	4004368
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

Maxxam ID		AEK251	AEK252	AEK253	AEK254	AEK255			
Sampling Date		2015/04/16 12:00	2015/04/16 17:15	2015/04/16 13:00	2015/04/16 10:30	2015/04/16 10:30			
COC Number		na	na	na	na	na			
	UNITS	ISM-AOI013-0. 5-B-AFTER ISM	SBS-AOI018-1.0	SBS-AOI006-1.0	SBS-AOI005-1.0-DUP	SBS-AOI005-1.0	RDL	MDL	QC Batch
Moisture	%	<1.0	19	20	21	20	1.0	0.50	4004368
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK241							
Sampling Date		2015/04/16 13:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI007-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.317	0.154	0.200	0.0400	1.00	0.317		4009518
1,2,3,7,8-Penta CDD *	pg/g	4.25	0.151	1.00	0.0400	1.00	4.25		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	11.7	0.145	1.00	0.0400	0.100	1.17		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	81.8	0.160	1.00	0.0400	0.100	8.18		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	35.9	0.151	1.00	0.0400	0.100	3.59		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1650	0.150	1.00	0.0400	0.0100	16.5		4009518
Octa CDD *	pg/g	11800 (1)	1.04	20.0	0.0800	0.000300	3.54		4009518
Total Tetra CDD *	pg/g	2.33	0.154	0.200	0.0400			5	4009518
Total Penta CDD *	pg/g	16.8	0.151	1.00	0.0400			11	4009518
Total Hexa CDD *	pg/g	311	0.154	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	2770	0.150	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	2.50	0.134	0.200	0.0400	0.100	0.250		4009518
1,2,3,7,8-Penta CDF **	pg/g	6.39	0.229	1.00	0.0400	0.0300	0.192		4009518
2,3,4,7,8-Penta CDF **	pg/g	10.2	0.223	1.00	0.0400	0.300	3.06		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	58.8	0.134	1.00	0.0400	0.100	5.88		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	22.3	0.139	1.00	0.0400	0.100	2.23		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	12.0	0.128	1.00	0.0400	0.100	1.20		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	1.12	0.144	1.00	0.0400	0.100	0.112		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	246	0.0996	1.00	0.0400	0.0100	2.46		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	15.2	0.104	1.00	0.0400	0.0100	0.152		4009518
Octa CDF **	pg/g	207	0.135	2.00	0.0800	0.000300	0.0621		4009518
Total Tetra CDF **	pg/g	15.5	0.134	0.200	0.0400			13	4009518
Total Penta CDF **	pg/g	142	0.226	1.00	0.0400			9	4009518
Total Hexa CDF **	pg/g	601	0.136	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	657	0.102	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.98	0.10	1.0	0.90	0.100	0.198		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						53.1		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 10X Dilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK241							
<b>Sampling Date</b>		2015/04/16 13:45							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI007-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	99							4009518
C13-1234678 HeptaCDD *	%	94							4009518
C13-1234678 HeptaCDF **	%	87							4009518
C13-123478 HexaCDD *	%	82							4009518
C13-123478 HexaCDF **	%	86							4009518
C13-1234789 HeptaCDF **	%	90							4009518
C13-123678 HexaCDD *	%	81							4009518
C13-123678 HexaCDF **	%	81							4009518
C13-12378 PentaCDD *	%	94							4009518
C13-12378 PentaCDF **	%	92							4009518
C13-123789 HexaCDF **	%	93							4009518
C13-234678 HexaCDF **	%	83							4009518
C13-23478 PentaCDF **	%	103							4009518
C13-2378 TetraCDD *	%	79							4009518
C13-2378 TetraCDF **	%	84							4009518
C13-OCDD *	%	108							4009518
Confirmation C13-2378 TetraCDF **	%	85							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK242							
Sampling Date		2015/04/16 16:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI011-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.142	0.119	0.200	0.0400	1.00	0.142		4009518
1,2,3,7,8-Penta CDD *	pg/g	1.45	0.146	1.00	0.0400	1.00	1.45		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	3.17	0.136	1.00	0.0400	0.100	0.317		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	15.7	0.150	1.00	0.0400	0.100	1.57		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	9.88	0.142	1.00	0.0400	0.100	0.988		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	341	0.142	1.00	0.0400	0.0100	3.41		4009518
Octa CDD *	pg/g	1810	0.170	2.00	0.0800	0.000300	0.543		4009518
Total Tetra CDD *	pg/g	1.37	0.119	0.200	0.0400			4	4009518
Total Penta CDD *	pg/g	7.37	0.146	1.00	0.0400			9	4009518
Total Hexa CDD *	pg/g	76.8	0.144	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	549	0.142	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	0.991	0.154	0.200	0.0400	0.100	0.0991		4009518
1,2,3,7,8-Penta CDF **	pg/g	0.830	0.125	1.00	0.0400	0.0300	0.0249		4009518
2,3,4,7,8-Penta CDF **	pg/g	1.04	0.122	1.00	0.0400	0.300	0.312		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	4.95	0.127	1.00	0.0400	0.100	0.495		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	3.21	0.133	1.00	0.0400	0.100	0.321		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	2.24	0.122	1.00	0.0400	0.100	0.224		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.190 (1)	0.190	1.00	0.0400	0.100	0.0190		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	71.4	0.118	1.00	0.0400	0.0100	0.714		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.05	0.122	1.00	0.0400	0.0100	0.0405		4009518
Octa CDF **	pg/g	141	0.131	2.00	0.0800	0.000300	0.0423		4009518
Total Tetra CDF **	pg/g	5.74	0.154	0.200	0.0400			11	4009518
Total Penta CDF **	pg/g	14.7	0.123	1.00	0.0400			8	4009518
Total Hexa CDF **	pg/g	90.1	0.130	1.00	0.0400			9	4009518
Total Hepta CDF **	pg/g	207	0.120	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.50	0.10	1.0	0.90	0.100	0.0500		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						10.7		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK242							
<b>Sampling Date</b>		2015/04/16 16:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI011-0. 5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	100							4009518
C13-1234678 HeptaCDD *	%	106							4009518
C13-1234678 HeptaCDF **	%	95							4009518
C13-123478 HexaCDD *	%	91							4009518
C13-123478 HexaCDF **	%	96							4009518
C13-1234789 HeptaCDF **	%	104							4009518
C13-123678 HexaCDD *	%	90							4009518
C13-123678 HexaCDF **	%	90							4009518
C13-12378 PentaCDD *	%	103							4009518
C13-12378 PentaCDF **	%	98							4009518
C13-123789 HexaCDF **	%	103							4009518
C13-234678 HexaCDF **	%	94							4009518
C13-23478 PentaCDF **	%	110							4009518
C13-2378 TetraCDD *	%	86							4009518
C13-2378 TetraCDF **	%	92							4009518
C13-OCDD *	%	113							4009518
Confirmation C13-2378 TetraCDF **	%	95							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK243							
Sampling Date		2015/04/16 14:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI031-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.248	0.103	0.200	0.0400	1.00	0.248		4009518
1,2,3,7,8-Penta CDD *	pg/g	1.95	0.103	1.00	0.0400	1.00	1.95		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	4.15	0.0958	1.00	0.0400	0.100	0.415		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	18.8	0.106	1.00	0.0400	0.100	1.88		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	11.8 (1)	0.0996	1.00	0.0400	0.100	1.18		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	397	0.101	1.00	0.0400	0.0100	3.97		4009518
Octa CDD *	pg/g	2170	0.104	2.00	0.0800	0.000300	0.651		4009518
Total Tetra CDD *	pg/g	4.03	0.103	0.200	0.0400			7	4009518
Total Penta CDD *	pg/g	10.4	0.103	1.00	0.0400			11	4009518
Total Hexa CDD *	pg/g	96.1	0.102	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	661	0.101	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	1.74	0.109	0.200	0.0400	0.100	0.174		4009518
1,2,3,7,8-Penta CDF **	pg/g	0.983	0.104	1.00	0.0400	0.0300	0.0295		4009518
2,3,4,7,8-Penta CDF **	pg/g	1.39	0.101	1.00	0.0400	0.300	0.417		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	6.15 (1)	0.105	1.00	0.0400	0.100	0.615		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	3.24	0.109	1.00	0.0400	0.100	0.324		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	2.23	0.100	1.00	0.0400	0.100	0.223		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.168 (2)	0.168	1.00	0.0400	0.100	0.0168		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	65.9	0.101	1.00	0.0400	0.0100	0.659		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.40	0.105	1.00	0.0400	0.0100	0.0340		4009518
Octa CDF **	pg/g	176	0.108	2.00	0.0800	0.000300	0.0528		4009518
Total Tetra CDF **	pg/g	11.9	0.109	0.200	0.0400			13	4009518
Total Penta CDF **	pg/g	19.3	0.103	1.00	0.0400			9	4009518
Total Hexa CDF **	pg/g	83.5	0.107	1.00	0.0400			10	4009518
Total Hepta CDF **	pg/g	196	0.103	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.27	0.12	1.0	0.90	0.100	0.127		4203296
TOTAL TOXIC EQUIVALENCY	pg/g						12.8		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / Merged Peak  
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK243							
<b>Sampling Date</b>		2015/04/16 14:30							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI031-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4009518
C13-1234678 HeptaCDD *	%	97							4009518
C13-1234678 HeptaCDF **	%	95							4009518
C13-123478 HexaCDD *	%	89							4009518
C13-123478 HexaCDF **	%	94							4009518
C13-1234789 HeptaCDF **	%	94							4009518
C13-123678 HexaCDD *	%	90							4009518
C13-123678 HexaCDF **	%	91							4009518
C13-12378 PentaCDD *	%	101							4009518
C13-12378 PentaCDF **	%	96							4009518
C13-123789 HexaCDF **	%	99							4009518
C13-234678 HexaCDF **	%	91							4009518
C13-23478 PentaCDF **	%	109							4009518
C13-2378 TetraCDD *	%	78							4009518
C13-2378 TetraCDF **	%	85							4009518
C13-OCDD *	%	112							4009518
Confirmation C13-2378 TetraCDF **	%	81							4203296

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK244							
Sampling Date		2015/04/16 17:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOIO18-0. 5-B-C-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.255	0.101	0.200	0.0400	1.00	0.255		4009518
1,2,3,7,8-Penta CDD *	pg/g	2.05	0.108	1.00	0.0400	1.00	2.05		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	4.32	0.100	1.00	0.0400	0.100	0.432		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	20.1	0.110	1.00	0.0400	0.100	2.01		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	13.0 (1)	0.104	1.00	0.0400	0.100	1.30		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	390	0.101	1.00	0.0400	0.0100	3.90		4009518
Octa CDD *	pg/g	2070	0.102	2.00	0.0800	0.000300	0.621		4009518
Total Tetra CDD *	pg/g	2.76	0.101	0.200	0.0400			7	4009518
Total Penta CDD *	pg/g	12.5	0.108	1.00	0.0400			10	4009518
Total Hexa CDD *	pg/g	109	0.106	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	648	0.101	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	0.969	0.108	0.200	0.0400	0.100	0.0969		4009518
1,2,3,7,8-Penta CDF **	pg/g	1.04	0.102	1.00	0.0400	0.0300	0.0312		4009518
2,3,4,7,8-Penta CDF **	pg/g	1.31	0.0988	1.00	0.0400	0.300	0.393		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	6.73 (1)	0.103	1.00	0.0400	0.100	0.673		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	3.47	0.107	1.00	0.0400	0.100	0.347		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	2.41	0.0985	1.00	0.0400	0.100	0.241		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.207	0.111	1.00	0.0400	0.100	0.0207		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	66.4	0.105	1.00	0.0400	0.0100	0.664		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.96	0.109	1.00	0.0400	0.0100	0.0296		4009518
Octa CDF **	pg/g	84.6	0.108	2.00	0.0800	0.000300	0.0254		4009518
Total Tetra CDF **	pg/g	6.94	0.108	0.200	0.0400			10	4009518
Total Penta CDF **	pg/g	16.6	0.100	1.00	0.0400			8	4009518
Total Hexa CDF **	pg/g	89.5	0.105	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	160	0.107	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.66	0.16	1.0	0.90	0.100	0.0660		4203296
TOTAL TOXIC EQUIVALENCY	pg/g						13.1		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / Merged Peak

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK244							
<b>Sampling Date</b>		2015/04/16 17:30							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI018-0. 5-B-C-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4009518
C13-1234678 HeptaCDD *	%	98							4009518
C13-1234678 HeptaCDF **	%	87							4009518
C13-123478 HexaCDD *	%	82							4009518
C13-123478 HexaCDF **	%	87							4009518
C13-1234789 HeptaCDF **	%	96							4009518
C13-123678 HexaCDD *	%	84							4009518
C13-123678 HexaCDF **	%	85							4009518
C13-12378 PentaCDD *	%	98							4009518
C13-12378 PentaCDF **	%	94							4009518
C13-123789 HexaCDF **	%	94							4009518
C13-234678 HexaCDF **	%	85							4009518
C13-23478 PentaCDF **	%	106							4009518
C13-2378 TetraCDD *	%	79							4009518
C13-2378 TetraCDF **	%	88							4009518
C13-OCDD *	%	107							4009518
Confirmation C13-2378 TetraCDF **	%	79							4203296

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK245							
Sampling Date		2015/04/16 16:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI018-0. 5-B-A-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.324	0.224	0.200	0.0400	1.00	0.324		4009518
1,2,3,7,8-Penta CDD *	pg/g	2.14	0.147	1.00	0.0400	1.00	2.14		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	4.40	0.127	1.00	0.0400	0.100	0.440		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	20.2	0.140	1.00	0.0400	0.100	2.02		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	14.1	0.132	1.00	0.0400	0.100	1.41		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	379	0.120	1.00	0.0400	0.0100	3.79		4009518
Octa CDD *	pg/g	1990	0.121	2.00	0.0800	0.000300	0.597		4009518
Total Tetra CDD *	pg/g	4.54	0.224	0.200	0.0400			4	4009518
Total Penta CDD *	pg/g	14.6	0.147	1.00	0.0400			9	4009518
Total Hexa CDD *	pg/g	112	0.135	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	636	0.120	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	1.78	0.144	0.200	0.0400	0.100	0.178		4009518
1,2,3,7,8-Penta CDF **	pg/g	1.28	0.129	1.00	0.0400	0.0300	0.0384		4009518
2,3,4,7,8-Penta CDF **	pg/g	1.72	0.126	1.00	0.0400	0.300	0.516		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	8.65	0.113	1.00	0.0400	0.100	0.865		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	4.57	0.118	1.00	0.0400	0.100	0.457		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	3.17	0.108	1.00	0.0400	0.100	0.317		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.250	0.123	1.00	0.0400	0.100	0.0250		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	96.1	0.109	1.00	0.0400	0.0100	0.961		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.62	0.113	1.00	0.0400	0.0100	0.0362		4009518
Octa CDF **	pg/g	87.6	0.140	2.00	0.0800	0.000300	0.0263		4009518
Total Tetra CDF **	pg/g	11.7	0.144	0.200	0.0400			13	4009518
Total Penta CDF **	pg/g	24.5	0.128	1.00	0.0400			9	4009518
Total Hexa CDF **	pg/g	110	0.115	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	213	0.111	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.84 (1)	0.84	1.0	0.90	0.100	0.0840		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						14.0		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK245							
<b>Sampling Date</b>		2015/04/16 16:45							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI018-0. 5-B-A-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	81							4009518
C13-1234678 HeptaCDD *	%	92							4009518
C13-1234678 HeptaCDF **	%	81							4009518
C13-123478 HexaCDD *	%	73							4009518
C13-123478 HexaCDF **	%	78							4009518
C13-1234789 HeptaCDF **	%	86							4009518
C13-123678 HexaCDD *	%	75							4009518
C13-123678 HexaCDF **	%	75							4009518
C13-12378 PentaCDD *	%	88							4009518
C13-12378 PentaCDF **	%	83							4009518
C13-123789 HexaCDF **	%	87							4009518
C13-234678 HexaCDF **	%	76							4009518
C13-23478 PentaCDF **	%	95							4009518
C13-2378 TetraCDD *	%	70							4009518
C13-2378 TetraCDF **	%	76							4009518
C13-OCDD *	%	100							4009518
Confirmation C13-2378 TetraCDF **	%	77							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK246							
Sampling Date		2015/04/16 17:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI018-0. 5-B-B-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.326	0.102	0.200	0.0400	1.00	0.326		4009518
1,2,3,7,8-Penta CDD *	pg/g	2.32	0.102	1.00	0.0400	1.00	2.32		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	4.62	0.103	1.00	0.0400	0.100	0.462		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	21.4	0.113	1.00	0.0400	0.100	2.14		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	14.8 (1)	0.107	1.00	0.0400	0.100	1.48		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	444	0.108	1.00	0.0400	0.0100	4.44		4009518
Octa CDD *	pg/g	2480	0.108	2.00	0.0800	0.000300	0.744		4009518
Total Tetra CDD *	pg/g	3.97	0.102	0.200	0.0400			7	4009518
Total Penta CDD *	pg/g	13.8	0.102	1.00	0.0400			8	4009518
Total Hexa CDD *	pg/g	119	0.109	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	753	0.108	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	2.28	0.102	0.200	0.0400	0.100	0.228		4009518
1,2,3,7,8-Penta CDF **	pg/g	1.40	0.103	1.00	0.0400	0.0300	0.0420		4009518
2,3,4,7,8-Penta CDF **	pg/g	1.73	0.0996	1.00	0.0400	0.300	0.519		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	7.66 (1)	0.106	1.00	0.0400	0.100	0.766		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	3.98	0.110	1.00	0.0400	0.100	0.398		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	2.78	0.101	1.00	0.0400	0.100	0.278		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.229 (2)	0.229	1.00	0.0400	0.100	0.0229		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	73.2	0.103	1.00	0.0400	0.0100	0.732		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.39	0.107	1.00	0.0400	0.0100	0.0339		4009518
Octa CDF **	pg/g	107	0.104	2.00	0.0800	0.000300	0.0321		4009518
Total Tetra CDF **	pg/g	12.6	0.102	0.200	0.0400			12	4009518
Total Penta CDF **	pg/g	19.4	0.101	1.00	0.0400			11	4009518
Total Hexa CDF **	pg/g	96.4	0.108	1.00	0.0400			10	4009518
Total Hepta CDF **	pg/g	186	0.105	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<1.0 (3)	1.0	1.0	0.90	0.100	0.100		4203296

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / Merged Peak  
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.  
(3) .  
RT>2 seconds - PCDD/DF analysis-Peak maxima of monitored ions exceeds 2 seconds

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK246							
Sampling Date		2015/04/16 17:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI018-0. 5-B-B-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g						14.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4009518
C13-1234678 HeptaCDD *	%	104							4009518
C13-1234678 HeptaCDF **	%	94							4009518
C13-123478 HexaCDD *	%	88							4009518
C13-123478 HexaCDF **	%	95							4009518
C13-1234789 HeptaCDF **	%	104							4009518
C13-123678 HexaCDD *	%	90							4009518
C13-123678 HexaCDF **	%	91							4009518
C13-12378 PentaCDD *	%	102							4009518
C13-12378 PentaCDF **	%	100							4009518
C13-123789 HexaCDF **	%	101							4009518
C13-234678 HexaCDF **	%	90							4009518
C13-23478 PentaCDF **	%	106							4009518
C13-2378 TetraCDD *	%	80							4009518
C13-2378 TetraCDF **	%	88							4009518
C13-OCDD *	%	115							4009518
Confirmation C13-2378 TetraCDF **	%	86							4203296
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK247							
Sampling Date		2015/04/16 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI006-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	10.8	0.104	0.200	0.0400	1.00	10.8		4009518
1,2,3,7,8-Penta CDD *	pg/g	4.00	0.104	1.00	0.0400	1.00	4.00		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	10.0	0.0986	1.00	0.0400	0.100	1.00		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	46.9	0.109	1.00	0.0400	0.100	4.69		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	29.1	0.102	1.00	0.0400	0.100	2.91		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	930	0.110	1.00	0.0400	0.0100	9.30		4009518
Octa CDD *	pg/g	4960 (1)	0.521	2.00	0.0800	0.000300	1.49		4009518
Total Tetra CDD *	pg/g	13.5	0.104	0.200	0.0400			5	4009518
Total Penta CDD *	pg/g	16.8	0.104	1.00	0.0400			10	4009518
Total Hexa CDD *	pg/g	214	0.105	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	1520	0.110	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	1.63	0.105	0.200	0.0400	0.100	0.163		4009518
1,2,3,7,8-Penta CDF **	pg/g	2.36	0.107	1.00	0.0400	0.0300	0.0708		4009518
2,3,4,7,8-Penta CDF **	pg/g	3.14	0.104	1.00	0.0400	0.300	0.942		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	18.1	0.106	1.00	0.0400	0.100	1.81		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	8.23	0.111	1.00	0.0400	0.100	0.823		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	5.11	0.102	1.00	0.0400	0.100	0.511		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.487	0.115	1.00	0.0400	0.100	0.0487		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	123	0.105	1.00	0.0400	0.0100	1.23		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.94	0.109	1.00	0.0400	0.0100	0.0694		4009518
Octa CDF **	pg/g	148	0.104	2.00	0.0800	0.000300	0.0444		4009518
Total Tetra CDF **	pg/g	9.18	0.105	0.200	0.0400			12	4009518
Total Penta CDF **	pg/g	35.6	0.106	1.00	0.0400			9	4009518
Total Hexa CDF **	pg/g	218	0.108	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	326	0.107	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.90 (2)	0.90	1.0	0.90	0.100	0.0900		4203296

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Results are from 5xdilution  
(2) Result are from 5X dilution  
RT>2 seconds - PCDD/DF analysis-Peak maxima of monitored ions exceeds 2 seconds  
EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK247							
Sampling Date		2015/04/16 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI006-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g						39.8		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4009518
C13-1234678 HeptaCDD *	%	108							4009518
C13-1234678 HeptaCDF **	%	96							4009518
C13-123478 HexaCDD *	%	90							4009518
C13-123478 HexaCDF **	%	95							4009518
C13-1234789 HeptaCDF **	%	105							4009518
C13-123678 HexaCDD *	%	91							4009518
C13-123678 HexaCDF **	%	91							4009518
C13-12378 PentaCDD *	%	101							4009518
C13-12378 PentaCDF **	%	94							4009518
C13-123789 HexaCDF **	%	102							4009518
C13-234678 HexaCDF **	%	92							4009518
C13-23478 PentaCDF **	%	110							4009518
C13-2378 TetraCDD *	%	79							4009518
C13-2378 TetraCDF **	%	87							4009518
C13-OCDD *	%	111							4009518
Confirmation C13-2378 TetraCDF **	%	148 (1)							4203296
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK248							
Sampling Date		2015/04/16 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI013-0. 5-F-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	3.79	0.210	0.200	0.0400	1.00	3.79		4009518
1,2,3,7,8-Penta CDD *	pg/g	8.81	0.136	1.00	0.0400	1.00	8.81		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	28.2	0.135	1.00	0.0400	0.100	2.82		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	159	0.148	1.00	0.0400	0.100	15.9		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	66.4	0.140	1.00	0.0400	0.100	6.64		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	3560 (1)	1.13	10.0	0.0400	0.0100	35.6		4009518
Octa CDD *	pg/g	20400 (1)	1.12	20.0	0.0800	0.000300	6.12		4009518
Total Tetra CDD *	pg/g	8.76	0.210	0.200	0.0400			8	4009518
Total Penta CDD *	pg/g	38.4	0.136	1.00	0.0400			12	4009518
Total Hexa CDD *	pg/g	641	0.143	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	6120	1.13	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	3.77	0.125	0.200	0.0400	0.100	0.377		4009518
1,2,3,7,8-Penta CDF **	pg/g	11.0	0.165	1.00	0.0400	0.0300	0.330		4009518
2,3,4,7,8-Penta CDF **	pg/g	15.7	0.160	1.00	0.0400	0.300	4.71		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	91.6	0.130	1.00	0.0400	0.100	9.16		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	37.5	0.135	1.00	0.0400	0.100	3.75		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	23.4	0.124	1.00	0.0400	0.100	2.34		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	1.80	0.141	1.00	0.0400	0.100	0.180		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	500	0.128	1.00	0.0400	0.0100	5.00		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	29.8	0.133	1.00	0.0400	0.0100	0.298		4009518
Octa CDF **	pg/g	557	0.116	2.00	0.0800	0.000300	0.167		4009518
Total Tetra CDF **	pg/g	24.6	0.125	0.200	0.0400			11	4009518
Total Penta CDF **	pg/g	208	0.162	1.00	0.0400			11	4009518
Total Hexa CDF **	pg/g	1070	0.132	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	1350	0.130	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	3.08	0.12	1.0	0.90	0.100	0.308		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						106		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 10X Dilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK248							
<b>Sampling Date</b>		2015/04/16 11:30							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI013-0. 5-F-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	83							4009518
C13-1234678 HeptaCDD *	%	89							4009518
C13-1234678 HeptaCDF **	%	83							4009518
C13-123478 HexaCDD *	%	94							4009518
C13-123478 HexaCDF **	%	91							4009518
C13-1234789 HeptaCDF **	%	80							4009518
C13-123678 HexaCDD *	%	95							4009518
C13-123678 HexaCDF **	%	85							4009518
C13-12378 PentaCDD *	%	85							4009518
C13-12378 PentaCDF **	%	79							4009518
C13-123789 HexaCDF **	%	92							4009518
C13-234678 HexaCDF **	%	88							4009518
C13-23478 PentaCDF **	%	92							4009518
C13-2378 TetraCDD *	%	72							4009518
C13-2378 TetraCDF **	%	75							4009518
C13-OCDD *	%	101							4009518
Confirmation C13-2378 TetraCDF **	%	76							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK249							
Sampling Date		2015/04/16 18:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI018-0. 5-F-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.461	0.152	0.200	0.0400	1.00	0.461		4009518
1,2,3,7,8-Penta CDD *	pg/g	2.80	0.146	1.00	0.0400	1.00	2.80		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	6.43	0.136	1.00	0.0400	0.100	0.643		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	27.8	0.150	1.00	0.0400	0.100	2.78		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	17.1	0.142	1.00	0.0400	0.100	1.71		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	553	0.192	1.00	0.0400	0.0100	5.53		4009518
Octa CDD *	pg/g	2940	0.168	2.00	0.0800	0.000300	0.882		4009518
Total Tetra CDD *	pg/g	4.43	0.152	0.200	0.0400			8	4009518
Total Penta CDD *	pg/g	15.2	0.146	1.00	0.0400			10	4009518
Total Hexa CDD *	pg/g	143	0.145	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	933	0.192	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	1.36	0.120	0.200	0.0400	0.100	0.136		4009518
1,2,3,7,8-Penta CDF **	pg/g	1.45	0.143	1.00	0.0400	0.0300	0.0435		4009518
2,3,4,7,8-Penta CDF **	pg/g	2.02	0.139	1.00	0.0400	0.300	0.606		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	9.91	0.143	1.00	0.0400	0.100	0.991		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	5.20	0.148	1.00	0.0400	0.100	0.520		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	3.48	0.136	1.00	0.0400	0.100	0.348		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.323	0.154	1.00	0.0400	0.100	0.0323		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	78.6	0.126	1.00	0.0400	0.0100	0.786		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.04	0.131	1.00	0.0400	0.0100	0.0404		4009518
Octa CDF **	pg/g	97.1	0.137	2.00	0.0800	0.000300	0.0291		4009518
Total Tetra CDF **	pg/g	13.1	0.120	0.200	0.0400			12	4009518
Total Penta CDF **	pg/g	42.7	0.141	1.00	0.0400			8	4009518
Total Hexa CDF **	pg/g	140	0.145	1.00	0.0400			10	4009518
Total Hepta CDF **	pg/g	196	0.128	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.84	0.11	1.0	0.90	0.100	0.0840		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						18.3		

**Surrogate Recovery (%)**

37CL4 2378 Tetra CDD *	%	82							4009518
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EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK249							
Sampling Date		2015/04/16 18:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI018-0. 5-F-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	88							4009518
C13-1234678 HeptaCDF **	%	85							4009518
C13-123478 HexaCDD *	%	89							4009518
C13-123478 HexaCDF **	%	89							4009518
C13-1234789 HeptaCDF **	%	85							4009518
C13-123678 HexaCDD *	%	87							4009518
C13-123678 HexaCDF **	%	86							4009518
C13-12378 PentaCDD *	%	93							4009518
C13-12378 PentaCDF **	%	87							4009518
C13-123789 HexaCDF **	%	93							4009518
C13-234678 HexaCDF **	%	87							4009518
C13-23478 PentaCDF **	%	98							4009518
C13-2378 TetraCDD *	%	72							4009518
C13-2378 TetraCDF **	%	77							4009518
C13-OCDD *	%	93							4009518
Confirmation C13-2378 TetraCDF **	%	82							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK250							
Sampling Date		2015/04/16 10:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI005-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	8.64	0.212	0.200	0.0400	1.00	8.64		4009518
1,2,3,7,8-Penta CDD *	pg/g	8.29	0.133	1.00	0.0400	1.00	8.29		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	18.1	0.132	1.00	0.0400	0.100	1.81		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	94.6	0.145	1.00	0.0400	0.100	9.46		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	55.5	0.137	1.00	0.0400	0.100	5.55		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1810	0.145	1.00	0.0400	0.0100	18.1		4009518
Octa CDD *	pg/g	9800 (1)	0.515	10.0	0.0800	0.000300	2.94		4009518
Total Tetra CDD *	pg/g	23.5	0.212	0.200	0.0400			14	4009518
Total Penta CDD *	pg/g	42.5	0.133	1.00	0.0400			11	4009518
Total Hexa CDD *	pg/g	429	0.140	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	3020	0.145	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	3.93	0.123	0.200	0.0400	0.100	0.393		4009518
1,2,3,7,8-Penta CDF **	pg/g	5.70	0.183	1.00	0.0400	0.0300	0.171		4009518
2,3,4,7,8-Penta CDF **	pg/g	9.10	0.177	1.00	0.0400	0.300	2.73		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	44.4	0.116	1.00	0.0400	0.100	4.44		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	22.0	0.121	1.00	0.0400	0.100	2.20		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	14.0	0.111	1.00	0.0400	0.100	1.40		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.854	0.126	1.00	0.0400	0.100	0.0854		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	249	0.116	1.00	0.0400	0.0100	2.49		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	15.3	0.121	1.00	0.0400	0.0100	0.153		4009518
Octa CDF **	pg/g	265	0.140	2.00	0.0800	0.000300	0.0795		4009518
Total Tetra CDF **	pg/g	56.2	0.123	0.200	0.0400			12	4009518
Total Penta CDF **	pg/g	150	0.180	1.00	0.0400			11	4009518
Total Hexa CDF **	pg/g	537	0.118	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	649	0.118	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.28	0.099	1.0	0.90	0.100	0.228		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						68.8		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 5x dilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK250							
<b>Sampling Date</b>		2015/04/16 10:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI005-0. 5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4009518
C13-1234678 HeptaCDD *	%	97							4009518
C13-1234678 HeptaCDF **	%	89							4009518
C13-123478 HexaCDD *	%	81							4009518
C13-123478 HexaCDF **	%	84							4009518
C13-1234789 HeptaCDF **	%	92							4009518
C13-123678 HexaCDD *	%	80							4009518
C13-123678 HexaCDF **	%	80							4009518
C13-12378 PentaCDD *	%	101							4009518
C13-12378 PentaCDF **	%	97							4009518
C13-123789 HexaCDF **	%	96							4009518
C13-234678 HexaCDF **	%	84							4009518
C13-23478 PentaCDF **	%	113							4009518
C13-2378 TetraCDD *	%	77							4009518
C13-2378 TetraCDF **	%	87							4009518
C13-OCDD *	%	97							4009518
Confirmation C13-2378 TetraCDF **	%	84							4014175

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 \*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK251							
Sampling Date		2015/04/16 12:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI013-0. 5-B-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.964	0.221	0.200	0.0400	1.00	0.964		4009518
1,2,3,7,8-Penta CDD *	pg/g	6.25	0.117	1.00	0.0400	1.00	6.25		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	13.8	0.124	1.00	0.0400	0.100	1.38		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	72.0	0.137	1.00	0.0400	0.100	7.20		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	38.9	0.129	1.00	0.0400	0.100	3.89		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1450	0.160	1.00	0.0400	0.0100	14.5		4009518
Octa CDD *	pg/g	8790 (1)	0.503	10.0	0.0800	0.000300	2.64		4009518
Total Tetra CDD *	pg/g	16.5	0.221	0.200	0.0400			13	4009518
Total Penta CDD *	pg/g	38.9	0.117	1.00	0.0400			12	4009518
Total Hexa CDD *	pg/g	349	0.132	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	2480	0.160	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	5.89	0.133	0.200	0.0400	0.100	0.589		4009518
1,2,3,7,8-Penta CDF **	pg/g	5.00	0.152	1.00	0.0400	0.0300	0.150		4009518
2,3,4,7,8-Penta CDF **	pg/g	6.27	0.148	1.00	0.0400	0.300	1.88		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	31.7	0.108	1.00	0.0400	0.100	3.17		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	14.9	0.112	1.00	0.0400	0.100	1.49		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	9.39	0.103	1.00	0.0400	0.100	0.939		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.833	0.117	1.00	0.0400	0.100	0.0833		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	199	0.142	1.00	0.0400	0.0100	1.99		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	11.4	0.148	1.00	0.0400	0.0100	0.114		4009518
Octa CDF **	pg/g	288	0.133	2.00	0.0800	0.000300	0.0864		4009518
Total Tetra CDF **	pg/g	32.5	0.133	0.200	0.0400			14	4009518
Total Penta CDF **	pg/g	70.7	0.150	1.00	0.0400			12	4009518
Total Hexa CDF **	pg/g	374	0.110	1.00	0.0400			12	4009518
Total Hepta CDF **	pg/g	541	0.145	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.67	0.12	0.12	0.11	0.100	0.267		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						47.0		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 5x dilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK251							
<b>Sampling Date</b>		2015/04/16 12:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ISM-AOI013-0. 5-B-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	89							4009518
C13-1234678 HeptaCDD *	%	102							4009518
C13-1234678 HeptaCDF **	%	95							4009518
C13-123478 HexaCDD *	%	91							4009518
C13-123478 HexaCDF **	%	97							4009518
C13-1234789 HeptaCDF **	%	100							4009518
C13-123678 HexaCDD *	%	91							4009518
C13-123678 HexaCDF **	%	93							4009518
C13-12378 PentaCDD *	%	102							4009518
C13-12378 PentaCDF **	%	99							4009518
C13-123789 HexaCDF **	%	102							4009518
C13-234678 HexaCDF **	%	96							4009518
C13-23478 PentaCDF **	%	118							4009518
C13-2378 TetraCDD *	%	79							4009518
C13-2378 TetraCDF **	%	89							4009518
C13-OCDD *	%	116							4009518
Confirmation C13-2378 TetraCDF **	%	90							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK252							
Sampling Date		2015/04/16 17:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI018-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.109	0.109	0.200	0.0400	1.00	0.109		4009518
1,2,3,7,8-Penta CDD *	pg/g	0.319	0.101	1.00	0.0400	1.00	0.319		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	0.609	0.0965	1.00	0.0400	0.100	0.0609		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	2.74	0.106	1.00	0.0400	0.100	0.274		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	2.03 (1)	0.100	1.00	0.0400	0.100	0.203		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	54.9	0.100	1.00	0.0400	0.0100	0.549		4009518
Octa CDD *	pg/g	290	0.105	2.00	0.0800	0.000300	0.0870		4009518
Total Tetra CDD *	pg/g	0.641	0.109	0.200	0.0400			3	4009518
Total Penta CDD *	pg/g	1.06	0.101	1.00	0.0400			3	4009518
Total Hexa CDD *	pg/g	14.0	0.102	1.00	0.0400			6	4009518
Total Hepta CDD *	pg/g	92.6	0.100	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	<0.668 (2)	0.668	0.200	0.0400	0.100	0.0668		4009518
1,2,3,7,8-Penta CDF **	pg/g	0.293	0.102	1.00	0.0400	0.0300	0.00879		4009518
2,3,4,7,8-Penta CDF **	pg/g	0.300	0.0995	1.00	0.0400	0.300	0.0900		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	1.16 (1)	0.0986	1.00	0.0400	0.100	0.116		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	0.607	0.103	1.00	0.0400	0.100	0.0607		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	0.440	0.0942	1.00	0.0400	0.100	0.0440		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.107	0.107	1.00	0.0400	0.100	0.0107		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	9.37	0.102	1.00	0.0400	0.0100	0.0937		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.466	0.106	1.00	0.0400	0.0100	0.00466		4009518
Octa CDF **	pg/g	9.09	0.103	2.00	0.0800	0.000300	0.00273		4009518
Total Tetra CDF **	pg/g	3.33	0.109	0.200	0.0400			11	4009518
Total Penta CDF **	pg/g	2.80	0.101	1.00	0.0400			6	4009518
Total Hexa CDF **	pg/g	13.3	0.100	1.00	0.0400			8	4009518
Total Hepta CDF **	pg/g	21.7	0.104	1.00	0.0400			3	4009518
TOTAL TOXIC EQUIVALENCY	pg/g						2.10		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / Merged Peak  
(2) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK252							
<b>Sampling Date</b>		2015/04/16 17:15							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-AOI018-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96							4009518
C13-1234678 HeptaCDD *	%	103							4009518
C13-1234678 HeptaCDF **	%	92							4009518
C13-123478 HexaCDD *	%	88							4009518
C13-123478 HexaCDF **	%	93							4009518
C13-1234789 HeptaCDF **	%	101							4009518
C13-123678 HexaCDD *	%	89							4009518
C13-123678 HexaCDF **	%	89							4009518
C13-12378 PentaCDD *	%	104							4009518
C13-12378 PentaCDF **	%	97							4009518
C13-123789 HexaCDF **	%	100							4009518
C13-234678 HexaCDF **	%	91							4009518
C13-23478 PentaCDF **	%	109							4009518
C13-2378 TetraCDD *	%	84							4009518
C13-2378 TetraCDF **	%	92							4009518
C13-OCDD *	%	109							4009518

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK253							
Sampling Date		2015/04/16 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI006-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	6.74	0.227	0.200	0.0400	1.00	6.74		4009518
1,2,3,7,8-Penta CDD *	pg/g	1.98	0.187	1.00	0.0400	1.00	1.98		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	5.03	0.139	1.00	0.0400	0.100	0.503		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	26.6	0.153	1.00	0.0400	0.100	2.66		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	14.1	0.144	1.00	0.0400	0.100	1.41		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	572	0.154	1.00	0.0400	0.0100	5.72		4009518
Octa CDD *	pg/g	2890	0.178	2.00	0.0800	0.000300	0.867		4009518
Total Tetra CDD *	pg/g	8.29	0.227	0.200	0.0400			4	4009518
Total Penta CDD *	pg/g	10.2	0.187	1.00	0.0400			9	4009518
Total Hexa CDD *	pg/g	122	0.147	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	936	0.154	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	1.03	0.130	0.200	0.0400	0.100	0.103		4009518
1,2,3,7,8-Penta CDF **	pg/g	1.51	0.140	1.00	0.0400	0.0300	0.0453		4009518
2,3,4,7,8-Penta CDF **	pg/g	2.21	0.136	1.00	0.0400	0.300	0.663		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	12.8	0.169	1.00	0.0400	0.100	1.28		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	5.29	0.176	1.00	0.0400	0.100	0.529		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	3.36	0.162	1.00	0.0400	0.100	0.336		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.329	0.183	1.00	0.0400	0.100	0.0329		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	74.6	0.106	1.00	0.0400	0.0100	0.746		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.32	0.110	1.00	0.0400	0.0100	0.0432		4009518
Octa CDF **	pg/g	79.1	0.116	2.00	0.0800	0.000300	0.0237		4009518
Total Tetra CDF **	pg/g	5.40	0.130	0.200	0.0400			9	4009518
Total Penta CDF **	pg/g	23.0	0.138	1.00	0.0400			9	4009518
Total Hexa CDF **	pg/g	144	0.172	1.00	0.0400			10	4009518
Total Hepta CDF **	pg/g	198	0.108	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.68	0.10	1.0	0.90	0.100	0.0680		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						23.6		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	62							4009518
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK253							
Sampling Date		2015/04/16 13:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI006-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	67							4009518
C13-1234678 HeptaCDF **	%	63							4009518
C13-123478 HexaCDD *	%	60							4009518
C13-123478 HexaCDF **	%	66							4009518
C13-1234789 HeptaCDF **	%	65							4009518
C13-123678 HexaCDD *	%	62							4009518
C13-123678 HexaCDF **	%	64							4009518
C13-12378 PentaCDD *	%	68							4009518
C13-12378 PentaCDF **	%	67							4009518
C13-123789 HexaCDF **	%	69							4009518
C13-234678 HexaCDF **	%	63							4009518
C13-23478 PentaCDF **	%	76							4009518
C13-2378 TetraCDD *	%	53							4009518
C13-2378 TetraCDF **	%	60							4009518
C13-OCDD *	%	71							4009518
Confirmation C13-2378 TetraCDF **	%	63							4014175

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin

\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK254							
Sampling Date		2015/04/16 10:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI005-1.0-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.12	0.202	0.200	0.0400	1.00	1.12		4009518
1,2,3,7,8-Penta CDD *	pg/g	7.94	0.150	1.00	0.0400	1.00	7.94		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	20.3	0.140	1.00	0.0400	0.100	2.03		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	104	0.155	1.00	0.0400	0.100	10.4		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	60.4	0.146	1.00	0.0400	0.100	6.04		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	2180 (1)	1.06	10.0	0.0400	0.0100	21.8		4009518
Octa CDD *	pg/g	11800 (1)	1.13	20.0	0.0800	0.000300	3.54		4009518
Total Tetra CDD *	pg/g	9.59	0.202	0.200	0.0400			11	4009518
Total Penta CDD *	pg/g	36.2	0.150	1.00	0.0400			11	4009518
Total Hexa CDD *	pg/g	470	0.149	1.00	0.0400			7	4009518
Total Hepta CDD *	pg/g	3770	1.06	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	3.34	0.119	0.200	0.0400	0.100	0.334		4009518
1,2,3,7,8-Penta CDF **	pg/g	6.96	0.162	1.00	0.0400	0.0300	0.209		4009518
2,3,4,7,8-Penta CDF **	pg/g	10.8	0.158	1.00	0.0400	0.300	3.24		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	56.0	0.0994	1.00	0.0400	0.100	5.60		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	25.5	0.103	1.00	0.0400	0.100	2.55		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	15.3	0.0949	1.00	0.0400	0.100	1.53		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	1.14	0.107	1.00	0.0400	0.100	0.114		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	316	0.106	1.00	0.0400	0.0100	3.16		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	19.5	0.110	1.00	0.0400	0.0100	0.195		4009518
Octa CDF **	pg/g	372	0.132	2.00	0.0800	0.000300	0.112		4009518
Total Tetra CDF **	pg/g	44.0	0.119	0.200	0.0400			13	4009518
Total Penta CDF **	pg/g	147	0.160	1.00	0.0400			10	4009518
Total Hexa CDF **	pg/g	651	0.101	1.00	0.0400			12	4009518
Total Hepta CDF **	pg/g	869	0.108	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.65	0.11	1.0	0.90	0.100	0.265		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						69.8		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 10X Dilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AEK254							
<b>Sampling Date</b>		2015/04/16 10:30							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-AOI005-1.0-DUP</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	94							4009518
C13-1234678 HeptaCDD *	%	97							4009518
C13-1234678 HeptaCDF **	%	96							4009518
C13-123478 HexaCDD *	%	85							4009518
C13-123478 HexaCDF **	%	93							4009518
C13-1234789 HeptaCDF **	%	100							4009518
C13-123678 HexaCDD *	%	86							4009518
C13-123678 HexaCDF **	%	89							4009518
C13-12378 PentaCDD *	%	108							4009518
C13-12378 PentaCDF **	%	104							4009518
C13-123789 HexaCDF **	%	102							4009518
C13-234678 HexaCDF **	%	88							4009518
C13-23478 PentaCDF **	%	113							4009518
C13-2378 TetraCDD *	%	83							4009518
C13-2378 TetraCDF **	%	92							4009518
C13-OCDD *	%	106							4009518
Confirmation C13-2378 TetraCDF **	%	89							4014175

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK255							
Sampling Date		2015/04/16 10:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI005-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.845	0.234	0.200	0.0400	1.00	0.845		4009518
1,2,3,7,8-Penta CDD *	pg/g	6.98	0.198	1.00	0.0400	1.00	6.98		4009518
1,2,3,4,7,8-Hexa CDD *	pg/g	17.1	0.135	1.00	0.0400	0.100	1.71		4009518
1,2,3,6,7,8-Hexa CDD *	pg/g	93.5	0.148	1.00	0.0400	0.100	9.35		4009518
1,2,3,7,8,9-Hexa CDD *	pg/g	51.0	0.140	1.00	0.0400	0.100	5.10		4009518
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1900	0.168	1.00	0.0400	0.0100	19.0		4009518
Octa CDD *	pg/g	10800 (1)	1.16	20.0	0.0800	0.000300	3.24		4009518
Total Tetra CDD *	pg/g	7.57	0.234	0.200	0.0400			11	4009518
Total Penta CDD *	pg/g	30.8	0.198	1.00	0.0400			10	4009518
Total Hexa CDD *	pg/g	408	0.143	1.00	0.0400			6	4009518
Total Hepta CDD *	pg/g	3150	0.168	1.00	0.0400			2	4009518
2,3,7,8-Tetra CDF **	pg/g	2.69	0.152	0.200	0.0400	0.100	0.269		4009518
1,2,3,7,8-Penta CDF **	pg/g	5.77	0.190	1.00	0.0400	0.0300	0.173		4009518
2,3,4,7,8-Penta CDF **	pg/g	8.31	0.185	1.00	0.0400	0.300	2.49		4009518
1,2,3,4,7,8-Hexa CDF **	pg/g	48.3	0.175	1.00	0.0400	0.100	4.83		4009518
1,2,3,6,7,8-Hexa CDF **	pg/g	21.4	0.182	1.00	0.0400	0.100	2.14		4009518
2,3,4,6,7,8-Hexa CDF **	pg/g	13.6	0.167	1.00	0.0400	0.100	1.36		4009518
1,2,3,7,8,9-Hexa CDF **	pg/g	0.900	0.189	1.00	0.0400	0.100	0.0900		4009518
1,2,3,4,6,7,8-Hepta CDF **	pg/g	288	0.120	1.00	0.0400	0.0100	2.88		4009518
1,2,3,4,7,8,9-Hepta CDF **	pg/g	17.6	0.125	1.00	0.0400	0.0100	0.176		4009518
Octa CDF **	pg/g	354	0.124	2.00	0.0800	0.000300	0.106		4009518
Total Tetra CDF **	pg/g	32.4	0.152	0.200	0.0400			8	4009518
Total Penta CDF **	pg/g	127	0.187	1.00	0.0400			10	4009518
Total Hexa CDF **	pg/g	579	0.178	1.00	0.0400			11	4009518
Total Hepta CDF **	pg/g	792	0.123	1.00	0.0400			4	4009518
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.89	0.15	1.0	0.90	0.100	0.189		4014175
TOTAL TOXIC EQUIVALENCY	pg/g						60.7		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 10X Dilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEK255							
Sampling Date		2015/04/16 10:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI005-1.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	83							4009518
C13-1234678 HeptaCDD *	%	89							4009518
C13-1234678 HeptaCDF **	%	82							4009518
C13-123478 HexaCDD *	%	79							4009518
C13-123478 HexaCDF **	%	84							4009518
C13-1234789 HeptaCDF **	%	86							4009518
C13-123678 HexaCDD *	%	77							4009518
C13-123678 HexaCDF **	%	80							4009518
C13-12378 PentaCDD *	%	88							4009518
C13-12378 PentaCDF **	%	85							4009518
C13-123789 HexaCDF **	%	87							4009518
C13-234678 HexaCDF **	%	80							4009518
C13-23478 PentaCDF **	%	97							4009518
C13-2378 TetraCDD *	%	70							4009518
C13-2378 TetraCDF **	%	78							4009518
C13-OCDD *	%	88							4009518
Confirmation C13-2378 TetraCDF **	%	80							4014175
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**TEST SUMMARY**

**Maxxam ID:** AEK241  
**Sample ID:** ISM-AOI007-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK242  
**Sample ID:** ISM-AOI011-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK243  
**Sample ID:** ISM-AOI031-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203296	N/A	2015/09/22	Leila Azzam
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK244  
**Sample ID:** ISM-AOI018-0.5-B-C-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203296	N/A	2015/09/22	Leila Azzam
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK245  
**Sample ID:** ISM-AOI018-0.5-B-A-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK246  
**Sample ID:** ISM-AOI018-0.5-B-B-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203296	N/A	2015/09/22	Leila Azzam

**TEST SUMMARY**

**Maxxam ID:** AEK246  
**Sample ID:** ISM-AOI018-0.5-B-B-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK246 Dup  
**Sample ID:** ISM-AOI018-0.5-B-B-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203296	N/A	2015/09/22	Leila Azzam

**Maxxam ID:** AEK247  
**Sample ID:** ISM-AOI006-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203296	N/A	2015/09/22	Leila Azzam
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK248  
**Sample ID:** ISM-AOI013-0.5-F-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK249  
**Sample ID:** ISM-AOI018-0.5-F-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK250  
**Sample ID:** ISM-AOI005-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha



**TEST SUMMARY**

**Maxxam ID:** AEK250 Dup  
**Sample ID:** ISM-AOI005-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK251  
**Sample ID:** ISM-AOI013-0.5-B-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK252  
**Sample ID:** SBS-AOI018-1.0  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/05	Kay Shaw
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK253  
**Sample ID:** SBS-AOI006-1.0  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK254  
**Sample ID:** SBS-AOI005-1.0-DUP  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**Maxxam ID:** AEK255  
**Sample ID:** SBS-AOI005-1.0  
**Matrix:** Soil

**Collected:** 2015/04/16  
**Shipped:**  
**Received:** 2015/04/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4009518	2015/05/01	2015/05/06	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014175	N/A	2015/05/06	Vica Cioranic
Moisture	BAL	4004368	N/A	2015/04/30	Chamika Deeyagaha

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.9°C
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Revised report reflects addition of missed TCDF confirmations.

**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4004368	BOP	RPD - Sample/Sample Dup	Moisture	2015/04/30	NC		%	20
4009518	KKS	Matrix Spike	37CL4 2378 Tetra CDD	2015/05/05		111	%	35 - 197
			C13-1234678 HeptaCDD	2015/05/05		107	%	23 - 140
			C13-1234678 HeptaCDF	2015/05/05		102	%	28 - 143
			C13-123478 HexaCDD	2015/05/05		100	%	32 - 141
			C13-123478 HexaCDF	2015/05/05		106	%	26 - 152
			C13-1234789 HeptaCDF	2015/05/05		107	%	26 - 138
			C13-123678 HexaCDD	2015/05/05		97	%	28 - 130
			C13-123678 HexaCDF	2015/05/05		101	%	26 - 123
			C13-12378 PentaCDD	2015/05/05		110	%	25 - 181
			C13-12378 PentaCDF	2015/05/05		104	%	24 - 185
			C13-123789 HexaCDF	2015/05/05		110	%	29 - 147
			C13-234678 HexaCDF	2015/05/05		101	%	28 - 136
			C13-23478 PentaCDF	2015/05/05		116	%	21 - 178
			C13-2378 TetraCDD	2015/05/05		90	%	25 - 164
			C13-2378 TetraCDF	2015/05/05		101	%	24 - 169
			C13-OCDD	2015/05/05		125	%	17 - 157
4009518	KKS	Matrix Spike(AEK247)	2,3,7,8-Tetra CDD	2015/05/05		NC	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/05/05		106	%	70 - 142
			1,2,3,4,7,8-Hexa CDD	2015/05/05		115	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/05/05		124	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/05/05		130	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/05/05		NC	%	70 - 140
			Octa CDD	2015/05/05		NC	%	78 - 144
			2,3,7,8-Tetra CDF	2015/05/05		113	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/05/05		115	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/05/05		102	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/05/05		115	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/05/05		120	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/05/05		117	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/05/05		115	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/05/05		NC	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/05/05		116	%	78 - 138
			Octa CDF	2015/05/05		NC	%	63 - 170
4009518	KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/05		102	%	35 - 197
			C13-1234678 HeptaCDD	2015/05/05		95	%	23 - 140
			C13-1234678 HeptaCDF	2015/05/05		94	%	28 - 143
			C13-123478 HexaCDD	2015/05/05		90	%	32 - 141
			C13-123478 HexaCDF	2015/05/05		95	%	26 - 152
			C13-1234789 HeptaCDF	2015/05/05		98	%	26 - 138
			C13-123678 HexaCDD	2015/05/05		91	%	28 - 130
			C13-123678 HexaCDF	2015/05/05		92	%	26 - 123
			C13-12378 PentaCDD	2015/05/05		107	%	25 - 181
			C13-12378 PentaCDF	2015/05/05		101	%	24 - 185
			C13-123789 HexaCDF	2015/05/05		103	%	29 - 147
			C13-234678 HexaCDF	2015/05/05		93	%	28 - 136
			C13-23478 PentaCDF	2015/05/05		117	%	21 - 178
			C13-2378 TetraCDD	2015/05/05		87	%	25 - 164
			C13-2378 TetraCDF	2015/05/05		96	%	24 - 169
			C13-OCDD	2015/05/05		103	%	17 - 157
			2,3,7,8-Tetra CDD	2015/05/05		120	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/05/05		99	%	70 - 142
			1,2,3,4,7,8-Hexa CDD	2015/05/05		109	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/05/05		111	%	76 - 134

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2015/05/05		125	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/05/05		109	%	70 - 140
			Octa CDD	2015/05/05		99	%	78 - 144
			2,3,7,8-Tetra CDF	2015/05/05		109	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/05/05		109	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/05/05		96	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/05/05		111	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/05/05		115	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/05/05		111	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/05/05		109	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/05/05		113	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/05/05		111	%	78 - 138
			Octa CDF	2015/05/05		101	%	63 - 170
4009518	KKS	Method Blank	37CL4 2378 Tetra CDD	2015/05/05		105	%	35 - 197
			C13-1234678 HeptaCDD	2015/05/05		97	%	23 - 140
			C13-1234678 HeptaCDF	2015/05/05		95	%	28 - 143
			C13-123478 HexaCDD	2015/05/05		92	%	32 - 141
			C13-123478 HexaCDF	2015/05/05		97	%	26 - 152
			C13-1234789 HeptaCDF	2015/05/05		99	%	26 - 138
			C13-123678 HexaCDD	2015/05/05		94	%	28 - 130
			C13-123678 HexaCDF	2015/05/05		96	%	26 - 123
			C13-12378 PentaCDD	2015/05/05		108	%	25 - 181
			C13-12378 PentaCDF	2015/05/05		105	%	24 - 185
			C13-123789 HexaCDF	2015/05/05		105	%	29 - 147
			C13-234678 HexaCDF	2015/05/05		94	%	28 - 136
			C13-23478 PentaCDF	2015/05/05		116	%	21 - 178
			C13-2378 TetraCDD	2015/05/05		89	%	25 - 164
			C13-2378 TetraCDF	2015/05/05		96	%	24 - 169
			C13-OCDD	2015/05/05		102	%	17 - 157
			2,3,7,8-Tetra CDD	2015/05/05	<0.102, EDL=0.102		pg/g	
			1,2,3,7,8-Penta CDD	2015/05/05	<0.108, EDL=0.108		pg/g	
			1,2,3,4,7,8-Hexa CDD	2015/05/05	<0.0981, EDL=0.0981		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/05/05	<0.108, EDL=0.108		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/05/05	<0.102, EDL=0.102		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/05/05	0.366, EDL=0.105		pg/g	
			Octa CDD	2015/05/05	1.32, EDL=0.106		pg/g	
			Total Tetra CDD	2015/05/05	<0.102, EDL=0.102		pg/g	
			Total Penta CDD	2015/05/05	<0.108, EDL=0.108		pg/g	
			Total Hexa CDD	2015/05/05	<0.104, EDL=0.104		pg/g	
			Total Hepta CDD	2015/05/05	0.366, EDL=0.105		pg/g	
			2,3,7,8-Tetra CDF	2015/05/05	<0.105, EDL=0.105		pg/g	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8-Penta CDF	2015/05/05	<0.105, EDL=0.105		pg/g	
			2,3,4,7,8-Penta CDF	2015/05/05	<0.102, EDL=0.102		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/05/05	<0.104, EDL=0.104		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/05/05	<0.108, EDL=0.108		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/05/05	<0.0993, EDL=0.0993		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/05/05	<0.112, EDL=0.112		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/05/05	<0.108, EDL=0.108 (1)		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/05/05	<0.103, EDL=0.103		pg/g	
			Octa CDF	2015/05/05	0.183, EDL=0.104		pg/g	
			Total Tetra CDF	2015/05/05	<0.105, EDL=0.105		pg/g	
			Total Penta CDF	2015/05/05	<0.103, EDL=0.103		pg/g	
			Total Hexa CDF	2015/05/05	<0.106, EDL=0.106		pg/g	
			Total Hepta CDF	2015/05/05	<0.119, EDL=0.119 (1)		pg/g	
4009518	KKS	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/05/05	NC		%	25
			1,2,3,7,8-Penta CDD	2015/05/05	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/05/05	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2015/05/05	1.2		%	25
			1,2,3,7,8,9-Hexa CDD	2015/05/05	9.5 (2)		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/05/05	3.0		%	25
			Octa CDD	2015/05/05	2.8		%	25
			Total Tetra CDD	2015/05/05	1.9		%	25
			Total Penta CDD	2015/05/05	3.5		%	25
			Total Hexa CDD	2015/05/05	4.4		%	25
			Total Hepta CDD	2015/05/05	2.9		%	25
			2,3,7,8-Tetra CDF	2015/05/05	NC (3)		%	25
			1,2,3,7,8-Penta CDF	2015/05/05	NC		%	25
			2,3,4,7,8-Penta CDF	2015/05/05	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2015/05/05	0.75 (2)		%	25
			1,2,3,6,7,8-Hexa CDF	2015/05/05	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2015/05/05	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2015/05/05	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2015/05/05	1.8		%	25
			1,2,3,4,7,8,9-Hepta CDF	2015/05/05	NC		%	25
			Octa CDF	2015/05/05	2.5		%	25
			Total Tetra CDF	2015/05/05	1.3		%	25
			Total Penta CDF	2015/05/05	8.1		%	25
			Total Hexa CDF	2015/05/05	2.3		%	25
			Total Hepta CDF	2015/05/05	1.8		%	25
4014175	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/05/06	<0.11, EDL=0.11		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4203296	LAZ	Method Blank	Confirmation C13-2378 TetraCDF	2015/05/06		90	%	40 - 135
			Confirmation 2,3,7,8-Tetra CDF	2015/09/22	<0.14, EDL=0.14		pg/g	
4203296	LAZ	RPD - Sample/Sample Dup	Confirmation C13-2378 TetraCDF	2015/09/22		96	%	40 - 135
			Confirmation 2,3,7,8-Tetra CDF	2015/09/22	NC		%	100
			Confirmation 2,3,7,8-Tetra CDF	2015/09/22	NC		%	100

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(2) EMPC / Merged Peak

(3) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5D0784  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/05**  
**Report #: R3710020**  
**Version: 2R**

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B577816**

**Received: 2015/04/29, 13:40**

Sample Matrix: Soil  
# Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Dioxins/Furans in Soil (1613B) (1)	5	2015/05/03	2015/05/07	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2015/05/07	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/29	BRL SOP-00406	EPA M8290A / M1613
Moisture	5	N/A	2015/05/01	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====  
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Total cover pages: 1



Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AEP502	AEP503	AEP504	AEP505	AEP506			
Sampling Date		2015/04/23 15:10	2015/04/23 15:30	2015/04/23 16:00	2015/04/23 16:20	2015/04/23 16:40			
COC Number		NA	NA	NA	NA	NA			
	<b>Units</b>	<b>SS-ROW036-0.5</b>	<b>SBS-AOI032-1.0</b>	<b>SS-ROW012-0.5</b>	<b>SS-ROW014-0.5</b>	<b>SBS-AOI017-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>

Moisture	%	9.5	18	19	23	18	1.0	0.50	4005942
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

Maxxam ID		AEP506			
Sampling Date		2015/04/23 16:40			
COC Number		NA			
	<b>Units</b>	<b>SBS-AOI017-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
		<b>Lab-Dup</b>			

Moisture	%	17	1.0	0.50	4005942
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP502							
Sampling Date		2015/04/23 15:10							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW036-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.913	0.334	0.186	0.400	1.00	0.913		4010827
1,2,3,7,8-Penta CDD	pg/g	3.88	0.460	0.929	0.400	1.00	3.88		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	6.07	0.282	0.929	0.400	0.100	0.607		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	14.1	0.310	0.929	0.400	0.100	1.41		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	15.5	0.293	0.929	0.400	0.100	1.55		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	363	0.236	0.929	0.400	0.0100	3.63		4010827
Octa CDD	pg/g	2520	0.247	1.86	0.800	0.000300	0.756		4010827
Total Tetra CDD	pg/g	3.90	0.334	0.186	0.400			5	4010827
Total Penta CDD	pg/g	22.2	0.460	0.929	0.400			10	4010827
Total Hexa CDD	pg/g	109	0.299	0.929	0.400			6	4010827
Total Hepta CDD	pg/g	630	0.236	0.929	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	<23.2 (1)	23.2	0.186	0.400	0.100	2.32		4010827
1,2,3,7,8-Penta CDF	pg/g	0.840	0.367	0.929	0.400	0.0300	0.0252		4010827
2,3,4,7,8-Penta CDF	pg/g	3.96	0.357	0.929	0.400	0.300	1.19		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	5.95	0.203	0.929	0.400	0.100	0.595		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	3.26	0.211	0.929	0.400	0.100	0.326		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	2.46	0.194	0.929	0.400	0.100	0.246		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	<0.220	0.220	0.929	0.400	0.100	0.0220		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	61.6	0.171	0.929	0.400	0.0100	0.616		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	5.37	0.178	0.929	0.400	0.0100	0.0537		4010827
Octa CDF	pg/g	223	0.495	1.86	0.800	0.000300	0.0669		4010827
Total Tetra CDF	pg/g	60.3	0.321	0.186	0.400			13	4010827
Total Penta CDF	pg/g	39.7	0.362	0.929	0.400			10	4010827
Total Hexa CDF	pg/g	87.2	0.206	0.929	0.400			9	4010827
Total Hepta CDF	pg/g	212	0.175	0.929	0.400			4	4010827
Confirmation 2,3,7,8-Tetra CDF	pg/g	2.11	0.099	0.93	0.84	0.100	0.211		4014081
TOTAL TOXIC EQUIVALENCY	pg/g						16.1		

RDL = Reportable Detection Limit

EDL = Estimated Detection Limit

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

(1) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP502							
Sampling Date		2015/04/23 15:10							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW036-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	79							4010827
C13-1234678 HeptaCDD	%	72							4010827
C13-1234678 HeptaCDF **	%	73							4010827
C13-123478 HexaCDD	%	73							4010827
C13-123478 HexaCDF	%	81							4010827
C13-1234789 HeptaCDF	%	69							4010827
C13-123678 HexaCDD	%	78							4010827
C13-123678 HexaCDF	%	83							4010827
C13-12378 PentaCDD	%	74							4010827
C13-12378 PentaCDF	%	72							4010827
C13-123789 HexaCDF	%	79							4010827
C13-234678 HexaCDF	%	77							4010827
C13-23478 PentaCDF	%	86							4010827
C13-2378 TetraCDD	%	64							4010827
C13-2378 TetraCDF	%	69							4010827
C13-OCDD	%	64							4010827
Confirmation C13-2378 TetraCDF	%	75							4014081

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP503							
Sampling Date		2015/04/23 15:30							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SBS-AOI032-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>
2,3,7,8-Tetra CDD *	pg/g	<0.180	0.180	0.186	0.400	1.00	0.180		4010827
1,2,3,7,8-Penta CDD	pg/g	0.851	0.201	0.928	0.400	1.00	0.851		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	2.00	0.166	0.928	0.400	0.100	0.200		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	6.30	0.183	0.928	0.400	0.100	0.630		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	5.40	0.172	0.928	0.400	0.100	0.540		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	169	0.326	0.928	0.400	0.0100	1.69		4010827
Octa CDD	pg/g	893	0.263	1.86	0.800	0.000300	0.268		4010827
Total Tetra CDD	pg/g	0.769	0.180	0.186	0.400			2	4010827
Total Penta CDD	pg/g	3.36	0.201	0.928	0.400			4	4010827
Total Hexa CDD	pg/g	39.1	0.176	0.928	0.400			6	4010827
Total Hepta CDD	pg/g	285	0.326	0.928	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	<0.371 (1)	0.371	0.186	0.400	0.100	0.0371		4010827
1,2,3,7,8-Penta CDF	pg/g	0.243	0.150	0.928	0.400	0.0300	0.00729		4010827
2,3,4,7,8-Penta CDF	pg/g	0.349	0.146	0.928	0.400	0.300	0.105		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	1.77	0.146	0.928	0.400	0.100	0.177		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	1.23	0.152	0.928	0.400	0.100	0.123		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	1.16	0.139	0.928	0.400	0.100	0.116		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	<0.158	0.158	0.928	0.400	0.100	0.0158		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	36.9	0.111	0.928	0.400	0.0100	0.369		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	1.61	0.115	0.928	0.400	0.0100	0.0161		4010827
Octa CDF	pg/g	105	0.0959	1.86	0.800	0.000300	0.0315		4010827
Total Tetra CDF	pg/g	4.53	0.263	0.186	0.400			5	4010827
Total Penta CDF	pg/g	12.2	0.148	0.928	0.400			7	4010827
Total Hexa CDF	pg/g	41.6	0.148	0.928	0.400			9	4010827
Total Hepta CDF	pg/g	110	0.113	0.928	0.400			4	4010827
TOTAL TOXIC EQUIVALENCY	pg/g						5.36		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD	%	71							4010827

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
(1) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.



Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP503							
Sampling Date		2015/04/23 15:30							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SBS-AOI032-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

C13-1234678 HeptaCDD *	%	70							4010827
C13-1234678 HeptaCDF **	%	74							4010827
C13-123478 HexaCDD	%	67							4010827
C13-123478 HexaCDF	%	73							4010827
C13-1234789 HeptaCDF	%	75							4010827
C13-123678 HexaCDD	%	66							4010827
C13-123678 HexaCDF	%	73							4010827
C13-12378 PentaCDD	%	70							4010827
C13-12378 PentaCDF	%	73							4010827
C13-123789 HexaCDF	%	74							4010827
C13-234678 HexaCDF	%	57							4010827
C13-23478 PentaCDF	%	75							4010827
C13-2378 TetraCDD	%	56							4010827
C13-2378 TetraCDF	%	58							4010827
C13-OCDD	%	81							4010827

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

### DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		AEP503							
Sampling Date		2015/04/23 15:30							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SBS-AOI032-1.0 Lab-Dup</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	<0.167	0.167	0.194	0.400	1.00	0.167		4010827
1,2,3,7,8-Penta CDD	pg/g	0.794	0.167	0.972	0.400	1.00	0.794		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	1.97	0.180	0.972	0.400	0.100	0.197		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	6.01	0.198	0.972	0.400	0.100	0.601		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	4.51	0.187	0.972	0.400	0.100	0.451		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	159	0.259	0.972	0.400	0.0100	1.59		4010827
Octa CDD	pg/g	856	0.257	1.94	0.800	0.000300	0.257		4010827
Total Tetra CDD	pg/g	0.483	0.167	0.194	0.400			2	4010827
Total Penta CDD	pg/g	2.60	0.167	0.972	0.400			3	4010827
Total Hexa CDD	pg/g	37.0	0.191	0.972	0.400			7	4010827
Total Hepta CDD	pg/g	267	0.259	0.972	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	<0.214	0.214	0.194	0.400	0.100	0.0214		4010827
1,2,3,7,8-Penta CDF	pg/g	0.207	0.117	0.972	0.400	0.0300	0.00621		4010827
2,3,4,7,8-Penta CDF	pg/g	0.339	0.114	0.972	0.400	0.300	0.102		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	1.66	0.110	0.972	0.400	0.100	0.166		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	1.17	0.115	0.972	0.400	0.100	0.117		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	0.985	0.105	0.972	0.400	0.100	0.0985		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	<0.119	0.119	0.972	0.400	0.100	0.0119		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	35.0	0.0764	0.972	0.400	0.0100	0.350		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	1.53	0.0794	0.972	0.400	0.0100	0.0153		4010827
Octa CDF	pg/g	98.1	0.192	1.94	0.800	0.000300	0.0294		4010827
Total Tetra CDF	pg/g	2.60 (f)	0.214	0.194	0.400			4	4010827
Total Penta CDF	pg/g	11.7	0.115	0.972	0.400			7	4010827
Total Hexa CDF	pg/g	40.2	0.112	0.972	0.400			9	4010827
Total Hepta CDF	pg/g	104	0.0778	0.972	0.400			4	4010827
TOTAL TOXIC EQUIVALENCY	pg/g						4.97		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD	%	73							4010827

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 (1) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP503							
Sampling Date		2015/04/23 15:30							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SBS-AOI032-1.0 Lab-Dup</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

C13-1234678 HeptaCDD *	%	80							4010827
C13-1234678 HeptaCDF **	%	78							4010827
C13-123478 HexaCDD	%	73							4010827
C13-123478 HexaCDF	%	80							4010827
C13-1234789 HeptaCDF	%	81							4010827
C13-123678 HexaCDD	%	73							4010827
C13-123678 HexaCDF	%	78							4010827
C13-12378 PentaCDD	%	74							4010827
C13-12378 PentaCDF	%	74							4010827
C13-123789 HexaCDF	%	80							4010827
C13-234678 HexaCDF	%	60							4010827
C13-23478 PentaCDF	%	72							4010827
C13-2378 TetraCDD	%	57							4010827
C13-2378 TetraCDF	%	56							4010827
C13-OCDD	%	84							4010827

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP504							
Sampling Date		2015/04/23 16:00							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW012-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.189	0.189	0.200	0.400	1.00	0.189		4010827
1,2,3,7,8-Penta CDD	pg/g	1.25	0.159	0.999	0.400	1.00	1.25		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	3.34	0.160	0.999	0.400	0.100	0.334		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	16.3	0.176	0.999	0.400	0.100	1.63		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	8.66	0.166	0.999	0.400	0.100	0.866		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	345	0.141	0.999	0.400	0.0100	3.45		4010827
Octa CDD	pg/g	2160	0.122	2.00	0.800	0.000300	0.648		4010827
Total Tetra CDD	pg/g	1.16	0.189	0.200	0.400			3	4010827
Total Penta CDD	pg/g	4.94	0.159	0.999	0.400			6	4010827
Total Hexa CDD	pg/g	74.9	0.169	0.999	0.400			7	4010827
Total Hepta CDD	pg/g	601	0.141	0.999	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	<0.569 (1)	0.569	0.200	0.400	0.100	0.0569		4010827
1,2,3,7,8-Penta CDF	pg/g	0.609	0.203	0.999	0.400	0.0300	0.0183		4010827
2,3,4,7,8-Penta CDF	pg/g	0.862	0.197	0.999	0.400	0.300	0.259		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	4.29	0.120	0.999	0.400	0.100	0.429		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	2.90	0.125	0.999	0.400	0.100	0.290		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	2.13	0.115	0.999	0.400	0.100	0.213		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	0.157	0.130	0.999	0.400	0.100	0.0157		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	44.1	0.0950	0.999	0.400	0.0100	0.441		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	2.50	0.0988	0.999	0.400	0.0100	0.0250		4010827
Octa CDF	pg/g	72.6	0.150	2.00	0.800	0.000300	0.0218		4010827
Total Tetra CDF	pg/g	6.44	0.200	0.200	0.400			6	4010827
Total Penta CDF	pg/g	24.7	0.200	0.999	0.400			7	4010827
Total Hexa CDF	pg/g	85.6	0.122	0.999	0.400			10	4010827
Total Hepta CDF	pg/g	116	0.0969	0.999	0.400			4	4010827
TOTAL TOXIC EQUIVALENCY	pg/g						10.1		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD	%	80							4010827

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP504							
Sampling Date		2015/04/23 16:00							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW012-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

C13-1234678 HeptaCDD *	%	91							4010827
C13-1234678 HeptaCDF **	%	87							4010827
C13-123478 HexaCDD	%	80							4010827
C13-123478 HexaCDF	%	87							4010827
C13-1234789 HeptaCDF	%	92							4010827
C13-123678 HexaCDD	%	79							4010827
C13-123678 HexaCDF	%	85							4010827
C13-12378 PentaCDD	%	84							4010827
C13-12378 PentaCDF	%	85							4010827
C13-123789 HexaCDF	%	87							4010827
C13-234678 HexaCDF	%	67							4010827
C13-23478 PentaCDF	%	87							4010827
C13-2378 TetraCDD	%	65							4010827
C13-2378 TetraCDF	%	65							4010827
C13-OCDD	%	99							4010827

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP505							
Sampling Date		2015/04/23 16:20							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	Units	SS-ROW014-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.36	0.220	0.190	0.400	1.00	1.36		4010827
1,2,3,7,8-Penta CDD	pg/g	25.1	0.240	0.949	0.400	1.00	25.1		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	88.6	0.409	0.949	0.400	0.100	8.86		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	569	0.451	0.949	0.400	0.100	56.9		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	208	0.425	0.949	0.400	0.100	20.8		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	11100 (1)	1.55	19.0	0.400	0.0100	111		4010827
Octa CDD	pg/g	66200 (1)	2.13	38.0	0.800	0.000300	19.9		4010827
Total Tetra CDD	pg/g	8.54	0.220	0.190	0.400			9	4010827
Total Penta CDD	pg/g	104	0.240	0.949	0.400			12	4010827
Total Hexa CDD	pg/g	2190	0.434	0.949	0.400			7	4010827
Total Hepta CDD	pg/g	18900 (1)	1.55	19.0	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	12.4	0.202	0.190	0.400	0.100	1.24		4010827
1,2,3,7,8-Penta CDF	pg/g	47.7	0.301	0.949	0.400	0.0300	1.43		4010827
2,3,4,7,8-Penta CDF	pg/g	69.7	0.292	0.949	0.400	0.300	20.9		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	403	0.781	0.949	0.400	0.100	40.3		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	161	0.812	0.949	0.400	0.100	16.1		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	88.3	0.746	0.949	0.400	0.100	8.83		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	6.69	0.845	0.949	0.400	0.100	0.669		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	1700	0.644	0.949	0.400	0.0100	17.0		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	99.9	0.669	0.949	0.400	0.0100	0.999		4010827
Octa CDF	pg/g	1440	0.778	1.90	0.800	0.000300	0.432		4010827
Total Tetra CDF	pg/g	64.8	0.202	0.190	0.400			12	4010827
Total Penta CDF	pg/g	1100	0.297	0.949	0.400			12	4010827
Total Hexa CDF	pg/g	4700	0.794	0.949	0.400			12	4010827
Total Hepta CDF	pg/g	4370	0.656	0.949	0.400			4	4010827
Confirmation 2,3,7,8-Tetra CDF	pg/g	11.2	0.17	0.95	0.86	0.100	1.12		4014081
TOTAL TOXIC EQUIVALENCY	pg/g						352		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 ( 1 ) \*\* From 20X Dilution Run \*\*

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP505							
Sampling Date		2015/04/23 16:20							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	<b>Units</b>	<b>SS-ROW014-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	76							4010827
C13-1234678 HeptaCDD	%	76 (1)							4010827
C13-1234678 HeptaCDF **	%	71							4010827
C13-123478 HexaCDD	%	66							4010827
C13-123478 HexaCDF	%	71							4010827
C13-1234789 HeptaCDF	%	80							4010827
C13-123678 HexaCDD	%	65							4010827
C13-123678 HexaCDF	%	69							4010827
C13-12378 PentaCDD	%	71							4010827
C13-12378 PentaCDF	%	69							4010827
C13-123789 HexaCDF	%	70							4010827
C13-234678 HexaCDF	%	53							4010827
C13-23478 PentaCDF	%	72							4010827
C13-2378 TetraCDD	%	52							4010827
C13-2378 TetraCDF	%	51							4010827
C13-OCDD	%	81 (1)							4010827
Confirmation C13-2378 TetraCDF	%	55							4014081

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like  
 Compounds  
 ( 1 ) \*\* From 20X Dilution Run \*\*

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP506							
Sampling Date		2015/04/23 16:40							
COC Number		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SBS-AOI017-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	1.22	0.182	0.185	0.400	1.00	1.22		4010827
1,2,3,7,8-Penta CDD	pg/g	2.47	0.184	0.925	0.400	1.00	2.47		4010827
1,2,3,4,7,8-Hexa CDD	pg/g	3.69	0.181	0.925	0.400	0.100	0.369		4010827
1,2,3,6,7,8-Hexa CDD	pg/g	10.4	0.199	0.925	0.400	0.100	1.04		4010827
1,2,3,7,8,9-Hexa CDD	pg/g	6.93	0.188	0.925	0.400	0.100	0.693		4010827
1,2,3,4,6,7,8-Hepta CDD	pg/g	175	0.120	0.925	0.400	0.0100	1.75		4010827
Octa CDD	pg/g	863	0.422	1.85	0.800	0.000300	0.259		4010827
Total Tetra CDD	pg/g	3.34	0.182	0.185	0.400			4	4010827
Total Penta CDD	pg/g	3.72	0.184	0.925	0.400			3	4010827
Total Hexa CDD	pg/g	45.9	0.192	0.925	0.400			5	4010827
Total Hepta CDD	pg/g	292	0.120	0.925	0.400			2	4010827
2,3,7,8-Tetra CDF **	pg/g	0.898	0.177	0.185	0.400	0.100	0.0898		4010827
1,2,3,7,8-Penta CDF	pg/g	2.26	0.166	0.925	0.400	0.0300	0.0678		4010827
2,3,4,7,8-Penta CDF	pg/g	2.33	0.161	0.925	0.400	0.300	0.699		4010827
1,2,3,4,7,8-Hexa CDF	pg/g	5.52	0.130	0.925	0.400	0.100	0.552		4010827
1,2,3,6,7,8-Hexa CDF	pg/g	3.66	0.135	0.925	0.400	0.100	0.366		4010827
2,3,4,6,7,8-Hexa CDF	pg/g	3.14	0.124	0.925	0.400	0.100	0.314		4010827
1,2,3,7,8,9-Hexa CDF	pg/g	1.78	0.141	0.925	0.400	0.100	0.178		4010827
1,2,3,4,6,7,8-Hepta CDF	pg/g	25.8	0.133	0.925	0.400	0.0100	0.258		4010827
1,2,3,4,7,8,9-Hepta CDF	pg/g	3.43	0.139	0.925	0.400	0.0100	0.0343		4010827
Octa CDF	pg/g	31.0	0.177	1.85	0.800	0.000300	0.00930		4010827
Total Tetra CDF	pg/g	3.53	0.177	0.185	0.400			6	4010827
Total Penta CDF	pg/g	13.3	0.164	0.925	0.400			6	4010827
Total Hexa CDF	pg/g	53.9	0.132	0.925	0.400			10	4010827
Total Hepta CDF	pg/g	68.6	0.136	0.925	0.400			4	4010827
Confirmation 2,3,7,8-Tetra CDF	pg/g	<0.51 (1)	0.51	0.92	0.83	0.100	0.0510		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						10.3		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 (1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AEP506							
Sampling Date		2015/04/23 16:40							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	<b>Units</b>	<b>SBS-AOI017-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	67							4010827
C13-1234678 HeptaCDD	%	67							4010827
C13-1234678 HeptaCDF **	%	61							4010827
C13-123478 HexaCDD	%	60							4010827
C13-123478 HexaCDF	%	63							4010827
C13-1234789 HeptaCDF	%	66							4010827
C13-123678 HexaCDD	%	61							4010827
C13-123678 HexaCDF	%	62							4010827
C13-12378 PentaCDD	%	61							4010827
C13-12378 PentaCDF	%	58							4010827
C13-123789 HexaCDF	%	66							4010827
C13-234678 HexaCDF	%	50							4010827
C13-23478 PentaCDF	%	60							4010827
C13-2378 TetraCDD	%	46							4010827
C13-2378 TetraCDF	%	45							4010827
C13-OCDD	%	67							4010827
Confirmation C13-2378 TetraCDF	%	45							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

### Test Summary

**Maxxam ID** AEP502 **Collected** 2015/04/23  
**Sample ID** SS-ROW036-0.5 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014081	N/A	2015/05/07	Vica Cioranic
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

**Maxxam ID** AEP503 **Collected** 2015/04/23  
**Sample ID** SBS-AOI032-1.0 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

**Maxxam ID** AEP503 Dup **Collected** 2015/04/23  
**Sample ID** SBS-AOI032-1.0 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw

**Maxxam ID** AEP504 **Collected** 2015/04/23  
**Sample ID** SS-ROW012-0.5 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

**Maxxam ID** AEP505 **Collected** 2015/04/23  
**Sample ID** SS-ROW014-0.5 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4014081	N/A	2015/05/07	Vica Cioranic
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

**Maxxam ID** AEP506 **Collected** 2015/04/23  
**Sample ID** SBS-AOI017-1.0 **Shipped**  
**Matrix** Soil **Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4010827	2015/05/03	2015/05/07	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

### Test Summary

**Maxxam ID** AEP506 Dup  
**Sample ID** SBS-AOI017-1.0  
**Matrix** Soil

**Collected** 2015/04/23  
**Shipped**  
**Received** 2015/04/29

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Moisture	BAL	4005942	N/A	2015/05/01	Chun Yan

Maxxam Job #: B577816  
Report Date: 2015/10/05

Apex Laboratories  
Client Project #: A5D0784

Package 1	8.3°C
Package 2	9.2°C

Each temperature is the average of up to three cooler temperatures taken at receipt

**GENERAL COMMENTS**

Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**



Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0784  
P.O. #:  
Site Location:

**Quality Assurance Report**  
Maxxam Job Number: GB577816

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4005942 BOP	RPD - Sample/Sample Dup	Moisture	2015/05/01	1.1		%	20
4010827 KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/06		59	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/06		58	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/06		58	%	28 - 143
		C13-123478 HexaCDD	2015/05/06		56	%	32 - 141
		C13-123478 HexaCDF	2015/05/06		59	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/06		57	%	26 - 138
		C13-123678 HexaCDD	2015/05/06		53	%	28 - 130
		C13-123678 HexaCDF	2015/05/06		59	%	26 - 123
		C13-12378 PentaCDD	2015/05/06		56	%	25 - 181
		C13-12378 PentaCDF	2015/05/06		57	%	24 - 185
		C13-123789 HexaCDF	2015/05/06		59	%	29 - 147
		C13-234678 HexaCDF	2015/05/06		41	%	28 - 136
		C13-23478 PentaCDF	2015/05/06		53	%	21 - 178
		C13-2378 TetraCDD	2015/05/06		44	%	25 - 164
		C13-2378 TetraCDF	2015/05/06		41	%	24 - 169
		C13-OCDD	2015/05/06		62	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/06		111	%	67 - 158
		1,2,3,7,8-Penta CDD	2015/05/06		97	%	70 - 142
		1,2,3,4,7,8-Hexa CDD	2015/05/06		105	%	70 - 164
		1,2,3,6,7,8-Hexa CDD	2015/05/06		110	%	76 - 134
		1,2,3,7,8,9-Hexa CDD	2015/05/06		109	%	64 - 162
		1,2,3,4,6,7,8-Hepta CDD	2015/05/06		105	%	70 - 140
		Octa CDD	2015/05/06		102	%	78 - 144
		2,3,7,8-Tetra CDF	2015/05/06		109	%	75 - 158
		1,2,3,7,8-Penta CDF	2015/05/06		108	%	80 - 134
		2,3,4,7,8-Penta CDF	2015/05/06		95	%	68 - 160
		1,2,3,4,7,8-Hexa CDF	2015/05/06		108	%	72 - 134
		1,2,3,6,7,8-Hexa CDF	2015/05/06		112	%	84 - 130
		2,3,4,6,7,8-Hexa CDF	2015/05/06		109	%	70 - 156
		1,2,3,7,8,9-Hexa CDF	2015/05/06		105	%	78 - 130
		1,2,3,4,6,7,8-Hepta CDF	2015/05/06		112	%	82 - 122
		1,2,3,4,7,8,9-Hepta CDF	2015/05/06		110	%	78 - 138
		Octa CDF	2015/05/06		96	%	63 - 170
	Method Blank	37CL4 2378 Tetra CDD	2015/05/07		70	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/07		70	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/07		76	%	28 - 143
		C13-123478 HexaCDD	2015/05/07		69	%	32 - 141
		C13-123478 HexaCDF	2015/05/07		78	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/07		76	%	26 - 138
		C13-123678 HexaCDD	2015/05/07		69	%	28 - 130
		C13-123678 HexaCDF	2015/05/07		79	%	26 - 123
		C13-12378 PentaCDD	2015/05/07		67	%	25 - 181
		C13-12378 PentaCDF	2015/05/07		76	%	24 - 185
		C13-123789 HexaCDF	2015/05/07		76	%	29 - 147
		C13-234678 HexaCDF	2015/05/07		48	%	28 - 136
		C13-23478 PentaCDF	2015/05/07		62	%	21 - 178
		C13-2378 TetraCDD	2015/05/07		52	%	25 - 164
		C13-2378 TetraCDF	2015/05/07		48	%	24 - 169
		C13-OCDD	2015/05/07		76	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/07	<0.164, EDL=0.164		pg/g	
		1,2,3,7,8-Penta CDD	2015/05/07	<0.148, EDL=0.148		pg/g	
		1,2,3,4,7,8-Hexa CDD	2015/05/07	<0.104, EDL=0.104		pg/g	

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0784  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)  
Maxxam Job Number: GB577816

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4010827	KKS Method Blank	1,2,3,6,7,8-Hexa CDD	2015/05/07	<0.115, EDL=0.115		pg/g	
		1,2,3,7,8,9-Hexa CDD	2015/05/07	<0.108, EDL=0.108		pg/g	
		1,2,3,4,6,7,8-Hepta CDD	2015/05/07	0.227, EDL=0.116		pg/g	
		Octa CDD	2015/05/07	0.906, EDL=0.107		pg/g	
		Total Tetra CDD	2015/05/07	<0.164, EDL=0.164		pg/g	
		Total Penta CDD	2015/05/07	<0.148, EDL=0.148		pg/g	
		Total Hexa CDD	2015/05/07	<0.110, EDL=0.110		pg/g	
		Total Hepta CDD	2015/05/07	0.395, EDL=0.116		pg/g	
		2,3,7,8-Tetra CDF	2015/05/07	<0.141, EDL=0.141		pg/g	
		1,2,3,7,8-Penta CDF	2015/05/07	<0.155, EDL=0.155		pg/g	
		2,3,4,7,8-Penta CDF	2015/05/07	<0.151, EDL=0.151		pg/g	
		1,2,3,4,7,8-Hexa CDF	2015/05/07	<0.109, EDL=0.109		pg/g	
		1,2,3,6,7,8-Hexa CDF	2015/05/07	<0.113, EDL=0.113		pg/g	
		2,3,4,6,7,8-Hexa CDF	2015/05/07	0.106, EDL=0.104		pg/g	
		1,2,3,7,8,9-Hexa CDF	2015/05/07	0.140, EDL=0.118		pg/g	
		1,2,3,4,6,7,8-Hepta CDF	2015/05/07	<0.0975, EDL=0.0975 (1)		pg/g	
		1,2,3,4,7,8,9-Hepta CDF	2015/05/07	<0.111, EDL=0.111 (1)		pg/g	
		Octa CDF	2015/05/07	0.317, EDL=0.0986		pg/g	
		Total Tetra CDF	2015/05/07	<0.141, EDL=0.141		pg/g	
		Total Penta CDF	2015/05/07	<0.153, EDL=0.153		pg/g	
		Total Hexa CDF	2015/05/07	0.140, EDL=0.111		pg/g	
		Total Hepta CDF	2015/05/07	<0.109, EDL=0.109 (1)		pg/g	
	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/05/07	NC		%	25
		1,2,3,7,8-Penta CDD	2015/05/07	NC		%	25
		1,2,3,4,7,8-Hexa CDD	2015/05/07	NC		%	25
		1,2,3,6,7,8-Hexa CDD	2015/05/07	4.7		%	25
		1,2,3,7,8,9-Hexa CDD	2015/05/07	NC		%	25
		1,2,3,4,6,7,8-Hepta CDD	2015/05/07	5.9		%	25
		Octa CDD	2015/05/07	4.3		%	25
		Total Tetra CDD	2015/05/07	NC		%	25
		Total Penta CDD	2015/05/07	NC		%	25
		Total Hexa CDD	2015/05/07	5.7		%	25
		Total Hepta CDD	2015/05/07	6.5		%	25
		2,3,7,8-Tetra CDF	2015/05/07	NC		%	25
		1,2,3,7,8-Penta CDF	2015/05/07	NC		%	25
		2,3,4,7,8-Penta CDF	2015/05/07	NC		%	25
		1,2,3,4,7,8-Hexa CDF	2015/05/07	NC		%	25
		1,2,3,6,7,8-Hexa CDF	2015/05/07	NC		%	25
		2,3,4,6,7,8-Hexa CDF	2015/05/07	NC		%	25
		1,2,3,7,8,9-Hexa CDF	2015/05/07	NC		%	25
		1,2,3,4,6,7,8-Hepta CDF	2015/05/07	5.1		%	25
		1,2,3,4,7,8,9-Hepta CDF	2015/05/07	NC		%	25
		Octa CDF	2015/05/07	6.9		%	25
		Total Tetra CDF	2015/05/07	54 (2)		%	25
		Total Penta CDF	2015/05/07	4.2		%	25
		Total Hexa CDF	2015/05/07	3.3		%	25
		Total Hepta CDF	2015/05/07	5.8		%	25
4014081	VCI Method Blank	Confirmation C13-2378 TetraCDF	2015/05/07		51	%	40 - 135
		Confirmation 2,3,7,8-Tetra CDF	2015/05/07	<0.17, EDL=0.17		pg/g	
4203313	LAZ Method Blank	Confirmation C13-2378 TetraCDF	2015/09/29		92	%	40 - 135
		Confirmation 2,3,7,8-Tetra CDF	2015/09/29	<0.12, EDL=0.12		pg/g	
	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/29	NC		%	100

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0784  
P.O. #:  
Site Location:

### Quality Assurance Report (Continued)

Maxxam Job Number: GB577816

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

( 1 ) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

( 2 ) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**Validation Signature Page**

**Maxxam Job #: B577816**

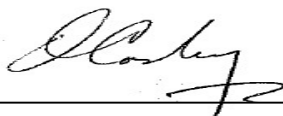
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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





Your Project #: A5D0781  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/05/19**  
Report #: R3433850  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B583474**

**Received: 2015/05/06, 13:46**

Sample Matrix: Soil  
# Samples Received: 9

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	8	2015/05/07	2015/05/11	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	1	2015/05/07	2015/05/12	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation in Soil	9	N/A	2015/05/12	BRL SOP-00406	EPA 8290A m
Moisture	9	N/A	2015/05/07	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AFP811	AFP812	AFP813	AFP814	AFP815			
Sampling Date		2015/04/23 11:25	2015/04/23 09:00	2015/04/23 14:40	2015/04/23 13:15	2015/04/23 14:15			
COC Number		na	na	na	na	na			
	Units	ISM-AOI017-0. 5-C-AFTER ISM	ISM-AOI012-0. 5-AFTER ISM	ISM-AOI029B-0 .5-AFTER ISM	ISM-AOI014-0. 5-AFTER ISM	ISM-AOI036-0. 5-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	<1.0	<1.0	1.6	<1.0	<1.0	1.0	0.040	4014169
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

Maxxam ID		AFP816	AFP817	AFP818	AFP819			
Sampling Date		2015/04/23 13:45	2015/04/23 10:50	2015/04/23 10:00	2015/04/23 10:30			
COC Number		na	na	na	na			
	Units	ISM-AOI032-0. 5-AFTER ISM	ISM-AOI017-0. 5-B-AFTER ISM	ISM-AOI015-0. 5-AFTER ISM	ISM-AOI017-0. 5-A-AFTER ISM	RDL	MDL	QC Batch
Moisture	%	1.6	<1.0	1.7	1.7	1.0	0.040	4014169
RDL = Reportable Detection Limit QC Batch = Quality Control Batch								

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP811							
Sampling Date		2015/04/23 11:25							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI017-0. 5-C-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	4.13	0.126	0.200	0.400	1.00	4.13		4017637
1,2,3,7,8-Penta CDD *	pg/g	6.84	0.152	0.999	0.400	1.00	6.84		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	15.2	0.237	0.999	0.400	0.100	1.52		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	54.9	0.251	0.999	0.400	0.100	5.49		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	36.5	0.231	0.999	0.400	0.100	3.65		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1100	0.123	0.999	0.400	0.0100	11.0		4017637
Octa CDD *	pg/g	6960 (1)	2.24	9.99	0.800	0.000300	2.09		4017637
Total Tetra CDD *	pg/g	10.3	0.126	0.200	0.400			7	4017637
Total Penta CDD *	pg/g	38.0	0.152	0.999	0.400			11	4017637
Total Hexa CDD *	pg/g	283	0.244	0.999	0.400			6	4017637
Total Hepta CDD *	pg/g	1850	0.123	0.999	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.85	0.146	0.200	0.400	0.100	0.285		4017637
1,2,3,7,8-Penta CDF **	pg/g	3.34	0.130	0.999	0.400	0.0300	0.100		4017637
2,3,4,7,8-Penta CDF **	pg/g	4.54	0.128	0.999	0.400	0.300	1.36		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	22.5	0.128	0.999	0.400	0.100	2.25		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	12.5	0.132	0.999	0.400	0.100	1.25		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	7.47	0.123	0.999	0.400	0.100	0.747		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.327	0.137	0.999	0.400	0.100	0.0327		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	187	0.153	0.999	0.400	0.0100	1.87		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	10.1	0.129	0.999	0.400	0.0100	0.101		4017637
Octa CDF **	pg/g	230	0.0997	2.00	0.800	0.000300	0.0690		4017637
Total Tetra CDF **	pg/g	17.2	0.146	0.200	0.400			9	4017637
Total Penta CDF **	pg/g	80.0	0.129	0.999	0.400			9	4017637
Total Hexa CDF **	pg/g	291	0.130	0.999	0.400			11	4017637
Total Hepta CDF **	pg/g	452	0.140	0.999	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<2.4 (2)	2.4	1.0	0.090	0.100	0.240		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						42.7		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*  
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AFP811							
<b>Sampling Date</b>		2015/04/23 11:25							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI017-0. 5-C-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	90							4017637
C13-1234678 HeptaCDD *	%	73							4017637
C13-1234678 HeptaCDF **	%	61							4017637
C13-123478 HexaCDD *	%	70							4017637
C13-123478 HexaCDF **	%	68							4017637
C13-1234789 HeptaCDF **	%	70							4017637
C13-123678 HexaCDD *	%	77							4017637
C13-123678 HexaCDF **	%	70							4017637
C13-12378 PentaCDD *	%	82							4017637
C13-12378 PentaCDF **	%	92							4017637
C13-123789 HexaCDF **	%	66							4017637
C13-234678 HexaCDF **	%	57							4017637
C13-23478 PentaCDF **	%	77							4017637
C13-2378 TetraCDD *	%	53							4017637
C13-2378 TetraCDF **	%	55							4017637
C13-OCDD *	%	81 (1)							4017637
Confirmation C13-2378 TetraCDF **	%	60							4021422

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*



Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP812							
Sampling Date		2015/04/23 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI012-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.471 (1)	0.471	0.199	0.400	1.00	0.471		4017637
1,2,3,7,8-Penta CDD *	pg/g	2.45	0.105	0.997	0.400	1.00	2.45		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	6.27	0.159	0.997	0.400	0.100	0.627		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	24.6	0.168	0.997	0.400	0.100	2.46		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	15.1	0.155	0.997	0.400	0.100	1.51		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	542	0.139	0.997	0.400	0.0100	5.42		4017637
Octa CDD *	pg/g	3500	0.133	1.99	0.800	0.000300	1.05		4017637
Total Tetra CDD *	pg/g	3.61	0.238	0.199	0.400			3	4017637
Total Penta CDD *	pg/g	14.5	0.105	0.997	0.400			8	4017637
Total Hexa CDD *	pg/g	135	0.163	0.997	0.400			6	4017637
Total Hepta CDD *	pg/g	906	0.139	0.997	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.12	0.208	0.199	0.400	0.100	0.212		4017637
1,2,3,7,8-Penta CDF **	pg/g	1.88	0.175	0.997	0.400	0.0300	0.0564		4017637
2,3,4,7,8-Penta CDF **	pg/g	2.57	0.173	0.997	0.400	0.300	0.771		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	12.6	0.167	0.997	0.400	0.100	1.26		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	7.46	0.173	0.997	0.400	0.100	0.746		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	4.93	0.160	0.997	0.400	0.100	0.493		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.270	0.180	0.997	0.400	0.100	0.0270		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	101	0.222	0.997	0.400	0.0100	1.01		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.40	0.188	0.997	0.400	0.0100	0.0540		4017637
Octa CDF **	pg/g	122	0.140	1.99	0.800	0.000300	0.0366		4017637
Total Tetra CDF **	pg/g	16.1	0.208	0.199	0.400			9	4017637
Total Penta CDF **	pg/g	57.6	0.174	0.997	0.400			9	4017637
Total Hexa CDF **	pg/g	160	0.170	0.997	0.400			10	4017637
Total Hepta CDF **	pg/g	231	0.203	0.997	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.03	0.53	1.0	0.90	0.100	0.203		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						18.6		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AFP812							
<b>Sampling Date</b>		2015/04/23 09:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI012-0. 5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	79							4017637
C13-1234678 HeptaCDD *	%	64							4017637
C13-1234678 HeptaCDF **	%	50							4017637
C13-123478 HexaCDD *	%	55							4017637
C13-123478 HexaCDF **	%	57							4017637
C13-1234789 HeptaCDF **	%	60							4017637
C13-123678 HexaCDD *	%	63							4017637
C13-123678 HexaCDF **	%	54							4017637
C13-12378 PentaCDD *	%	67							4017637
C13-12378 PentaCDF **	%	61							4017637
C13-123789 HexaCDF **	%	56							4017637
C13-234678 HexaCDF **	%	47							4017637
C13-23478 PentaCDF **	%	65							4017637
C13-2378 TetraCDD *	%	42							4017637
C13-2378 TetraCDF **	%	45							4017637
C13-OCDD *	%	73							4017637
Confirmation C13-2378 TetraCDF **	%	42							4021422

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 \*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP813							
Sampling Date		2015/04/23 14:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI029B-0 .5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.713	0.126	0.199	0.400	1.00	0.713		4017637
1,2,3,7,8-Penta CDD *	pg/g	5.24	0.136	0.995	0.400	1.00	5.24		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	10.5	0.0711	0.995	0.400	0.100	1.05		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	38.5	0.0755	0.995	0.400	0.100	3.85		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	23.8	0.0693	0.995	0.400	0.100	2.38		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	763	0.0744	0.995	0.400	0.0100	7.63		4017637
Octa CDD *	pg/g	5080 (1)	1.74	9.95	0.800	0.000300	1.52		4017637
Total Tetra CDD *	pg/g	10.5	0.126	0.199	0.400			10	4017637
Total Penta CDD *	pg/g	34.4	0.136	0.995	0.400			12	4017637
Total Hexa CDD *	pg/g	214	0.0731	0.995	0.400			6	4017637
Total Hepta CDD *	pg/g	1390	0.0744	0.995	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.85	0.156	0.199	0.400	0.100	0.285		4017637
1,2,3,7,8-Penta CDF **	pg/g	2.48	0.155	0.995	0.400	0.0300	0.0744		4017637
2,3,4,7,8-Penta CDF **	pg/g	3.48	0.154	0.995	0.400	0.300	1.04		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	13.7	0.115	0.995	0.400	0.100	1.37		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	7.73	0.118	0.995	0.400	0.100	0.773		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	5.96	0.110	0.995	0.400	0.100	0.596		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.322	0.123	0.995	0.400	0.100	0.0322		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	130	0.181	0.995	0.400	0.0100	1.30		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.97	0.153	0.995	0.400	0.0100	0.0697		4017637
Octa CDF **	pg/g	208	0.174	1.99	0.800	0.000300	0.0624		4017637
Total Tetra CDF **	pg/g	18.6	0.156	0.199	0.400			13	4017637
Total Penta CDF **	pg/g	57.7	0.155	0.995	0.400			12	4017637
Total Hexa CDF **	pg/g	179	0.116	0.995	0.400			11	4017637
Total Hepta CDF **	pg/g	329	0.166	0.995	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.79 (2)	0.79	0.99	0.89	0.100	0.0790		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						27.8		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*  
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AFP813							
<b>Sampling Date</b>		2015/04/23 14:40							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		# of	
	<b>Units</b>	<b>ISM-AOI029B-0 .5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	84							4017637
C13-1234678 HeptaCDD *	%	105							4017637
C13-1234678 HeptaCDF **	%	83							4017637
C13-123478 HexaCDD *	%	102							4017637
C13-123478 HexaCDF **	%	103							4017637
C13-1234789 HeptaCDF **	%	105							4017637
C13-123678 HexaCDD *	%	112							4017637
C13-123678 HexaCDF **	%	101							4017637
C13-12378 PentaCDD *	%	113							4017637
C13-12378 PentaCDF **	%	98							4017637
C13-123789 HexaCDF **	%	94							4017637
C13-234678 HexaCDF **	%	90							4017637
C13-23478 PentaCDF **	%	112							4017637
C13-2378 TetraCDD *	%	65							4017637
C13-2378 TetraCDF **	%	76							4017637
C13-OCDD *	%	104 (1)							4017637
Confirmation C13-2378 TetraCDF **	%	82							4021422

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*



Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP814							
Sampling Date		2015/04/23 13:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI014-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.589	0.194	0.199	0.400	1.00	0.589		4017637
1,2,3,7,8-Penta CDD *	pg/g	5.40	0.0869	0.995	0.400	1.00	5.40		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	14.8	0.204	0.995	0.400	0.100	1.48		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	58.0	0.216	0.995	0.400	0.100	5.80		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	31.6	0.199	0.995	0.400	0.100	3.16		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1230	0.0954	0.995	0.400	0.0100	12.3		4017637
Octa CDD *	pg/g	7750 (1)	2.06	9.95	0.800	0.000300	2.33		4017637
Total Tetra CDD *	pg/g	6.26	0.194	0.199	0.400			8	4017637
Total Penta CDD *	pg/g	29.8	0.0869	0.995	0.400			12	4017637
Total Hexa CDD *	pg/g	276	0.209	0.995	0.400			6	4017637
Total Hepta CDD *	pg/g	2180	0.0954	0.995	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.27	0.143	0.199	0.400	0.100	0.227		4017637
1,2,3,7,8-Penta CDF **	pg/g	4.33	0.146	0.995	0.400	0.0300	0.130		4017637
2,3,4,7,8-Penta CDF **	pg/g	5.93	0.144	0.995	0.400	0.300	1.78		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	32.2	0.120	0.995	0.400	0.100	3.22		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	15.7	0.124	0.995	0.400	0.100	1.57		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	9.89	0.115	0.995	0.400	0.100	0.989		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.608	0.129	0.995	0.400	0.100	0.0608		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	<205 (2)	205	0.995	0.400	0.0100	2.05		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	10.7	0.0683	0.995	0.400	0.0100	0.107		4017637
Octa CDF **	pg/g	219	0.101	1.99	0.800	0.000300	0.0657		4017637
Total Tetra CDF **	pg/g	17.9	0.143	0.199	0.400			12	4017637
Total Penta CDF **	pg/g	102	0.145	0.995	0.400			12	4017637
Total Hexa CDF **	pg/g	360	0.122	0.995	0.400			11	4017637
Total Hepta CDF **	pg/g	284	0.0741	0.995	0.400			3	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.76 (3)	0.76	1.0	0.90	0.100	0.0760		4021422

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*  
(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.  
(3) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP814							
Sampling Date		2015/04/23 13:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI014-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g						41.1		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	91							4017637
C13-1234678 HeptaCDD *	%	91							4017637
C13-1234678 HeptaCDF **	%	74							4017637
C13-123478 HexaCDD *	%	87							4017637
C13-123478 HexaCDF **	%	91							4017637
C13-1234789 HeptaCDF **	%	90							4017637
C13-123678 HexaCDD *	%	99							4017637
C13-123678 HexaCDF **	%	84							4017637
C13-12378 PentaCDD *	%	103							4017637
C13-12378 PentaCDF **	%	100							4017637
C13-123789 HexaCDF **	%	85							4017637
C13-234678 HexaCDF **	%	80							4017637
C13-23478 PentaCDF **	%	108							4017637
C13-2378 TetraCDD *	%	68							4017637
C13-2378 TetraCDF **	%	78							4017637
C13-OCDD *	%	119 (1)							4017637
Confirmation C13-2378 TetraCDF **	%	80							4021422

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 \*\* CDF = Chloro Dibenzo-p-Furan  
 (1) \*\* From 5X Dilution \*\*

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP815							
Sampling Date		2015/04/23 14:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI036-0- 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	7.33	0.125	0.199	0.400	1.00	7.33		4017637
1,2,3,7,8-Penta CDD *	pg/g	4.45	0.112	0.997	0.400	1.00	4.45		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	8.11	0.167	0.997	0.400	0.100	0.811		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	28.2	0.177	0.997	0.400	0.100	2.82		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	19.0	0.162	0.997	0.400	0.100	1.90		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	563	0.113	0.997	0.400	0.0100	5.63		4017637
Octa CDD *	pg/g	3560	0.0971	1.99	0.800	0.000300	1.07		4017637
Total Tetra CDD *	pg/g	22.1	0.125	0.199	0.400			10	4017637
Total Penta CDD *	pg/g	35.5	0.112	0.997	0.400			12	4017637
Total Hexa CDD *	pg/g	189	0.171	0.997	0.400			7	4017637
Total Hepta CDD *	pg/g	951	0.113	0.997	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	4.40	0.0970	0.199	0.400	0.100	0.440		4017637
1,2,3,7,8-Penta CDF **	pg/g	2.15	0.121	0.997	0.400	0.0300	0.0645		4017637
2,3,4,7,8-Penta CDF **	pg/g	3.40	0.120	0.997	0.400	0.300	1.02		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	13.8	0.115	0.997	0.400	0.100	1.38		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	7.03	0.119	0.997	0.400	0.100	0.703		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	6.01	0.111	0.997	0.400	0.100	0.601		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.263	0.124	0.997	0.400	0.100	0.0263		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	122	0.0937	0.997	0.400	0.0100	1.22		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.37	0.0791	0.997	0.400	0.0100	0.0637		4017637
Octa CDF **	pg/g	250	0.103	1.99	0.800	0.000300	0.0750		4017637
Total Tetra CDF **	pg/g	31.3	0.0970	0.199	0.400			14	4017637
Total Penta CDF **	pg/g	67.5	0.120	0.997	0.400			11	4017637
Total Hexa CDF **	pg/g	165	0.117	0.997	0.400			12	4017637
Total Hepta CDF **	pg/g	323	0.0858	0.997	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.24	0.20	1.0	0.90	0.100	0.224		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						29.4		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	89							4017637
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP815							
Sampling Date		2015/04/23 14:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI036-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	102							4017637
C13-1234678 HeptaCDF **	%	82							4017637
C13-123478 HexaCDD *	%	103							4017637
C13-123478 HexaCDF **	%	102							4017637
C13-1234789 HeptaCDF **	%	101							4017637
C13-123678 HexaCDD *	%	117							4017637
C13-123678 HexaCDF **	%	97							4017637
C13-12378 PentaCDD *	%	119							4017637
C13-12378 PentaCDF **	%	102							4017637
C13-123789 HexaCDF **	%	97							4017637
C13-234678 HexaCDF **	%	92							4017637
C13-23478 PentaCDF **	%	114							4017637
C13-2378 TetraCDD *	%	71							4017637
C13-2378 TetraCDF **	%	80							4017637
C13-OCDD *	%	110							4017637
Confirmation C13-2378 TetraCDF **	%	88							4021422

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP816							
Sampling Date		2015/04/23 13:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI032-0- 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.599	0.144	0.200	0.400	1.00	0.599		4017637
1,2,3,7,8-Penta CDD *	pg/g	3.40	0.106	0.998	0.400	1.00	3.40		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	5.72	0.113	0.998	0.400	0.100	0.572		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	19.6	0.119	0.998	0.400	0.100	1.96		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	13.1	0.110	0.998	0.400	0.100	1.31		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	390	0.144	0.998	0.400	0.0100	3.90		4017637
Octa CDD *	pg/g	2470	0.108	2.00	0.800	0.000300	0.741		4017637
Total Tetra CDD *	pg/g	12.3	0.144	0.200	0.400			9	4017637
Total Penta CDD *	pg/g	28.8	0.106	0.998	0.400			11	4017637
Total Hexa CDD *	pg/g	114	0.116	0.998	0.400			6	4017637
Total Hepta CDD *	pg/g	659	0.144	0.998	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.98	0.118	0.200	0.400	0.100	0.298		4017637
1,2,3,7,8-Penta CDF **	pg/g	1.65	0.102	0.998	0.400	0.0300	0.0495		4017637
2,3,4,7,8-Penta CDF **	pg/g	2.45	0.101	0.998	0.400	0.300	0.735		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	9.61	0.0862	0.998	0.400	0.100	0.961		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	5.70	0.0891	0.998	0.400	0.100	0.570		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	5.05	0.0828	0.998	0.400	0.100	0.505		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.240	0.0927	0.998	0.400	0.100	0.0240		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	80.2	0.127	0.998	0.400	0.0100	0.802		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.88	0.107	0.998	0.400	0.0100	0.0388		4017637
Octa CDF **	pg/g	154	0.111	2.00	0.800	0.000300	0.0462		4017637
Total Tetra CDF **	pg/g	23.5	0.118	0.200	0.400			13	4017637
Total Penta CDF **	pg/g	69.3	0.102	0.998	0.400			13	4017637
Total Hexa CDF **	pg/g	125	0.0875	0.998	0.400			11	4017637
Total Hepta CDF **	pg/g	201	0.116	0.998	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.39	0.15	1.0	0.90	0.100	0.139		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						16.4		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	102							4017637

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP816							
Sampling Date		2015/04/23 13:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI032-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	104							4017637
C13-1234678 HeptaCDF **	%	84							4017637
C13-123478 HexaCDD *	%	109							4017637
C13-123478 HexaCDF **	%	109							4017637
C13-1234789 HeptaCDF **	%	104							4017637
C13-123678 HexaCDD *	%	120							4017637
C13-123678 HexaCDF **	%	108							4017637
C13-12378 PentaCDD *	%	112							4017637
C13-12378 PentaCDF **	%	101							4017637
C13-123789 HexaCDF **	%	94							4017637
C13-234678 HexaCDF **	%	93							4017637
C13-23478 PentaCDF **	%	113							4017637
C13-2378 TetraCDD *	%	77							4017637
C13-2378 TetraCDF **	%	84							4017637
C13-OCDD *	%	110							4017637
Confirmation C13-2378 TetraCDF **	%	87							4021422

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP817							
Sampling Date		2015/04/23 10:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI017-0. 5-B-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	2.77	0.144	0.199	0.400	1.00	2.77		4017637
1,2,3,7,8-Penta CDD *	pg/g	4.39	0.107	0.996	0.400	1.00	4.39		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	11.3	0.182	0.996	0.400	0.100	1.13		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	41.3	0.193	0.996	0.400	0.100	4.13		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	23.3	0.178	0.996	0.400	0.100	2.33		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	836	0.212	0.996	0.400	0.0100	8.36		4017637
Octa CDD *	pg/g	5060 (1)	1.80	9.96	0.800	0.000300	1.52		4017637
Total Tetra CDD *	pg/g	6.09	0.144	0.199	0.400			4	4017637
Total Penta CDD *	pg/g	23.3	0.107	0.996	0.400			11	4017637
Total Hexa CDD *	pg/g	209	0.187	0.996	0.400			6	4017637
Total Hepta CDD *	pg/g	1410	0.212	0.996	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	1.89	0.130	0.199	0.400	0.100	0.189		4017637
1,2,3,7,8-Penta CDF **	pg/g	2.40	0.139	0.996	0.400	0.0300	0.0720		4017637
2,3,4,7,8-Penta CDF **	pg/g	3.14	0.138	0.996	0.400	0.300	0.942		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	16.6	0.115	0.996	0.400	0.100	1.66		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	9.41	0.119	0.996	0.400	0.100	0.941		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	6.01	0.110	0.996	0.400	0.100	0.601		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.273 (2)	0.273	0.996	0.400	0.100	0.0273		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	139	0.0964	0.996	0.400	0.0100	1.39		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	7.28	0.0814	0.996	0.400	0.0100	0.0728		4017637
Octa CDF **	pg/g	172	0.105	1.99	0.800	0.000300	0.0516		4017637
Total Tetra CDF **	pg/g	12.4	0.130	0.199	0.400			10	4017637
Total Penta CDF **	pg/g	57.2	0.138	0.996	0.400			10	4017637
Total Hexa CDF **	pg/g	214	0.117	0.996	0.400			10	4017637
Total Hepta CDF **	pg/g	329	0.0883	0.996	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.95	0.17	1.0	0.90	0.100	0.0950		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						30.5		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*  
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AFP817							
<b>Sampling Date</b>		2015/04/23 10:50							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI017-0. 5-B-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	89							4017637
C13-1234678 HeptaCDD *	%	98							4017637
C13-1234678 HeptaCDF **	%	81							4017637
C13-123478 HexaCDD *	%	98							4017637
C13-123478 HexaCDF **	%	100							4017637
C13-1234789 HeptaCDF **	%	97							4017637
C13-123678 HexaCDD *	%	109							4017637
C13-123678 HexaCDF **	%	93							4017637
C13-12378 PentaCDD *	%	104							4017637
C13-12378 PentaCDF **	%	91							4017637
C13-123789 HexaCDF **	%	87							4017637
C13-234678 HexaCDF **	%	86							4017637
C13-23478 PentaCDF **	%	105							4017637
C13-2378 TetraCDD *	%	73							4017637
C13-2378 TetraCDF **	%	78							4017637
C13-OCDD *	%	115 (1)							4017637
Confirmation C13-2378 TetraCDF **	%	79							4021422

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*



Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP818							
Sampling Date		2015/04/23 10:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI015-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	3.37	0.241	0.199	0.400	1.00	3.37		4017637
1,2,3,7,8-Penta CDD *	pg/g	45.5	0.245	0.994	0.400	1.00	45.5		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	80.0	0.106	0.994	0.400	0.100	8.00		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	285	0.113	0.994	0.400	0.100	28.5		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	191	0.103	0.994	0.400	0.100	19.1		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	4080 (1)	1.19	4.97	0.400	0.0100	40.8		4017637
Octa CDD *	pg/g	19400 (1)	0.631	9.94	0.800	0.000300	5.82		4017637
Total Tetra CDD *	pg/g	28.0	0.241	0.199	0.400			10	4017637
Total Penta CDD *	pg/g	301	0.245	0.994	0.400			10	4017637
Total Hexa CDD *	pg/g	2090	0.109	0.994	0.400			7	4017637
Total Hepta CDD *	pg/g	7470 (1)	1.19	4.97	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	6.01	0.168	0.199	0.400	0.100	0.601		4017637
1,2,3,7,8-Penta CDF **	pg/g	14.6	0.194	0.994	0.400	0.0300	0.438		4017637
2,3,4,7,8-Penta CDF **	pg/g	14.1	0.192	0.994	0.400	0.300	4.23		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	74.0	0.201	0.994	0.400	0.100	7.40		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	83.7	0.208	0.994	0.400	0.100	8.37		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	45.9	0.193	0.994	0.400	0.100	4.59		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	1.00	0.217	0.994	0.400	0.100	0.100		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	584	0.132	0.994	0.400	0.0100	5.84		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	26.3	0.112	0.994	0.400	0.0100	0.263		4017637
Octa CDF **	pg/g	375	0.126	1.99	0.800	0.000300	0.113		4017637
Total Tetra CDF **	pg/g	43.4	0.168	0.199	0.400			14	4017637
Total Penta CDF **	pg/g	365	0.193	0.994	0.400			12	4017637
Total Hexa CDF **	pg/g	1060	0.205	0.994	0.400			11	4017637
Total Hepta CDF **	pg/g	1080	0.121	0.994	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	4.92	0.17	0.99	0.89	0.100	0.492		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						183		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution \*\*

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		AFP818							
<b>Sampling Date</b>		2015/04/23 10:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI015-0. 5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	81							4017637
C13-1234678 HeptaCDD *	%	87 (1)							4017637
C13-1234678 HeptaCDF **	%	68							4017637
C13-123478 HexaCDD *	%	84							4017637
C13-123478 HexaCDF **	%	87							4017637
C13-1234789 HeptaCDF **	%	83							4017637
C13-123678 HexaCDD *	%	99							4017637
C13-123678 HexaCDF **	%	79							4017637
C13-12378 PentaCDD *	%	95							4017637
C13-12378 PentaCDF **	%	85							4017637
C13-123789 HexaCDF **	%	79							4017637
C13-234678 HexaCDF **	%	79							4017637
C13-23478 PentaCDF **	%	99							4017637
C13-2378 TetraCDD *	%	58							4017637
C13-2378 TetraCDF **	%	67							4017637
C13-OCDD *	%	106 (1)							4017637
Confirmation C13-2378 TetraCDF **	%	74							4021422

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 \*\* CDF = Chloro Dibenzo-p-Furan  
 (1) \*\* From 5X Dilution \*\*

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP819							
Sampling Date		2015/04/23 10:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	Units	ISM-AOI017-0. 5-A-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	3.37	0.290	0.198	0.400	1.00	3.37		4017637
1,2,3,7,8-Penta CDD *	pg/g	7.15	0.182	0.992	0.400	1.00	7.15		4017637
1,2,3,4,7,8-Hexa CDD *	pg/g	18.6	0.200	0.992	0.400	0.100	1.86		4017637
1,2,3,6,7,8-Hexa CDD *	pg/g	63.8	0.212	0.992	0.400	0.100	6.38		4017637
1,2,3,7,8,9-Hexa CDD *	pg/g	40.0	0.195	0.992	0.400	0.100	4.00		4017637
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1180	0.165	0.992	0.400	0.0100	11.8		4017637
Octa CDD *	pg/g	7020 (1)	1.61	9.92	0.800	0.000300	2.11		4017637
Total Tetra CDD *	pg/g	9.97	0.290	0.198	0.400			4	4017637
Total Penta CDD *	pg/g	34.2	0.182	0.992	0.400			10	4017637
Total Hexa CDD *	pg/g	329	0.206	0.992	0.400			7	4017637
Total Hepta CDD *	pg/g	1920	0.165	0.992	0.400			2	4017637
2,3,7,8-Tetra CDF **	pg/g	2.67	0.136	0.198	0.400	0.100	0.267		4017637
1,2,3,7,8-Penta CDF **	pg/g	3.52	0.155	0.992	0.400	0.0300	0.106		4017637
2,3,4,7,8-Penta CDF **	pg/g	4.32	0.154	0.992	0.400	0.300	1.30		4017637
1,2,3,4,7,8-Hexa CDF **	pg/g	22.9	0.132	0.992	0.400	0.100	2.29		4017637
1,2,3,6,7,8-Hexa CDF **	pg/g	14.4	0.137	0.992	0.400	0.100	1.44		4017637
2,3,4,6,7,8-Hexa CDF **	pg/g	8.15	0.127	0.992	0.400	0.100	0.815		4017637
1,2,3,7,8,9-Hexa CDF **	pg/g	0.470	0.142	0.992	0.400	0.100	0.0470		4017637
1,2,3,4,6,7,8-Hepta CDF **	pg/g	214	0.311	0.992	0.400	0.0100	2.14		4017637
1,2,3,4,7,8,9-Hepta CDF **	pg/g	13.6	0.263	0.992	0.400	0.0100	0.136		4017637
Octa CDF **	pg/g	290	0.126	1.98	0.800	0.000300	0.0870		4017637
Total Tetra CDF **	pg/g	18.0	0.136	0.198	0.400			11	4017637
Total Penta CDF **	pg/g	77.0	0.154	0.992	0.400			11	4017637
Total Hexa CDF **	pg/g	306	0.134	0.992	0.400			11	4017637
Total Hepta CDF **	pg/g	532	0.285	0.992	0.400			4	4017637
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.48	0.18	0.99	0.89	0.100	0.148		4021422
TOTAL TOXIC EQUIVALENCY	pg/g						45.2		

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 5X Dilution Run \*\*

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AFP819								
Sampling Date		2015/04/23 10:30								
COC Number		na				TOXIC EQUIVALENCY		# of		
	Units	ISM-AOI017-0. 5-A-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch	
<b>Surrogate Recovery (%)</b>										
37CL4 2378 Tetra CDD *	%	95								4017637
C13-1234678 HeptaCDD *	%	112								4017637
C13-1234678 HeptaCDF **	%	92								4017637
C13-123478 HexaCDD *	%	105								4017637
C13-123478 HexaCDF **	%	108								4017637
C13-1234789 HeptaCDF **	%	109								4017637
C13-123678 HexaCDD *	%	117								4017637
C13-123678 HexaCDF **	%	100								4017637
C13-12378 PentaCDD *	%	121								4017637
C13-12378 PentaCDF **	%	102								4017637
C13-123789 HexaCDF **	%	95								4017637
C13-234678 HexaCDF **	%	102								4017637
C13-23478 PentaCDF **	%	122								4017637
C13-2378 TetraCDD *	%	80								4017637
C13-2378 TetraCDF **	%	86								4017637
C13-OCDD *	%	126 (1)								4017637
Confirmation C13-2378 TetraCDF **	%	100								4021422

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 \*\* CDF = Chloro Dibenzo-p-Furan  
 (1) \*\* From 5X Dilution Run \*\*



Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**TEST SUMMARY**

**Maxxam ID:** AFP811  
**Sample ID:** ISM-AOI017-0.5-C-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP811 Dup  
**Sample ID:** ISM-AOI017-0.5-C-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP812  
**Sample ID:** ISM-AOI012-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP813  
**Sample ID:** ISM-AOI029B-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP814  
**Sample ID:** ISM-AOI014-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP815  
**Sample ID:** ISM-AOI036-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**TEST SUMMARY**

**Maxxam ID:** AFP816  
**Sample ID:** ISM-AOI032-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP817  
**Sample ID:** ISM-AOI017-0.5-B-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP818  
**Sample ID:** ISM-AOI015-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/11	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

**Maxxam ID:** AFP819  
**Sample ID:** ISM-AOI017-0.5-A-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/04/23  
**Shipped:**  
**Received:** 2015/05/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4017637	2015/05/07	2015/05/12	Owen Cosby
2378TCDF Confirmation in Soil	HRMS/MS	4021422	N/A	2015/05/12	Leila Azzam
Moisture	BAL	4014169	N/A	2015/05/07	Valentina Kaftani

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.9°C
Package 2	8.4°C

### DIOXINS AND FURANS BY HRMS (SOIL)

Dioxins/Furans in Soil (1613B): \*\* From 20X Dilution Run \*\*

**Results relate only to the items tested.**

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
4014169	BOP	RPD - Sample/Sample Dup	Moisture	2015/05/07	NC		%	20
4017637	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/11		86	%	35 - 197
			C13-1234678 HeptaCDD	2015/05/11		82	%	23 - 140
			C13-1234678 HeptaCDF	2015/05/11		68	%	28 - 143
			C13-123478 HexaCDD	2015/05/11		74	%	32 - 141
			C13-123478 HexaCDF	2015/05/11		74	%	26 - 152
			C13-1234789 HeptaCDF	2015/05/11		78	%	26 - 138
			C13-123678 HexaCDD	2015/05/11		85	%	28 - 130
			C13-123678 HexaCDF	2015/05/11		77	%	26 - 123
			C13-12378 PentaCDD	2015/05/11		90	%	25 - 181
			C13-12378 PentaCDF	2015/05/11		77	%	24 - 185
			C13-123789 HexaCDF	2015/05/11		74	%	29 - 147
			C13-234678 HexaCDF	2015/05/11		61	%	28 - 136
			C13-23478 PentaCDF	2015/05/11		91	%	21 - 178
			C13-2378 TetraCDD	2015/05/11		62	%	25 - 164
			C13-2378 TetraCDF	2015/05/11		68	%	24 - 169
			C13-OCDD	2015/05/11		82	%	17 - 157
			2,3,7,8-Tetra CDD	2015/05/11		115	%	67 - 158
			1,2,3,7,8-Penta CDD	2015/05/11		100	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2015/05/11		114	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2015/05/11		97	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2015/05/11		125	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2015/05/11		107	%	70 - 140
			Octa CDD	2015/05/11		121	%	78 - 144
			2,3,7,8-Tetra CDF	2015/05/11		108	%	75 - 158
			1,2,3,7,8-Penta CDF	2015/05/11		113	%	80 - 134
			2,3,4,7,8-Penta CDF	2015/05/11		97	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2015/05/11		110	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2015/05/11		109	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2015/05/11		118	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2015/05/11		122	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2015/05/11		122	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2015/05/11		102	%	78 - 138
			Octa CDF	2015/05/11		116	%	63 - 170
4017637	OBC	Method Blank	37CL4 2378 Tetra CDD	2015/05/11		81	%	35 - 197
			C13-1234678 HeptaCDD	2015/05/11		79	%	23 - 140
			C13-1234678 HeptaCDF	2015/05/11		76	%	28 - 143
			C13-123478 HexaCDD	2015/05/11		80	%	32 - 141
			C13-123478 HexaCDF	2015/05/11		79	%	26 - 152
			C13-1234789 HeptaCDF	2015/05/11		82	%	26 - 138
			C13-123678 HexaCDD	2015/05/11		87	%	28 - 130
			C13-123678 HexaCDF	2015/05/11		75	%	26 - 123
			C13-12378 PentaCDD	2015/05/11		91	%	25 - 181
			C13-12378 PentaCDF	2015/05/11		85	%	24 - 185
			C13-123789 HexaCDF	2015/05/11		78	%	29 - 147
			C13-234678 HexaCDF	2015/05/11		63	%	28 - 136
			C13-23478 PentaCDF	2015/05/11		83	%	21 - 178
			C13-2378 TetraCDD	2015/05/11		62	%	25 - 164
			C13-2378 TetraCDF	2015/05/11		66	%	24 - 169
			C13-OCDD	2015/05/11		88	%	17 - 157
			2,3,7,8-Tetra CDD	2015/05/11	<0.133, EDL=0.133		pg/g	
			1,2,3,7,8-Penta CDD	2015/05/11	<0.0927, EDL=0.0927		pg/g	



Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
			1,2,3,4,7,8-Hexa CDD	2015/05/11	<0.0857, EDL=0.0857		pg/g	
			1,2,3,6,7,8-Hexa CDD	2015/05/11	<0.0909, EDL=0.0909		pg/g	
			1,2,3,7,8,9-Hexa CDD	2015/05/11	<0.0834, EDL=0.0834		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2015/05/11	0.127, EDL=0.0889		pg/g	
			Octa CDD	2015/05/11	0.762, EDL=0.0978		pg/g	
			Total Tetra CDD	2015/05/11	<0.370, EDL=0.370 (1)		pg/g	
			Total Penta CDD	2015/05/11	<0.217, EDL=0.217 (1)		pg/g	
			Total Hexa CDD	2015/05/11	<0.586, EDL=0.586 (1)		pg/g	
			Total Hepta CDD	2015/05/11	0.127, EDL=0.0889		pg/g	
			2,3,7,8-Tetra CDF	2015/05/11	<0.115, EDL=0.115		pg/g	
			1,2,3,7,8-Penta CDF	2015/05/11	<0.138, EDL=0.138		pg/g	
			2,3,4,7,8-Penta CDF	2015/05/11	<0.137, EDL=0.137		pg/g	
			1,2,3,4,7,8-Hexa CDF	2015/05/11	<0.0790, EDL=0.0790		pg/g	
			1,2,3,6,7,8-Hexa CDF	2015/05/11	<0.0816, EDL=0.0816		pg/g	
			2,3,4,6,7,8-Hexa CDF	2015/05/11	<0.0759, EDL=0.0759		pg/g	
			1,2,3,7,8,9-Hexa CDF	2015/05/11	0.110, EDL=0.0850		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2015/05/11	<0.128, EDL=0.128 (1)		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2015/05/11	<0.0659, EDL=0.0659		pg/g	
			Octa CDF	2015/05/11	<0.146, EDL=0.146 (1)		pg/g	
			Total Tetra CDF	2015/05/11	<0.115, EDL=0.115		pg/g	
			Total Penta CDF	2015/05/11	<0.138, EDL=0.138		pg/g	
			Total Hexa CDF	2015/05/11	0.110, EDL=0.0802		pg/g	
			Total Hepta CDF	2015/05/11	<0.127, EDL=0.127 (1)		pg/g	
4021422	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/05/12	<0.18, EDL=0.18		pg/g	
			Confirmation C13-2378 TetraCDF	2015/05/12		74	%	40 - 135

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	Units	QC Limits
4021422	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/05/12	8.7		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

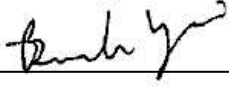
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B583474  
Report Date: 2015/05/19

Apex Laboratories  
Client Project #: A5D0781

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Cristina Carriere, Scientific Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5D0913  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/02**  
**Report #: R3707732**  
**Version: 8R**

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B585895**

**Received: 2015/05/08, 13:15**

Sample Matrix: Soil  
# Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Dioxins/Furans in Soil (1613B) (1)	9	2015/05/12	2015/05/20	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	7	N/A	2015/05/22	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2015/09/29	BRL SOP-00406	EPA M8290A / M1613
Moisture	9	N/A	2015/05/12	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====  
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Total cover pages: 1



Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AGA748	AGA749	AGA750			
Sampling Date		2015/04/30 08:40	2015/04/30 09:25	2015/04/30 10:00			
COC Number		na	na	na			
	<b>Units</b>	<b>ISM-AOI020B-0.5-AFTER ISM</b>	<b>ISM-AOI021-0.5-AFTER ISM</b>	<b>ISM-AOI030-0.5-AFTER ISM</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>

Moisture	%	2.5	<1.0	<1.0	1.0	0.50	4019722
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

Maxxam ID		AGA751	AGA752	AGA753			
Sampling Date		2015/04/30 10:30	2015/04/30 11:10	2015/04/30 11:40			
COC Number		na	na	na			
	<b>Units</b>	<b>ISM-AOI024-0.5-AFTER ISM</b>	<b>ISM-AOI025-0.5-AFTER ISM</b>	<b>ISM-AOI027-0.5-AFTER ISM</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>

Moisture	%	4.0	1.6	1.7	1.0	0.50	4019722
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

Maxxam ID		AGA754	AGA755	AGA756	AGA756			
Sampling Date		2015/04/30 12:10	2015/04/30 12:40	2015/04/30 13:15	2015/04/30 13:15			
COC Number		na	na	na	na			
	<b>Units</b>	<b>ISM-AOI029A-0.5-AFTER ISM</b>	<b>SS-ROW030-0.5 A5D0913-15</b>	<b>SS-AOI020B-1.0 A5D0913-17</b>	<b>SS-AOI020B-1.0 A5D0913-17 Lab-Dup</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>

Moisture	%	1.8	20	17	17	1.0	0.50	4019722
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RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA748							
Sampling Date		2015/04/30 08:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI020B-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	1.54	0.144	0.200	0.400	1.00	1.54		4025819
1,2,3,7,8-Penta CDD	pg/g	3.26	0.178	0.999	0.400	1.00	3.26		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	8.40	0.118	0.999	0.400	0.100	0.840		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	33.2	0.125	0.999	0.400	0.100	3.32		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	24.8	0.115	0.999	0.400	0.100	2.48		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	734	0.102	0.999	0.400	0.0100	7.34		4025819
Octa CDD	pg/g	3800	0.132	2.00	0.800	0.000300	1.14		4025819
Total Tetra CDD	pg/g	4.14	0.144	0.200	0.400			7	4025819
Total Penta CDD	pg/g	16.0	0.178	0.999	0.400			7	4025819
Total Hexa CDD	pg/g	181	0.121	0.999	0.400			7	4025819
Total Hepta CDD	pg/g	1240	0.102	0.999	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	1.55	0.133	0.200	0.400	0.100	0.155		4025819
1,2,3,7,8-Penta CDF	pg/g	2.10	0.115	0.999	0.400	0.0300	0.0630		4025819
2,3,4,7,8-Penta CDF	pg/g	2.98	0.114	0.999	0.400	0.300	0.894		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	16.7	0.140	0.999	0.400	0.100	1.67		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	8.46	0.145	0.999	0.400	0.100	0.846		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	5.52	0.135	0.999	0.400	0.100	0.552		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.268	0.151	0.999	0.400	0.100	0.0268		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	134	0.112	0.999	0.400	0.0100	1.34		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	5.95	0.0945	0.999	0.400	0.0100	0.0595		4025819
Octa CDF	pg/g	187	0.137	2.00	0.800	0.000300	0.0561		4025819
Total Tetra CDF	pg/g	7.91	0.133	0.200	0.400			9	4025819
Total Penta CDF	pg/g	27.0	0.115	0.999	0.400			9	4025819
Total Hexa CDF	pg/g	175	0.142	0.999	0.400			11	4025819
Total Hepta CDF	pg/g	306	0.103	0.999	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.34	0.079	1.0	0.90	0.100	0.134		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						25.6		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA748							
Sampling Date		2015/04/30 08:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI020B-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	102							4025819
C13-1234678 HeptaCDD	%	90							4025819
C13-1234678 HeptaCDF **	%	83							4025819
C13-123478 HexaCDD	%	77							4025819
C13-123478 HexaCDF	%	87							4025819
C13-1234789 HeptaCDF	%	88							4025819
C13-123678 HexaCDD	%	90							4025819
C13-123678 HexaCDF	%	79							4025819
C13-12378 PentaCDD	%	111							4025819
C13-12378 PentaCDF	%	106							4025819
C13-123789 HexaCDF	%	95							4025819
C13-234678 HexaCDF	%	79							4025819
C13-23478 PentaCDF	%	127							4025819
C13-2378 TetraCDD	%	84							4025819
C13-2378 TetraCDF	%	88							4025819
C13-OCDD	%	112							4025819
Confirmation C13-2378 TetraCDF	%	102							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA748							
Sampling Date		2015/04/30 08:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI020B-0.5-AFTER ISM Lab-Dup</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	1.62	0.172	0.199	0.400	1.00	1.62		4025819
1,2,3,7,8-Penta CDD	pg/g	3.48	0.179	0.997	0.400	1.00	3.48		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	7.48	0.199	0.997	0.400	0.100	0.748		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	34.7	0.211	0.997	0.400	0.100	3.47		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	22.7	0.194	0.997	0.400	0.100	2.27		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	766	0.0793	0.997	0.400	0.0100	7.66		4025819
Octa CDD	pg/g	4930 (1)	0.528	9.97	0.800	0.000300	1.48		4025819
Total Tetra CDD	pg/g	4.23	0.172	0.199	0.400			5	4025819
Total Penta CDD	pg/g	18.2	0.179	0.997	0.400			10	4025819
Total Hexa CDD	pg/g	183	0.204	0.997	0.400			7	4025819
Total Hepta CDD	pg/g	1330	0.0793	0.997	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	1.90	0.123	0.199	0.400	0.100	0.190		4025819
1,2,3,7,8-Penta CDF	pg/g	2.35	0.157	0.997	0.400	0.0300	0.0705		4025819
2,3,4,7,8-Penta CDF	pg/g	3.09	0.156	0.997	0.400	0.300	0.927		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	17.7	0.138	0.997	0.400	0.100	1.77		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	8.87	0.143	0.997	0.400	0.100	0.887		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	6.43	0.133	0.997	0.400	0.100	0.643		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.330	0.149	0.997	0.400	0.100	0.0330		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	133	0.168	0.997	0.400	0.0100	1.33		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	6.50	0.142	0.997	0.400	0.0100	0.0650		4025819
Octa CDF	pg/g	204	0.103	1.99	0.800	0.000300	0.0612		4025819
Total Tetra CDF	pg/g	9.65	0.123	0.199	0.400			12	4025819
Total Penta CDF	pg/g	30.2	0.156	0.997	0.400			9	4025819
Total Hexa CDF	pg/g	186	0.140	0.997	0.400			11	4025819
Total Hepta CDF	pg/g	311	0.154	0.997	0.400			4	4025819

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 ( 1 ) \*\* From 5X Dilution Run \*\*

Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.



Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA748							
Sampling Date		2015/04/30 08:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI020B-0.5-AFTER</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>
		<b>ISM Lab-Dup</b>							

Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.41	0.085	1.0	0.90	0.100	0.141		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						26.7		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	92							4025819
C13-1234678 HeptaCDD	%	102							4025819
C13-1234678 HeptaCDF	%	104							4025819
C13-123478 HexaCDD	%	82							4025819
C13-123478 HexaCDF	%	84							4025819
C13-1234789 HeptaCDF	%	98							4025819
C13-123678 HexaCDD	%	91							4025819
C13-123678 HexaCDF	%	82							4025819
C13-12378 PentaCDD	%	105							4025819
C13-12378 PentaCDF	%	99							4025819
C13-123789 HexaCDF	%	93							4025819
C13-234678 HexaCDF	%	82							4025819
C13-23478 PentaCDF	%	118							4025819
C13-2378 TetraCDD	%	85							4025819
C13-2378 TetraCDF	%	89							4025819
C13-OCDD	%	77 (1)							4025819
Confirmation C13-2378 TetraCDF	%	103							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 ( 1 ) \*\* From 5X Dilution Run \*\*

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA749							
Sampling Date		2015/04/30 09:25							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI021-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	<0.116	0.116	0.199	0.400	1.00	0.116		4025819
1,2,3,7,8-Penta CDD	pg/g	0.478	0.0913	0.995	0.400	1.00	0.478		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	1.06	0.0858	0.995	0.400	0.100	0.106		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	4.00	0.0910	0.995	0.400	0.100	0.400		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	3.74	0.0835	0.995	0.400	0.100	0.374		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	115	0.0994	0.995	0.400	0.0100	1.15		4025819
Octa CDD	pg/g	946	0.167	1.99	0.800	0.000300	0.284		4025819
Total Tetra CDD	pg/g	0.159	0.116	0.199	0.400			1	4025819
Total Penta CDD	pg/g	1.60	0.0913	0.995	0.400			6	4025819
Total Hexa CDD	pg/g	21.8	0.0881	0.995	0.400			6	4025819
Total Hepta CDD	pg/g	195	0.0994	0.995	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	0.240	0.0972	0.199	0.400	0.100	0.0240		4025819
1,2,3,7,8-Penta CDF	pg/g	0.233	0.115	0.995	0.400	0.0300	0.00699		4025819
2,3,4,7,8-Penta CDF	pg/g	0.313	0.114	0.995	0.400	0.300	0.0939		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	1.49	0.0959	0.995	0.400	0.100	0.149		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	0.774	0.0991	0.995	0.400	0.100	0.0774		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	0.556	0.0921	0.995	0.400	0.100	0.0556		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	<0.103	0.103	0.995	0.400	0.100	0.0103		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	17.6	0.101	0.995	0.400	0.0100	0.176		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	0.856	0.0849	0.995	0.400	0.0100	0.00856		4025819
Octa CDF	pg/g	34.8	0.0968	1.99	0.800	0.000300	0.0104		4025819
Total Tetra CDF	pg/g	0.240	0.0972	0.199	0.400			1	4025819
Total Penta CDF	pg/g	1.69	0.115	0.995	0.400			6	4025819
Total Hexa CDF	pg/g	14.3	0.0974	0.995	0.400			8	4025819
Total Hepta CDF	pg/g	48.0	0.0921	0.995	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	<0.13	0.13	0.99	0.89	0.100	0.0130		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						3.51		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA749							
Sampling Date		2015/04/30 09:25							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI021-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	87							4025819
C13-1234678 HeptaCDD	%	99							4025819
C13-1234678 HeptaCDF **	%	96							4025819
C13-123478 HexaCDD	%	75							4025819
C13-123478 HexaCDF	%	69							4025819
C13-1234789 HeptaCDF	%	98							4025819
C13-123678 HexaCDD	%	84							4025819
C13-123678 HexaCDF	%	68							4025819
C13-12378 PentaCDD	%	108							4025819
C13-12378 PentaCDF	%	94							4025819
C13-123789 HexaCDF	%	92							4025819
C13-234678 HexaCDF	%	73							4025819
C13-23478 PentaCDF	%	118							4025819
C13-2378 TetraCDD	%	78							4025819
C13-2378 TetraCDF	%	84							4025819
C13-OCDD	%	133							4025819
Confirmation C13-2378 TetraCDF	%	80							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA750							
Sampling Date		2015/04/30 10:00							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI030-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	<0.625	0.625	0.200	0.400	1.00	0.625		4025819
1,2,3,7,8-Penta CDD	pg/g	1.20	0.695	0.999	0.400	1.00	1.20		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	3.66	0.367	0.999	0.400	0.100	0.366		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	12.5	0.390	0.999	0.400	0.100	1.25		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	9.36	0.358	0.999	0.400	0.100	0.936		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	299	0.426	0.999	0.400	0.0100	2.99		4025819
Octa CDD	pg/g	1800	1.11	2.00	0.800	0.000300	0.540		4025819
Total Tetra CDD	pg/g	<0.625	0.625	0.200	0.400			0	4025819
Total Penta CDD	pg/g	5.41	0.695	0.999	0.400			3	4025819
Total Hexa CDD	pg/g	79.5	0.377	0.999	0.400			7	4025819
Total Hepta CDD	pg/g	541	0.426	0.999	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	0.799	0.474	0.200	0.400	0.100	0.0799		4025819
1,2,3,7,8-Penta CDF	pg/g	<0.581	0.581	0.999	0.400	0.0300	0.0174		4025819
2,3,4,7,8-Penta CDF	pg/g	1.00	0.575	0.999	0.400	0.300	0.300		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	5.19	0.432	0.999	0.400	0.100	0.519		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	2.41	0.447	0.999	0.400	0.100	0.241		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	2.29	0.415	0.999	0.400	0.100	0.229		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	<0.465	0.465	0.999	0.400	0.100	0.0465		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	49.0	0.286	0.999	0.400	0.0100	0.490		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	2.21	0.242	0.999	0.400	0.0100	0.0221		4025819
Octa CDF	pg/g	72.3	0.297	2.00	0.800	0.000300	0.0217		4025819
Total Tetra CDF	pg/g	1.69	0.474	0.200	0.400			2	4025819
Total Penta CDF	pg/g	8.14	0.578	0.999	0.400			4	4025819
Total Hexa CDF	pg/g	61.2	0.439	0.999	0.400			7	4025819
Total Hepta CDF	pg/g	121	0.262	0.999	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	0.45	0.11	1.0	0.90	0.100	0.0450		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						9.84		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds



Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA750							
Sampling Date		2015/04/30 10:00							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI030-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	86							4025819
C13-1234678 HeptaCDD	%	122							4025819
C13-1234678 HeptaCDF **	%	128							4025819
C13-123478 HexaCDD	%	108							4025819
C13-123478 HexaCDF	%	110							4025819
C13-1234789 HeptaCDF	%	119							4025819
C13-123678 HexaCDD	%	127							4025819
C13-123678 HexaCDF	%	135 (1)							4025819
C13-12378 PentaCDD	%	95							4025819
C13-12378 PentaCDF	%	93							4025819
C13-123789 HexaCDF	%	108							4025819
C13-234678 HexaCDF	%	111							4025819
C13-23478 PentaCDF	%	97							4025819
C13-2378 TetraCDD	%	78							4025819
C13-2378 TetraCDF	%	83							4025819
C13-OCDD	%	126							4025819
Confirmation C13-2378 TetraCDF	%	80							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 ( 1 ) Recovery exceeds method criteria.  
 Minimal impact on data

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA751							
Sampling Date		2015/04/30 10:30							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI024-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.501	0.103	0.198	0.400	1.00	0.501		4025819
1,2,3,7,8-Penta CDD	pg/g	2.09	0.105	0.992	0.400	1.00	2.09		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	4.18	0.100	0.992	0.400	0.100	0.418		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	16.7	0.106	0.992	0.400	0.100	1.67		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	13.7	0.0978	0.992	0.400	0.100	1.37		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	397	0.106	0.992	0.400	0.0100	3.97		4025819
Octa CDD	pg/g	2600	0.101	1.98	0.800	0.000300	0.780		4025819
Total Tetra CDD	pg/g	2.15	0.103	0.198	0.400			4	4025819
Total Penta CDD	pg/g	12.7	0.105	0.992	0.400			10	4025819
Total Hexa CDD	pg/g	90.6	0.103	0.992	0.400			5	4025819
Total Hepta CDD	pg/g	680	0.106	0.992	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	2.40	0.103	0.198	0.400	0.100	0.240		4025819
1,2,3,7,8-Penta CDF	pg/g	1.53	0.101	0.992	0.400	0.0300	0.0459		4025819
2,3,4,7,8-Penta CDF	pg/g	3.21	0.0997	0.992	0.400	0.300	0.963		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	8.03	0.102	0.992	0.400	0.100	0.803		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	7.22	0.105	0.992	0.400	0.100	0.722		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	7.04	0.0976	0.992	0.400	0.100	0.704		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.208	0.109	0.992	0.400	0.100	0.0208		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	81.4	0.109	0.992	0.400	0.0100	0.814		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	4.04	0.0917	0.992	0.400	0.0100	0.0404		4025819
Octa CDF	pg/g	138	0.108	1.98	0.800	0.000300	0.0414		4025819
Total Tetra CDF	pg/g	41.4	0.103	0.198	0.400			10	4025819
Total Penta CDF	pg/g	91.2	0.100	0.992	0.400			7	4025819
Total Hexa CDF	pg/g	161	0.103	0.992	0.400			10	4025819
Total Hepta CDF	pg/g	212	0.0994	0.992	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.93	0.044	0.99	0.89	0.100	0.193		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						15.1		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA751							
Sampling Date		2015/04/30 10:30							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI024-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	87							4025819
C13-1234678 HeptaCDD	%	84							4025819
C13-1234678 HeptaCDF **	%	85							4025819
C13-123478 HexaCDD	%	78							4025819
C13-123478 HexaCDF	%	77							4025819
C13-1234789 HeptaCDF	%	78							4025819
C13-123678 HexaCDD	%	85							4025819
C13-123678 HexaCDF	%	76							4025819
C13-12378 PentaCDD	%	104							4025819
C13-12378 PentaCDF	%	93							4025819
C13-123789 HexaCDF	%	87							4025819
C13-234678 HexaCDF	%	71							4025819
C13-23478 PentaCDF	%	114							4025819
C13-2378 TetraCDD	%	77							4025819
C13-2378 TetraCDF	%	83							4025819
C13-OCDD	%	90							4025819
Confirmation C13-2378 TetraCDF	%	95							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA752							
Sampling Date		2015/04/30 11:10							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI025-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.695	0.170	0.200	0.400	1.00	0.695		4025819
1,2,3,7,8-Penta CDD	pg/g	2.86	0.117	0.998	0.400	1.00	2.86		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	5.87	0.161	0.998	0.400	0.100	0.587		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	23.3	0.171	0.998	0.400	0.100	2.33		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	20.7	0.157	0.998	0.400	0.100	2.07		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	454	0.0915	0.998	0.400	0.0100	4.54		4025819
Octa CDD	pg/g	2740	0.0985	2.00	0.800	0.000300	0.822		4025819
Total Tetra CDD	pg/g	2.98	0.170	0.200	0.400			5	4025819
Total Penta CDD	pg/g	16.2	0.117	0.998	0.400			11	4025819
Total Hexa CDD	pg/g	132	0.165	0.998	0.400			7	4025819
Total Hepta CDD	pg/g	764	0.0915	0.998	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	2.16	0.102	0.200	0.400	0.100	0.216		4025819
1,2,3,7,8-Penta CDF	pg/g	1.56	0.0892	0.998	0.400	0.0300	0.0468		4025819
2,3,4,7,8-Penta CDF	pg/g	2.05	0.0882	0.998	0.400	0.300	0.615		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	8.34	0.124	0.998	0.400	0.100	0.834		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	5.35	0.128	0.998	0.400	0.100	0.535		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	3.69	0.119	0.998	0.400	0.100	0.369		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.234	0.134	0.998	0.400	0.100	0.0234		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	80.6	0.123	0.998	0.400	0.0100	0.806		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	3.96	0.104	0.998	0.400	0.0100	0.0396		4025819
Octa CDF	pg/g	122	0.110	2.00	0.800	0.000300	0.0366		4025819
Total Tetra CDF	pg/g	9.35	0.102	0.200	0.400			11	4025819
Total Penta CDF	pg/g	22.4	0.0887	0.998	0.400			11	4025819
Total Hexa CDF	pg/g	101	0.126	0.998	0.400			11	4025819
Total Hepta CDF	pg/g	193	0.112	0.998	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.44	0.044	1.0	0.90	0.100	0.144		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						17.4		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds



Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA752							
Sampling Date		2015/04/30 11:10							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI025-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	87							4025819
C13-1234678 HeptaCDD	%	78							4025819
C13-1234678 HeptaCDF **	%	73							4025819
C13-123478 HexaCDD	%	73							4025819
C13-123478 HexaCDF	%	72							4025819
C13-1234789 HeptaCDF	%	76							4025819
C13-123678 HexaCDD	%	77							4025819
C13-123678 HexaCDF	%	67							4025819
C13-12378 PentaCDD	%	108							4025819
C13-12378 PentaCDF	%	96							4025819
C13-123789 HexaCDF	%	88							4025819
C13-234678 HexaCDF	%	69							4025819
C13-23478 PentaCDF	%	121							4025819
C13-2378 TetraCDD	%	82							4025819
C13-2378 TetraCDF	%	84							4025819
C13-OCDD	%	88							4025819
Confirmation C13-2378 TetraCDF	%	95							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA753							
Sampling Date		2015/04/30 11:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI027-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.488	0.103	0.200	0.400	1.00	0.488		4025819
1,2,3,7,8-Penta CDD	pg/g	1.58	0.102	0.999	0.400	1.00	1.58		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	3.40	0.107	0.999	0.400	0.100	0.340		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	13.8	0.113	0.999	0.400	0.100	1.38		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	11.8	0.104	0.999	0.400	0.100	1.18		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	309	0.107	0.999	0.400	0.0100	3.09		4025819
Octa CDD	pg/g	2050	0.105	2.00	0.800	0.000300	0.615		4025819
Total Tetra CDD	pg/g	1.16	0.103	0.200	0.400			3	4025819
Total Penta CDD	pg/g	8.27	0.102	0.999	0.400			9	4025819
Total Hexa CDD	pg/g	76.8	0.110	0.999	0.400			7	4025819
Total Hepta CDD	pg/g	523	0.107	0.999	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	0.903	0.107	0.200	0.400	0.100	0.0903		4025819
1,2,3,7,8-Penta CDF	pg/g	0.763	0.104	0.999	0.400	0.0300	0.0229		4025819
2,3,4,7,8-Penta CDF	pg/g	1.03	0.103	0.999	0.400	0.300	0.309		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	5.40	0.103	0.999	0.400	0.100	0.540		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	2.60	0.106	0.999	0.400	0.100	0.260		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	2.20	0.0988	0.999	0.400	0.100	0.220		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.137	0.111	0.999	0.400	0.100	0.0137		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	49.1	0.112	0.999	0.400	0.0100	0.491		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	2.48	0.0944	0.999	0.400	0.0100	0.0248		4025819
Octa CDF	pg/g	73.9	0.112	2.00	0.800	0.000300	0.0222		4025819
Total Tetra CDF	pg/g	4.10	0.107	0.200	0.400			11	4025819
Total Penta CDF	pg/g	8.30	0.103	0.999	0.400			8	4025819
Total Hexa CDF	pg/g	54.6	0.104	0.999	0.400			9	4025819
Total Hepta CDF	pg/g	116	0.102	0.999	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	0.640	0.036	1.0	0.90	0.100	0.0640		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						10.6		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA753							
Sampling Date		2015/04/30 11:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI027-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	95							4025819
C13-1234678 HeptaCDD	%	99							4025819
C13-1234678 HeptaCDF **	%	99							4025819
C13-123478 HexaCDD	%	83							4025819
C13-123478 HexaCDF	%	83							4025819
C13-1234789 HeptaCDF	%	96							4025819
C13-123678 HexaCDD	%	92							4025819
C13-123678 HexaCDF	%	77							4025819
C13-12378 PentaCDD	%	111							4025819
C13-12378 PentaCDF	%	109							4025819
C13-123789 HexaCDF	%	97							4025819
C13-234678 HexaCDF	%	80							4025819
C13-23478 PentaCDF	%	126							4025819
C13-2378 TetraCDD	%	85							4025819
C13-2378 TetraCDF	%	93							4025819
C13-OCDD	%	128							4025819
Confirmation C13-2378 TetraCDF	%	100							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA754							
Sampling Date		2015/04/30 12:10							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI029A-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.359	0.150	0.199	0.400	1.00	0.359		4025819
1,2,3,7,8-Penta CDD	pg/g	2.79	0.0937	0.997	0.400	1.00	2.79		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	5.21	0.102	0.997	0.400	0.100	0.521		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	23.0	0.108	0.997	0.400	0.100	2.30		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	23.1	0.0990	0.997	0.400	0.100	2.31		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	475	0.209	0.997	0.400	0.0100	4.75		4025819
Octa CDD	pg/g	3050	0.135	1.99	0.800	0.000300	0.915		4025819
Total Tetra CDD	pg/g	1.66	0.150	0.199	0.400			5	4025819
Total Penta CDD	pg/g	7.82	0.0937	0.997	0.400			9	4025819
Total Hexa CDD	pg/g	97.5	0.104	0.997	0.400			7	4025819
Total Hepta CDD	pg/g	678	0.209	0.997	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	1.35	0.106	0.199	0.400	0.100	0.135		4025819
1,2,3,7,8-Penta CDF	pg/g	1.55	0.0879	0.997	0.400	0.0300	0.0465		4025819
2,3,4,7,8-Penta CDF	pg/g	1.96	0.0869	0.997	0.400	0.300	0.588		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	8.26	0.148	0.997	0.400	0.100	0.826		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	4.00	0.152	0.997	0.400	0.100	0.400		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	3.35	0.142	0.997	0.400	0.100	0.335		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.249	0.159	0.997	0.400	0.100	0.0249		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	73.0	0.0855	0.997	0.400	0.0100	0.730		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	4.09	0.0722	0.997	0.400	0.0100	0.0409		4025819
Octa CDF	pg/g	75.4	0.130	1.99	0.800	0.000300	0.0226		4025819
Total Tetra CDF	pg/g	3.82	0.106	0.199	0.400			7	4025819
Total Penta CDF	pg/g	9.05	0.0874	0.997	0.400			9	4025819
Total Hexa CDF	pg/g	49.0	0.150	0.997	0.400			9	4025819
Total Hepta CDF	pg/g	152	0.0783	0.997	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.14	0.044	1.0	0.90	0.100	0.114		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						17.1		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds



Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA754							
Sampling Date		2015/04/30 12:10							
COC Number		na					<b>TOXIC EQUIVALENCY</b>	<b># of</b>	
	<b>Units</b>	<b>ISM-AOI029A-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	86							4025819
C13-1234678 HeptaCDD	%	76							4025819
C13-1234678 HeptaCDF **	%	37							4025819
C13-123478 HexaCDD	%	59							4025819
C13-123478 HexaCDF	%	30							4025819
C13-1234789 HeptaCDF	%	71							4025819
C13-123678 HexaCDD	%	73							4025819
C13-123678 HexaCDF	%	35							4025819
C13-12378 PentaCDD	%	109							4025819
C13-12378 PentaCDF	%	98							4025819
C13-123789 HexaCDF	%	92							4025819
C13-234678 HexaCDF	%	64							4025819
C13-23478 PentaCDF	%	93							4025819
C13-2378 TetraCDD	%	80							4025819
C13-2378 TetraCDF	%	85							4025819
C13-OCDD	%	102							4025819
Confirmation C13-2378 TetraCDF	%	97							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA755							
Sampling Date		2015/04/30 12:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW030-0.5 A5D0913-15</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.296	0.0337	0.0665	0.400	1.00	0.296		4025819
1,2,3,7,8-Penta CDD	pg/g	2.78	0.0333	0.333	0.400	1.00	2.78		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	6.25	0.0340	0.333	0.400	0.100	0.625		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	21.4	0.0360	0.333	0.400	0.100	2.14		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	20.9	0.0331	0.333	0.400	0.100	2.09		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	430	0.0340	0.333	0.400	0.0100	4.30		4025819
Octa CDD	pg/g	976	0.0340	0.665	0.800	0.000300	0.293		4025819
Total Tetra CDD	pg/g	2.40	0.0337	0.0665	0.400			10	4025819
Total Penta CDD	pg/g	13.8	0.0333	0.333	0.400			12	4025819
Total Hexa CDD	pg/g	122	0.0349	0.333	0.400			7	4025819
Total Hepta CDD	pg/g	702	0.0340	0.333	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	0.710	0.0339	0.0665	0.400	0.100	0.0710		4025819
1,2,3,7,8-Penta CDF	pg/g	1.24	0.0333	0.333	0.400	0.0300	0.0372		4025819
2,3,4,7,8-Penta CDF	pg/g	1.47	0.0329	0.333	0.400	0.300	0.441		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	8.45	0.0335	0.333	0.400	0.100	0.845		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	4.38	0.0346	0.333	0.400	0.100	0.438		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	2.71	0.0322	0.333	0.400	0.100	0.271		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.151	0.0360	0.333	0.400	0.100	0.0151		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	70.2	0.0362	0.333	0.400	0.0100	0.702		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	3.52	0.0306	0.333	0.400	0.0100	0.0352		4025819
Octa CDF	pg/g	85.7	0.0328	0.665	0.800	0.000300	0.0257		4025819
Total Tetra CDF	pg/g	4.79	0.0339	0.0665	0.400			12	4025819
Total Penta CDF	pg/g	15.0	0.0331	0.333	0.400			11	4025819
Total Hexa CDF	pg/g	96.8	0.0340	0.333	0.400			11	4025819
Total Hepta CDF	pg/g	182	0.0331	0.333	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	0.495	0.0095	0.33	0.30	0.100	0.0495		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						15.4		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA755							
Sampling Date		2015/04/30 12:40							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW030-0.5 A5D0913-15</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	97							4025819
C13-1234678 HeptaCDD	%	117							4025819
C13-1234678 HeptaCDF **	%	101							4025819
C13-123478 HexaCDD	%	71							4025819
C13-123478 HexaCDF	%	75							4025819
C13-1234789 HeptaCDF	%	98							4025819
C13-123678 HexaCDD	%	82							4025819
C13-123678 HexaCDF	%	71							4025819
C13-12378 PentaCDD	%	104							4025819
C13-12378 PentaCDF	%	97							4025819
C13-123789 HexaCDF	%	92							4025819
C13-234678 HexaCDF	%	69							4025819
C13-23478 PentaCDF	%	112							4025819
C13-2378 TetraCDD	%	83							4025819
C13-2378 TetraCDF	%	95							4025819
C13-OCDD	%	156							4025819
Confirmation C13-2378 TetraCDF	%	100							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA756							
Sampling Date		2015/04/30 13:15							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-AOI020B-1.0 A5D0913-17</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.272	0.0358	0.0666	0.400	1.00	0.272		4025819
1,2,3,7,8-Penta CDD	pg/g	0.496	0.0364	0.333	0.400	1.00	0.496		4025819
1,2,3,4,7,8-Hexa CDD	pg/g	1.12	0.0323	0.333	0.400	0.100	0.112		4025819
1,2,3,6,7,8-Hexa CDD	pg/g	4.93	0.0343	0.333	0.400	0.100	0.493		4025819
1,2,3,7,8,9-Hexa CDD	pg/g	4.65	0.0315	0.333	0.400	0.100	0.465		4025819
1,2,3,4,6,7,8-Hepta CDD	pg/g	119	0.0334	0.333	0.400	0.0100	1.19		4025819
Octa CDD	pg/g	745	0.0334	0.666	0.800	0.000300	0.224		4025819
Total Tetra CDD	pg/g	0.569	0.0358	0.0666	0.400			3	4025819
Total Penta CDD	pg/g	1.47	0.0364	0.333	0.400			7	4025819
Total Hexa CDD	pg/g	21.6	0.0332	0.333	0.400			7	4025819
Total Hepta CDD	pg/g	173	0.0334	0.333	0.400			2	4025819
2,3,7,8-Tetra CDF **	pg/g	0.358	0.0365	0.0666	0.400	0.100	0.0358		4025819
1,2,3,7,8-Penta CDF	pg/g	0.377	0.0363	0.333	0.400	0.0300	0.0113		4025819
2,3,4,7,8-Penta CDF	pg/g	0.554	0.0359	0.333	0.400	0.300	0.166		4025819
1,2,3,4,7,8-Hexa CDF	pg/g	2.41	0.0322	0.333	0.400	0.100	0.241		4025819
1,2,3,6,7,8-Hexa CDF	pg/g	1.23	0.0333	0.333	0.400	0.100	0.123		4025819
2,3,4,6,7,8-Hexa CDF	pg/g	0.920	0.0309	0.333	0.400	0.100	0.0920		4025819
1,2,3,7,8,9-Hexa CDF	pg/g	0.0560	0.0346	0.333	0.400	0.100	0.00560		4025819
1,2,3,4,6,7,8-Hepta CDF	pg/g	23.3	0.0378	0.333	0.400	0.0100	0.233		4025819
1,2,3,4,7,8,9-Hepta CDF	pg/g	0.907	0.0319	0.333	0.400	0.0100	0.00907		4025819
Octa CDF	pg/g	33.8	0.0333	0.666	0.800	0.000300	0.0101		4025819
Total Tetra CDF	pg/g	1.67	0.0365	0.0666	0.400			11	4025819
Total Penta CDF	pg/g	3.22	0.0361	0.333	0.400			7	4025819
Total Hexa CDF	pg/g	15.6	0.0327	0.333	0.400			10	4025819
Total Hepta CDF	pg/g	47.8	0.0346	0.333	0.400			4	4025819
Confirmation 2,3,7,8-Tetra CDF	pg/g	0.320	0.0096	0.33	0.30	0.100	0.0320		4027724
TOTAL TOXIC EQUIVALENCY	pg/g						4.18		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AGA756							
Sampling Date		2015/04/30 13:15							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-AOI020B-1.0 A5D0913-17</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	91							4025819
C13-1234678 HeptaCDD	%	86							4025819
C13-1234678 HeptaCDF **	%	49							4025819
C13-123478 HexaCDD	%	58							4025819
C13-123478 HexaCDF	%	31							4025819
C13-1234789 HeptaCDF	%	81							4025819
C13-123678 HexaCDD	%	70							4025819
C13-123678 HexaCDF	%	34							4025819
C13-12378 PentaCDD	%	103							4025819
C13-12378 PentaCDF	%	93							4025819
C13-123789 HexaCDF	%	88							4025819
C13-234678 HexaCDF	%	65							4025819
C13-23478 PentaCDF	%	92							4025819
C13-2378 TetraCDD	%	76							4025819
C13-2378 TetraCDF	%	87							4025819
C13-OCDD	%	122							4025819
Confirmation C13-2378 TetraCDF	%	94							4027724

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds



Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

### Test Summary

**Maxxam ID** AGA748 **Collected** 2015/04/30  
**Sample ID** ISM-AOI020B-0.5-AFTER ISM **Shipped**  
**Matrix** Soil **Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA748 Dup **Collected** 2015/04/30  
**Sample ID** ISM-AOI020B-0.5-AFTER ISM **Shipped**  
**Matrix** Soil **Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam

**Maxxam ID** AGA749 **Collected** 2015/04/30  
**Sample ID** ISM-AOI021-0.5-AFTER ISM **Shipped**  
**Matrix** Soil **Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA750 **Collected** 2015/04/30  
**Sample ID** ISM-AOI030-0.5-AFTER ISM **Shipped**  
**Matrix** Soil **Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA751 **Collected** 2015/04/30  
**Sample ID** ISM-AOI024-0.5-AFTER ISM **Shipped**  
**Matrix** Soil **Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA752 **Collected** 2015/04/30  
**Sample ID** ISM-AOI025-0.5-AFTER ISM **Shipped**  
**Matrix** Soil **Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

**Test Summary**

**Maxxam ID** AGA753  
**Sample ID** ISM-AOI027-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA754  
**Sample ID** ISM-AOI029A-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA755  
**Sample ID** SS-ROW030-0.5 A5D0913-15  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA756  
**Sample ID** SS-AOI020B-1.0 A5D0913-17  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4025819	2015/05/12	2015/05/20	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4027724	N/A	2015/05/22	Leila Azzam
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

**Maxxam ID** AGA756 Dup  
**Sample ID** SS-AOI020B-1.0 A5D0913-17  
**Matrix** Soil

**Collected** 2015/04/30  
**Shipped**  
**Received** 2015/05/08

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Moisture	BAL	4019722	N/A	2015/05/12	Valentina Kaftani

Maxxam Job #: B585895  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0913

Package 1	7.7°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

**GENERAL COMMENTS**

Report revised to reflect change of sample ID for sample AGA756.  
Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0913  
P.O. #:  
Site Location:

**Quality Assurance Report**  
Maxxam Job Number: GB585895

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4019722 BOP	RPD - Sample/Sample Dup	Moisture	2015/05/12	1.2		%	20
4025819 OBC	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/19		90	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/19		78	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/19		73	%	28 - 143
		C13-123478 HexaCDD	2015/05/19		76	%	32 - 141
		C13-123478 HexaCDF	2015/05/19		74	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/19		81	%	26 - 138
		C13-123678 HexaCDD	2015/05/19		84	%	28 - 130
		C13-123678 HexaCDF	2015/05/19		70	%	26 - 123
		C13-12378 PentaCDD	2015/05/19		113	%	25 - 181
		C13-12378 PentaCDF	2015/05/19		103	%	24 - 185
		C13-123789 HexaCDF	2015/05/19		90	%	29 - 147
		C13-234678 HexaCDF	2015/05/19		74	%	28 - 136
		C13-23478 PentaCDF	2015/05/19		121	%	21 - 178
		C13-2378 TetraCDD	2015/05/19		79	%	25 - 164
		C13-2378 TetraCDF	2015/05/19		84	%	24 - 169
		C13-OCDD	2015/05/19		83	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/19		112	%	67 - 158
		1,2,3,7,8-Penta CDD	2015/05/19		92	%	25 - 181
		1,2,3,4,7,8-Hexa CDD	2015/05/19		106	%	70 - 164
		1,2,3,6,7,8-Hexa CDD	2015/05/19		101	%	76 - 134
		1,2,3,7,8,9-Hexa CDD	2015/05/19		141	%	64 - 162
		1,2,3,4,6,7,8-Hepta CDD	2015/05/19		101	%	70 - 140
		Octa CDD	2015/05/19		110	%	78 - 144
		2,3,7,8-Tetra CDF	2015/05/19		101	%	75 - 158
		1,2,3,7,8-Penta CDF	2015/05/19		95	%	80 - 134
		2,3,4,7,8-Penta CDF	2015/05/19		88	%	68 - 160
		1,2,3,4,7,8-Hexa CDF	2015/05/19		101	%	72 - 134
		1,2,3,6,7,8-Hexa CDF	2015/05/19		110	%	84 - 130
		2,3,4,6,7,8-Hexa CDF	2015/05/19		105	%	70 - 156
		1,2,3,7,8,9-Hexa CDF	2015/05/19		106	%	78 - 130
		1,2,3,4,6,7,8-Hepta CDF	2015/05/19		122	%	82 - 122
		1,2,3,4,7,8,9-Hepta CDF	2015/05/19		96	%	78 - 138
		Octa CDF	2015/05/19		106	%	63 - 170
	Method Blank	37CL4 2378 Tetra CDD	2015/05/20		89	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/20		85	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/20		74	%	28 - 143
		C13-123478 HexaCDD	2015/05/20		75	%	32 - 141
		C13-123478 HexaCDF	2015/05/20		71	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/20		80	%	26 - 138
		C13-123678 HexaCDD	2015/05/20		83	%	28 - 130
		C13-123678 HexaCDF	2015/05/20		74	%	26 - 123
		C13-12378 PentaCDD	2015/05/20		108	%	25 - 181
		C13-12378 PentaCDF	2015/05/20		97	%	24 - 185
		C13-123789 HexaCDF	2015/05/20		90	%	29 - 147
		C13-234678 HexaCDF	2015/05/20		72	%	28 - 136
		C13-23478 PentaCDF	2015/05/20		121	%	21 - 178
		C13-2378 TetraCDD	2015/05/20		74	%	25 - 164
		C13-2378 TetraCDF	2015/05/20		83	%	24 - 169
		C13-OCDD	2015/05/20		83	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/20	<0.0878, EDL=0.0878		pg/g	
		1,2,3,7,8-Penta CDD	2015/05/20	<0.0884, EDL=0.0884		pg/g	
		1,2,3,4,7,8-Hexa CDD	2015/05/20	<0.0749, EDL=0.0749		pg/g	

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0913  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB585895

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits	
4025819 OBC	Method Blank	1,2,3,6,7,8-Hexa CDD	2015/05/20	<0.0795, EDL=0.0795		pg/g		
		1,2,3,7,8,9-Hexa CDD	2015/05/20	<0.0730, EDL=0.0730		pg/g		
		1,2,3,4,6,7,8-Hepta CDD	2015/05/20	<0.0711, EDL=0.0711		pg/g		
		Octa CDD	2015/05/20	0.161, EDL=0.106		pg/g		
		Total Tetra CDD	2015/05/20	<0.138, EDL=0.138 (1)		pg/g		
		Total Penta CDD	2015/05/20	<0.110, EDL=0.110 (1)		pg/g		
		Total Hexa CDD	2015/05/20	<0.235, EDL=0.235 (1)		pg/g		
		Total Hepta CDD	2015/05/20	<0.0711, EDL=0.0711		pg/g		
		2,3,7,8-Tetra CDF	2015/05/20	<0.0572, EDL=0.0572		pg/g		
		1,2,3,7,8-Penta CDF	2015/05/20	<0.0590, EDL=0.0590		pg/g		
		2,3,4,7,8-Penta CDF	2015/05/20	<0.0584, EDL=0.0584		pg/g		
		1,2,3,4,7,8-Hexa CDF	2015/05/20	<0.122, EDL=0.122		pg/g		
		1,2,3,6,7,8-Hexa CDF	2015/05/20	<0.126, EDL=0.126		pg/g		
		2,3,4,6,7,8-Hexa CDF	2015/05/20	<0.117, EDL=0.117		pg/g		
		1,2,3,7,8,9-Hexa CDF	2015/05/20	<0.131, EDL=0.131		pg/g		
		1,2,3,4,6,7,8-Hepta CDF	2015/05/20	<0.0860, EDL=0.0860		pg/g		
		1,2,3,4,7,8,9-Hepta CDF	2015/05/20	<0.0726, EDL=0.0726		pg/g		
		Octa CDF	2015/05/20	<0.110, EDL=0.110		pg/g		
		Total Tetra CDF	2015/05/20	<0.0652, EDL=0.0652 (1)		pg/g		
		Total Penta CDF	2015/05/20	<0.0587, EDL=0.0587		pg/g		
		Total Hexa CDF	2015/05/20	<0.124, EDL=0.124		pg/g		
		Total Hepta CDF	2015/05/20	<0.0788, EDL=0.0788		pg/g		
		RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2015/05/20	5.3		%	25
			1,2,3,7,8-Penta CDD	2015/05/20	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2015/05/20	12		%	25
			1,2,3,6,7,8-Hexa CDD	2015/05/20	4.5		%	25
			1,2,3,7,8,9-Hexa CDD	2015/05/20	9.0		%	25
			1,2,3,4,6,7,8-Hepta CDD	2015/05/20	4.4		%	25
	Octa CDD		2015/05/20	26 (2)		%	25	
	Total Tetra CDD		2015/05/20	2.0		%	25	
	Total Penta CDD		2015/05/20	13		%	25	
	Total Hexa CDD		2015/05/20	0.98		%	25	
	Total Hepta CDD		2015/05/20	6.9		%	25	
	2,3,7,8-Tetra CDF		2015/05/20	20		%	25	
	1,2,3,7,8-Penta CDF		2015/05/20	NC		%	25	
	2,3,4,7,8-Penta CDF		2015/05/20	NC		%	25	
	1,2,3,4,7,8-Hexa CDF		2015/05/20	5.6		%	25	
	1,2,3,6,7,8-Hexa CDF		2015/05/20	4.7		%	25	
	2,3,4,6,7,8-Hexa CDF		2015/05/20	15		%	25	
	1,2,3,7,8,9-Hexa CDF		2015/05/20	NC		%	25	
	1,2,3,4,6,7,8-Hepta CDF		2015/05/20	0.48		%	25	
	1,2,3,4,7,8,9-Hepta CDF		2015/05/20	8.8		%	25	
	Octa CDF	2015/05/20	8.3		%	25		
	Total Tetra CDF	2015/05/20	20		%	25		
	Total Penta CDF	2015/05/20	11		%	25		
	Total Hexa CDF	2015/05/20	6.1		%	25		
	Total Hepta CDF	2015/05/20	1.6		%	25		
	4027724 LAZ	Method Blank	Confirmation C13-2378 TetraCDF	2015/05/22		110	%	40 - 135
Confirmation 2,3,7,8-Tetra CDF			2015/05/22	<0.045, EDL=0.045		pg/g		
4203313 LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/05/22	NC		%	100	
		Confirmation C13-2378 TetraCDF	2015/09/29		92	%	40 - 135	



Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0913  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB585895

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4203313 LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2015/09/29	<0.12, EDL=0.12		pg/g	
	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/29	NC		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

( 1 ) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

( 2 ) \*\* From 5X Dilution Run \*\*

Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**Validation Signature Page**

**Maxxam Job #: B585895**

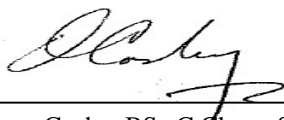
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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



---

Brad Newman, Scientific Specialist



---

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A5E0255  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/02**  
**Report #: R3707753**  
**Version: 2R**

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B592755**

**Received: 2015/05/19, 12:30**

Sample Matrix: Soil  
# Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Dioxins/Furans in Soil (1613B) (1)	3	2015/05/25	2015/05/28	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/05/28	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2015/09/29	BRL SOP-00406	EPA M8290A / M1613
Moisture	2	N/A	2015/05/22	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====  
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Total cover pages: 1

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AHH743	AHH744			
Sampling Date		2015/05/07 14:05	2015/05/07 14:30			
COC Number		na	na			
	<b>Units</b>	<b>SS-ROW004-0.5</b>	<b>SS-ROW008-0.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	4.9	18	1.0	0.50	4034073
RDL = Reportable Detection Limit QC Batch = Quality Control Batch						

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH743							
Sampling Date		2015/05/07 14:05							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW004-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.111	0.0953	0.997	0.400	1.00	0.111		4040184
1,2,3,7,8-Penta CDD	pg/g	0.259	0.128	4.98	0.400	1.00	0.259		4040184
1,2,3,4,7,8-Hexa CDD	pg/g	0.391	0.109	4.98	0.400	0.100	0.0391		4040184
1,2,3,6,7,8-Hexa CDD	pg/g	1.09	0.115	4.98	0.400	0.100	0.109		4040184
1,2,3,7,8,9-Hexa CDD	pg/g	0.876	0.113	4.98	0.400	0.100	0.0876		4040184
1,2,3,4,6,7,8-Hepta CDD	pg/g	21.2	0.0917	4.98	0.400	0.0100	0.212		4040184
Octa CDD	pg/g	122	0.152	9.97	0.800	0.000300	0.0366		4040184
Total Tetra CDD	pg/g	0.263	0.0953	0.997	0.400			2	4040184
Total Penta CDD	pg/g	0.636	0.128	4.98	0.400			2	4040184
Total Hexa CDD	pg/g	6.79	0.114	4.98	0.400			6	4040184
Total Hepta CDD	pg/g	36.9	0.0917	4.98	0.400			2	4040184
2,3,7,8-Tetra CDF **	pg/g	0.164	0.106	0.997	0.400	0.100	0.0164		4040184
1,2,3,7,8-Penta CDF	pg/g	<0.100	0.100	4.98	0.400	0.0300	0.00300		4040184
2,3,4,7,8-Penta CDF	pg/g	0.148	0.0984	4.98	0.400	0.300	0.0444		4040184
1,2,3,4,7,8-Hexa CDF	pg/g	0.517	0.0941	4.98	0.400	0.100	0.0517		4040184
1,2,3,6,7,8-Hexa CDF	pg/g	0.378	0.0994	4.98	0.400	0.100	0.0378		4040184
2,3,4,6,7,8-Hexa CDF	pg/g	0.301	0.0894	4.98	0.400	0.100	0.0301		4040184
1,2,3,7,8,9-Hexa CDF	pg/g	0.143	0.0949	4.98	0.400	0.100	0.0143		4040184
1,2,3,4,6,7,8-Hepta CDF	pg/g	6.66	0.0756	4.98	0.400	0.0100	0.0666		4040184
1,2,3,4,7,8,9-Hepta CDF	pg/g	0.303	0.0759	4.98	0.400	0.0100	0.00303		4040184
Octa CDF	pg/g	8.05	0.153	9.97	0.800	0.000300	0.00242		4040184
Total Tetra CDF	pg/g	0.792	0.106	0.997	0.400			4	4040184
Total Penta CDF	pg/g	3.07	0.0994	4.98	0.400			5	4040184
Total Hexa CDF	pg/g	9.45	0.0943	4.98	0.400			8	4040184
Total Hepta CDF	pg/g	14.3	0.0758	4.98	0.400			3	4040184
Confirmation 2,3,7,8-Tetra CDF	pg/g	<0.38	0.38	1.0	0.90	0.100	0.0380		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						1.15		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD	%	81							4040184

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds



Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH743							
Sampling Date		2015/05/07 14:05							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW004-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

C13-1234678 HeptaCDD *	%	78							4040184
C13-1234678 HeptaCDF **	%	79							4040184
C13-123478 HexaCDD	%	79							4040184
C13-123478 HexaCDF	%	86							4040184
C13-1234789 HeptaCDF	%	79							4040184
C13-123678 HexaCDD	%	91							4040184
C13-123678 HexaCDF	%	84							4040184
C13-12378 PentaCDD	%	87							4040184
C13-12378 PentaCDF	%	87							4040184
C13-123789 HexaCDF	%	84							4040184
C13-234678 HexaCDF	%	68							4040184
C13-23478 PentaCDF	%	88							4040184
C13-2378 TetraCDD	%	69							4040184
C13-2378 TetraCDF	%	71							4040184
C13-OCDD	%	79							4040184
Confirmation C13-2378 TetraCDF	%	71							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH744							
Sampling Date		2015/05/07 14:30							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW008-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.283	0.187	0.996	0.400	1.00	0.283		4040184
1,2,3,7,8-Penta CDD	pg/g	1.65	0.104	4.98	0.400	1.00	1.65		4040184
1,2,3,4,7,8-Hexa CDD	pg/g	3.80	0.123	4.98	0.400	0.100	0.380		4040184
1,2,3,6,7,8-Hexa CDD	pg/g	14.3	0.130	4.98	0.400	0.100	1.43		4040184
1,2,3,7,8,9-Hexa CDD	pg/g	9.15	0.127	4.98	0.400	0.100	0.915		4040184
1,2,3,4,6,7,8-Hepta CDD	pg/g	344	0.0849	4.98	0.400	0.0100	3.44		4040184
Octa CDD	pg/g	1980	0.451	9.96	0.800	0.000300	0.594		4040184
Total Tetra CDD	pg/g	1.52	0.187	0.996	0.400			3	4040184
Total Penta CDD	pg/g	9.11	0.104	4.98	0.400			11	4040184
Total Hexa CDD	pg/g	80.2	0.128	4.98	0.400			7	4040184
Total Hepta CDD	pg/g	577	0.0849	4.98	0.400			2	4040184
2,3,7,8-Tetra CDF **	pg/g	0.727	0.0900	0.996	0.400	0.100	0.0727		4040184
1,2,3,7,8-Penta CDF	pg/g	0.763	0.106	4.98	0.400	0.0300	0.0229		4040184
2,3,4,7,8-Penta CDF	pg/g	1.01	0.104	4.98	0.400	0.300	0.303		4040184
1,2,3,4,7,8-Hexa CDF	pg/g	4.74	0.165	4.98	0.400	0.100	0.474		4040184
1,2,3,6,7,8-Hexa CDF	pg/g	3.12	0.175	4.98	0.400	0.100	0.312		4040184
2,3,4,6,7,8-Hexa CDF	pg/g	2.16	0.157	4.98	0.400	0.100	0.216		4040184
1,2,3,7,8,9-Hexa CDF	pg/g	0.184	0.167	4.98	0.400	0.100	0.0184		4040184
1,2,3,4,6,7,8-Hepta CDF	pg/g	57.4	0.0937	4.98	0.400	0.0100	0.574		4040184
1,2,3,4,7,8,9-Hepta CDF	pg/g	3.06	0.0941	4.98	0.400	0.0100	0.0306		4040184
Octa CDF	pg/g	117	0.120	9.96	0.800	0.000300	0.0351		4040184
Total Tetra CDF	pg/g	6.64	0.0900	0.996	0.400			9	4040184
Total Penta CDF	pg/g	29.8	0.105	4.98	0.400			9	4040184
Total Hexa CDF	pg/g	94.4	0.166	4.98	0.400			9	4040184
Total Hepta CDF	pg/g	159	0.0939	4.98	0.400			4	4040184
Confirmation 2,3,7,8-Tetra CDF	pg/g	<0.32 (1)	0.32	1.0	0.90	0.100	0.0320		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						10.7		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 ( 1 ) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH744							
Sampling Date		2015/05/07 14:30							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW008-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	91							4040184
C13-1234678 HeptaCDD	%	85							4040184
C13-1234678 HeptaCDF **	%	83							4040184
C13-123478 HexaCDD	%	84							4040184
C13-123478 HexaCDF	%	90							4040184
C13-1234789 HeptaCDF	%	84							4040184
C13-123678 HexaCDD	%	96							4040184
C13-123678 HexaCDF	%	85							4040184
C13-12378 PentaCDD	%	90							4040184
C13-12378 PentaCDF	%	90							4040184
C13-123789 HexaCDF	%	88							4040184
C13-234678 HexaCDF	%	78							4040184
C13-23478 PentaCDF	%	94							4040184
C13-2378 TetraCDD	%	75							4040184
C13-2378 TetraCDF	%	78							4040184
C13-OCDD	%	95							4040184
Confirmation C13-2378 TetraCDF	%	73							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH745							
Sampling Date		2015/05/07 15:25							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI016-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	0.485	0.122	0.997	0.400	1.00	0.485		4040184
1,2,3,7,8-Penta CDD	pg/g	5.87	0.236	4.98	0.400	1.00	5.87		4040184
1,2,3,4,7,8-Hexa CDD	pg/g	13.1	0.150	4.98	0.400	0.100	1.31		4040184
1,2,3,6,7,8-Hexa CDD	pg/g	46.7	0.159	4.98	0.400	0.100	4.67		4040184
1,2,3,7,8,9-Hexa CDD	pg/g	30.5	0.155	4.98	0.400	0.100	3.05		4040184
1,2,3,4,6,7,8-Hepta CDD	pg/g	972	0.110	4.98	0.400	0.0100	9.72		4040184
Octa CDD	pg/g	5390 (1)	1.84	49.8	0.800	0.000300	1.62		4040184
Total Tetra CDD	pg/g	7.40	0.122	0.997	0.400			9	4040184
Total Penta CDD	pg/g	35.6	0.236	4.98	0.400			12	4040184
Total Hexa CDD	pg/g	262	0.156	4.98	0.400			7	4040184
Total Hepta CDD	pg/g	1700	0.110	4.98	0.400			2	4040184
2,3,7,8-Tetra CDF **	pg/g	3.27	0.138	0.997	0.400	0.100	0.327		4040184
1,2,3,7,8-Penta CDF	pg/g	3.56	0.106	4.98	0.400	0.0300	0.107		4040184
2,3,4,7,8-Penta CDF	pg/g	5.06	0.104	4.98	0.400	0.300	1.52		4040184
1,2,3,4,7,8-Hexa CDF	pg/g	24.0	0.110	4.98	0.400	0.100	2.40		4040184
1,2,3,6,7,8-Hexa CDF	pg/g	11.8	0.117	4.98	0.400	0.100	1.18		4040184
2,3,4,6,7,8-Hexa CDF	pg/g	7.48	0.105	4.98	0.400	0.100	0.748		4040184
1,2,3,7,8,9-Hexa CDF	pg/g	0.462	0.111	4.98	0.400	0.100	0.0462		4040184
1,2,3,4,6,7,8-Hepta CDF	pg/g	142	0.132	4.98	0.400	0.0100	1.42		4040184
1,2,3,4,7,8,9-Hepta CDF	pg/g	8.19	0.133	4.98	0.400	0.0100	0.0819		4040184
Octa CDF	pg/g	166	0.149	9.97	0.800	0.000300	0.0498		4040184
Total Tetra CDF	pg/g	23.8	0.138	0.997	0.400			12	4040184
Total Penta CDF	pg/g	118	0.105	4.98	0.400			12	4040184
Total Hexa CDF	pg/g	311	0.111	4.98	0.400			13	4040184
Total Hepta CDF	pg/g	362	0.132	4.98	0.400			4	4040184
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.61	0.11	1.0	0.90	0.100	0.161		4041388
TOTAL TOXIC EQUIVALENCY	pg/g						34.4		

RDL = Reportable Detection Limit  
EDL = Estimated Detection Limit  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
( 1 ) \*\* From 5X Dilution \*\*

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHH745							
Sampling Date		2015/05/07 15:25							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>ISM-AOI016-0.5-AFTER ISM</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	85							4040184
C13-1234678 HeptaCDD	%	67							4040184
C13-1234678 HeptaCDF **	%	65							4040184
C13-123478 HexaCDD	%	63							4040184
C13-123478 HexaCDF	%	69							4040184
C13-1234789 HeptaCDF	%	64							4040184
C13-123678 HexaCDD	%	75							4040184
C13-123678 HexaCDF	%	68							4040184
C13-12378 PentaCDD	%	73							4040184
C13-12378 PentaCDF	%	71							4040184
C13-123789 HexaCDF	%	68							4040184
C13-234678 HexaCDF	%	55							4040184
C13-23478 PentaCDF	%	72							4040184
C13-2378 TetraCDD	%	61							4040184
C13-2378 TetraCDF	%	61							4040184
C13-OCDD	%	65 (1)							4040184
Confirmation C13-2378 TetraCDF	%	54							4041388

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like  
 Compounds  
 ( 1 ) \*\* From 5X Dilution \*\*



Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

### Test Summary

**Maxxam ID** AHH743  
**Sample ID** SS-ROW004-0.5  
**Matrix** Soil

**Collected** 2015/05/07  
**Shipped**  
**Received** 2015/05/19

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4040184	2015/05/25	2015/05/28	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4034073	N/A	2015/05/22	Chun Yan

**Maxxam ID** AHH744  
**Sample ID** SS-ROW008-0.5  
**Matrix** Soil

**Collected** 2015/05/07  
**Shipped**  
**Received** 2015/05/19

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4040184	2015/05/25	2015/05/28	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4034073	N/A	2015/05/22	Chun Yan

**Maxxam ID** AHH745  
**Sample ID** ISM-AOI016-0.5-AFTER ISM  
**Matrix** Soil

**Collected** 2015/05/07  
**Shipped**  
**Received** 2015/05/19

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4040184	2015/05/25	2015/05/28	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4041388	N/A	2015/05/28	Cathy Xu

Maxxam Job #: B592755  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5E0255

Package 1	5.5°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

**GENERAL COMMENTS**

Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5E0255  
P.O. #:  
Site Location:

**Quality Assurance Report**  
Maxxam Job Number: GB592755

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4034073 BOP	RPD - Sample/Sample Dup	Moisture	2015/05/22	3.8		%	20
4040184 KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/28		76	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/28		75	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/28		75	%	28 - 143
		C13-123478 HexaCDD	2015/05/28		74	%	32 - 141
		C13-123478 HexaCDF	2015/05/28		77	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/28		73	%	26 - 138
		C13-123678 HexaCDD	2015/05/28		85	%	28 - 130
		C13-123678 HexaCDF	2015/05/28		76	%	26 - 123
		C13-12378 PentaCDD	2015/05/28		82	%	25 - 181
		C13-12378 PentaCDF	2015/05/28		80	%	24 - 185
		C13-123789 HexaCDF	2015/05/28		75	%	29 - 147
		C13-234678 HexaCDF	2015/05/28		64	%	28 - 136
		C13-23478 PentaCDF	2015/05/28		80	%	21 - 178
		C13-2378 TetraCDD	2015/05/28		62	%	25 - 164
		C13-2378 TetraCDF	2015/05/28		64	%	24 - 169
		C13-OCDD	2015/05/28		79	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/28		110	%	67 - 158
		1,2,3,7,8-Penta CDD	2015/05/28		103	%	70 - 142
		1,2,3,4,7,8-Hexa CDD	2015/05/28		113	%	70 - 164
		1,2,3,6,7,8-Hexa CDD	2015/05/28		95	%	76 - 134
		1,2,3,7,8,9-Hexa CDD	2015/05/28		106	%	64 - 162
		1,2,3,4,6,7,8-Hepta CDD	2015/05/28		107	%	70 - 140
		Octa CDD	2015/05/28		109	%	78 - 144
		2,3,7,8-Tetra CDF	2015/05/28		107	%	75 - 158
		1,2,3,7,8-Penta CDF	2015/05/28		104	%	80 - 134
		2,3,4,7,8-Penta CDF	2015/05/28		96	%	68 - 160
		1,2,3,4,7,8-Hexa CDF	2015/05/28		105	%	72 - 134
		1,2,3,6,7,8-Hexa CDF	2015/05/28		105	%	84 - 130
		2,3,4,6,7,8-Hexa CDF	2015/05/28		107	%	70 - 156
		1,2,3,7,8,9-Hexa CDF	2015/05/28		104	%	78 - 130
		1,2,3,4,6,7,8-Hepta CDF	2015/05/28		108	%	82 - 122
		1,2,3,4,7,8,9-Hepta CDF	2015/05/28		107	%	78 - 138
		Octa CDF	2015/05/28		99	%	63 - 170
	Method Blank	37CL4 2378 Tetra CDD	2015/05/28		83	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/28		79	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/28		80	%	28 - 143
		C13-123478 HexaCDD	2015/05/28		79	%	32 - 141
		C13-123478 HexaCDF	2015/05/28		84	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/28		79	%	26 - 138
		C13-123678 HexaCDD	2015/05/28		93	%	28 - 130
		C13-123678 HexaCDF	2015/05/28		79	%	26 - 123
		C13-12378 PentaCDD	2015/05/28		91	%	25 - 181
		C13-12378 PentaCDF	2015/05/28		87	%	24 - 185
		C13-123789 HexaCDF	2015/05/28		83	%	29 - 147
		C13-234678 HexaCDF	2015/05/28		71	%	28 - 136
		C13-23478 PentaCDF	2015/05/28		91	%	21 - 178
		C13-2378 TetraCDD	2015/05/28		71	%	25 - 164
		C13-2378 TetraCDF	2015/05/28		72	%	24 - 169
		C13-OCDD	2015/05/28		81	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/28	<0.0865, EDL=0.0865		pg/g	
		1,2,3,7,8-Penta CDD	2015/05/28	<0.0803, EDL=0.0803		pg/g	
		1,2,3,4,7,8-Hexa CDD	2015/05/28	<0.0791, EDL=0.0791		pg/g	

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5E0255  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB592755

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4040184 KKS	Method Blank	1,2,3,6,7,8-Hexa CDD	2015/05/28	<0.0836, EDL=0.0836		pg/g	
		1,2,3,7,8,9-Hexa CDD	2015/05/28	<0.0819, EDL=0.0819		pg/g	
		1,2,3,4,6,7,8-Hepta CDD	2015/05/28	0.490, EDL=0.128		pg/g	
		Octa CDD	2015/05/28	2.93, EDL=0.118		pg/g	
		Total Tetra CDD	2015/05/28	<0.0865, EDL=0.0865		pg/g	
		Total Penta CDD	2015/05/28	<0.0803, EDL=0.0803		pg/g	
		Total Hexa CDD	2015/05/28	0.148, EDL=0.0824		pg/g	
		Total Hepta CDD	2015/05/28	1.19, EDL=0.128		pg/g	
		2,3,7,8-Tetra CDF	2015/05/28	<0.103, EDL=0.103		pg/g	
		1,2,3,7,8-Penta CDF	2015/05/28	<0.0943, EDL=0.0943		pg/g	
		2,3,4,7,8-Penta CDF	2015/05/28	<0.0923, EDL=0.0923		pg/g	
		1,2,3,4,7,8-Hexa CDF	2015/05/28	<0.0786, EDL=0.0786		pg/g	
		1,2,3,6,7,8-Hexa CDF	2015/05/28	<0.0831, EDL=0.0831		pg/g	
		2,3,4,6,7,8-Hexa CDF	2015/05/28	<0.0747, EDL=0.0747		pg/g	
		1,2,3,7,8,9-Hexa CDF	2015/05/28	0.0980, EDL=0.0794		pg/g	
		1,2,3,4,6,7,8-Hepta CDF	2015/05/28	<0.144, EDL=0.144 (1)		pg/g	
		1,2,3,4,7,8,9-Hepta CDF	2015/05/28	<0.0937, EDL=0.0937		pg/g	
		Octa CDF	2015/05/28	0.391, EDL=0.0990		pg/g	
		Total Tetra CDF	2015/05/28	<0.103, EDL=0.103		pg/g	
		Total Penta CDF	2015/05/28	<0.0933, EDL=0.0933		pg/g	
		Total Hexa CDF	2015/05/28	0.0980, EDL=0.0789		pg/g	
		Total Hepta CDF	2015/05/28	0.124, EDL=0.0935		pg/g	
		4041388 CXU	Method Blank	Confirmation C13-2378 TetraCDF	2015/05/28		79
		Confirmation 2,3,7,8-Tetra CDF	2015/05/28	<0.11, EDL=0.11		pg/g	
4203313 LAZ	Method Blank	Confirmation C13-2378 TetraCDF	2015/09/29		92	%	40 - 135
		Confirmation 2,3,7,8-Tetra CDF	2015/09/29	<0.12, EDL=0.12		pg/g	
	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2015/09/29	NC		%	100

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

( 1 ) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**Validation Signature Page**

**Maxxam Job #: B592755**

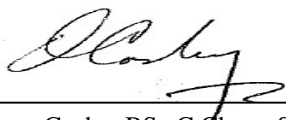
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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



---

Brad Newman, Scientific Specialist



---

Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





Your Project #: A5D0784  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2015/10/02**  
**Report #: R3707744**  
**Version: 2R**

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B594651**  
**Received: 2015/05/21, 14:25**

Sample Matrix: Soil  
# Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Dioxins/Furans in Soil (1613B) (1)	2	2015/05/25	2015/05/28	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/05/28	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2015/09/29	BRL SOP-00406	EPA M8290A / M1613
Moisture	2	N/A	2015/05/22	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.  
\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Total cover pages: 1

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		AHQ997	AHQ998			
Sampling Date		2015/04/23 15:20	2015/04/23 16:30			
COC Number		na	na			
	<b>Units</b>	<b>SS-ROW036-1.0</b>	<b>SS-ROW014-1.0</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	19	19	1.0	0.50	4034073
RDL = Reportable Detection Limit QC Batch = Quality Control Batch						

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHQ997							
Sampling Date		2015/04/23 15:20							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW036-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>
2,3,7,8-Tetra CDD *	pg/g	<0.114	0.114	0.200	0.400	1.00	0.114		4045436
1,2,3,7,8-Penta CDD	pg/g	0.183	0.114	0.999	0.400	1.00	0.183		4045436
1,2,3,4,7,8-Hexa CDD	pg/g	0.266	0.154	0.999	0.400	0.100	0.0266		4045436
1,2,3,6,7,8-Hexa CDD	pg/g	0.539	0.164	0.999	0.400	0.100	0.0539		4045436
1,2,3,7,8,9-Hexa CDD	pg/g	0.555	0.158	0.999	0.400	0.100	0.0555		4045436
1,2,3,4,6,7,8-Hepta CDD	pg/g	13.0	0.102	0.999	0.400	0.0100	0.130		4045436
Octa CDD	pg/g	99.2	0.263	2.00	0.800	0.000300	0.0298		4045436
Total Tetra CDD	pg/g	0.944	0.114	0.200	0.400			3	4045436
Total Penta CDD	pg/g	0.796	0.114	0.999	0.400			3	4045436
Total Hexa CDD	pg/g	4.13	0.160	0.999	0.400			5	4045436
Total Hepta CDD	pg/g	24.1	0.102	0.999	0.400			2	4045436
2,3,7,8-Tetra CDF **	pg/g	0.527	0.169	0.200	0.400	0.100	0.0527		4045436
1,2,3,7,8-Penta CDF	pg/g	<0.146	0.146	0.999	0.400	0.0300	0.00438		4045436
2,3,4,7,8-Penta CDF	pg/g	0.205	0.142	0.999	0.400	0.300	0.0615		4045436
1,2,3,4,7,8-Hexa CDF	pg/g	0.447	0.0978	0.999	0.400	0.100	0.0447		4045436
1,2,3,6,7,8-Hexa CDF	pg/g	0.261	0.104	0.999	0.400	0.100	0.0261		4045436
2,3,4,6,7,8-Hexa CDF	pg/g	0.270	0.0934	0.999	0.400	0.100	0.0270		4045436
1,2,3,7,8,9-Hexa CDF	pg/g	<0.0983	0.0983	0.999	0.400	0.100	0.00983		4045436
1,2,3,4,6,7,8-Hepta CDF	pg/g	2.78	0.0982	0.999	0.400	0.0100	0.0278		4045436
1,2,3,4,7,8,9-Hepta CDF	pg/g	0.214	0.0981	0.999	0.400	0.0100	0.00214		4045436
Octa CDF	pg/g	7.13	0.162	2.00	0.800	0.000300	0.00214		4045436
Total Tetra CDF	pg/g	3.68	0.169	0.200	0.400			8	4045436
Total Penta CDF	pg/g	3.47	0.144	0.999	0.400			5	4045436
Total Hexa CDF	pg/g	5.30	0.0983	0.999	0.400			7	4045436
Total Hepta CDF	pg/g	7.55	0.0981	0.999	0.400			3	4045436
Confirmation 2,3,7,8-Tetra CDF	pg/g	<0.24	0.24	1.0	0.90	0.100	0.0240		4203313
TOTAL TOXIC EQUIVALENCY	pg/g						0.822		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD	%	77							4045436
<p>RDL = Reportable Detection Limit  EDL = Estimated Detection Limit  QC Batch = Quality Control Batch  * CDD = Chloro Dibenzo-p-Dioxin, ** CDF = Chloro Dibenzo-p-Furan  TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds</p>									

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHQ997							
Sampling Date		2015/04/23 15:20							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW036-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

C13-1234678 HeptaCDD *	%	62							4045436
C13-1234678 HeptaCDF **	%	63							4045436
C13-123478 HexaCDD	%	61							4045436
C13-123478 HexaCDF	%	68							4045436
C13-1234789 HeptaCDF	%	64							4045436
C13-123678 HexaCDD	%	71							4045436
C13-123678 HexaCDF	%	67							4045436
C13-12378 PentaCDD	%	68							4045436
C13-12378 PentaCDF	%	67							4045436
C13-123789 HexaCDF	%	65							4045436
C13-234678 HexaCDF	%	53							4045436
C13-23478 PentaCDF	%	67							4045436
C13-2378 TetraCDD	%	54							4045436
C13-2378 TetraCDF	%	54							4045436
C13-OCDD	%	69							4045436
Confirmation C13-2378 TetraCDF	%	54							4203313

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHQ998							
Sampling Date		2015/04/23 16:30							
COC Number		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>Units</b>	<b>SS-ROW014-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

2,3,7,8-Tetra CDD *	pg/g	<0.217	0.217	0.200	0.400	1.00	0.217		4045436
1,2,3,7,8-Penta CDD	pg/g	4.54	0.152	0.998	0.400	1.00	4.54		4045436
1,2,3,4,7,8-Hexa CDD	pg/g	17.7	0.169	0.998	0.400	0.100	1.77		4045436
1,2,3,6,7,8-Hexa CDD	pg/g	98.9	0.181	0.998	0.400	0.100	9.89		4045436
1,2,3,7,8,9-Hexa CDD	pg/g	42.4	0.174	0.998	0.400	0.100	4.24		4045436
1,2,3,4,6,7,8-Hepta CDD	pg/g	2400 (1)	1.00	9.98	0.400	0.0100	24.0		4045436
Octa CDD	pg/g	15300 (1)	4.41	20.0	0.800	0.000300	4.59		4045436
Total Tetra CDD	pg/g	1.64	0.217	0.200	0.400			2	4045436
Total Penta CDD	pg/g	20.0	0.152	0.998	0.400			10	4045436
Total Hexa CDD	pg/g	418	0.177	0.998	0.400			7	4045436
Total Hepta CDD	pg/g	4080 (1)	1.00	9.98	0.400			2	4045436
2,3,7,8-Tetra CDF **	pg/g	2.42	0.102	0.200	0.400	0.100	0.242		4045436
1,2,3,7,8-Penta CDF	pg/g	8.48	0.124	0.998	0.400	0.0300	0.254		4045436
2,3,4,7,8-Penta CDF	pg/g	12.7	0.121	0.998	0.400	0.300	3.81		4045436
1,2,3,4,7,8-Hexa CDF	pg/g	80.7	0.170	0.998	0.400	0.100	8.07		4045436
1,2,3,6,7,8-Hexa CDF	pg/g	32.1	0.182	0.998	0.400	0.100	3.21		4045436
2,3,4,6,7,8-Hexa CDF	pg/g	17.8	0.163	0.998	0.400	0.100	1.78		4045436
1,2,3,7,8,9-Hexa CDF	pg/g	1.30	0.171	0.998	0.400	0.100	0.130		4045436
1,2,3,4,6,7,8-Hepta CDF	pg/g	358	0.166	0.998	0.400	0.0100	3.58		4045436
1,2,3,4,7,8,9-Hepta CDF	pg/g	19.1	0.166	0.998	0.400	0.0100	0.191		4045436
Octa CDF	pg/g	262	0.125	2.00	0.800	0.000300	0.0786		4045436
Total Tetra CDF	pg/g	18.7	0.102	0.200	0.400			10	4045436
Total Penta CDF	pg/g	241	0.122	0.998	0.400			11	4045436
Total Hexa CDF	pg/g	915	0.171	0.998	0.400			12	4045436
Total Hepta CDF	pg/g	897	0.166	0.998	0.400			4	4045436
Confirmation 2,3,7,8-Tetra CDF	pg/g	1.97	0.15	1.0	0.90	0.100	0.197		4041388
TOTAL TOXIC EQUIVALENCY	pg/g						70.5		

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like  
 Compounds  
 ( 1 ) \*\* From 10X Dilution \*\*



Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		AHQ998							
Sampling Date		2015/04/23 16:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	<b>Units</b>	<b>SS-ROW014-1.0</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	79							4045436
C13-1234678 HeptaCDD	%	64 (1)							4045436
C13-1234678 HeptaCDF **	%	65							4045436
C13-123478 HexaCDD	%	62							4045436
C13-123478 HexaCDF	%	68							4045436
C13-1234789 HeptaCDF	%	64							4045436
C13-123678 HexaCDD	%	73							4045436
C13-123678 HexaCDF	%	64							4045436
C13-12378 PentaCDD	%	73							4045436
C13-12378 PentaCDF	%	70							4045436
C13-123789 HexaCDF	%	65							4045436
C13-234678 HexaCDF	%	56							4045436
C13-23478 PentaCDF	%	73							4045436
C13-2378 TetraCDD	%	57							4045436
C13-2378 TetraCDF	%	62							4045436
C13-OCDD	%	74 (1)							4045436
Confirmation C13-2378 TetraCDF	%	54							4041388

RDL = Reportable Detection Limit  
 EDL = Estimated Detection Limit  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin, \*\* CDF = Chloro Dibenzo-p-Furan  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like  
 Compounds  
 ( 1 ) \*\* From 10X Dilution \*\*

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

### Test Summary

**Maxxam ID** AHQ997  
**Sample ID** SS-ROW036-1.0  
**Matrix** Soil

**Collected** 2015/04/23  
**Shipped**  
**Received** 2015/05/21

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4045436	2015/05/25	2015/05/28	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4203313	N/A	2015/09/29	Leila Azzam
Moisture	BAL	4034073	N/A	2015/05/22	Chun Yan

**Maxxam ID** AHQ998  
**Sample ID** SS-ROW014-1.0  
**Matrix** Soil

**Collected** 2015/04/23  
**Shipped**  
**Received** 2015/05/21

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4045436	2015/05/25	2015/05/28	Kay Shaw
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4041388	N/A	2015/05/28	Cathy Xu
Moisture	BAL	4034073	N/A	2015/05/22	Chun Yan

Maxxam Job #: B594651  
Report Date: 2015/10/02

Apex Laboratories  
Client Project #: A5D0784

Package 1	5.5°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

**GENERAL COMMENTS**

Report revised to reflect addition of missed TCDF confirmations.

**Results relate only to the items tested.**

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0784  
P.O. #:  
Site Location:

**Quality Assurance Report**  
Maxxam Job Number: GB594651

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits
4034073 BOP	RPD - Sample/Sample Dup	Moisture	2015/05/22	3.8		%	20
4041388 CXU	Method Blank	Confirmation C13-2378 TetraCDF	2015/05/28		79	%	40 - 135
		Confirmation 2,3,7,8-Tetra CDF	2015/05/28	<0.11, EDL=0.11		pg/g	
4045436 KKS	Spiked Blank	37CL4 2378 Tetra CDD	2015/05/28		75	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/28		75	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/28		76	%	28 - 143
		C13-123478 HexaCDD	2015/05/28		75	%	32 - 141
		C13-123478 HexaCDF	2015/05/28		78	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/28		74	%	26 - 138
		C13-123678 HexaCDD	2015/05/28		85	%	28 - 130
		C13-123678 HexaCDF	2015/05/28		76	%	26 - 123
		C13-12378 PentaCDD	2015/05/28		82	%	25 - 181
		C13-12378 PentaCDF	2015/05/28		81	%	24 - 185
		C13-123789 HexaCDF	2015/05/28		76	%	29 - 147
		C13-234678 HexaCDF	2015/05/28		65	%	28 - 136
		C13-23478 PentaCDF	2015/05/28		81	%	21 - 178
		C13-2378 TetraCDD	2015/05/28		62	%	25 - 164
		C13-2378 TetraCDF	2015/05/28		64	%	24 - 169
		C13-OCDD	2015/05/28		79	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/28		113	%	67 - 158
		1,2,3,7,8-Penta CDD	2015/05/28		107	%	70 - 142
		1,2,3,4,7,8-Hexa CDD	2015/05/28		115	%	70 - 164
		1,2,3,6,7,8-Hexa CDD	2015/05/28		98	%	76 - 134
		1,2,3,7,8,9-Hexa CDD	2015/05/28		107	%	64 - 162
		1,2,3,4,6,7,8-Hepta CDD	2015/05/28		107	%	70 - 140
		Octa CDD	2015/05/28		110	%	78 - 144
		2,3,7,8-Tetra CDF	2015/05/28		110	%	75 - 158
		1,2,3,7,8-Penta CDF	2015/05/28		107	%	80 - 134
		2,3,4,7,8-Penta CDF	2015/05/28		99	%	68 - 160
		1,2,3,4,7,8-Hexa CDF	2015/05/28		106	%	72 - 134
		1,2,3,6,7,8-Hexa CDF	2015/05/28		108	%	84 - 130
		2,3,4,6,7,8-Hexa CDF	2015/05/28		109	%	70 - 156
		1,2,3,7,8,9-Hexa CDF	2015/05/28		105	%	78 - 130
		1,2,3,4,6,7,8-Hepta CDF	2015/05/28		108	%	82 - 122
		1,2,3,4,7,8,9-Hepta CDF	2015/05/28		107	%	78 - 138
		Octa CDF	2015/05/28		101	%	63 - 170
	Method Blank	37CL4 2378 Tetra CDD	2015/05/28		82	%	35 - 197
		C13-1234678 HeptaCDD	2015/05/28		79	%	23 - 140
		C13-1234678 HeptaCDF	2015/05/28		80	%	28 - 143
		C13-123478 HexaCDD	2015/05/28		79	%	32 - 141
		C13-123478 HexaCDF	2015/05/28		84	%	26 - 152
		C13-1234789 HeptaCDF	2015/05/28		80	%	26 - 138
		C13-123678 HexaCDD	2015/05/28		93	%	28 - 130
		C13-123678 HexaCDF	2015/05/28		79	%	26 - 123
		C13-12378 PentaCDD	2015/05/28		92	%	25 - 181
		C13-12378 PentaCDF	2015/05/28		88	%	24 - 185
		C13-123789 HexaCDF	2015/05/28		84	%	29 - 147
		C13-234678 HexaCDF	2015/05/28		71	%	28 - 136
		C13-23478 PentaCDF	2015/05/28		92	%	21 - 178
		C13-2378 TetraCDD	2015/05/28		72	%	25 - 164
		C13-2378 TetraCDF	2015/05/28		72	%	24 - 169
		C13-OCDD	2015/05/28		82	%	17 - 157
		2,3,7,8-Tetra CDD	2015/05/28	<0.0882, EDL=0.0882		pg/g	

Apex Laboratories  
Attention: Philip Nerenberg  
Client Project #: A5D0784  
P.O. #:  
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: GB594651

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	%Recovery	Units	QC Limits		
4045436 KKS	Method Blank	1,2,3,7,8-Penta CDD	2015/05/28	<0.0827, EDL=0.0827		pg/g			
		1,2,3,4,7,8-Hexa CDD	2015/05/28	<0.0809, EDL=0.0809		pg/g			
		1,2,3,6,7,8-Hexa CDD	2015/05/28	<0.0865, EDL=0.0865		pg/g			
		1,2,3,7,8,9-Hexa CDD	2015/05/28	<0.0833, EDL=0.0833		pg/g			
		1,2,3,4,6,7,8-Hepta CDD	2015/05/28	0.490, EDL=0.128		pg/g			
		Octa CDD	2015/05/28	2.96, EDL=0.118		pg/g			
		Total Tetra CDD	2015/05/28	<0.0882, EDL=0.0882		pg/g			
		Total Penta CDD	2015/05/28	<0.0827, EDL=0.0827		pg/g			
		Total Hexa CDD	2015/05/28	0.152, EDL=0.0844		pg/g			
		Total Hepta CDD	2015/05/28	1.20, EDL=0.128		pg/g			
		2,3,7,8-Tetra CDF	2015/05/28	<0.107, EDL=0.107		pg/g			
		1,2,3,7,8-Penta CDF	2015/05/28	<0.0968, EDL=0.0968		pg/g			
		2,3,4,7,8-Penta CDF	2015/05/28	<0.0945, EDL=0.0945		pg/g			
		1,2,3,4,7,8-Hexa CDF	2015/05/28	<0.0799, EDL=0.0799		pg/g			
		1,2,3,6,7,8-Hexa CDF	2015/05/28	<0.0853, EDL=0.0853		pg/g			
		2,3,4,6,7,8-Hexa CDF	2015/05/28	<0.0763, EDL=0.0763		pg/g			
		1,2,3,7,8,9-Hexa CDF	2015/05/28	0.0991, EDL=0.0803		pg/g			
		1,2,3,4,6,7,8-Hepta CDF	2015/05/28	<0.146, EDL=0.146 (1)		pg/g			
		1,2,3,4,7,8,9-Hepta CDF	2015/05/28	<0.0941, EDL=0.0941		pg/g			
		Octa CDF	2015/05/28	0.398, EDL=0.101		pg/g			
		Total Tetra CDF	2015/05/28	<0.107, EDL=0.107		pg/g			
		Total Penta CDF	2015/05/28	<0.0956, EDL=0.0956		pg/g			
		Total Hexa CDF	2015/05/28	0.0991, EDL=0.0803		pg/g			
		Total Hepta CDF	2015/05/28	0.124, EDL=0.0942		pg/g			
		4203313 LAZ	Method Blank	Confirmation C13-2378 TetraCDF	2015/09/29		92	%	40 - 135
				Confirmation 2,3,7,8-Tetra CDF	2015/09/29	<0.12, EDL=0.12		pg/g	
RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF		2015/09/29	NC		%	100		

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

( 1 ) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



**Validation Signature Page**

**Maxxam Job #: B594651**

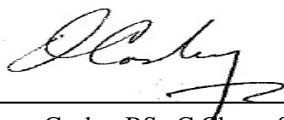
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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Brad Newman, Scientific Specialist



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Tuesday, January 26, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: POR OPP / 9003.01.39

Enclosed are the results of analyses for work order A5L0948, which was received by the laboratory on 12/23/2015 at 3:30:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
01/26/16 16:33

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI035-0.5-As Received	A5L0948-01	Soil	12/23/15 11:30	12/23/15 15:30
ISM-AOI035-0.5-After ISM	A5L0948-02	Soil	12/23/15 11:30	12/23/15 15:30

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 01/26/16 16:33

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI035-0.5-After ISM (A5L0948-02)</b>			<b>Matrix: Soil</b>					
Batch: 6010067								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	01/06/16 12:50	PSEP/SM 5310B MOD	

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 01/26/16 16:33

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI035-0.5-As Received (A5L0948-01)</b>			<b>Matrix: Soil</b>		<b>Batch: 6010074</b>			
% Solids	77.2	---	1.00	% by Weight	1	01/07/16 07:33	EPA 8000C	
<b>ISM-AOI035-0.5-After ISM (A5L0948-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 6010074</b>			
% Solids	98.0	---	1.00	% by Weight	1	01/07/16 07:33	EPA 8000C	

Apex Laboratories



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Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 01/26/16 16:33

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6010067 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (6010067-BLK1)</b>						Prepared: 01/05/16 16:10 Analyzed: 01/06/16 12:50						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6010067-BS1)</b>						Prepared: 01/05/16 16:10 Analyzed: 01/06/16 12:50						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9300	---		mg/kg	1	10000	---	93	85-115%	---	---	
<b>Duplicate (6010067-DUP1)</b>						Prepared: 01/05/16 16:10 Analyzed: 01/06/16 12:50						
<b>QC Source Sample: ISM-AOI035-0.5-After ISM (A5L0948-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	18000	---	200	mg/kg	1	---	17000	---	---	6	20%	

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 01/26/16 16:33

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6010074 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6010074-DUP1)</b>						Prepared: 01/06/16 09:16 Analyzed: 01/07/16 07:33						
QC Source Sample: Other (A6A0022-01)												
EPA 8000C												
% Solids	84.6	---	1.00	% by Weight	1	---	84.4	---	---	0.2	10%	
<b>Duplicate (6010074-DUP2)</b>						Prepared: 01/06/16 09:16 Analyzed: 01/07/16 07:33						
QC Source Sample: Other (A6A0041-05)												
EPA 8000C												
% Solids	75.3	---	1.00	% by Weight	1	---	74.7	---	---	0.8	10%	
<b>Duplicate (6010074-DUP3)</b>						Prepared: 01/06/16 14:23 Analyzed: 01/07/16 07:33						
QC Source Sample: Other (A6A0052-18)												
EPA 8000C												
% Solids	64.5	---	1.00	% by Weight	1	---	64.4	---	---	0.1	10%	
<b>Duplicate (6010074-DUP4)</b>						Prepared: 01/06/16 17:58 Analyzed: 01/07/16 07:33						
QC Source Sample: Other (A6A0078-05)												
EPA 8000C												
% Solids	81.7	---	1.00	% by Weight	1	---	81.8	---	---	0.1	10%	
<b>Duplicate (6010074-DUP5)</b>						Prepared: 01/06/16 17:58 Analyzed: 01/07/16 07:33						
QC Source Sample: Other (A6A0084-03)												
EPA 8000C												
% Solids	74.1	---	1.00	% by Weight	1	---	74.0	---	---	0.08	10%	



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 01/26/16 16:33

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6010067</b>							
A5L0948-02	Soil	PSEP/SM 5310B MOD	12/23/15 11:30	01/05/16 16:10	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6010074</b>							
A5L0948-01	Soil	EPA 8000C	12/23/15 11:30	01/06/16 09:17	1N/A/1N/A	1N/A/1N/A	NA
A5L0948-02	Soil	EPA 8000C	12/23/15 11:30	01/06/16 09:17	1N/A/1N/A	1N/A/1N/A	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher


**Reported:**  
01/26/16 16:33

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
01/26/16 16:33

Lab # A5L0948 coc L of 1

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>	Project Mgr: <b>Phil Wiescher</b>	Project Name: <b>POR OPP</b>	Project # <b>9003.01.39</b>
Address: <b>2001 NW 19th Ave, Ste 200 PDX OR</b>		Phone: <b>503-718-2323</b>	Fax: <b>503-718-0333</b>
Email: <b>pwiescher@maulfooster.com</b>			
Sampled by:			
Site Location: <b>OR</b>	Other: <b>WA</b>		
SAMPLE ID	LAB ID #	DATE	TIME
<b>ISM-AEIOSS-0.5</b>	<b>12/23/15</b>	<b>11:30</b>	<b>1</b>
ANALYSIS REQUEST			
AL, Sb, As, Ba, Bi, Br, Cd, Cr, Cu, Pb, Mn, Ni, Zn, Hg, Hb, Mn, Mo, Ni, P, Se, Ag, Na, Ti, V, Zn	TOTAL DISS TCLP	1200-COLS	1200-Z
TCLP Metals (8)	RCRA Metals (8)	600 TTO	8082 PCBs
8270 SVOC	8260 BTEX	8260 RBDM VOCs	8260 VOC
NWTPH-Gx	NWTPH-Dx	NWTPH-CID	# OF CONTAINERS
MATRIX			
Normal Turn Around Time (TAT) = 7-10 Business Days			
TAT Requested (circle)			
<input checked="" type="radio"/> YES <input type="radio"/> NO 1 Day    2 Day    3 Day 4 DAY    5 DAY    Other:			
SPECIAL INSTRUCTIONS: <b>ISM processing</b>			
RELINQUISHED BY:	RECEIVED BY:	RECEIVED BY:	RECEIVED BY:
Signature: <b>Emily McGee</b>	Signature: <b>Phil Wiescher</b>	Signature: <b>Phil Wiescher</b>	Signature: <b>Phil Wiescher</b>
Date: <b>1/23/16</b>	Date: <b>12/23/15</b>	Date: <b>12/23/15</b>	Date: <b>12/23/15</b>
Printed Name: <b>Emily Curtis</b>	Printed Name: <b>Phil Wiescher</b>	Printed Name: <b>Phil Wiescher</b>	Printed Name: <b>Phil Wiescher</b>
Time: <b>15:50</b>	Time: <b>15:50</b>	Time: <b>15:50</b>	Time: <b>15:50</b>
Company: <b>MFA</b>	Company: <b>Apex</b>	Company: <b>Apex</b>	Company: <b>Apex</b>

Apex Laboratories

*Philip Nerenberg*

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Philip Nerenberg, Lab Director





Your Project #: A5L0948  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/01/20**  
Report #: R3857479  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B603252**

**Received: 2016/01/07, 15:45**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2016/01/11	2016/01/18	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2016/01/18	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2016/01/08	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		BPW012			
<b>Sampling Date</b>		2015/12/23 11:30			
<b>COC Number</b>		NA			
	<b>UNITS</b>	<b>ISM-AOI035-0- 5-AFTER ISM</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	2.0	1.0	0.50	4339193
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BPW012							
Sampling Date		2015/12/23 11:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI035-0-5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.20	0.0314	0.0649	0.400	1.00	1.20		4348884
1,2,3,7,8-Penta CDD *	pg/g	5.80	0.0293	0.324	0.400	1.00	5.80		4348884
1,2,3,4,7,8-Hexa CDD *	pg/g	8.75	0.0279	0.324	0.400	0.100	0.875		4348884
1,2,3,6,7,8-Hexa CDD *	pg/g	25.9	0.0294	0.324	0.400	0.100	2.59		4348884
1,2,3,7,8,9-Hexa CDD *	pg/g	26.1	0.0269	0.324	0.400	0.100	2.61		4348884
1,2,3,4,6,7,8-Hepta CDD *	pg/g	430	0.0284	0.324	0.400	0.0100	4.30		4348884
Octa CDD *	pg/g	1050	0.0301	0.649	0.800	0.000300	0.315		4348884
Total Tetra CDD *	pg/g	4.76	0.0314	0.0649	0.400			9	4348884
Total Penta CDD *	pg/g	41.5	0.0293	0.324	0.400			12	4348884
Total Hexa CDD *	pg/g	141	0.0281	0.324	0.400			7	4348884
Total Hepta CDD *	pg/g	692	0.0284	0.324	0.400			2	4348884
2,3,7,8-Tetra CDF **	pg/g	18.0	0.0419	0.0649	0.400	0.100	1.80		4348884
1,2,3,7,8-Penta CDF **	pg/g	14.7	0.0339	0.324	0.400	0.0300	0.441		4348884
2,3,4,7,8-Penta CDF **	pg/g	26.4	0.0334	0.324	0.400	0.300	7.92		4348884
1,2,3,4,7,8-Hexa CDF **	pg/g	81.1	0.0580	0.324	0.400	0.100	8.11		4348884
1,2,3,6,7,8-Hexa CDF **	pg/g	37.0	0.0599	0.324	0.400	0.100	3.70		4348884
2,3,4,6,7,8-Hexa CDF **	pg/g	55.7	0.0560	0.324	0.400	0.100	5.57		4348884
1,2,3,7,8,9-Hexa CDF **	pg/g	1.75	0.0581	0.324	0.400	0.100	0.175		4348884
1,2,3,4,6,7,8-Hepta CDF **	pg/g	342	0.0304	0.324	0.400	0.0100	3.42		4348884
1,2,3,4,7,8,9-Hepta CDF **	pg/g	19.0	0.0300	0.324	0.400	0.0100	0.190		4348884
Octa CDF **	pg/g	476	0.0346	0.649	0.800	0.000300	0.143		4348884
Total Tetra CDF **	pg/g	64.2	0.0419	0.0649	0.400			15	4348884
Total Penta CDF **	pg/g	160	0.0337	0.324	0.400			16	4348884
Total Hexa CDF **	pg/g	272	0.0580	0.324	0.400			14	4348884
Total Hepta CDF **	pg/g	639	0.0302	0.324	0.400			4	4348884
Confirmation 2,3,7,8-Tetra CDF **	pg/g	10.8	0.072	0.32	0.29	0.100	1.08		4349614
TOTAL TOXIC EQUIVALENCY	pg/g						48.4		

**Surrogate Recovery (%)**

37CL4 2378 Tetra CDD *	%	99							4348884
------------------------	---	----	--	--	--	--	--	--	---------

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BPW012							
Sampling Date		2015/12/23 11:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI035-0. 5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	79							4348884
C13-1234678 HeptaCDF **	%	47							4348884
C13-123478 HexaCDD *	%	90							4348884
C13-123478 HexaCDF **	%	43							4348884
C13-1234789 HeptaCDF **	%	66							4348884
C13-123678 HexaCDD *	%	101							4348884
C13-123678 HexaCDF **	%	51							4348884
C13-12378 PentaCDD *	%	92							4348884
C13-12378 PentaCDF **	%	73							4348884
C13-123789 HexaCDF **	%	105							4348884
C13-234678 HexaCDF **	%	84							4348884
C13-23478 PentaCDF **	%	81							4348884
C13-2378 TetraCDD *	%	101							4348884
C13-2378 TetraCDF **	%	40							4348884
C13-OCDD *	%	88							4348884
Confirmation C13-2378 TetraCDF **	%	52							4349614

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** BPW012  
**Sample ID:** ISM-AOI035-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2015/12/23  
**Shipped:**  
**Received:** 2016/01/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4348884	2016/01/11	2016/01/18	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4349614	N/A	2016/01/18	Leila Azzam
Moisture	BAL	4339193	N/A	2016/01/08	Chun Yan



**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.1°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4339193	NS3	RPD - Sample/Sample Dup	Moisture	2016/01/08	2.6		%	20
4348884	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2016/01/17		83	%	35 - 197
			C13-1234678 HeptaCDD	2016/01/17		74	%	23 - 140
			C13-1234678 HeptaCDF	2016/01/17		73	%	28 - 143
			C13-123478 HexaCDD	2016/01/17		96	%	32 - 141
			C13-123478 HexaCDF	2016/01/17		94	%	26 - 152
			C13-1234789 HeptaCDF	2016/01/17		66	%	26 - 138
			C13-123678 HexaCDD	2016/01/17		106	%	28 - 130
			C13-123678 HexaCDF	2016/01/17		95	%	26 - 123
			C13-12378 PentaCDD	2016/01/17		86	%	25 - 181
			C13-12378 PentaCDF	2016/01/17		69	%	24 - 185
			C13-123789 HexaCDF	2016/01/17		98	%	29 - 147
			C13-234678 HexaCDF	2016/01/17		85	%	28 - 136
			C13-23478 PentaCDF	2016/01/17		79	%	21 - 178
			C13-2378 TetraCDD	2016/01/17		87	%	25 - 164
			C13-2378 TetraCDF	2016/01/17		76	%	24 - 169
			C13-OCDD	2016/01/17		76	%	17 - 157
			2,3,7,8-Tetra CDD	2016/01/17		98	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/01/17		85	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/01/17		100	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/01/17		97	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/01/17		98	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/01/17		98	%	70 - 140
			Octa CDD	2016/01/17		102	%	78 - 144
			2,3,7,8-Tetra CDF	2016/01/17		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/01/17		89	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/01/17		84	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/01/17		101	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/01/17		96	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/01/17		114	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/01/17		83	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/01/17		104	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/01/17		99	%	78 - 138
			Octa CDF	2016/01/17		97	%	63 - 170
4348884	OBC	Method Blank	37CL4 2378 Tetra CDD	2016/01/17		89	%	35 - 197
			C13-1234678 HeptaCDD	2016/01/17		69	%	23 - 140
			C13-1234678 HeptaCDF	2016/01/17		69	%	28 - 143
			C13-123478 HexaCDD	2016/01/17		87	%	32 - 141
			C13-123478 HexaCDF	2016/01/17		87	%	26 - 152
			C13-1234789 HeptaCDF	2016/01/17		61	%	26 - 138
			C13-123678 HexaCDD	2016/01/17		96	%	28 - 130
			C13-123678 HexaCDF	2016/01/17		94	%	26 - 123
			C13-12378 PentaCDD	2016/01/17		79	%	25 - 181
			C13-12378 PentaCDF	2016/01/17		63	%	24 - 185
			C13-123789 HexaCDF	2016/01/17		90	%	29 - 147
			C13-234678 HexaCDF	2016/01/17		81	%	28 - 136
			C13-23478 PentaCDF	2016/01/17		77	%	21 - 178
			C13-2378 TetraCDD	2016/01/17		81	%	25 - 164
			C13-2378 TetraCDF	2016/01/17		72	%	24 - 169
			C13-OCDD	2016/01/17		68	%	17 - 157
			2,3,7,8-Tetra CDD	2016/01/17	<0.0556, EDL=0.0556		pg/g	
			1,2,3,7,8-Penta CDD	2016/01/17	<0.112, EDL=0.112		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2016/01/17	<0.0921, EDL=0.0921		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/01/17	<0.0968, EDL=0.0968		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/01/17	<0.0885, EDL=0.0885		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/01/17	0.213, EDL=0.0612		pg/g	
			Octa CDD	2016/01/17	0.728, EDL=0.139		pg/g	
			Total Tetra CDD	2016/01/17	<0.177, EDL=0.177 (1)		pg/g	
			Total Penta CDD	2016/01/17	<0.112, EDL=0.112		pg/g	
			Total Hexa CDD	2016/01/17	<0.237, EDL=0.237 (1)		pg/g	
			Total Hepta CDD	2016/01/17	0.213, EDL=0.0612		pg/g	
			2,3,7,8-Tetra CDF	2016/01/17	<0.0653, EDL=0.0653		pg/g	
			1,2,3,7,8-Penta CDF	2016/01/17	<0.0703, EDL=0.0703		pg/g	
			2,3,4,7,8-Penta CDF	2016/01/17	<0.0693, EDL=0.0693		pg/g	
			1,2,3,4,7,8-Hexa CDF	2016/01/17	<0.0571, EDL=0.0571		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/01/17	<0.0590, EDL=0.0590		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/01/17	<0.0552, EDL=0.0552		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/01/17	0.0987, EDL=0.0572		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/01/17	<0.0874, EDL=0.0874		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/01/17	<0.0864, EDL=0.0864		pg/g	
			Octa CDF	2016/01/17	0.135, EDL=0.101		pg/g	
			Total Tetra CDF	2016/01/17	<0.0653, EDL=0.0653		pg/g	
			Total Penta CDF	2016/01/17	<0.0698, EDL=0.0698		pg/g	
			Total Hexa CDF	2016/01/17	0.0987, EDL=0.0571		pg/g	
			Total Hepta CDF	2016/01/17	<0.0869, EDL=0.0869		pg/g	
4349614	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/01/18	<0.085, EDL=0.085		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date		%		
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
			Confirmation C13-2378 TetraCDF	2016/01/18		120	%	40 - 135
<p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.</p>								

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Friday, March 11, 2016

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A6B0380, which was received by the laboratory on 2/10/2016 at 12:08:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

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Apex Laboratories



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
03/11/16 13:07

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-A0I003-0.5-As Received	A6B0380-01	Soil	02/09/16 11:30	02/10/16 12:08
ISM-A0I003-0.5-After ISM	A6B0380-02	Soil	02/09/16 11:30	02/10/16 12:08

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 03/11/16 13:07

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-A01003-0.5-After ISM (A6B0380-02)</b>			<b>Matrix: Soil</b>					
Batch: 6020472								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	02/18/16 13:45	PSEP/SM 5310B MOD	

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 03/11/16 13:07

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-A0I003-0.5-As Received (A6B0380-01)</b>			<b>Matrix: Soil</b>		<b>Batch: 6020385</b>			
% Solids	77.4	---	1.00	% by Weight	1	02/15/16 07:51	EPA 8000C	
<b>ISM-A0I003-0.5-After ISM (A6B0380-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 6020453</b>			
% Solids	94.6	---	1.00	% by Weight	1	02/17/16 09:26	EPA 8000C	

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 03/11/16 13:07

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6020472 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (6020472-BLK1)</b>						Prepared: 02/16/16 16:35 Analyzed: 02/18/16 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6020472-BS1)</b>						Prepared: 02/16/16 16:35 Analyzed: 02/18/16 13:45						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	8800	---		mg/kg	1	10000	---	88	85-115%	---	---	
<b>Duplicate (6020472-DUP1)</b>						Prepared: 02/16/16 16:35 Analyzed: 02/18/16 13:45						
<b>QC Source Sample: ISM-A01003-0.5-After ISM (A6B0380-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	16000	---	200	mg/kg	1	---	17000	---	---	11	20%	





Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
03/11/16 13:07

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6020385 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6020385-DUP1)</b>						Prepared: 02/12/16 14:02 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0382-08)												
EPA 8000C												
% Solids	68.0	---	1.00	% by Weight	1	---	68.5	---	---	0.6	10%	
<b>Duplicate (6020385-DUP2)</b>						Prepared: 02/12/16 14:02 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0402-10)												
EPA 8000C												
% Solids	76.5	---	1.00	% by Weight	1	---	78.0	---	---	2	10%	
<b>Duplicate (6020385-DUP3)</b>						Prepared: 02/12/16 14:02 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0420-02)												
EPA 8000C												
% Solids	67.4	---	1.00	% by Weight	1	---	67.3	---	---	0.07	10%	
<b>Duplicate (6020385-DUP4)</b>						Prepared: 02/12/16 14:02 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0420-10)												
EPA 8000C												
% Solids	78.9	---	1.00	% by Weight	1	---	78.7	---	---	0.2	10%	
<b>Duplicate (6020385-DUP5)</b>						Prepared: 02/12/16 18:59 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0436-01)												
EPA 8000C												
% Solids	80.2	---	1.00	% by Weight	1	---	78.4	---	---	2	10%	
<b>Duplicate (6020385-DUP6)</b>						Prepared: 02/12/16 18:59 Analyzed: 02/15/16 07:51						
QC Source Sample: Other (A6B0443-03)												
EPA 8000C												
% Solids	76.5	---	1.00	% by Weight	1	---	76.4	---	---	0.2	10%	
<b>Batch 6020453 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6020453-DUP1)</b>						Prepared: 02/16/16 09:36 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0478-04)												
EPA 8000C												

Apex Laboratories



Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

Reported:  
 03/11/16 13:07

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6020453 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6020453-DUP1)</b>						Prepared: 02/16/16 09:36 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0478-04)												
% Solids	89.0	---	1.00	% by Weight	1	---	90.4	---	---	2	10%	
<b>Duplicate (6020453-DUP2)</b>						Prepared: 02/16/16 09:36 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0486-02)												
EPA 8000C												
% Solids	79.9	---	1.00	% by Weight	1	---	80.0	---	---	0.03	10%	
<b>Duplicate (6020453-DUP3)</b>						Prepared: 02/16/16 09:36 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0494-04)												
EPA 8000C												
% Solids	88.3	---	1.00	% by Weight	1	---	87.3	---	---	1	10%	
<b>Duplicate (6020453-DUP4)</b>						Prepared: 02/16/16 14:24 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0513-06)												
EPA 8000C												
% Solids	71.4	---	1.00	% by Weight	1	---	71.5	---	---	0.2	10%	
<b>Duplicate (6020453-DUP5)</b>						Prepared: 02/16/16 18:17 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0449-15)												
EPA 8000C												
% Solids	75.6	---	1.00	% by Weight	1	---	75.5	---	---	0.03	10%	
<b>Duplicate (6020453-DUP6)</b>						Prepared: 02/16/16 18:18 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0523-03)												
EPA 8000C												
% Solids	77.7	---	1.00	% by Weight	1	---	79.0	---	---	2	10%	
<b>Duplicate (6020453-DUP7)</b>						Prepared: 02/16/16 19:40 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0535-02)												
EPA 8000C												
% Solids	73.8	---	1.00	% by Weight	1	---	73.4	---	---	0.5	10%	
<b>Duplicate (6020453-DUP8)</b>						Prepared: 02/16/16 19:40 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0539-02)												

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 03/11/16 13:07

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6020453 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6020453-DUP8)</b>						Prepared: 02/16/16 19:40 Analyzed: 02/17/16 09:26						
QC Source Sample: Other (A6B0539-02)												
EPA 8000C												
% Solids	83.6	---	1.00	% by Weight	1	---	84.0	---	---	0.4	10%	



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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 03/11/16 13:07

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6020472</b>							
A6B0380-02	Soil	PSEP/SM 5310B MOD	02/09/16 11:30	02/16/16 16:35	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6020385</b>							
A6B0380-01	Soil	EPA 8000C	02/09/16 11:30	02/12/16 18:59	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 6020453</b>							
A6B0380-02	Soil	EPA 8000C	02/09/16 11:30	02/16/16 14:25	1N/A/1N/A	1N/A/1N/A	NA



**Maul Foster & Alongi, INC.**  
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Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
03/11/16 13:07

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

Reported:  
03/11/16 13:07

Lab # AL6B0386 of 1

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>MFA</u>		Project Name: <u>Port of Ridgefield</u>		Project # <u>9003.01.39</u>	
Address: <u>2001 NW 19th Ave STE 200</u>		Phone: <u>503 501 5209</u>		Email: <u>paul.wiescher@maulfooster.com</u>	
Project Mgr: <u>M. Novak</u>		Fax:		COC <u>1</u> of <u>1</u>	
ANALYSIS REQUEST					
Site Location: <u>OR</u>	Other: <u>WA</u>				
SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS
<u>ISM-A01003-0.5</u>		<u>2-9-16</u>	<u>11:30</u>	<u>SO</u>	<u>1</u>
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
SPECIAL INSTRUCTIONS: <u>ISM processing</u>					
Normal Turn Around Time (TAT) = 7-10 Business Days YES <input checked="" type="radio"/> NO <input type="radio"/>			TAT Requested (circle) 1 Day <input type="radio"/> 2 Day <input type="radio"/> 3 Day <input type="radio"/> 4 DAY <input type="radio"/> 5 DAY <input type="radio"/> Other: _____		
RECEIVED BY: <u>[Signature]</u> Signature: <u>[Signature]</u> Date: <u>2/10/16</u> Printed Name: <u>Paul Wiescher</u> Time: <u>12:08</u>			RECEIVED BY: _____ Signature: _____ Date: _____ Printed Name: _____ Time: _____		
RELINQUISHED BY: <u>MFA</u> Signature: <u>[Signature]</u> Date: <u>2/10/16</u> Printed Name: <u>Kevin Turner</u> Time: <u>12:08</u>			RELINQUISHED BY: _____ Signature: _____ Date: _____ Printed Name: _____ Time: _____		
Company: <u>MFA</u>			Company: <u>Apex Labs</u>		

Apex Laboratories

*Philip Nerenberg*

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Your Project #: A6B0380  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/03/05**  
Report #: R3917970  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B632779**

**Received: 2016/02/17, 15:50**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2016/02/28	2016/03/03	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2016/03/04	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2016/02/18	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		BW1140			
<b>Sampling Date</b>		2016/02/09 11:30			
<b>COC Number</b>		na			
	<b>UNITS</b>	<b>ISM-A01003-0.5-AFTER ISM</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	6.0	1.0	0.50	4386140
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BW1140							
Sampling Date		2016/02/09 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01003- 0.5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	3.71	0.0398	0.0690	0.400	1.00	3.71		4403298
1,2,3,7,8-Penta CDD *	pg/g	2.00	0.0366	0.345	0.400	1.00	2.00		4403298
1,2,3,4,7,8-Hexa CDD *	pg/g	4.83	0.0339	0.345	0.400	0.100	0.483		4403298
1,2,3,6,7,8-Hexa CDD *	pg/g	16.1	0.0353	0.345	0.400	0.100	1.61		4403298
1,2,3,7,8,9-Hexa CDD *	pg/g	13.0	0.0349	0.345	0.400	0.100	1.30		4403298
1,2,3,4,6,7,8-Hepta CDD *	pg/g	334	0.0416	0.345	0.400	0.0100	3.34		4403298
Octa CDD *	pg/g	1760	0.0187	0.690	0.800	0.000300	0.528		4403298
Total Tetra CDD *	pg/g	5.63	0.0398	0.345	0.400			8	4403298
Total Penta CDD *	pg/g	10.3	0.0366	0.345	0.400			11	4403298
Total Hexa CDD *	pg/g	90.0	0.0350	0.345	0.400			7	4403298
Total Hepta CDD *	pg/g	569	0.0416	0.345	0.400			2	4403298
2,3,7,8-Tetra CDF **	pg/g	1.33	0.0313	0.0690	0.400	0.100	0.133		4403298
1,2,3,7,8-Penta CDF **	pg/g	0.847	0.0337	0.345	0.400	0.0300	0.0254		4403298
2,3,4,7,8-Penta CDF **	pg/g	1.64	0.0327	0.345	0.400	0.300	0.492		4403298
1,2,3,4,7,8-Hexa CDF **	pg/g	6.75	0.0434	0.345	0.400	0.100	0.675		4403298
1,2,3,6,7,8-Hexa CDF **	pg/g	3.36	0.0449	0.345	0.400	0.100	0.336		4403298
2,3,4,6,7,8-Hexa CDF **	pg/g	2.65	0.0418	0.345	0.400	0.100	0.265		4403298
1,2,3,7,8,9-Hexa CDF **	pg/g	0.135	0.0443	0.345	0.400	0.100	0.0135		4403298
1,2,3,4,6,7,8-Hepta CDF **	pg/g	48.4	0.0373	0.345	0.400	0.0100	0.484		4403298
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.73	0.0380	0.345	0.400	0.0100	0.0273		4403298
Octa CDF **	pg/g	66.3	0.0540	0.690	0.800	0.000300	0.0199		4403298
Total Tetra CDF **	pg/g	6.44	0.0313	0.345	0.400			13	4403298
Total Penta CDF **	pg/g	23.5	0.0332	0.345	0.400			12	4403298
Total Hexa CDF **	pg/g	88.6	0.0436	0.345	0.400			11	4403298
Total Hepta CDF **	pg/g	121	0.0377	0.345	0.400			4	4403298
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.823	0.036	0.35	0.32	0.100	0.0823		4405533
TOTAL TOXIC EQUIVALENCY	pg/g						15.4		
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	108							4403298
C13-1234678 HeptaCDD *	%	96							4403298
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		BW1140							
Sampling Date		2016/02/09 11:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-A01003- 0.5-AFTER ISM	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	97							4403298
C13-123478 HexaCDD *	%	83							4403298
C13-123478 HexaCDF **	%	87							4403298
C13-1234789 HeptaCDF **	%	100							4403298
C13-123678 HexaCDD *	%	104							4403298
C13-123678 HexaCDF **	%	102							4403298
C13-12378 PentaCDD *	%	116							4403298
C13-12378 PentaCDF **	%	130							4403298
C13-123789 HexaCDF **	%	112							4403298
C13-234678 HexaCDF **	%	86							4403298
C13-23478 PentaCDF **	%	95							4403298
C13-2378 TetraCDD *	%	99							4403298
C13-2378 TetraCDF **	%	106							4403298
C13-OCDD *	%	112							4403298
Confirmation C13-2378 TetraCDF **	%	104							4405533

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
\* CDD = Chloro Dibenzo-p-Dioxin



**TEST SUMMARY**

**Maxxam ID:** BWI140  
**Sample ID:** ISM-A0I003-0.5-AFTER ISM  
**Matrix:** Soil

**Collected:** 2016/02/09  
**Shipped:**  
**Received:** 2016/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4403298	2016/02/28	2016/03/03	Cuong Duc Do
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4405533	N/A	2016/03/04	Vica Cioranic
Moisture	BAL	4386140	N/A	2016/02/18	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.4°C
-----------	-------

**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4386140	SB1	RPD - Sample/Sample Dup	Moisture	2016/02/18	2.6		%	20
4403298	CD	Spiked Blank	37CL4 2378 Tetra CDD	2016/03/03		97	%	35 - 197
			C13-1234678 HeptaCDD	2016/03/03		80	%	23 - 140
			C13-1234678 HeptaCDF	2016/03/03		84	%	28 - 143
			C13-123478 HexaCDD	2016/03/03		74	%	32 - 141
			C13-123478 HexaCDF	2016/03/03		76	%	26 - 152
			C13-1234789 HeptaCDF	2016/03/03		84	%	26 - 138
			C13-123678 HexaCDD	2016/03/03		95	%	28 - 130
			C13-123678 HexaCDF	2016/03/03		91	%	26 - 123
			C13-12378 PentaCDD	2016/03/03		102	%	25 - 181
			C13-12378 PentaCDF	2016/03/03		117	%	24 - 185
			C13-123789 HexaCDF	2016/03/03		105	%	29 - 147
			C13-234678 HexaCDF	2016/03/03		82	%	28 - 136
			C13-23478 PentaCDF	2016/03/03		84	%	21 - 178
			C13-2378 TetraCDD	2016/03/03		86	%	25 - 164
			C13-2378 TetraCDF	2016/03/03		95	%	24 - 169
			C13-OCDD	2016/03/03		78	%	17 - 157
			2,3,7,8-Tetra CDD	2016/03/03		94	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/03/03		92	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/03/03		92	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/03/03		93	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/03/03		102	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/03/03		95	%	70 - 140
			Octa CDD	2016/03/03		102	%	78 - 144
			2,3,7,8-Tetra CDF	2016/03/03		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/03/03		92	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/03/03		97	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/03/03		96	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/03/03		95	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/03/03		91	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/03/03		98	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/03/03		105	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/03/03		98	%	78 - 138
			Octa CDF	2016/03/03		95	%	63 - 170
4403298	CD	RPD	2,3,7,8-Tetra CDD	2016/03/03	1.1		%	25
			1,2,3,7,8-Penta CDD	2016/03/03	6.7		%	25
			1,2,3,4,7,8-Hexa CDD	2016/03/03	3.2		%	25
			1,2,3,6,7,8-Hexa CDD	2016/03/03	1.1		%	25
			1,2,3,7,8,9-Hexa CDD	2016/03/03	15		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/03/03	13		%	25
			Octa CDD	2016/03/03	17		%	25
			2,3,7,8-Tetra CDF	2016/03/03	1.0		%	25
			1,2,3,7,8-Penta CDF	2016/03/03	2.2		%	25
			2,3,4,7,8-Penta CDF	2016/03/03	4.2		%	25
			1,2,3,4,7,8-Hexa CDF	2016/03/03	0		%	25
			1,2,3,6,7,8-Hexa CDF	2016/03/03	6.5		%	25
			2,3,4,6,7,8-Hexa CDF	2016/03/03	1.1		%	25
			1,2,3,7,8,9-Hexa CDF	2016/03/03	6.3		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/03/03	0.96		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/03/03	7.4		%	25
			Octa CDF	2016/03/03	17		%	25
4403298	CD	Method Blank	37CL4 2378 Tetra CDD	2016/03/03		104	%	35 - 197
			C13-1234678 HeptaCDD	2016/03/03		90	%	23 - 140
			C13-1234678 HeptaCDF	2016/03/03		96	%	28 - 143

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-123478 HexaCDD	2016/03/03		86	%	32 - 141
			C13-123478 HexaCDF	2016/03/03		80	%	26 - 152
			C13-1234789 HeptaCDF	2016/03/03		99	%	26 - 138
			C13-123678 HexaCDD	2016/03/03		106	%	28 - 130
			C13-123678 HexaCDF	2016/03/03		99	%	26 - 123
			C13-12378 PentaCDD	2016/03/03		112	%	25 - 181
			C13-12378 PentaCDF	2016/03/03		126	%	24 - 185
			C13-123789 HexaCDF	2016/03/03		117	%	29 - 147
			C13-234678 HexaCDF	2016/03/03		91	%	28 - 136
			C13-23478 PentaCDF	2016/03/03		93	%	21 - 178
			C13-2378 TetraCDD	2016/03/03		92	%	25 - 164
			C13-2378 TetraCDF	2016/03/03		106	%	24 - 169
			C13-OCDD	2016/03/03		85	%	17 - 157
			2,3,7,8-Tetra CDD	2016/03/03	<0.110, EDL=0.110		pg/g	
			1,2,3,7,8-Penta CDD	2016/03/03	<0.0907, EDL=0.0907		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/03/03	<0.113, EDL=0.113		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/03/03	<0.118, EDL=0.118		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/03/03	<0.116, EDL=0.116		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/03/03	<0.113, EDL=0.113		pg/g	
			Octa CDD	2016/03/03	0.270, EDL=0.102		pg/g	
			Total Tetra CDD	2016/03/03	<0.110, EDL=0.110		pg/g	
			Total Penta CDD	2016/03/03	<0.0907, EDL=0.0907		pg/g	
			Total Hexa CDD	2016/03/03	<0.117, EDL=0.117		pg/g	
			Total Hepta CDD	2016/03/03	<0.113, EDL=0.113		pg/g	
			2,3,7,8-Tetra CDF	2016/03/03	<0.0503, EDL=0.0503		pg/g	
			1,2,3,7,8-Penta CDF	2016/03/03	<0.120, EDL=0.120		pg/g	
			2,3,4,7,8-Penta CDF	2016/03/03	<0.116, EDL=0.116		pg/g	
			1,2,3,4,7,8-Hexa CDF	2016/03/03	<0.134, EDL=0.134		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/03/03	<0.139, EDL=0.139		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/03/03	<0.129, EDL=0.129		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/03/03	<0.137, EDL=0.137		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/03/03	<0.0825, EDL=0.0825		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2016/03/03	<0.0842, EDL=0.0842		pg/g	
			Octa CDF	2016/03/03	<0.110, EDL=0.110		pg/g	
			Total Tetra CDF	2016/03/03	<0.0503, EDL=0.0503		pg/g	
			Total Penta CDF	2016/03/03	<0.118, EDL=0.118		pg/g	
			Total Hexa CDF	2016/03/03	<0.135, EDL=0.135		pg/g	
			Total Hepta CDF	2016/03/03	<0.0834, EDL=0.0834		pg/g	
4405533	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/03/04	<0.098, EDL=0.098		pg/g	
			Confirmation C13-2378 TetraCDF	2016/03/04		79	%	40 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.



**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Thursday, April 28, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield / 9003.01.39

Enclosed are the results of analyses for work order A6C0884, which was received by the laboratory on 3/23/2016 at 10:25:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
04/28/16 14:47

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROWRRW-0.5	A6C0884-01	Soil	03/22/16 09:45	03/23/16 10:25
SBS-ROWRRW-1.5	A6C0884-03	Soil	03/22/16 09:55	03/23/16 10:25
SBS-AOI002-1.5	A6C0884-04	Soil	03/22/16 11:40	03/23/16 10:25
SS-ROW011-0.5	A6C0884-06	Soil	03/22/16 12:15	03/23/16 10:25
SBS-ROW011-1.5	A6C0884-08	Soil	03/22/16 12:30	03/23/16 10:25
SBS-AOI037-1.5	A6C0884-12	Soil	03/22/16 14:10	03/23/16 10:25
SBS-AOI028B-1.5	A6C0884-14	Soil	03/22/16 14:45	03/23/16 10:25

Apex Laboratories



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Philip Nerenberg, Lab Director

Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 04/28/16 14:47

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROWRRW-0.5 (A6C0884-01)</b>			<b>Matrix: Soil</b>					
Batch: 6030916								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	03/31/16 11:50	PSEP/SM 5310B MOD	
<b>SBS-ROWRRW-1.5 (A6C0884-03)</b>			<b>Matrix: Soil</b>					
Batch: 6030916								
<b>Total Organic Carbon</b>	<b>9000</b>	---	200	mg/kg	1	03/31/16 11:50	PSEP/SM 5310B MOD	
<b>SBS-AOI002-1.5 (A6C0884-04)</b>			<b>Matrix: Soil</b>					
Batch: 6030916								
<b>Total Organic Carbon</b>	<b>7900</b>	---	200	mg/kg	1	03/31/16 11:50	PSEP/SM 5310B MOD	
<b>SS-ROW011-0.5 (A6C0884-06)</b>			<b>Matrix: Soil</b>					
Batch: 6030916								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	03/31/16 11:50	PSEP/SM 5310B MOD	
<b>SBS-ROW011-1.5 (A6C0884-08)</b>			<b>Matrix: Soil</b>					
Batch: 6030916								
<b>Total Organic Carbon</b>	<b>9600</b>	---	200	mg/kg	1	03/31/16 11:50	PSEP/SM 5310B MOD	
<b>SBS-AOI037-1.5 (A6C0884-12)</b>			<b>Matrix: Soil</b>					
Batch: 6030916								
<b>Total Organic Carbon</b>	<b>10000</b>	---	200	mg/kg	1	03/31/16 11:50	PSEP/SM 5310B MOD	
<b>SBS-AOI028B-1.5 (A6C0884-14)</b>			<b>Matrix: Soil</b>					
Batch: 6030916								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	03/31/16 11:50	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 04/28/16 14:47

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6030916 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (6030916-BLK1)</b>						Prepared: 03/29/16 10:10 Analyzed: 03/31/16 11:50						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>LCS (6030916-BS1)</b>						Prepared: 03/29/16 10:10 Analyzed: 03/31/16 11:50						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (6030916-DUP1)</b>						Prepared: 03/29/16 10:10 Analyzed: 03/31/16 11:50						
<b>QC Source Sample: SS-ROWRRW-0.5 (A6C0884-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	11000	---	200	mg/kg	1	---	14000	---	---	23	20%	Q-04

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 04/28/16 14:47

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6030916</b>							
A6C0884-01	Soil	PSEP/SM 5310B MOD	03/22/16 09:45	03/29/16 10:10	5g/5g	5g/5g	NA
A6C0884-03	Soil	PSEP/SM 5310B MOD	03/22/16 09:55	03/29/16 10:10	5g/5g	5g/5g	NA
A6C0884-04	Soil	PSEP/SM 5310B MOD	03/22/16 11:40	03/29/16 10:10	5g/5g	5g/5g	NA
A6C0884-06	Soil	PSEP/SM 5310B MOD	03/22/16 12:15	03/29/16 10:10	5g/5g	5g/5g	NA
A6C0884-08	Soil	PSEP/SM 5310B MOD	03/22/16 12:30	03/29/16 10:10	5g/5g	5g/5g	NA
A6C0884-12	Soil	PSEP/SM 5310B MOD	03/22/16 14:10	03/29/16 10:10	5g/5g	5g/5g	NA
A6C0884-14	Soil	PSEP/SM 5310B MOD	03/22/16 14:45	03/29/16 10:10	5g/5g	5g/5g	NA

Apex Laboratories



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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
04/28/16 14:47

## Notes and Definitions

### Qualifiers:

Q-04 Spike recovery and/or RPD is outside control limits due to a non-homogeneous sample matrix.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.


Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
04/28/16 14:47

**APEX LABS**      **CHAIN OF CUSTODY**      Lab # **A600884**      Project # **Port Ridgefield**      COC **2** of **2**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>		Project Mgr: <b>P. Wiescher</b>		Project Name: <b>9003.01.39</b>		Project # <b>Port Ridgefield</b>	
Address: <b>2001 NW 19th Ave Ste 200, PDX OR 97209</b>		Phone: <b>503-501-5209</b>		Fax: <b>501-5209</b>		Email: <b>PWiescher@maulfooster.com</b>	
Sampled by: <b>EMM/HAM</b>							
Site Location: <b>OR</b> Other: <b>WA</b> ANALYSIS REQUEST AL, SB, AN, BA, BE, CA, CR, CO, CU, FE, NI, ZN, Hg, Mn, Mo, Ni, Pb, Se, Ag, Na, TL, V, Zn, TOTAL DISS TCLP							
LAB ID #		DATE		TIME		MATRIX	
SAMPLE ID		DATE		TIME		MATRIX	
1 SBS-A01019-2.0		3/22/16		1335		50.2	
2 SBS-A01037-1.5		1410		1420		1445	
3 SBS-A01037-2.0		1445		1455		1455	
4 SBS-A01028B-1.5		1455		1455		1455	
5 SBS-A01028B-2.0		1455		1455		1455	
6							
7							
8							
9							
10							
SPECIAL INSTRUCTIONS: <b>Dioxins to measure.</b>							
TAT Requested (circle) <b>1 DAY</b> 2 Day      3 Day      Other:				RECEIVED BY:      Signature:      Date:      Time:			
RELINQUISHED BY:      Signature: <b>Emy Hled</b> Date: <b>3/23/16</b>				RECEIVED BY:      Signature:      Date:      Time:			
SAMPLES ARE HELD FOR 30 DAYS				RELINQUISHED BY:      Signature: <b>Emy Hled</b> Date: <b>3/23/16</b>			
Company: <b>MFA</b>				RELINQUISHED BY:      Signature:      Date:      Time:			

*Philip Nerenberg*





Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
04/28/16 14:47

**\* updated \***  
**CHAIN OF CUSTODY**

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>		Project Mgr: <b>P. Wiescher</b>		Project # (Ba): <b>Port of Ridgefield</b>	
Address: <b>2001 NW 19th Ave Ste 200, Portland, OR 97209</b>		Phone: <b>503-501-5209</b>		Email: <b>p.wiescher@maulfooster.com</b>	
Sampled by: <b>EMM/HAM</b>		Lab #: <b>Acc0884</b>		COC # of <b>2</b>	
Site Location: <b>OR</b>		Project Name: <b>9003.01.39</b>		Project # (Ba): <b>Port of Ridgefield</b>	
Other: <b>WA</b>		Phone: <b>503-501-5209</b>		Email: <b>p.wiescher@maulfooster.com</b>	
<b>ANALYSIS REQUEST</b>					
Throw out this sample. Will not need it analyzed.					
SAMPLE ID	MATRIX	# OF CONTAINERS	SWTPH-ID	SWTPH-CN	SWTPH-VOC
1. <b>SBS A01019-2-C</b>		<b>50</b>			
2. <b>SBS A01037-1-S</b>		<b>1410</b>			
3. <b>SBS A01037-2-C</b>		<b>1420</b>			
4. <b>SBS A01038-1-S</b>		<b>1445</b>			
5. <b>SBS A01038-2-C</b>		<b>1455</b>			
<b>ANALYSIS REQUEST</b>					
TOTAL DIS. TYP 76. AS. NA. TR. V. N. K. 76. AS. NA. TR. V. N. K. CA. CR. CA. CR. PE. PE. AL. SB. AS. BA. BA. BA. CA. TCLP Metals (8) RCRA Metals (8) 609 TIO 6082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX 8260 RBDVOCs 8260 VOC					
SPECIAL INSTRUCTIONS: <b>Boxes to Analyze.</b>					
RECEIVED BY: Signature: <b>EMM/HAM</b> Date: <b>3/23/16</b> Printed Name: <b>EMM/HAM</b> Title: <b>Sample Tech</b>			RECEIVED BY: Signature: _____ Date: _____ Printed Name: _____ Title: _____ Company: _____		

*Philip Nerenberg*



Your Project #: A6C0884  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/04/29**  
Report #: R3976193  
Version: 3 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B659963**

**Received: 2016/03/26, 13:35**

Sample Matrix: Soil  
# Samples Received: 7

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	3	2016/03/30	2016/04/04	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	4	2016/03/30	2016/04/05	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	4	N/A	2016/04/13	BRL SOP-00406	EPA M8290A / M1613
Moisture	7	N/A	2016/03/29	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		CBV963	CBV964	CBV965	CBV966	CBV967			
Sampling Date		2016/03/22 09:45	2016/03/22 09:55	2016/03/22 11:40	2016/03/22 12:15	2016/03/22 12:30			
COC Number		na	na	na	na	na			
	UNITS	SS-R0WRRW-0.5 A6C0884-01	SBS-R0WRRW- 1.5 A6C0884-03	SBS-AOI002-1.5 A6C0884-04	SS-R0W011-0.5 A6C0884-06	SBS-R0W011- 1.5 A6C0884-08	RDL	MDL	QC Batch
Moisture	%	18	22	20	22	18	1.0	0.50	4435020
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

Maxxam ID		CBV968	CBV969			
Sampling Date		2016/03/22 14:10	2016/03/22 14:45			
COC Number		na	na			
	UNITS	SBS-AOI037-1.5 A6C0884-12	SBS-AOI028B-1.5 A6C0884-14	RDL	MDL	QC Batch
Moisture	%	20	27	1.0	0.50	4435020
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CBV963							
Sampling Date		2016/03/22 09:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROWRRW-0.5 A6C0884-01	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.410	0.133	1.00	0.400	1.00	0.410	N/A	4442412
1,2,3,7,8-Penta CDD *	pg/g	3.04	0.124	5.00	0.400	1.00	3.04	N/A	4442412
1,2,3,4,7,8-Hexa CDD *	pg/g	8.33	0.104	5.00	0.400	0.100	0.833	N/A	4442412
1,2,3,6,7,8-Hexa CDD *	pg/g	33.2	0.108	5.00	0.400	0.100	3.32	N/A	4442412
1,2,3,7,8,9-Hexa CDD *	pg/g	21.5	0.109	5.00	0.400	0.100	2.15	N/A	4442412
1,2,3,4,6,7,8-Hepta CDD *	pg/g	687	0.0559	5.00	0.400	0.0100	6.87	N/A	4442412
Octa CDD *	pg/g	4530 (1)	4.87	100	0.800	0.000300	1.36	N/A	4442412
Total Tetra CDD *	pg/g	2.24	0.133	1.00	0.400	N/A	N/A	6	4442412
Total Penta CDD *	pg/g	13.2	0.124	5.00	0.400	N/A	N/A	11	4442412
Total Hexa CDD *	pg/g	167	0.107	5.00	0.400	N/A	N/A	7	4442412
Total Hepta CDD *	pg/g	1240	0.0559	5.00	0.400	N/A	N/A	2	4442412
2,3,7,8-Tetra CDF **	pg/g	1.38	0.177	1.00	0.400	0.100	0.138	N/A	4442412
1,2,3,7,8-Penta CDF **	pg/g	2.34	0.122	5.00	0.400	0.0300	0.0702	N/A	4442412
2,3,4,7,8-Penta CDF **	pg/g	3.30	0.119	5.00	0.400	0.300	0.990	N/A	4442412
1,2,3,4,7,8-Hexa CDF **	pg/g	11.8	0.156	5.00	0.400	0.100	1.18	N/A	4442412
1,2,3,6,7,8-Hexa CDF **	pg/g	6.08	0.162	5.00	0.400	0.100	0.608	N/A	4442412
2,3,4,6,7,8-Hexa CDF **	pg/g	4.62	0.150	5.00	0.400	0.100	0.462	N/A	4442412
1,2,3,7,8,9-Hexa CDF **	pg/g	0.447	0.160	5.00	0.400	0.100	0.0447	N/A	4442412
1,2,3,4,6,7,8-Hepta CDF **	pg/g	87.3	0.0926	5.00	0.400	0.0100	0.873	N/A	4442412
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.06	0.0931	5.00	0.400	0.0100	0.0606	N/A	4442412
Octa CDF **	pg/g	143	0.261	10.0	0.800	0.000300	0.0429	N/A	4442412
Total Tetra CDF **	pg/g	20.7	0.177	1.00	0.400	N/A	N/A	12	4442412
Total Penta CDF **	pg/g	91.2	0.121	5.00	0.400	N/A	N/A	10	4442412
Total Hexa CDF **	pg/g	195	0.157	5.00	0.400	N/A	N/A	11	4442412
Total Hepta CDF **	pg/g	242	0.0928	5.00	0.400	N/A	N/A	4	4442412

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 10X Dilution Run \*\*

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CBV963							
Sampling Date		2016/03/22 09:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROWRRW-0.5 A6C0884-01	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<1.9 (1)	1.9	1.0	0.90	0.100	0.190	N/A	4452911
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	22.5	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	119	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234789 HeptaCDF **	%	106	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDF **	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDD *	%	127	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDF **	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123789 HexaCDF **	%	113	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-234678 HexaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-23478 PentaCDF **	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDF **	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-OCDD *	%	91 (2)	N/A	N/A	N/A	N/A	N/A	N/A	4442412
Confirmation C13-2378 TetraCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4452911

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\*\* CDF = Chloro Dibenzo-p-Furan  
N/A = Not Applicable  
\* CDD = Chloro Dibenzo-p-Dioxin  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.  
(2) \*\* From 10X Dilution Run \*\*



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CBV964							
Sampling Date		2016/03/22 09:55							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROWRRW- 1.5 A6C0884-03	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.275 (1)	0.275	0.993	0.400	1.00	0.275	N/A	4442412
1,2,3,7,8-Penta CDD *	pg/g	0.658	0.102	4.97	0.400	1.00	0.658	N/A	4442412
1,2,3,4,7,8-Hexa CDD *	pg/g	1.49	0.104	4.97	0.400	0.100	0.149	N/A	4442412
1,2,3,6,7,8-Hexa CDD *	pg/g	4.33	0.108	4.97	0.400	0.100	0.433	N/A	4442412
1,2,3,7,8,9-Hexa CDD *	pg/g	3.18	0.108	4.97	0.400	0.100	0.318	N/A	4442412
1,2,3,4,6,7,8-Hepta CDD *	pg/g	89.3	0.0928	4.97	0.400	0.0100	0.893	N/A	4442412
Octa CDD *	pg/g	553	0.220	9.93	0.800	0.000300	0.166	N/A	4442412
Total Tetra CDD *	pg/g	0.158	0.134	0.993	0.400	N/A	N/A	1	4442412
Total Penta CDD *	pg/g	1.51	0.102	4.97	0.400	N/A	N/A	4	4442412
Total Hexa CDD *	pg/g	22.1	0.107	4.97	0.400	N/A	N/A	6	4442412
Total Hepta CDD *	pg/g	149	0.0928	4.97	0.400	N/A	N/A	2	4442412
2,3,7,8-Tetra CDF **	pg/g	0.449	0.0873	0.993	0.400	0.100	0.0449	N/A	4442412
1,2,3,7,8-Penta CDF **	pg/g	0.642	0.117	4.97	0.400	0.0300	0.0193	N/A	4442412
2,3,4,7,8-Penta CDF **	pg/g	0.818	0.114	4.97	0.400	0.300	0.245	N/A	4442412
1,2,3,4,7,8-Hexa CDF **	pg/g	2.09	0.103	4.97	0.400	0.100	0.209	N/A	4442412
1,2,3,6,7,8-Hexa CDF **	pg/g	1.04	0.107	4.97	0.400	0.100	0.104	N/A	4442412
2,3,4,6,7,8-Hexa CDF **	pg/g	0.950	0.0996	4.97	0.400	0.100	0.0950	N/A	4442412
1,2,3,7,8,9-Hexa CDF **	pg/g	0.386	0.106	4.97	0.400	0.100	0.0386	N/A	4442412
1,2,3,4,6,7,8-Hepta CDF **	pg/g	11.6	0.111	4.97	0.400	0.0100	0.116	N/A	4442412
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.36	0.112	4.97	0.400	0.0100	0.0136	N/A	4442412
Octa CDF **	pg/g	22.3	0.167	9.93	0.800	0.000300	0.00669	N/A	4442412
Total Tetra CDF **	pg/g	2.63	0.0873	0.993	0.400	N/A	N/A	6	4442412
Total Penta CDF **	pg/g	12.7	0.115	4.97	0.400	N/A	N/A	8	4442412
Total Hexa CDF **	pg/g	26.4	0.104	4.97	0.400	N/A	N/A	9	4442412
Total Hepta CDF **	pg/g	32.3	0.111	4.97	0.400	N/A	N/A	4	4442412
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	3.78	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CBV964							
<b>Sampling Date</b>		2016/03/22 09:55							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-ROWRRW-1.5 A6C0884-03</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	104	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDD *	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDD *	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234789 HeptaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDD *	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDD *	%	113	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123789 HexaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-234678 HexaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-23478 PentaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDD *	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-OCDD *	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4442412

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 N/A = Not Applicable  
 \*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CBV965							
Sampling Date		2016/03/22 11:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI002-1.5 A6C0884-04	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.296	0.138	0.995	0.400	1.00	0.296	N/A	4442412
1,2,3,7,8-Penta CDD *	pg/g	0.815	0.0973	4.98	0.400	1.00	0.815	N/A	4442412
1,2,3,4,7,8-Hexa CDD *	pg/g	2.20	0.142	4.98	0.400	0.100	0.220	N/A	4442412
1,2,3,6,7,8-Hexa CDD *	pg/g	7.23	0.148	4.98	0.400	0.100	0.723	N/A	4442412
1,2,3,7,8,9-Hexa CDD *	pg/g	5.91	0.148	4.98	0.400	0.100	0.591	N/A	4442412
1,2,3,4,6,7,8-Hepta CDD *	pg/g	159	0.111	4.98	0.400	0.0100	1.59	N/A	4442412
Octa CDD *	pg/g	926	0.303	9.95	0.800	0.000300	0.278	N/A	4442412
Total Tetra CDD *	pg/g	1.73	0.138	0.995	0.400	N/A	N/A	4	4442412
Total Penta CDD *	pg/g	3.49	0.0973	4.98	0.400	N/A	N/A	8	4442412
Total Hexa CDD *	pg/g	39.3	0.147	4.98	0.400	N/A	N/A	7	4442412
Total Hepta CDD *	pg/g	278	0.111	4.98	0.400	N/A	N/A	2	4442412
2,3,7,8-Tetra CDF **	pg/g	<0.841 (1)	0.841	0.995	0.400	0.100	0.0841	N/A	4442412
1,2,3,7,8-Penta CDF **	pg/g	0.621	0.127	4.98	0.400	0.0300	0.0186	N/A	4442412
2,3,4,7,8-Penta CDF **	pg/g	0.774	0.124	4.98	0.400	0.300	0.232	N/A	4442412
1,2,3,4,7,8-Hexa CDF **	pg/g	2.63	0.118	4.98	0.400	0.100	0.263	N/A	4442412
1,2,3,6,7,8-Hexa CDF **	pg/g	1.38	0.123	4.98	0.400	0.100	0.138	N/A	4442412
2,3,4,6,7,8-Hexa CDF **	pg/g	1.06	0.114	4.98	0.400	0.100	0.106	N/A	4442412
1,2,3,7,8,9-Hexa CDF **	pg/g	0.146	0.122	4.98	0.400	0.100	0.0146	N/A	4442412
1,2,3,4,6,7,8-Hepta CDF **	pg/g	19.0	0.107	4.98	0.400	0.0100	0.190	N/A	4442412
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.27	0.108	4.98	0.400	0.0100	0.0127	N/A	4442412
Octa CDF **	pg/g	25.8	0.113	9.95	0.800	0.000300	0.00774	N/A	4442412
Total Tetra CDF **	pg/g	7.38	0.149	0.995	0.400	N/A	N/A	12	4442412
Total Penta CDF **	pg/g	17.2	0.125	4.98	0.400	N/A	N/A	10	4442412
Total Hexa CDF **	pg/g	36.2	0.119	4.98	0.400	N/A	N/A	11	4442412
Total Hepta CDF **	pg/g	49.1	0.108	4.98	0.400	N/A	N/A	4	4442412
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	5.58	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CBV965							
<b>Sampling Date</b>		2016/03/22 11:40							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-AOI002-1.5 A6C0884-04</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	111	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDD *	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDD *	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234789 HeptaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDD *	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDD *	%	110	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123789 HexaCDF **	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-234678 HexaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-23478 PentaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDD *	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-OCDD *	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4442412

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CBV966							
Sampling Date		2016/03/22 12:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW011-0.5 A6C0884-06	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.473	0.133	0.999	0.400	1.00	0.473	N/A	4442412
1,2,3,7,8-Penta CDD *	pg/g	2.95	0.114	4.99	0.400	1.00	2.95	N/A	4442412
1,2,3,4,7,8-Hexa CDD *	pg/g	10.3	0.169	4.99	0.400	0.100	1.03	N/A	4442412
1,2,3,6,7,8-Hexa CDD *	pg/g	48.9	0.177	4.99	0.400	0.100	4.89	N/A	4442412
1,2,3,7,8,9-Hexa CDD *	pg/g	28.1	0.177	4.99	0.400	0.100	2.81	N/A	4442412
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1090	0.122	4.99	0.400	0.0100	10.9	N/A	4442412
Octa CDD *	pg/g	7300 (1)	6.65	99.9	0.800	0.000300	2.19	N/A	4442412
Total Tetra CDD *	pg/g	5.62	0.133	0.999	0.400	N/A	N/A	9	4442412
Total Penta CDD *	pg/g	15.1	0.114	4.99	0.400	N/A	N/A	10	4442412
Total Hexa CDD *	pg/g	235	0.175	4.99	0.400	N/A	N/A	7	4442412
Total Hepta CDD *	pg/g	1960	0.122	4.99	0.400	N/A	N/A	2	4442412
2,3,7,8-Tetra CDF **	pg/g	3.38	0.191	0.999	0.400	0.100	0.338	N/A	4442412
1,2,3,7,8-Penta CDF **	pg/g	4.14	0.154	4.99	0.400	0.0300	0.124	N/A	4442412
2,3,4,7,8-Penta CDF **	pg/g	7.25	0.150	4.99	0.400	0.300	2.18	N/A	4442412
1,2,3,4,7,8-Hexa CDF **	pg/g	25.2	0.0892	4.99	0.400	0.100	2.52	N/A	4442412
1,2,3,6,7,8-Hexa CDF **	pg/g	11.2	0.0926	4.99	0.400	0.100	1.12	N/A	4442412
2,3,4,6,7,8-Hexa CDF **	pg/g	8.91	0.0859	4.99	0.400	0.100	0.891	N/A	4442412
1,2,3,7,8,9-Hexa CDF **	pg/g	0.658	0.0917	4.99	0.400	0.100	0.0658	N/A	4442412
1,2,3,4,6,7,8-Hepta CDF **	pg/g	132	0.0878	4.99	0.400	0.0100	1.32	N/A	4442412
1,2,3,4,7,8,9-Hepta CDF **	pg/g	9.29	0.0883	4.99	0.400	0.0100	0.0929	N/A	4442412
Octa CDF **	pg/g	219	0.245	9.99	0.800	0.000300	0.0657	N/A	4442412
Total Tetra CDF **	pg/g	43.5	0.191	0.999	0.400	N/A	N/A	14	4442412
Total Penta CDF **	pg/g	199	0.152	4.99	0.400	N/A	N/A	13	4442412
Total Hexa CDF **	pg/g	352	0.0898	4.99	0.400	N/A	N/A	12	4442412
Total Hepta CDF **	pg/g	375	0.0880	4.99	0.400	N/A	N/A	4	4442412
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.69	0.10	1.0	0.90	0.100	0.269	N/A	4452911

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 10X Dilution Run \*\*



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CBV966							
Sampling Date		2016/03/22 12:15							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW011-0.5 A6C0884-06	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	33.9	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	126	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDD *	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDF **	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDD *	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234789 HeptaCDF **	%	106	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDF **	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDD *	%	132	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDF **	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123789 HexaCDF **	%	116	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-234678 HexaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-23478 PentaCDF **	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDF **	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-OCDD *	%	88 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4442412
Confirmation C13-2378 TetraCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4452911
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch N/A = Not Applicable * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan (1) ** From 10X Dilution Run **									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CBV967							
Sampling Date		2016/03/22 12:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW011- 1.5 A6C0884-08	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.828	0.117	0.998	0.400	1.00	0.828	N/A	4442412
1,2,3,7,8-Penta CDD *	pg/g	1.71	0.0988	4.99	0.400	1.00	1.71	N/A	4442412
1,2,3,4,7,8-Hexa CDD *	pg/g	3.93	0.132	4.99	0.400	0.100	0.393	N/A	4442412
1,2,3,6,7,8-Hexa CDD *	pg/g	16.3	0.137	4.99	0.400	0.100	1.63	N/A	4442412
1,2,3,7,8,9-Hexa CDD *	pg/g	9.34	0.138	4.99	0.400	0.100	0.934	N/A	4442412
1,2,3,4,6,7,8-Hepta CDD *	pg/g	370	0.252	4.99	0.400	0.0100	3.70	N/A	4442412
Octa CDD *	pg/g	2410	0.342	9.98	0.800	0.000300	0.723	N/A	4442412
Total Tetra CDD *	pg/g	1.86	0.117	0.998	0.400	N/A	N/A	4	4442412
Total Penta CDD *	pg/g	5.57	0.0988	4.99	0.400	N/A	N/A	8	4442412
Total Hexa CDD *	pg/g	74.7	0.136	4.99	0.400	N/A	N/A	7	4442412
Total Hepta CDD *	pg/g	598	0.252	4.99	0.400	N/A	N/A	2	4442412
2,3,7,8-Tetra CDF **	pg/g	1.49	0.208	0.998	0.400	0.100	0.149	N/A	4442412
1,2,3,7,8-Penta CDF **	pg/g	2.57	0.189	4.99	0.400	0.0300	0.0771	N/A	4442412
2,3,4,7,8-Penta CDF **	pg/g	4.84	0.183	4.99	0.400	0.300	1.45	N/A	4442412
1,2,3,4,7,8-Hexa CDF **	pg/g	11.3	0.128	4.99	0.400	0.100	1.13	N/A	4442412
1,2,3,6,7,8-Hexa CDF **	pg/g	7.16	0.133	4.99	0.400	0.100	0.716	N/A	4442412
2,3,4,6,7,8-Hexa CDF **	pg/g	7.12	0.123	4.99	0.400	0.100	0.712	N/A	4442412
1,2,3,7,8,9-Hexa CDF **	pg/g	1.42	0.132	4.99	0.400	0.100	0.142	N/A	4442412
1,2,3,4,6,7,8-Hepta CDF **	pg/g	46.3	0.0910	4.99	0.400	0.0100	0.463	N/A	4442412
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.38	0.0915	4.99	0.400	0.0100	0.0438	N/A	4442412
Octa CDF **	pg/g	60.0	0.250	9.98	0.800	0.000300	0.0180	N/A	4442412
Total Tetra CDF **	pg/g	30.3	0.208	0.998	0.400	N/A	N/A	9	4442412
Total Penta CDF **	pg/g	182	0.186	4.99	0.400	N/A	N/A	10	4442412
Total Hexa CDF **	pg/g	218	0.129	4.99	0.400	N/A	N/A	11	4442412
Total Hepta CDF **	pg/g	114	0.0912	4.99	0.400	N/A	N/A	4	4442412
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.11	0.17	1.0	0.90	0.100	0.111	N/A	4452911
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	14.8	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CBV967							
<b>Sampling Date</b>		2016/03/22 12:30							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-ROW011- 1.5 A6C0884-08</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	115	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234789 HeptaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDD *	%	132	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123789 HexaCDF **	%	114	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-234678 HexaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-23478 PentaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDF **	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-OCDD *	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4442412
Confirmation C13-2378 TetraCDF **	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4452911

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 N/A = Not Applicable  
 \*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CBV967							
Sampling Date		2016/03/22 12:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW011- 1.5 A6C0884-08 Lab-Dup	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.527	0.120	0.996	0.400	1.00	0.527	N/A	4442412
1,2,3,7,8-Penta CDD *	pg/g	1.51	0.150	4.98	0.400	1.00	1.51	N/A	4442412
1,2,3,4,7,8-Hexa CDD *	pg/g	3.90	0.160	4.98	0.400	0.100	0.390	N/A	4442412
1,2,3,6,7,8-Hexa CDD *	pg/g	16.7	0.166	4.98	0.400	0.100	1.67	N/A	4442412
1,2,3,7,8,9-Hexa CDD *	pg/g	8.68	0.167	4.98	0.400	0.100	0.868	N/A	4442412
1,2,3,4,6,7,8-Hepta CDD *	pg/g	373	0.282	4.98	0.400	0.0100	3.73	N/A	4442412
Octa CDD *	pg/g	2370	0.661	9.96	0.800	0.000300	0.711	N/A	4442412
Total Tetra CDD *	pg/g	1.50	0.120	0.996	0.400	N/A	N/A	4	4442412
Total Penta CDD *	pg/g	5.37	0.150	4.98	0.400	N/A	N/A	7	4442412
Total Hexa CDD *	pg/g	75.4	0.165	4.98	0.400	N/A	N/A	7	4442412
Total Hepta CDD *	pg/g	630	0.282	4.98	0.400	N/A	N/A	2	4442412
2,3,7,8-Tetra CDF **	pg/g	1.35	0.152	0.996	0.400	0.100	0.135	N/A	4442412
1,2,3,7,8-Penta CDF **	pg/g	2.30	0.233	4.98	0.400	0.0300	0.0690	N/A	4442412
2,3,4,7,8-Penta CDF **	pg/g	4.65	0.227	4.98	0.400	0.300	1.40	N/A	4442412
1,2,3,4,7,8-Hexa CDF **	pg/g	11.4	0.107	4.98	0.400	0.100	1.14	N/A	4442412
1,2,3,6,7,8-Hexa CDF **	pg/g	7.03	0.111	4.98	0.400	0.100	0.703	N/A	4442412
2,3,4,6,7,8-Hexa CDF **	pg/g	7.02	0.103	4.98	0.400	0.100	0.702	N/A	4442412
1,2,3,7,8,9-Hexa CDF **	pg/g	0.986	0.110	4.98	0.400	0.100	0.0986	N/A	4442412
1,2,3,4,6,7,8-Hepta CDF **	pg/g	47.5	0.195	4.98	0.400	0.0100	0.475	N/A	4442412
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.13	0.197	4.98	0.400	0.0100	0.0413	N/A	4442412
Octa CDF **	pg/g	57.1	0.190	9.96	0.800	0.000300	0.0171	N/A	4442412
Total Tetra CDF **	pg/g	28.6	0.152	0.996	0.400	N/A	N/A	11	4442412
Total Penta CDF **	pg/g	186	0.230	4.98	0.400	N/A	N/A	9	4442412
Total Hexa CDF **	pg/g	224	0.107	4.98	0.400	N/A	N/A	12	4442412
Total Hepta CDF **	pg/g	128	0.196	4.98	0.400	N/A	N/A	4	4442412
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.03	0.13	1.0	0.90	0.100	0.103	N/A	4452911

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

Lab-Dup = Laboratory Initiated Duplicate

\* CDD = Chloro Dibenzo-p-Dioxin

N/A = Not Applicable

\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CBV967							
Sampling Date		2016/03/22 12:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-ROW011- 1.5 A6C0884-08 Lab-Dup	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	14.2	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	119	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDD *	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDD *	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234789 HeptaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDD *	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDD *	%	117	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123789 HexaCDF **	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-234678 HexaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-23478 PentaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDD *	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-OCDD *	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4442412
Confirmation C13-2378 TetraCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4452911

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
N/A = Not Applicable  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CBV968							
Sampling Date		2016/03/22 14:10							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI037-1.5 A6C0884-12	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.202 (1)	0.202	0.998	0.400	1.00	0.202	N/A	4442412
1,2,3,7,8-Penta CDD *	pg/g	0.245	0.0980	4.99	0.400	1.00	0.245	N/A	4442412
1,2,3,4,7,8-Hexa CDD *	pg/g	0.364	0.135	4.99	0.400	0.100	0.0364	N/A	4442412
1,2,3,6,7,8-Hexa CDD *	pg/g	0.963	0.141	4.99	0.400	0.100	0.0963	N/A	4442412
1,2,3,7,8,9-Hexa CDD *	pg/g	0.906	0.141	4.99	0.400	0.100	0.0906	N/A	4442412
1,2,3,4,6,7,8-Hepta CDD *	pg/g	19.3	0.141	4.99	0.400	0.0100	0.193	N/A	4442412
Octa CDD *	pg/g	126	0.516	9.98	0.800	0.000300	0.0378	N/A	4442412
Total Tetra CDD *	pg/g	0.465	0.0919	0.998	0.400	N/A	N/A	2	4442412
Total Penta CDD *	pg/g	0.350	0.0980	4.99	0.400	N/A	N/A	2	4442412
Total Hexa CDD *	pg/g	5.97	0.139	4.99	0.400	N/A	N/A	6	4442412
Total Hepta CDD *	pg/g	31.9	0.141	4.99	0.400	N/A	N/A	2	4442412
2,3,7,8-Tetra CDF **	pg/g	0.258	0.0840	0.998	0.400	0.100	0.0258	N/A	4442412
1,2,3,7,8-Penta CDF **	pg/g	0.216	0.110	4.99	0.400	0.0300	0.00648	N/A	4442412
2,3,4,7,8-Penta CDF **	pg/g	0.225	0.107	4.99	0.400	0.300	0.0675	N/A	4442412
1,2,3,4,7,8-Hexa CDF **	pg/g	0.528	0.140	4.99	0.400	0.100	0.0528	N/A	4442412
1,2,3,6,7,8-Hexa CDF **	pg/g	0.272	0.146	4.99	0.400	0.100	0.0272	N/A	4442412
2,3,4,6,7,8-Hexa CDF **	pg/g	0.236	0.135	4.99	0.400	0.100	0.0236	N/A	4442412
1,2,3,7,8,9-Hexa CDF **	pg/g	0.165	0.144	4.99	0.400	0.100	0.0165	N/A	4442412
1,2,3,4,6,7,8-Hepta CDF **	pg/g	2.40	0.101	4.99	0.400	0.0100	0.0240	N/A	4442412
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.311	0.101	4.99	0.400	0.0100	0.00311	N/A	4442412
Octa CDF **	pg/g	7.62	0.271	9.98	0.800	0.000300	0.00229	N/A	4442412
Total Tetra CDF **	pg/g	0.749	0.0840	0.998	0.400	N/A	N/A	3	4442412
Total Penta CDF **	pg/g	2.21	0.109	4.99	0.400	N/A	N/A	5	4442412
Total Hexa CDF **	pg/g	5.18	0.141	4.99	0.400	N/A	N/A	7	4442412
Total Hepta CDF **	pg/g	5.47	0.101	4.99	0.400	N/A	N/A	3	4442412
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	1.15	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CBV968							
<b>Sampling Date</b>		2016/03/22 14:10							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-AOI037-1.5 A6C0884-12</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	112	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDD *	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234789 HeptaCDF **	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDF **	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDD *	%	124	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123789 HexaCDF **	%	109	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-234678 HexaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-23478 PentaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDD *	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-OCDD *	%	38	N/A	N/A	N/A	N/A	N/A	N/A	4442412

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 N/A = Not Applicable  
 \*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CBV969							
Sampling Date		2016/03/22 14:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI028B-1.5 A6C0884-14	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.266	0.0899	0.995	0.400	1.00	0.266	N/A	4442412
1,2,3,7,8-Penta CDD *	pg/g	1.22	0.0962	4.97	0.400	1.00	1.22	N/A	4442412
1,2,3,4,7,8-Hexa CDD *	pg/g	4.86	0.119	4.97	0.400	0.100	0.486	N/A	4442412
1,2,3,6,7,8-Hexa CDD *	pg/g	19.3	0.124	4.97	0.400	0.100	1.93	N/A	4442412
1,2,3,7,8,9-Hexa CDD *	pg/g	12.4	0.125	4.97	0.400	0.100	1.24	N/A	4442412
1,2,3,4,6,7,8-Hepta CDD *	pg/g	479	0.115	4.97	0.400	0.0100	4.79	N/A	4442412
Octa CDD *	pg/g	3050	0.0982	9.95	0.800	0.000300	0.915	N/A	4442412
Total Tetra CDD *	pg/g	2.22	0.0899	0.995	0.400	N/A	N/A	6	4442412
Total Penta CDD *	pg/g	6.36	0.0962	4.97	0.400	N/A	N/A	10	4442412
Total Hexa CDD *	pg/g	99.9	0.123	4.97	0.400	N/A	N/A	7	4442412
Total Hepta CDD *	pg/g	862	0.115	4.97	0.400	N/A	N/A	2	4442412
2,3,7,8-Tetra CDF **	pg/g	1.16	0.107	0.995	0.400	0.100	0.116	N/A	4442412
1,2,3,7,8-Penta CDF **	pg/g	1.43	0.0948	4.97	0.400	0.0300	0.0429	N/A	4442412
2,3,4,7,8-Penta CDF **	pg/g	2.36	0.0921	4.97	0.400	0.300	0.708	N/A	4442412
1,2,3,4,7,8-Hexa CDF **	pg/g	9.12	0.120	4.97	0.400	0.100	0.912	N/A	4442412
1,2,3,6,7,8-Hexa CDF **	pg/g	4.06	0.125	4.97	0.400	0.100	0.406	N/A	4442412
2,3,4,6,7,8-Hexa CDF **	pg/g	3.42	0.116	4.97	0.400	0.100	0.342	N/A	4442412
1,2,3,7,8,9-Hexa CDF **	pg/g	0.339	0.124	4.97	0.400	0.100	0.0339	N/A	4442412
1,2,3,4,6,7,8-Hepta CDF **	pg/g	54.7	0.0911	4.97	0.400	0.0100	0.547	N/A	4442412
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.77	0.0916	4.97	0.400	0.0100	0.0377	N/A	4442412
Octa CDF **	pg/g	99.3	0.0986	9.95	0.800	0.000300	0.0298	N/A	4442412
Total Tetra CDF **	pg/g	12.6	0.107	0.995	0.400	N/A	N/A	10	4442412
Total Penta CDF **	pg/g	45.1	0.0934	4.97	0.400	N/A	N/A	9	4442412
Total Hexa CDF **	pg/g	129	0.121	4.97	0.400	N/A	N/A	11	4442412
Total Hepta CDF **	pg/g	150	0.0914	4.97	0.400	N/A	N/A	4	4442412
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.71	0.10	0.99	0.89	0.100	0.0710	N/A	4452911
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	14.0	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CBV969							
<b>Sampling Date</b>		2016/03/22 14:45							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>SBS-AOI028B-1.5 A6C0884-14</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDD *	%	66	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDF **	%	66	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDD *	%	60	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDF **	%	66	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234789 HeptaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDD *	%	65	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDF **	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123789 HexaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-234678 HexaCDF **	%	60	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-23478 PentaCDF **	%	70	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDD *	%	67	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-OCDD *	%	63	N/A	N/A	N/A	N/A	N/A	N/A	4442412
Confirmation C13-2378 TetraCDF **	%	65	N/A	N/A	N/A	N/A	N/A	N/A	4452911

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** CBV963  
**Sample ID:** SS-ROWRRW-0.5 A6C0884-01  
**Matrix:** Soil

**Collected:** 2016/03/22  
**Shipped:**  
**Received:** 2016/03/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4442412	2016/03/30	2016/04/04	Cuong Duc Do
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4452911	N/A	2016/04/13	Vica Cioranic
Moisture	BAL	4435020	N/A	2016/03/29	Shivani Desai

**Maxxam ID:** CBV964  
**Sample ID:** SBS-ROWRRW-1.5 A6C0884-03  
**Matrix:** Soil

**Collected:** 2016/03/22  
**Shipped:**  
**Received:** 2016/03/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4442412	2016/03/30	2016/04/04	Cuong Duc Do
Moisture	BAL	4435020	N/A	2016/03/29	Shivani Desai

**Maxxam ID:** CBV965  
**Sample ID:** SBS-AOI002-1.5 A6C0884-04  
**Matrix:** Soil

**Collected:** 2016/03/22  
**Shipped:**  
**Received:** 2016/03/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4442412	2016/03/30	2016/04/05	Cuong Duc Do
Moisture	BAL	4435020	N/A	2016/03/29	Shivani Desai

**Maxxam ID:** CBV966  
**Sample ID:** SS-ROW011-0.5 A6C0884-06  
**Matrix:** Soil

**Collected:** 2016/03/22  
**Shipped:**  
**Received:** 2016/03/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4442412	2016/03/30	2016/04/05	Cuong Duc Do
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4452911	N/A	2016/04/13	Vica Cioranic
Moisture	BAL	4435020	N/A	2016/03/29	Shivani Desai

**Maxxam ID:** CBV967  
**Sample ID:** SBS-ROW011-1.5 A6C0884-08  
**Matrix:** Soil

**Collected:** 2016/03/22  
**Shipped:**  
**Received:** 2016/03/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4442412	2016/03/30	2016/04/05	Cuong Duc Do
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4452911	N/A	2016/04/13	Vica Cioranic
Moisture	BAL	4435020	N/A	2016/03/29	Shivani Desai

**Maxxam ID:** CBV967 Dup  
**Sample ID:** SBS-ROW011-1.5 A6C0884-08  
**Matrix:** Soil

**Collected:** 2016/03/22  
**Shipped:**  
**Received:** 2016/03/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4442412	2016/03/30	2016/04/05	Cuong Duc Do
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4452911	N/A	2016/04/13	Vica Cioranic



**TEST SUMMARY**

**Maxxam ID:** CBV968  
**Sample ID:** SBS-AOI037-1.5 A6C0884-12  
**Matrix:** Soil

**Collected:** 2016/03/22  
**Shipped:**  
**Received:** 2016/03/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4442412	2016/03/30	2016/04/05	Cuong Duc Do
Moisture	BAL	4435020	N/A	2016/03/29	Shivani Desai

**Maxxam ID:** CBV969  
**Sample ID:** SBS-AOI028B-1.5 A6C0884-14  
**Matrix:** Soil

**Collected:** 2016/03/22  
**Shipped:**  
**Received:** 2016/03/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4442412	2016/03/30	2016/04/04	Cuong Duc Do
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4452911	N/A	2016/04/13	Vica Cioranic
Moisture	BAL	4435020	N/A	2016/03/29	Shivani Desai

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.5°C
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Sample IDs inspected according to CoC

Method Blank: Low level PCDD/DF present below the RDL

Report revised to reflect changes to sample IDs.

#### DIOXINS AND FURANS BY HRMS (SOIL)

SPIKED BLANK Dioxins/Furans in Soil (1613B): \*\* Native percent recoveries were calculated with respect to the Method Spike \*\*

**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4435020	SPO	RPD - Sample/Sample Dup	Moisture	2016/03/29	1.3		%	20
4442412	CD	Matrix Spike	37CL4 2378 Tetra CDD	2016/04/04		112	%	35 - 197
			C13-1234678 HeptaCDD	2016/04/04		83	%	23 - 140
			C13-1234678 HeptaCDF	2016/04/04		88	%	28 - 143
			C13-123478 HexaCDD	2016/04/04		81	%	32 - 141
			C13-123478 HexaCDF	2016/04/04		87	%	26 - 152
			C13-1234789 HeptaCDF	2016/04/04		98	%	26 - 138
			C13-123678 HexaCDD	2016/04/04		91	%	28 - 130
			C13-123678 HexaCDF	2016/04/04		95	%	26 - 123
			C13-12378 PentaCDD	2016/04/04		118	%	25 - 181
			C13-12378 PentaCDF	2016/04/04		89	%	24 - 185
			C13-123789 HexaCDF	2016/04/04		108	%	29 - 147
			C13-234678 HexaCDF	2016/04/04		84	%	28 - 136
			C13-23478 PentaCDF	2016/04/04		89	%	21 - 178
			C13-2378 TetraCDD	2016/04/04		84	%	25 - 164
			C13-2378 TetraCDF	2016/04/04		93	%	24 - 169
			C13-OCDD	2016/04/04		69	%	17 - 157
4442412	CD	Matrix Spike(CBV965)	2,3,7,8-Tetra CDD	2016/04/04		93	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/04/04		93	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/04/04		96	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/04/04		94	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/04/04		95	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/04/04		121	%	70 - 140
			Octa CDD	2016/04/04		203 (1)	%	78 - 144
			2,3,7,8-Tetra CDF	2016/04/04		102	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/04/04		93	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/04/04		94	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/04/04		94	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/04/04		98	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/04/04		93	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/04/04		93	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/04/04		98	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/04/04		95	%	78 - 138
			Octa CDF	2016/04/04		113	%	63 - 170
4442412	CD	Spiked Blank	37CL4 2378 Tetra CDD	2016/04/04		112	%	35 - 197
			C13-1234678 HeptaCDD	2016/04/04		76	%	23 - 140
			C13-1234678 HeptaCDF	2016/04/04		84	%	28 - 143
			C13-123478 HexaCDD	2016/04/04		72	%	32 - 141
			C13-123478 HexaCDF	2016/04/04		81	%	26 - 152
			C13-1234789 HeptaCDF	2016/04/04		98	%	26 - 138
			C13-123678 HexaCDD	2016/04/04		84	%	28 - 130
			C13-123678 HexaCDF	2016/04/04		90	%	26 - 123
			C13-12378 PentaCDD	2016/04/04		114	%	25 - 181
			C13-12378 PentaCDF	2016/04/04		87	%	24 - 185
			C13-123789 HexaCDF	2016/04/04		104	%	29 - 147
			C13-234678 HexaCDF	2016/04/04		77	%	28 - 136
			C13-23478 PentaCDF	2016/04/04		87	%	21 - 178
			C13-2378 TetraCDD	2016/04/04		82	%	25 - 164
			C13-2378 TetraCDF	2016/04/04		90	%	24 - 169
			C13-OCDD	2016/04/04		74	%	17 - 157
			2,3,7,8-Tetra CDD	2016/04/04		102	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/04/04		103	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/04/04		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/04/04		101	%	76 - 134

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/04/04		110	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/04/04		105	%	70 - 140
			Octa CDD	2016/04/04		107	%	78 - 144
			2,3,7,8-Tetra CDF	2016/04/04		106	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/04/04		100	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/04/04		103	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/04/04		102	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/04/04		106	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/04/04		105	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/04/04		100	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/04/04		101	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/04/04		102	%	78 - 138
			Octa CDF	2016/04/04		103	%	63 - 170
4442412	CD	Method Blank	37CL4 2378 Tetra CDD	2016/04/04		111	%	35 - 197
			C13-1234678 HeptaCDD	2016/04/04		92	%	23 - 140
			C13-1234678 HeptaCDF	2016/04/04		93	%	28 - 143
			C13-123478 HexaCDD	2016/04/04		81	%	32 - 141
			C13-123478 HexaCDF	2016/04/04		90	%	26 - 152
			C13-1234789 HeptaCDF	2016/04/04		107	%	26 - 138
			C13-123678 HexaCDD	2016/04/04		90	%	28 - 130
			C13-123678 HexaCDF	2016/04/04		103	%	26 - 123
			C13-12378 PentaCDD	2016/04/04		126	%	25 - 181
			C13-12378 PentaCDF	2016/04/04		95	%	24 - 185
			C13-123789 HexaCDF	2016/04/04		111	%	29 - 147
			C13-234678 HexaCDF	2016/04/04		85	%	28 - 136
			C13-23478 PentaCDF	2016/04/04		96	%	21 - 178
			C13-2378 TetraCDD	2016/04/04		87	%	25 - 164
			C13-2378 TetraCDF	2016/04/04		98	%	24 - 169
			C13-OCDD	2016/04/04		83	%	17 - 157
			2,3,7,8-Tetra CDD	2016/04/04	<0.104, EDL=0.104		pg/g	
			1,2,3,7,8-Penta CDD	2016/04/04	0.152, EDL=0.126		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/04/04	0.201, EDL=0.0985		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/04/04	0.197, EDL=0.103		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/04/04	0.199, EDL=0.103		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/04/04	0.296, EDL=0.0887		pg/g	
			Octa CDD	2016/04/04	1.10, EDL=0.121		pg/g	
			Total Tetra CDD	2016/04/04	<0.104, EDL=0.104		pg/g	
			Total Penta CDD	2016/04/04	0.152, EDL=0.126		pg/g	
			Total Hexa CDD	2016/04/04	0.597, EDL=0.102		pg/g	
			Total Hepta CDD	2016/04/04	0.296, EDL=0.0887		pg/g	
			2,3,7,8-Tetra CDF	2016/04/04	<0.0824, EDL=0.0824		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8-Penta CDF	2016/04/04	0.196, EDL=0.103		pg/g	
			2,3,4,7,8-Penta CDF	2016/04/04	0.185, EDL=0.0997		pg/g	
			1,2,3,4,7,8-Hexa CDF	2016/04/04	0.189, EDL=0.0757		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/04/04	0.176, EDL=0.0786		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/04/04	0.182, EDL=0.0729		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/04/04	0.193, EDL=0.0779		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/04/04	0.234, EDL=0.101		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/04/04	0.185, EDL=0.102		pg/g	
			Octa CDF	2016/04/04	0.521, EDL=0.109		pg/g	
			Total Tetra CDF	2016/04/04	<0.0824, EDL=0.0824		pg/g	
			Total Penta CDF	2016/04/04	0.381, EDL=0.101		pg/g	
			Total Hexa CDF	2016/04/04	0.741, EDL=0.0762		pg/g	
			Total Hepta CDF	2016/04/04	0.419, EDL=0.101		pg/g	
4442412	CD	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2016/04/05	NC		%	25
			1,2,3,7,8-Penta CDD	2016/04/05	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2016/04/05	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2016/04/05	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2016/04/05	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/04/05	0.81		%	25
			Octa CDD	2016/04/05	1.5		%	25
			Total Tetra CDD	2016/04/05	NC		%	25
			Total Penta CDD	2016/04/05	NC		%	25
			Total Hexa CDD	2016/04/05	0.94		%	25
			Total Hepta CDD	2016/04/05	5.1		%	25
			2,3,7,8-Tetra CDF	2016/04/05	NC		%	25
			1,2,3,7,8-Penta CDF	2016/04/05	NC		%	25
			2,3,4,7,8-Penta CDF	2016/04/05	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2016/04/05	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2016/04/05	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2016/04/05	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2016/04/05	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/04/05	2.7		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/04/05	NC		%	25
			Octa CDF	2016/04/05	5.0		%	25
			Total Tetra CDF	2016/04/05	5.5		%	25
			Total Penta CDF	2016/04/05	2.2		%	25
			Total Hexa CDF	2016/04/05	2.5		%	25
			Total Hepta CDF	2016/04/05	12		%	25
4452911	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/04/13	<0.11, EDL=0.11		pg/g	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4452911	VCI	RPD - Sample/Sample Dup	Confirmation C13-2378 TetraCDF	2016/04/13		125	%	40 - 135
			Confirmation 2,3,7,8-Tetra CDF	2016/04/13	NC		%	100
			Confirmation 2,3,7,8-Tetra CDF	2016/04/14	NC		%	100
<p>Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.</p> <p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).</p> <p>(1) Recovery exceeds method criteria due to matrix effects</p>								

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



\_\_\_\_\_  
Cristina Carriere, Scientific Services



\_\_\_\_\_  
Cathy Xu, Senior Analyst, HRMS Services, Senior Analyst, HRMS Services



\_\_\_\_\_  
Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Thursday, April 28, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: POR OPP / 9003.01.39

Enclosed are the results of analyses for work order A6C0990, which was received by the laboratory on 3/26/2016 at 2:30:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
04/28/16 14:51

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SBS-AOI019-1.5	A6C0990-01	Soil	03/25/16 11:50	03/26/16 14:30

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 04/28/16 14:51

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SBS-AOI019-1.5 (A6C0990-01)</b>			<b>Matrix: Soil</b>					
Batch: 6030916								
<b>Total Organic Carbon</b>	<b>11000</b>	---	200	mg/kg	1	03/31/16 11:50	SM 5310B MOD	

Apex Laboratories



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Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 04/28/16 14:51

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6030916 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (6030916-BLK1)</b>						Prepared: 03/29/16 10:10 Analyzed: 03/31/16 11:50						
<b>SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6030916-BS1)</b>						Prepared: 03/29/16 10:10 Analyzed: 03/31/16 11:50						
<b>SM 5310B MOD</b>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	85-115%	---	---	
<b>Duplicate (6030916-DUP1)</b>						Prepared: 03/29/16 10:10 Analyzed: 03/31/16 11:50						
<b>QC Source Sample: Other (A6C0884-01)</b>												
<b>SM 5310B MOD</b>												
Total Organic Carbon	11000	---	200	mg/kg	1	---	14000	---	---	23	20%	Q-04



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
04/28/16 14:51

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6030916</b>							
A6C0990-01	Soil	SM 5310B MOD	03/25/16 11:50	03/29/16 10:10	5g/5g	5g/5g	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
04/28/16 14:51

## Notes and Definitions

### Qualifiers:

Q-04 Spike recovery and/or RPD is outside control limits due to a non-homogeneous sample matrix.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.


Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).







Your Project #: A6C0990  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/04/29**  
Report #: R3976186  
Version: 3 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B661539**

**Received: 2016/03/29, 16:25**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2016/03/30	2016/04/04	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2016/04/13	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2016/04/01	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		CCD719			
<b>Sampling Date</b>		2016/03/25 11:50			
<b>COC Number</b>		na			
	<b>UNITS</b>	<b>SBS-AOI019-1.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	20	1.0	0.50	4440781
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CCD719							
Sampling Date		2016/03/25 11:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI019-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.262	0.0988	0.995	0.400	1.00	0.262	N/A	4442412
1,2,3,7,8-Penta CDD *	pg/g	1.69	0.0981	4.97	0.400	1.00	1.69	N/A	4442412
1,2,3,4,7,8-Hexa CDD *	pg/g	7.57	0.124	4.97	0.400	0.100	0.757	N/A	4442412
1,2,3,6,7,8-Hexa CDD *	pg/g	31.4	0.129	4.97	0.400	0.100	3.14	N/A	4442412
1,2,3,7,8,9-Hexa CDD *	pg/g	19.7	0.129	4.97	0.400	0.100	1.97	N/A	4442412
1,2,3,4,6,7,8-Hepta CDD *	pg/g	800	0.0747	4.97	0.400	0.0100	8.00	N/A	4442412
Octa CDD *	pg/g	5350 (1)	1.03	99.5	0.800	0.000300	1.61	N/A	4442412
Total Tetra CDD *	pg/g	2.47	0.0988	0.995	0.400	N/A	N/A	7	4442412
Total Penta CDD *	pg/g	8.49	0.0981	4.97	0.400	N/A	N/A	9	4442412
Total Hexa CDD *	pg/g	163	0.128	4.97	0.400	N/A	N/A	7	4442412
Total Hepta CDD *	pg/g	1370	0.0747	4.97	0.400	N/A	N/A	2	4442412
2,3,7,8-Tetra CDF **	pg/g	1.56	0.108	0.995	0.400	0.100	0.156	N/A	4442412
1,2,3,7,8-Penta CDF **	pg/g	2.29	0.139	4.97	0.400	0.0300	0.0687	N/A	4442412
2,3,4,7,8-Penta CDF **	pg/g	3.90	0.135	4.97	0.400	0.300	1.17	N/A	4442412
1,2,3,4,7,8-Hexa CDF **	pg/g	16.1	0.101	4.97	0.400	0.100	1.61	N/A	4442412
1,2,3,6,7,8-Hexa CDF **	pg/g	7.36	0.105	4.97	0.400	0.100	0.736	N/A	4442412
2,3,4,6,7,8-Hexa CDF **	pg/g	5.81	0.0971	4.97	0.400	0.100	0.581	N/A	4442412
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.337 (2)	0.337	4.97	0.400	0.100	0.0337	N/A	4442412
1,2,3,4,6,7,8-Hepta CDF **	pg/g	94.5	0.110	4.97	0.400	0.0100	0.945	N/A	4442412
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.50	0.111	4.97	0.400	0.0100	0.0650	N/A	4442412
Octa CDF **	pg/g	155	0.138	9.95	0.800	0.000300	0.0465	N/A	4442412
Total Tetra CDF **	pg/g	20.6	0.108	0.995	0.400	N/A	N/A	14	4442412
Total Penta CDF **	pg/g	81.1	0.137	4.97	0.400	N/A	N/A	12	4442412
Total Hexa CDF **	pg/g	231	0.102	4.97	0.400	N/A	N/A	11	4442412
Total Hepta CDF **	pg/g	261	0.111	4.97	0.400	N/A	N/A	4	4442412
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<1.4 (2)	1.4	0.99	0.89	0.100	0.140	N/A	4452911
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	22.8	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 10X DILUTION  
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CCD719							
Sampling Date		2016/03/25 11:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SBS-AOI019-1.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	105	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDD *	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234678 HeptaCDF **	%	70	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDD *	%	64	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123478 HexaCDF **	%	69	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-1234789 HeptaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDD *	%	70	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123678 HexaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-12378 PentaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-123789 HexaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-234678 HexaCDF **	%	65	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-23478 PentaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDD *	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-2378 TetraCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4442412
C13-OCDD *	%	60	N/A	N/A	N/A	N/A	N/A	N/A	4442412
Confirmation C13-2378 TetraCDF **	%	69	N/A	N/A	N/A	N/A	N/A	N/A	4452911
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan									

**TEST SUMMARY**

**Maxxam ID:** CCD719  
**Sample ID:** SBS-AOI019-1.5  
**Matrix:** Soil

**Collected:** 2016/03/25  
**Shipped:**  
**Received:** 2016/03/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4442412	2016/03/30	2016/04/04	Cuong Duc Do
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4452911	N/A	2016/04/13	Vica Cioranic
Moisture	BAL	4440781	N/A	2016/04/01	Chun Yan

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.7°C
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Report revised to reflect change to sample ID.

**DIOXINS AND FURANS BY HRMS (SOIL)**

SPIKED BLANK Dioxins/Furans in Soil (1613B): \*\* Native percent recoveries were calculated with respect to the Method Spike \*\*

**Results relate only to the items tested.**



**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4440781	SPO	RPD - Sample/Sample Dup	Moisture	2016/04/01	1.1		%	20
4442412	CD	Matrix Spike	37CL4 2378 Tetra CDD	2016/04/04		112	%	35 - 197
			C13-1234678 HeptaCDD	2016/04/04		83	%	23 - 140
			C13-1234678 HeptaCDF	2016/04/04		88	%	28 - 143
			C13-123478 HexaCDD	2016/04/04		81	%	32 - 141
			C13-123478 HexaCDF	2016/04/04		87	%	26 - 152
			C13-1234789 HeptaCDF	2016/04/04		98	%	26 - 138
			C13-123678 HexaCDD	2016/04/04		91	%	28 - 130
			C13-123678 HexaCDF	2016/04/04		95	%	26 - 123
			C13-12378 PentaCDD	2016/04/04		118	%	25 - 181
			C13-12378 PentaCDF	2016/04/04		89	%	24 - 185
			C13-123789 HexaCDF	2016/04/04		108	%	29 - 147
			C13-234678 HexaCDF	2016/04/04		84	%	28 - 136
			C13-23478 PentaCDF	2016/04/04		89	%	21 - 178
			C13-2378 TetraCDD	2016/04/04		84	%	25 - 164
			C13-2378 TetraCDF	2016/04/04		93	%	24 - 169
			C13-OCDD	2016/04/04		69	%	17 - 157
			2,3,7,8-Tetra CDD	2016/04/04		93	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/04/04		93	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/04/04		96	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/04/04		94	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/04/04		95	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/04/04		121	%	70 - 140
			Octa CDD	2016/04/04		203 (1)	%	78 - 144
			2,3,7,8-Tetra CDF	2016/04/04		102	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/04/04		93	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/04/04		94	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/04/04		94	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/04/04		98	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/04/04		93	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/04/04		93	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/04/04		98	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/04/04		95	%	78 - 138
			Octa CDF	2016/04/04		113	%	63 - 170
4442412	CD	Spiked Blank	37CL4 2378 Tetra CDD	2016/04/04		112	%	35 - 197
			C13-1234678 HeptaCDD	2016/04/04		76	%	23 - 140
			C13-1234678 HeptaCDF	2016/04/04		84	%	28 - 143
			C13-123478 HexaCDD	2016/04/04		72	%	32 - 141
			C13-123478 HexaCDF	2016/04/04		81	%	26 - 152
			C13-1234789 HeptaCDF	2016/04/04		98	%	26 - 138
			C13-123678 HexaCDD	2016/04/04		84	%	28 - 130
			C13-123678 HexaCDF	2016/04/04		90	%	26 - 123
			C13-12378 PentaCDD	2016/04/04		114	%	25 - 181
			C13-12378 PentaCDF	2016/04/04		87	%	24 - 185
			C13-123789 HexaCDF	2016/04/04		104	%	29 - 147
			C13-234678 HexaCDF	2016/04/04		77	%	28 - 136
			C13-23478 PentaCDF	2016/04/04		87	%	21 - 178
			C13-2378 TetraCDD	2016/04/04		82	%	25 - 164
			C13-2378 TetraCDF	2016/04/04		90	%	24 - 169
			C13-OCDD	2016/04/04		74	%	17 - 157
			2,3,7,8-Tetra CDD	2016/04/04		102	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/04/04		103	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/04/04		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/04/04		101	%	76 - 134

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/04/04		110	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/04/04		105	%	70 - 140
			Octa CDD	2016/04/04		107	%	78 - 144
			2,3,7,8-Tetra CDF	2016/04/04		106	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/04/04		100	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/04/04		103	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/04/04		102	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/04/04		106	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/04/04		105	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/04/04		100	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/04/04		101	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/04/04		102	%	78 - 138
			Octa CDF	2016/04/04		103	%	63 - 170
4442412	CD	Method Blank	37CL4 2378 Tetra CDD	2016/04/04		111	%	35 - 197
			C13-1234678 HeptaCDD	2016/04/04		92	%	23 - 140
			C13-1234678 HeptaCDF	2016/04/04		93	%	28 - 143
			C13-123478 HexaCDD	2016/04/04		81	%	32 - 141
			C13-123478 HexaCDF	2016/04/04		90	%	26 - 152
			C13-1234789 HeptaCDF	2016/04/04		107	%	26 - 138
			C13-123678 HexaCDD	2016/04/04		90	%	28 - 130
			C13-123678 HexaCDF	2016/04/04		103	%	26 - 123
			C13-12378 PentaCDD	2016/04/04		126	%	25 - 181
			C13-12378 PentaCDF	2016/04/04		95	%	24 - 185
			C13-123789 HexaCDF	2016/04/04		111	%	29 - 147
			C13-234678 HexaCDF	2016/04/04		85	%	28 - 136
			C13-23478 PentaCDF	2016/04/04		96	%	21 - 178
			C13-2378 TetraCDD	2016/04/04		87	%	25 - 164
			C13-2378 TetraCDF	2016/04/04		98	%	24 - 169
			C13-OCDD	2016/04/04		83	%	17 - 157
			2,3,7,8-Tetra CDD	2016/04/04	<0.104, EDL=0.104		pg/g	
			1,2,3,7,8-Penta CDD	2016/04/04	0.152, EDL=0.126		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/04/04	0.201, EDL=0.0985		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/04/04	0.197, EDL=0.103		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/04/04	0.199, EDL=0.103		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/04/04	0.296, EDL=0.0887		pg/g	
			Octa CDD	2016/04/04	1.10, EDL=0.121		pg/g	
			Total Tetra CDD	2016/04/04	<0.104, EDL=0.104		pg/g	
			Total Penta CDD	2016/04/04	0.152, EDL=0.126		pg/g	
			Total Hexa CDD	2016/04/04	0.597, EDL=0.102		pg/g	
			Total Hepta CDD	2016/04/04	0.296, EDL=0.0887		pg/g	
			2,3,7,8-Tetra CDF	2016/04/04	<0.0824, EDL=0.0824		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8-Penta CDF	2016/04/04	0.196, EDL=0.103		pg/g	
			2,3,4,7,8-Penta CDF	2016/04/04	0.185, EDL=0.0997		pg/g	
			1,2,3,4,7,8-Hexa CDF	2016/04/04	0.189, EDL=0.0757		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/04/04	0.176, EDL=0.0786		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/04/04	0.182, EDL=0.0729		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/04/04	0.193, EDL=0.0779		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/04/04	0.234, EDL=0.101		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/04/04	0.185, EDL=0.102		pg/g	
			Octa CDF	2016/04/04	0.521, EDL=0.109		pg/g	
			Total Tetra CDF	2016/04/04	<0.0824, EDL=0.0824		pg/g	
			Total Penta CDF	2016/04/04	0.381, EDL=0.101		pg/g	
			Total Hexa CDF	2016/04/04	0.741, EDL=0.0762		pg/g	
			Total Hepta CDF	2016/04/04	0.419, EDL=0.101		pg/g	
4442412	CD	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2016/04/05	NC		%	25
			1,2,3,7,8-Penta CDD	2016/04/05	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2016/04/05	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2016/04/05	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2016/04/05	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/04/05	0.81		%	25
			Octa CDD	2016/04/05	1.5		%	25
			Total Tetra CDD	2016/04/05	NC		%	25
			Total Penta CDD	2016/04/05	NC		%	25
			Total Hexa CDD	2016/04/05	0.94		%	25
			Total Hepta CDD	2016/04/05	5.1		%	25
			2,3,7,8-Tetra CDF	2016/04/05	NC		%	25
			1,2,3,7,8-Penta CDF	2016/04/05	NC		%	25
			2,3,4,7,8-Penta CDF	2016/04/05	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2016/04/05	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2016/04/05	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2016/04/05	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2016/04/05	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/04/05	2.7		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/04/05	NC		%	25
			Octa CDF	2016/04/05	5.0		%	25
			Total Tetra CDF	2016/04/05	5.5		%	25
			Total Penta CDF	2016/04/05	2.2		%	25
			Total Hexa CDF	2016/04/05	2.5		%	25
			Total Hepta CDF	2016/04/05	12		%	25
4452911	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/04/13	<0.11, EDL=0.11		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Confirmation C13-2378 TetraCDF	2016/04/13		125	%	40 - 135
4452911	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/04/13	NC		%	100
			Confirmation 2,3,7,8-Tetra CDF	2016/04/14	NC		%	100

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery exceeds method criteria due to matrix effects

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Cathy Xu, Senior Analyst, HRMS Services, Senior Analyst, HRMS Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Thursday, July 14, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A6F0523, which was received by the laboratory on 6/16/2016 at 10:55:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
07/14/16 12:11

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI023-0.5-After Processing	A6F0523-02	Sediment	06/15/16 12:00	06/16/16 10:55

Apex Laboratories



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 07/14/16 12:11

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI023-0.5-After Processing (A6F0523-02)</b>			<b>Matrix: Sediment</b>					
Batch: 6060712								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	06/24/16 13:10	PSEP/SM 5310B MOD	

Apex Laboratories



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 07/14/16 12:11

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6060712 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (6060712-BLK1)</b>						Prepared: 06/23/16 17:25 Analyzed: 06/24/16 13:10						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6060712-BS1)</b>						Prepared: 06/23/16 17:25 Analyzed: 06/24/16 13:10						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115%	---	---	
<b>Duplicate (6060712-DUP1)</b>						Prepared: 06/23/16 17:25 Analyzed: 06/24/16 13:10						
<b>QC Source Sample: ISM-AOI023-0.5-After Processing (A6F0523-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	17000	---	200	mg/kg	1	---	18000	---	---	7	20%	



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 07/14/16 12:11

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6060712</b>							
A6F0523-02	Sediment	PSEP/SM 5310B MOD	06/15/16 12:00	06/23/16 17:25	5g/5g	5g/5g	NA

Apex Laboratories



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
07/14/16 12:11

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Your Project #: A6F0523  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/07/07**  
Report #: R4055536  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B6C8672**

**Received: 2016/06/22, 15:40**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2016/06/27	2016/07/05	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2016/07/06	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2016/06/24	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		COU077			
<b>Sampling Date</b>		2016/06/15 12:00			
<b>COC Number</b>		na			
	<b>UNITS</b>	<b>ISM-AOI023-0.5- AFTER PROCESSING</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	1.8	1.0	0.50	4554026
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COU077							
Sampling Date		2016/06/15 12:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI023-0.5- AFTER PROCESSING	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.662	0.106	0.200	0.0399	1.00	0.662	N/A	4563578
1,2,3,7,8-Penta CDD *	pg/g	2.51	0.102	0.998	0.0399	1.00	2.51	N/A	4563578
1,2,3,4,7,8-Hexa CDD *	pg/g	6.27	0.0954	0.998	0.0399	0.100	0.627	N/A	4563578
1,2,3,6,7,8-Hexa CDD *	pg/g	26.8	0.0985	0.998	0.0399	0.100	2.68	N/A	4563578
1,2,3,7,8,9-Hexa CDD *	pg/g	18.4	0.103	0.998	0.0399	0.100	1.84	N/A	4563578
1,2,3,4,6,7,8-Hepta CDD *	pg/g	569	0.108	0.998	0.0399	0.0100	5.69	N/A	4563578
Octa CDD *	pg/g	3520	0.106	2.00	0.0799	0.000300	1.06	N/A	4563578
Total Tetra CDD *	pg/g	3.83	0.106	0.200	0.0399	N/A	N/A	10	4563578
Total Penta CDD *	pg/g	13.2	0.102	0.998	0.0399	N/A	N/A	10	4563578
Total Hexa CDD *	pg/g	152	0.103	0.998	0.0399	N/A	N/A	7	4563578
Total Hepta CDD *	pg/g	993	0.108	0.998	0.0399	N/A	N/A	2	4563578
2,3,7,8-Tetra CDF **	pg/g	1.40	0.107	0.200	0.0399	0.100	0.140	N/A	4563578
1,2,3,7,8-Penta CDF **	pg/g	1.44	0.104	0.998	0.0399	0.0300	0.0432	N/A	4563578
2,3,4,7,8-Penta CDF **	pg/g	2.27	0.104	0.998	0.0399	0.300	0.681	N/A	4563578
1,2,3,4,7,8-Hexa CDF **	pg/g	9.57	0.109	0.998	0.0399	0.100	0.957	N/A	4563578
1,2,3,6,7,8-Hexa CDF **	pg/g	4.79	0.114	0.998	0.0399	0.100	0.479	N/A	4563578
2,3,4,6,7,8-Hexa CDF **	pg/g	2.94	0.100	0.998	0.0399	0.100	0.294	N/A	4563578
1,2,3,7,8,9-Hexa CDF **	pg/g	0.191	0.112	0.998	0.0399	0.100	0.0191	N/A	4563578
1,2,3,4,6,7,8-Hepta CDF **	pg/g	83.5	0.110	0.998	0.0399	0.0100	0.835	N/A	4563578
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.63	0.114	0.998	0.0399	0.0100	0.0563	N/A	4563578
Octa CDF **	pg/g	133	0.111	2.00	0.0799	0.000300	0.0399	N/A	4563578
Total Tetra CDF **	pg/g	6.57	0.107	0.200	0.0399	N/A	N/A	12	4563578
Total Penta CDF **	pg/g	16.1	0.104	0.998	0.0399	N/A	N/A	8	4563578
Total Hexa CDF **	pg/g	121	0.108	0.998	0.0399	N/A	N/A	11	4563578
Total Hepta CDF **	pg/g	241	0.111	0.998	0.0399	N/A	N/A	4	4563578
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.97	0.13	1.0	0.90	0.100	0.0970	N/A	4568571
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	18.6	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		COU077							
<b>Sampling Date</b>		2016/06/15 12:00							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		# of	
	<b>UNITS</b>	<b>ISM-AOI023-0.5- AFTER PROCESSING</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-1234678 HeptaCDD *	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-1234678 HeptaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-123478 HexaCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-123478 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-1234789 HeptaCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-123678 HexaCDD *	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-123678 HexaCDF **	%	70	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-12378 PentaCDD *	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-12378 PentaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-123789 HexaCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-234678 HexaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-23478 PentaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-2378 TetraCDD *	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-2378 TetraCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4563578
C13-OCDD *	%	108	N/A	N/A	N/A	N/A	N/A	N/A	4563578
Confirmation C13-2378 TetraCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4568571

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** COU077  
**Sample ID:** ISM-AOI023-0.5-AFTER PROCESSING  
**Matrix:** Soil

**Collected:** 2016/06/15  
**Shipped:**  
**Received:** 2016/06/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4563578	2016/06/27	2016/07/05	Cuong Duc Do
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4568571	N/A	2016/07/06	Vica Cioranic
Moisture	BAL	4554026	N/A	2016/06/24	Chun Yan

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.3°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4554026	NS3	RPD - Sample/Sample Dup	Moisture	2016/06/24	0		%	20
4563578	CD	Spiked Blank	37CL4 2378 Tetra CDD	2016/07/05		98	%	35 - 197
			C13-1234678 HeptaCDD	2016/07/05		86	%	23 - 140
			C13-1234678 HeptaCDF	2016/07/05		77	%	28 - 143
			C13-123478 HexaCDD	2016/07/05		88	%	32 - 141
			C13-123478 HexaCDF	2016/07/05		82	%	26 - 152
			C13-1234789 HeptaCDF	2016/07/05		82	%	26 - 138
			C13-123678 HexaCDD	2016/07/05		78	%	28 - 130
			C13-123678 HexaCDF	2016/07/05		78	%	26 - 123
			C13-12378 PentaCDD	2016/07/05		104	%	25 - 181
			C13-12378 PentaCDF	2016/07/05		84	%	24 - 185
			C13-123789 HexaCDF	2016/07/05		79	%	29 - 147
			C13-234678 HexaCDF	2016/07/05		79	%	28 - 136
			C13-23478 PentaCDF	2016/07/05		86	%	21 - 178
			C13-2378 TetraCDD	2016/07/05		77	%	25 - 164
			C13-2378 TetraCDF	2016/07/05		80	%	24 - 169
			C13-OCDD	2016/07/05		81	%	17 - 157
			2,3,7,8-Tetra CDD	2016/07/05		100	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/07/05		86	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/07/05		92	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/07/05		103	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/07/05		110	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05		96	%	70 - 140
			Octa CDD	2016/07/05		109	%	78 - 144
			2,3,7,8-Tetra CDF	2016/07/05		99	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/07/05		93	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/07/05		106	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/07/05		102	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/07/05		102	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/07/05		102	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/07/05		108	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05		103	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05		104	%	78 - 138
			Octa CDF	2016/07/05		105	%	63 - 170
4563578	CD	Spiked Blank DUP	37CL4 2378 Tetra CDD	2016/07/05		84	%	35 - 197
			C13-1234678 HeptaCDD	2016/07/05		104	%	23 - 140
			C13-1234678 HeptaCDF	2016/07/05		86	%	28 - 143
			C13-123478 HexaCDD	2016/07/05		102	%	32 - 141
			C13-123478 HexaCDF	2016/07/05		92	%	26 - 152
			C13-1234789 HeptaCDF	2016/07/05		91	%	26 - 138
			C13-123678 HexaCDD	2016/07/05		90	%	28 - 130
			C13-123678 HexaCDF	2016/07/05		87	%	26 - 123
			C13-12378 PentaCDD	2016/07/05		105	%	25 - 181
			C13-12378 PentaCDF	2016/07/05		86	%	24 - 185
			C13-123789 HexaCDF	2016/07/05		90	%	29 - 147
			C13-234678 HexaCDF	2016/07/05		93	%	28 - 136
			C13-23478 PentaCDF	2016/07/05		84	%	21 - 178
			C13-2378 TetraCDD	2016/07/05		80	%	25 - 164
			C13-2378 TetraCDF	2016/07/05		82	%	24 - 169
			C13-OCDD	2016/07/05		105	%	17 - 157
			2,3,7,8-Tetra CDD	2016/07/05		101	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/07/05		83	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/07/05		96	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/07/05		103	%	76 - 134

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/07/05		111	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05		98	%	70 - 140
			Octa CDD	2016/07/05		98	%	78 - 144
			2,3,7,8-Tetra CDF	2016/07/05		100	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/07/05		92	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/07/05		112	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/07/05		104	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/07/05		107	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/07/05		98	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/07/05		110	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05		104	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05		118	%	78 - 138
			Octa CDF	2016/07/05		98	%	63 - 170
4563578	CD	RPD	2,3,7,8-Tetra CDD	2016/07/05	1.0		%	25
			1,2,3,7,8-Penta CDD	2016/07/05	3.6		%	25
			1,2,3,4,7,8-Hexa CDD	2016/07/05	4.3		%	25
			1,2,3,6,7,8-Hexa CDD	2016/07/05	0		%	25
			1,2,3,7,8,9-Hexa CDD	2016/07/05	0.90		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05	2.1		%	25
			Octa CDD	2016/07/05	11		%	25
			2,3,7,8-Tetra CDF	2016/07/05	1.0		%	25
			1,2,3,7,8-Penta CDF	2016/07/05	1.1		%	25
			2,3,4,7,8-Penta CDF	2016/07/05	5.5		%	25
			1,2,3,4,7,8-Hexa CDF	2016/07/05	1.9		%	25
			1,2,3,6,7,8-Hexa CDF	2016/07/05	4.8		%	25
			2,3,4,6,7,8-Hexa CDF	2016/07/05	4.0		%	25
			1,2,3,7,8,9-Hexa CDF	2016/07/05	1.8		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05	0.97		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05	13		%	25
			Octa CDF	2016/07/05	6.9		%	25
4563578	CD	Method Blank	37CL4 2378 Tetra CDD	2016/07/05		69	%	35 - 197
			C13-1234678 HeptaCDD	2016/07/05		80	%	23 - 140
			C13-1234678 HeptaCDF	2016/07/05		69	%	28 - 143
			C13-123478 HexaCDD	2016/07/05		81	%	32 - 141
			C13-123478 HexaCDF	2016/07/05		71	%	26 - 152
			C13-1234789 HeptaCDF	2016/07/05		71	%	26 - 138
			C13-123678 HexaCDD	2016/07/05		67	%	28 - 130
			C13-123678 HexaCDF	2016/07/05		66	%	26 - 123
			C13-12378 PentaCDD	2016/07/05		79	%	25 - 181
			C13-12378 PentaCDF	2016/07/05		64	%	24 - 185
			C13-123789 HexaCDF	2016/07/05		69	%	29 - 147
			C13-234678 HexaCDF	2016/07/05		68	%	28 - 136
			C13-23478 PentaCDF	2016/07/05		61	%	21 - 178
			C13-2378 TetraCDD	2016/07/05		62	%	25 - 164
			C13-2378 TetraCDF	2016/07/05		64	%	24 - 169
			C13-OCDD	2016/07/05		84	%	17 - 157
			2,3,7,8-Tetra CDD	2016/07/05	<0.104, EDL=0.104		pg/g	
			1,2,3,7,8-Penta CDD	2016/07/05	<0.102, EDL=0.102		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/07/05	<0.0957, EDL=0.0957		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/07/05	<0.0989, EDL=0.0989		pg/g	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/07/05	<0.103, EDL=0.103		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05	<0.109, EDL=0.109		pg/g	
			Octa CDD	2016/07/05	1.12, EDL=0.105		pg/g	
			Total Tetra CDD	2016/07/05	<0.104, EDL=0.104		pg/g	
			Total Penta CDD	2016/07/05	<0.102, EDL=0.102		pg/g	
			Total Hexa CDD	2016/07/05	<0.104, EDL=0.104		pg/g	
			Total Hepta CDD	2016/07/05	0.265, EDL=0.109		pg/g	
			2,3,7,8-Tetra CDF	2016/07/05	<0.102, EDL=0.102		pg/g	
			1,2,3,7,8-Penta CDF	2016/07/05	<0.107, EDL=0.107		pg/g	
			2,3,4,7,8-Penta CDF	2016/07/05	<0.107, EDL=0.107		pg/g	
			1,2,3,4,7,8-Hexa CDF	2016/07/05	<0.105, EDL=0.105		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/07/05	<0.110, EDL=0.110		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/07/05	<0.0965, EDL=0.0965		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/07/05	<0.108, EDL=0.108		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05	<0.104, EDL=0.104		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05	<0.108, EDL=0.108		pg/g	
			Octa CDF	2016/07/05	0.116, EDL=0.104		pg/g	
			Total Tetra CDF	2016/07/05	<0.102, EDL=0.102		pg/g	
			Total Penta CDF	2016/07/05	<0.107, EDL=0.107		pg/g	
			Total Hexa CDF	2016/07/05	<0.105, EDL=0.105		pg/g	
			Total Hepta CDF	2016/07/05	<0.106, EDL=0.106		pg/g	
4568571	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/07/06	<0.11, EDL=0.11		pg/g	
			Confirmation C13-2378 TetraCDF	2016/07/06		98	%	40 - 135

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date		%		
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
4568571	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/07/06	23		%	100

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

*Ceres Analytical Laboratory, Inc.  
4919 Windplay Dr., Suite 1  
El Dorado Hills, CA 95762*

July 25, 2017

Ceres ID: 11527-Rev.1

Apex Laboratories  
12232 S.W. Garden Place  
Tigard, OR 97223

The following report contains the results for the one soil sample received on July 20, 2017. This sample was analyzed for tetra through octa chlorinated dioxins and dibenzofurans by EPA method 1613B. Rush 3-day turn-around time was provided for this work.

Results for the soil sample are reported on a dry weight basis.

Confirmation analysis was performed for the 2,3,7,8-TCDF on a Quadrex Q-225 column for isomer specificity.

**Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

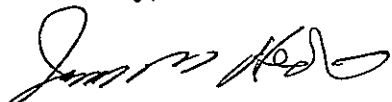
This work was authorized under Apex Laboratories' Project # A7G0292.

The report consists of a Cover Letter, Sample Inventory (Section I), Data Summary (Section II), Sample Tracking (Section VI), and Qualifiers/Abbreviations (Section VII). Raw Data (Section III), Continuing Calibration (Section IV), and Initial Calibration (Section V) are available in a full report (.pdf format) upon request.

The Sample Tracking Section includes all external and internal chain of custodies, laboratory bench sheets, and any special instructions received.

If you have any questions regarding this report, please feel free to contact me at (916)932-5011.

Sincerely,



James M. Hedin  
Director of Operations/CEO  
[jhedin@ceres-lab.com](mailto:jhedin@ceres-lab.com)

## Section I: Sample Inventory

<u>Ceres Sample ID:</u>	<u>Sample ID</u>	<u>Date Received</u>	<u>Collection Date &amp; Time</u>
11527-001	ISM-AOI004-0.5 - After Processing (A7G0292-02)	7/20/2017	7/12/2017 11:30



## **Section II: Data Summary**



### EPA Method 1613B

<b>Quality Assurance Sample Method Blank</b>  <b>Project ID:</b> A7G0292	<b>QC Batch #:</b> 1627 <b>Matrix:</b> Soil <b>Sample Size:</b> 10.00 g	<b>Date Received:</b> NA <b>Date Extracted:</b> 7/20/2017 <b>ZB-5MS Analysis:</b> 7/23/2017
--	---	---

Analyte	Conc. (pg/g)	MDL	Qualifiers	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 0.241	0.172		13C-2378-TCDD	86.1	25-164	
12378-PeCDD	DL= 0.321	0.327		13C-12378-PeCDD	90.4	25-181	
123478-HxCDD	DL= 0.436	0.327		13C-123478-HxCDD	102	32-141	
123678-HxCDD	DL= 0.512	0.655		13C-123678-HxCDD	91.4	28-130	
123789-HxCDD	DL= 0.455	0.315		13C-1234678-HpCDD	90.7	23-140	
1234678-HpCDD	DL= 0.578	0.409		13C-OCDD	87.0	17-157	
OCDD	DL= 0.651	1.01		13C-2378-TCDF	90.4	24-169	
2,3,7,8-TCDF	DL= 0.214	0.0886		13C-12378-PeCDF	98.7	24-185	
12378-PeCDF	DL= 0.220	0.412		13C-23478-PeCDF	103	21-178	
23478-PeCDF	DL= 0.192	0.422		13C-123478-HxCDF	97.8	26-152	
123478-HxCDF	DL= 0.247	0.518		13C-123678-HxCDF	95.9	26-123	
123678-HxCDF	DL= 0.265	0.533		13C-234678-HxCDF	93.0	28-136	
234678-HxCDF	DL= 0.284	0.319		13C-123789-HxCDF	82.0	29-147	
123789-HxCDF	DL= 0.414	0.425		13C-1234678-HpCDF	88.8	28-143	
1234678-HpCDF	DL= 0.469	0.279		13C-1234789-HpCDF	86.6	26-138	
1234789-HpCDF	DL= 0.622	0.378					
OCDF	DL= 1.48	0.461					
<b>Totals</b>	<b>Conc. (pg/g)</b>	<b>EMPC</b>		<b>CRS</b>			
Total TCDD	DL= 0.241			37Cl4-2378-TCDD	92.2	35-197	
Total PeCDD	DL= 0.321						
Total HxCDD	DL= 0.512						DL - Signifies Non-Detect (ND) at sample specific detection limit.
Total HpCDD	DL= 0.578						EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
Total TCDF	DL= 0.214						(a) - Lower control limit - Upper control limit
Total PeCDF	DL= 0.220						(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.
Total HxCDF	DL= 0.414						
Total HpCDF	DL= 0.622						

<b>Total Toxic Equivalency (TEQ min.) (b):</b>	0.0 pg/g
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### EPA Method 1613B

<p><b>Quality Assurance Sample</b> <b>Ongoing Precision and Recovery</b></p> <p>Project ID: A7G0292</p>	<p>QC Batch #: 1627</p> <p>Matrix: Soil</p> <p>Sample Size: 10.00 g</p>	<p>Date Received: NA</p> <p>Date Extracted: 7/20/2017</p> <p>ZB-5MS Analysis: 7/23/2017</p>
---	---	---

Analyte	Conc. (ng/mL)	Limits (a)	Labeled Standards	% Rec.	Limits (a)
2,3,7,8-TCDD	9.39	6.7-15.8	13C-2378-TCDD	93.8	20-175
12378-PeCDD	48.4	35-71	13C-12378-PeCDD	81.8	21-227
123478-HxCDD	46.0	35-82	13C-123478-HxCDD	83.4	21-193
123678-HxCDD	50.5	38-67	13C-123678-HxCDD	91.7	25-163
123789-HxCDD	56.1	32-81	13C-1234678-HpCDD	99.7	26-166
1234678-HpCDD	49.7	35-70	13C-OCDD	98.3	13-198
OCDD	104	78-144	13C-2378-TCDF	86.9	22-152
2,3,7,8-TCDF	9.53	7.5-15.8	13C-12378-PeCDF	87.2	21-192
12378-PeCDF	45.2	40-67	13C-23478-PeCDF	89.4	13-328
23478-PeCDF	44.2	34-80	13C-123478-HxCDF	79.7	19-202
123478-HxCDF	43.1	36-67	13C-123678-HxCDF	70.3	21-159
123678-HxCDF	42.8	42-65	13C-234678-HxCDF	76.4	22-176
234678-HxCDF	44.0	35-78	13C-123789-HxCDF	91.6	17-205
123789-HxCDF	47.2	39-65	13C-1234678-HpCDF	91.0	21-158
1234678-HpCDF	43.6	41-61	13C-1234789-HpCDF	93.7	20-186
1234789-HpCDF	42.2	39-69			
OCDF	99.1	63-170			
			<b>CRS</b>		
			37Cl4-2378-TCDD	104	31-191
(a) Limits based on method acceptance criteria.					

Analyst: JMH

Reviewed by: BS



### EPA Method 1613B

<b>Client Sample ID:</b> ISM-AOI004-0.5 - After Processing (A7G0292-02)		
<b>Project ID:</b> A7G0292	<b>Ceres Sample ID:</b> 11527-001	<b>Date Received:</b> 7/20/2017
<b>Date Collected:</b> 7/12/2017	<b>QC Batch #:</b> 1627	<b>Date Extracted:</b> 7/20/2017
<b>Time Collected:</b> 11:30 AM	<b>Matrix:</b> Soil	<b>ZB-5MS Analysis:</b> 7/23/2017
	<b>Sample Size:</b> 10.82 g	<b>% Solids:</b> 96.2
		<b>Q-225 Analysis:</b> 7/24/2017

Analyte	Conc. (pg/g)	MDL	Qualifiers	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	0.762	0.172	J	13C-2378-TCDD	83.2	25-164	
12378-PeCDD	4.13	0.327	J	13C-12378-PeCDD	103	25-181	
123478-HxCDD	6.68	0.327		13C-123478-HxCDD	101	32-141	
123678-HxCDD	27.5	0.655		13C-123678-HxCDD	91.5	28-130	
123789-HxCDD	16.2	0.315		13C-1234678-HpCDD	79.2	23-140	
1234678-HpCDD	456	0.409		13C-OCDD	49.9	17-157	
OCDD	2,740	1.01		13C-2378-TCDF	91.1	24-169	
2,3,7,8-TCDF	1.67	0.0886		13C-12378-PeCDF	91.9	24-185	
12378-PeCDF	1.78	0.412	J	13C-23478-PeCDF	106	21-178	
23478-PeCDF	2.85	0.422	J	13C-123478-HxCDF	89.1	26-152	
123478-HxCDF	8.70	0.518		13C-123678-HxCDF	87.9	26-123	
123678-HxCDF	4.34	0.533	J	13C-234678-HxCDF	91.0	28-136	
234678-HxCDF	2.75	0.319	J	13C-123789-HxCDF	82.9	29-147	
123789-HxCDF	DL= 0.618	0.425		13C-1234678-HpCDF	66.4	28-143	
1234678-HpCDF	57.3	0.279		13C-1234789-HpCDF	72.1	26-138	
1234789-HpCDF	4.00	0.378	J				
OCDF	112	0.461					
<b>Totals</b>	<b>Conc. (pg/g)</b>	<b>EMPC</b>		<b>CRS</b>			
Total TCDD	7.69			37Cl4-2378-TCDD	98.9	35-197	
Total PeCDD	20.2	24.1					
Total HxCDD	134						DL - Signifies Non-Detect (ND) at sample specific detection limit.
Total HpCDD	767						EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure.
Total TCDF	48.8	50.0					(a) - Lower control limit - Upper control limit
Total PeCDF	60.5						(b) - TEQ based on (2005) World Health Organization (WHO) Toxic Equivalent Factors.
Total HxCDF	124						
Total HpCDF	156						

<b>Total Toxic Equivalency (TEQ min.) (b):</b>	<b>18.6 pg/g</b>
--	------------------

## **Section VI: Sample Tracking**



SUBCONTRACT ORDER

Apex Laboratories

A7G0292

SENDING LABORATORY:

Apex Laboratories  
12232 S.W. Garden Place  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 718-0333  
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Ceres Analytical Laboratory, Inc  
4919 Windplay Drive, Suite 1  
El Dorado Hills, CA 95762  
Phone : (916) 932-5011  
Fax: -9

Sample Name: ISM-AOI004-0.5 - After Processing      Soil      Sampled: 07/12/17 11:30      (A7G0292-02)  
After ISM Processing

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	07/24/17 17:00	01/08/18 11:30	Low Level Standard Required, Use Containers G,H,I, J <u>Use full volume</u>
<i>Containers Supplied:</i>			
(G)40 mL VOA - Non Preserved			
(H)40 mL VOA - Non Preserved			
(I)40 mL VOA - Non Preserved			
(J)40 mL VOA - Non Preserved			

~~ASAP - ISM Sample~~

Released By: Date: 7-19-17

Received By: Date: 7/20/17 09:31

Released By: UPS (Shipper) Date: \_\_\_\_\_

Received By: UPS (Shipper) Date: \_\_\_\_\_

## Sample Receipt Check List

Ceres ID: <u>11527</u>	Date/Time: <u>7/20/17 09:31</u>
Client Project ID: <u>A7G0292</u>	Received Temp: <u>0.4</u> °C Acceptable: <input checked="" type="radio"/> Y / <input type="radio"/> N
Chain of Custody Relinquished by signed?	<input checked="" type="radio"/> Y / <input type="radio"/> N
Custody Seals? Present?	<input type="radio"/> Y / <input type="radio"/> N
Intact?	<input type="radio"/> Y / <input type="radio"/> N
NA:	<input checked="" type="radio"/> NA
Unlabeled / Illegible Samples	<input type="radio"/> Y / <input checked="" type="radio"/> N
Proper Containers:	<input checked="" type="radio"/> Y / <input type="radio"/> N
Preservation Acceptable (Chemical or <u>Temperature</u> )?	<input checked="" type="radio"/> Y / <input type="radio"/> N
Drinking Water, Sodium Thiosulfate present? Residual Cl?	Y / <input checked="" type="radio"/> N / <input type="radio"/> NA
Aqueous sample pH: <u>~7</u>	Y / <input type="radio"/> N
List COC discrepancies:	
<del><u>See 7/20/17</u></del>	
List Damaged Samples:	
<del><u>See 7/20/17</u></del>	

## Section VII: Qualifiers/Abbreviations

<b>J</b>	Concentration found below the lower quantitation limit but greater than zero.
<b>B</b>	Analyte present in the associated Method Blank.
<b>E</b>	Concentration found exceeds the Calibration range of the HRGC/HRMS.
<b>D</b>	This analyte concentration was calculated from a dilution.
<b>X</b>	The concentration found is the estimated maximum possible concentration due to chlorinated diphenyl ethers present in the sample.
<b>H</b>	Recovery limits exceeded. See cover letter.
<b>*</b>	Results taken from dilution.
<b>I</b>	Interference. See cover letter.
<b>Conc.</b>	Concentration Found
<b>DL</b>	Calculated Detection Limit
<b>ND</b>	Non-Detect
<b>% Rec.</b>	Percent Recovery

Friday, June 24, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield / 9003.01.39

Enclosed are the results of analyses for work order A6D0673, which was received by the laboratory on 4/18/2016 at 10:18:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/24/16 13:36

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Row-P2-006-0.5	A6D0673-01	Sediment	04/15/16 09:20	04/18/16 10:18
Row-P2-003-0.5	A6D0673-02	Sediment	04/15/16 09:35	04/18/16 10:18
Row-P2-002-0.5	A6D0673-03	Sediment	04/15/16 09:50	04/18/16 10:18
Row-P2-002-0.5-Dup	A6D0673-04	Sediment	04/15/16 09:50	04/18/16 10:18
Row-P2-001-0.5	A6D0673-05	Sediment	04/15/16 10:05	04/18/16 10:18
Row-P2-005-0.5	A6D0673-06	Sediment	04/15/16 10:45	04/18/16 10:18
Row-P2-004-0.5	A6D0673-07	Sediment	04/15/16 10:55	04/18/16 10:18
Row-P2-011A-0.5	A6D0673-08	Sediment	04/15/16 11:05	04/18/16 10:18
Row-P2-011B-0.5	A6D0673-09	Sediment	04/15/16 11:20	04/18/16 10:18
Row-P2-007-0.5	A6D0673-10	Sediment	04/15/16 11:30	04/18/16 10:18
Row-P2-008-0.5	A6D0673-11	Sediment	04/15/16 11:40	04/18/16 10:18
Row-P2-009-0.5	A6D0673-12	Sediment	04/15/16 11:50	04/18/16 10:18
Row-P2-010-0.5	A6D0673-13	Sediment	04/15/16 12:00	04/18/16 10:18
Row-P2-013-0.5	A6D0673-14	Sediment	04/15/16 12:15	04/18/16 10:18
Row-P2-014-0.5	A6D0673-15	Sediment	04/15/16 12:25	04/18/16 10:18
Row-P2-012-0.5	A6D0673-16	Sediment	04/15/16 12:35	04/18/16 10:18
Row-P2-015-0.5	A6D0673-17	Sediment	04/15/16 12:45	04/18/16 10:18
Row-P2-017-0.5	A6D0673-18	Sediment	04/15/16 13:00	04/18/16 10:18
Row-P2-016-0.5	A6D0673-19	Sediment	04/15/16 13:10	04/18/16 10:18

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
06/24/16 13:36

## ANALYTICAL CASE NARRATIVE

**Work Order: A6D0673**

Amended Report Revision 1:

This report supersedes all previous reports.

Analysis of TOC on 10 samples were added after the previous report version containing results for 9 samples had been completed.

Philip Nerenberg  
Lab Director  
4/7/16



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/24/16 13:36

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
			<b>Matrix: Sediment</b>					
Batch: 6040686								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	04/28/16 14:15	PSEP/SM 5310B MOD	
			<b>Matrix: Sediment</b>					
Batch: 6040686								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	04/28/16 14:15	PSEP/SM 5310B MOD	
			<b>Matrix: Sediment</b>					
Batch: 6040686								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	04/28/16 14:15	PSEP/SM 5310B MOD	
			<b>Matrix: Sediment</b>					
Batch: 6040686								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	04/28/16 14:15	PSEP/SM 5310B MOD	
			<b>Matrix: Sediment</b>					
Batch: 6040686								
<b>Total Organic Carbon</b>	<b>4500</b>	---	200	mg/kg	1	04/28/16 14:15	PSEP/SM 5310B MOD	
			<b>Matrix: Sediment</b>					
Batch: 6040686								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	04/28/16 14:15	PSEP/SM 5310B MOD	
			<b>Matrix: Sediment</b>					
Batch: 6040686								
<b>Total Organic Carbon</b>	<b>8400</b>	---	200	mg/kg	1	04/28/16 14:15	PSEP/SM 5310B MOD	
			<b>Matrix: Sediment</b>					
Batch: 6060612								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	06/22/16 13:00	PSEP/SM 5310B MOD	H-08
			<b>Matrix: Sediment</b>					
Batch: 6060612								
<b>Total Organic Carbon</b>	<b>15000</b>	---	200	mg/kg	1	06/22/16 13:00	PSEP/SM 5310B MOD	H-08

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/24/16 13:36

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
			<b>Matrix: Sediment</b>					
Batch: 6060538								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	06/21/16 15:20	PSEP/SM 5310B MOD	H-08
			<b>Matrix: Sediment</b>					
Batch: 6060538								
<b>Total Organic Carbon</b>	<b>26000</b>	---	200	mg/kg	1	06/21/16 15:20	PSEP/SM 5310B MOD	H-08
			<b>Matrix: Sediment</b>					
Batch: 6060538								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	06/21/16 15:20	PSEP/SM 5310B MOD	H-08
			<b>Matrix: Sediment</b>					
Batch: 6060538								
<b>Total Organic Carbon</b>	<b>9200</b>	---	200	mg/kg	1	06/21/16 15:20	PSEP/SM 5310B MOD	H-08
			<b>Matrix: Sediment</b>					
Batch: 6060538								
<b>Total Organic Carbon</b>	<b>12000</b>	---	200	mg/kg	1	06/21/16 15:20	PSEP/SM 5310B MOD	H-08
			<b>Matrix: Sediment</b>					
Batch: 6060538								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	06/21/16 15:20	PSEP/SM 5310B MOD	H-08
			<b>Matrix: Sediment</b>					
Batch: 6060538								
<b>Total Organic Carbon</b>	<b>13000</b>	---	200	mg/kg	1	06/21/16 15:20	PSEP/SM 5310B MOD	H-08
			<b>Matrix: Sediment</b>					
Batch: 6060538								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/21/16 15:20	PSEP/SM 5310B MOD	H-08
			<b>Matrix: Sediment</b>					
Batch: 6060538								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	06/21/16 15:20	PSEP/SM 5310B MOD	H-08

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 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher


**Reported:**  
 06/24/16 13:36

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>Row-P2-016-0.5 (A6D0673-19)</b>			<b>Matrix: Sediment</b>					
Batch: 6060538								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/21/16 15:20	PSEP/SM 5310B MOD	H-08

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Philip Nerenberg, Lab Director

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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher


Reported:  
06/24/16 13:36

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6040686 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (6040686-BLK1)</b>						Prepared: 04/22/16 16:35 Analyzed: 04/28/16 14:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6040686-BS1)</b>						Prepared: 04/22/16 16:35 Analyzed: 04/28/16 14:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115%	---	---	
<b>Duplicate (6040686-DUP1)</b>						Prepared: 04/22/16 16:35 Analyzed: 04/28/16 14:15						
<b>QC Source Sample: Other (A6D0601-04)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9900	---	200	mg/kg	1	---	10000	---	---	1	20%	
<b>Duplicate (6040686-DUP2)</b>						Prepared: 04/22/16 16:35 Analyzed: 04/28/16 14:15						
<b>QC Source Sample: Row-P2-006-0.5 (A6D0673-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	19000	---	200	mg/kg	1	---	21000	---	---	11	20%	
<b>Batch 6060538 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (6060538-BLK1)</b>						Prepared: 06/17/16 15:15 Analyzed: 06/21/16 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6060538-BS1)</b>						Prepared: 06/17/16 15:15 Analyzed: 06/21/16 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115%	---	---	
<b>Duplicate (6060538-DUP1)</b>						Prepared: 06/17/16 15:15 Analyzed: 06/21/16 15:20						
<b>QC Source Sample: Row-P2-007-0.5 (A6D0673-10)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	27000	---	200	mg/kg	1	---	22000	---	---	20	20%	
<b>Duplicate (6060538-DUP2)</b>						Prepared: 06/17/16 15:15 Analyzed: 06/21/16 15:20						
<b>QC Source Sample: Other (A6D0774-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	24000	---	200	mg/kg	1	---	28000	---	---	17	20%	

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 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/24/16 13:36

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6060612 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (6060612-BLK1)</b>						Prepared: 06/21/16 15:55 Analyzed: 06/22/16 13:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6060612-BS1)</b>						Prepared: 06/21/16 15:55 Analyzed: 06/22/16 13:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9400	---		mg/kg	1	10000	---	94	85-115%	---	---	
<b>Duplicate (6060612-DUP1)</b>						Prepared: 06/21/16 15:55 Analyzed: 06/22/16 13:00						
<b>QC Source Sample: Row-P2-011A-0.5 (A6D0673-08)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	22000	---	200	mg/kg	1	---	21000	---	---	4	20%	



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 Portland, OR 97209

Project: **Port of Ridgefield**  
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 Project Manager: Phil Wiescher

**Reported:**  
 06/24/16 13:36

### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6040686</b>							
A6D0673-01	Sediment	PSEP/SM 5310B MOD	04/15/16 09:20	04/22/16 16:35	5g/5g	5g/5g	NA
A6D0673-02	Sediment	PSEP/SM 5310B MOD	04/15/16 09:35	04/22/16 16:35	5g/5g	5g/5g	NA
A6D0673-03	Sediment	PSEP/SM 5310B MOD	04/15/16 09:50	04/22/16 16:35	5g/5g	5g/5g	NA
A6D0673-04	Sediment	PSEP/SM 5310B MOD	04/15/16 09:50	04/22/16 16:35	5g/5g	5g/5g	NA
A6D0673-05	Sediment	PSEP/SM 5310B MOD	04/15/16 10:05	04/22/16 16:35	5g/5g	5g/5g	NA
A6D0673-06	Sediment	PSEP/SM 5310B MOD	04/15/16 10:45	04/22/16 16:35	5g/5g	5g/5g	NA
A6D0673-07	Sediment	PSEP/SM 5310B MOD	04/15/16 10:55	04/22/16 16:35	5g/5g	5g/5g	NA
<b>Batch: 6060538</b>							
A6D0673-10	Sediment	PSEP/SM 5310B MOD	04/15/16 11:30	06/17/16 15:15	5g/5g	5g/5g	NA
A6D0673-11	Sediment	PSEP/SM 5310B MOD	04/15/16 11:40	06/17/16 15:15	5g/5g	5g/5g	NA
A6D0673-12	Sediment	PSEP/SM 5310B MOD	04/15/16 11:50	06/17/16 15:15	5g/5g	5g/5g	NA
A6D0673-13	Sediment	PSEP/SM 5310B MOD	04/15/16 12:00	06/17/16 15:15	5g/5g	5g/5g	NA
A6D0673-14	Sediment	PSEP/SM 5310B MOD	04/15/16 12:15	06/17/16 15:15	5g/5g	5g/5g	NA
A6D0673-15	Sediment	PSEP/SM 5310B MOD	04/15/16 12:25	06/17/16 15:15	5g/5g	5g/5g	NA
A6D0673-16	Sediment	PSEP/SM 5310B MOD	04/15/16 12:35	06/17/16 15:15	5g/5g	5g/5g	NA
A6D0673-17	Sediment	PSEP/SM 5310B MOD	04/15/16 12:45	06/17/16 15:15	5g/5g	5g/5g	NA
A6D0673-18	Sediment	PSEP/SM 5310B MOD	04/15/16 13:00	06/17/16 15:15	5g/5g	5g/5g	NA
A6D0673-19	Sediment	PSEP/SM 5310B MOD	04/15/16 13:10	06/17/16 15:15	5g/5g	5g/5g	NA

**Batch: 6060612**

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 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/24/16 13:36

### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A6D0673-08	Sediment	PSEP/SM 5310B MOD	04/15/16 11:05	06/21/16 15:55	5g/5g	5g/5g	NA
A6D0673-09	Sediment	PSEP/SM 5310B MOD	04/15/16 11:20	06/21/16 15:55	5g/5g	5g/5g	NA

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/24/16 13:36

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/24/16 13:36

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: **MFA** Project Mgr: **P. Wiescher**

Address: **2001 NW 19th Ave, Ste 200, PDX, OR 97209** Phone: **503 501 5209** Fax:

Sampled by: **ENH/ERK**

Site Location: **OR** (WA) Other: \_\_\_\_\_

Project Name: **9003.01.39**

Project # **BA of Ridgefield**

Email: **Phil.Wiescher@maulalongi.com**

Lab # **A020073** COC **2** of **2**

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS			ANALYSIS REQUEST
				YES	NO	OTHER	
1	4/15	1140 S	2				TCLP Metals (8)
2		1150 S	2				RCRA Metals (8)
3		1200 S	2				600 TIO
4		1215 S	2				8082 PCBs
5		1225 S	2				8270 SIM PAHS
6		1235 S	2				8270 SVOC
7		1245 S	2				8260 BTEX
8		1300 S	2				8260 RBDM VOCs
9		1310 S	2				8260 VOC
10							NWTH-GX
							NWTH-DX
							NWTH-HCID

Normal Turn Around Time (TAT) = 7-10 Business Days

TAT Requested (circle): **1 Day** 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS: **DIGMS to MAXIMUM.**

RELINQUISHED BY: **Gary Hens** Signature: \_\_\_\_\_ Date: **4/15/16**

Printed Name: **GARY HENS** Time: \_\_\_\_\_

Company: **MFA**

RECEIVED BY: **Phil Wiescher** Signature: \_\_\_\_\_ Date: **4/18/16**

Printed Name: **Phil Wiescher** Time: **10:18**

Company: \_\_\_\_\_

*Philip Nerenberg*

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Friday, September 16, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: POR OPP / 9003.01.39

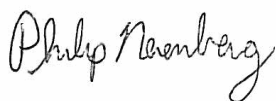
Enclosed are the results of analyses for work order A6D0774, which was received by the laboratory on 4/21/2016 at 1:19:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
09/16/16 10:56

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ROW-P2-019-0.5	A6D0774-01	Soil	04/20/16 09:30	04/21/16 13:19
ROW-P2-018-0.5	A6D0774-02	Soil	04/20/16 09:45	04/21/16 13:19
ROW-P2-021-0.5	A6D0774-04	Soil	04/20/16 10:00	04/21/16 13:19
ROW-P2-020-0.5	A6D0774-05	Soil	04/20/16 10:10	04/21/16 13:19
ROW-P2-022-0.5	A6D0774-06	Soil	04/20/16 10:20	04/21/16 13:19
ROW-P2-034-0.5	A6D0774-14	Soil	04/20/16 12:30	04/21/16 13:19
ROW-P2-033-0.5	A6D0774-15	Soil	04/20/16 12:40	04/21/16 13:19

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
09/16/16 10:56

## ANALYTICAL CASE NARRATIVE

**Work Order: A6D0774**

Amended Report Revision 1:

This report supersedes all previous reports.

Analysis of TOC on the following samples were added after the previous report version had been completed .

ROW-P2-021-0.5  
ROW-P2-020-0.5  
ROW-P2-022-0.5  
ROW-P2-034-0.5  
ROW-P2-033-0.5

Philip Nerenberg  
Lab Director  
9/16/16



Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 09/16/16 10:56

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ROW-P2-019-0.5 (A6D0774-01)</b>								
Batch: 6060538								
<b>Total Organic Carbon</b>	<b>28000</b>	---	200	mg/kg	1	06/21/16 15:20	PSEP/SM 5310B MOD	H-08
<b>ROW-P2-018-0.5 (A6D0774-02)</b>								
Batch: 6060612								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/22/16 13:00	PSEP/SM 5310B MOD	H-08
<b>ROW-P2-021-0.5 (A6D0774-04)</b>								
Batch: 6080867								
<b>Total Organic Carbon</b>	<b>35000</b>	---	200	mg/kg	1	08/26/16 15:25	PSEP/SM 5310B MOD	H-08
<b>ROW-P2-020-0.5 (A6D0774-05)</b>								
Batch: 6080867								
<b>Total Organic Carbon</b>	<b>35000</b>	---	200	mg/kg	1	08/26/16 15:25	PSEP/SM 5310B MOD	H-08
<b>ROW-P2-022-0.5 (A6D0774-06)</b>								
Batch: 6080867								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	08/26/16 15:25	PSEP/SM 5310B MOD	H-08
<b>ROW-P2-034-0.5 (A6D0774-14)</b>								
Batch: 6080867								
<b>Total Organic Carbon</b>	<b>25000</b>	---	200	mg/kg	1	08/26/16 15:25	PSEP/SM 5310B MOD	H-08
<b>ROW-P2-033-0.5 (A6D0774-15)</b>								
Batch: 6080867								
<b>Total Organic Carbon</b>	<b>23000</b>	---	200	mg/kg	1	08/26/16 15:25	PSEP/SM 5310B MOD	H-08

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Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher


Reported:  
09/16/16 10:56

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6060538 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (6060538-BLK1)</b>						Prepared: 06/17/16 15:15 Analyzed: 06/21/16 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6060538-BS1)</b>						Prepared: 06/17/16 15:15 Analyzed: 06/21/16 15:20						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115%	---	---	---
<b>Duplicate (6060538-DUP1)</b>						Prepared: 06/17/16 15:15 Analyzed: 06/21/16 15:20						
<b>QC Source Sample: Other (A6D0673-10)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	27000	---	200	mg/kg	1	---	22000	---	---	20	20%	---
<b>Duplicate (6060538-DUP2)</b>						Prepared: 06/17/16 15:15 Analyzed: 06/21/16 15:20						
<b>QC Source Sample: ROW-P2-019-0.5 (A6D0774-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	24000	---	200	mg/kg	1	---	28000	---	---	17	20%	---
<b>Batch 6060612 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (6060612-BLK1)</b>						Prepared: 06/21/16 15:55 Analyzed: 06/22/16 13:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6060612-BS1)</b>						Prepared: 06/21/16 15:55 Analyzed: 06/22/16 13:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9400	---		mg/kg	1	10000	---	94	85-115%	---	---	---
<b>Duplicate (6060612-DUP1)</b>						Prepared: 06/21/16 15:55 Analyzed: 06/22/16 13:00						
<b>QC Source Sample: Other (A6D0673-08)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	22000	---	200	mg/kg	1	---	21000	---	---	4	20%	---
<b>Batch 6080867 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (6080867-BLK1)</b>						Prepared: 08/24/16 11:20 Analyzed: 08/26/16 15:25						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 09/16/16 10:56

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6080867 - PSEP TOC</b>						<b>Soil</b>						
<b>LCS (6080867-BS1)</b>						Prepared: 08/24/16 11:20 Analyzed: 08/26/16 15:25						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9200	---		mg/kg	1	10000	---	92	85-115%	---	---	
<b>Duplicate (6080867-DUP1)</b>						Prepared: 08/24/16 11:20 Analyzed: 08/26/16 15:25						
<b>QC Source Sample: ROW-P2-021-0.5 (A6D0774-04)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	37000	---	200	mg/kg	1	---	35000	---	---	7	20%	



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**Reported:**  
 09/16/16 10:56

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6060538</b>							
A6D0774-01	Soil	PSEP/SM 5310B MOD	04/20/16 09:30	06/17/16 15:15	5g/5g	5g/5g	NA
<b>Batch: 6060612</b>							
A6D0774-02	Soil	PSEP/SM 5310B MOD	04/20/16 09:45	06/21/16 15:55	5g/5g	5g/5g	NA
<b>Batch: 6080867</b>							
A6D0774-04	Soil	PSEP/SM 5310B MOD	04/20/16 10:00	08/24/16 11:20	5g/5g	5g/5g	NA
A6D0774-05	Soil	PSEP/SM 5310B MOD	04/20/16 10:10	08/24/16 11:20	5g/5g	5g/5g	NA
A6D0774-06	Soil	PSEP/SM 5310B MOD	04/20/16 10:20	08/24/16 11:20	5g/5g	5g/5g	NA
A6D0774-14	Soil	PSEP/SM 5310B MOD	04/20/16 12:30	08/24/16 11:20	5g/5g	5g/5g	NA
A6D0774-15	Soil	PSEP/SM 5310B MOD	04/20/16 12:40	08/24/16 11:20	5g/5g	5g/5g	NA

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Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
09/16/16 10:56

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Maul Foster & Alongi, INC.  
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Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
09/16/16 10:56

**APEX LABS**      **CHAIN OF CUSTODY**      Lab # AED0714      COC 1 of 2

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: **MFA**      Project Mgr: **Phil Wiescher**      Project Name: **POA of Ridgefield OP**      Project #: **9003.01.39**  
 Address: **2001 NW 19th Ave Ste 200, Portland, OR**      Phone: **503-SDI-509**      Email: **Phil.Wiescher@maulfooster.com**  
 Sampled by: **ENH/RRR/KR**      Fax: \_\_\_\_\_

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-FCID	NWTPH-DX	NWTPH-GX	8260 VOC	8260 RBDM VOCs	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCA Metals (8)	TCLP Metals (8)	AL, SP, AR, BA, BE, CA, CR, CO, CU, FE, NI, PB, MN, SE, ZN	TOTAL DISS TCLP	1200-COLS	1200-Z	USEPA 1613B	DIOMs	KEEP TOC	SM, PCB	Archive	
ROW-P2-019-0.5	4/22/09	0930	S	2																						
ROW-P2-018-0.5	0945		S	2																						
ROW-P2-027-0.5	0950		S	2																						
ROW-P2-021-0.5	1000		S	2																						
ROW-P2-020-0.5	1010		S	2																						
ROW-P2-022-0.5	1016		S	2																						
ROW-P2-023-0.5	1030		S	2																						
ROW-P2-024-0.5	1040		S	2																						
ROW-P2-025-0.5	1050		S	2																						
ROW-P2-026-0.5	1105		S	2																						

ANALYSIS REQUEST

SPECIAL INSTRUCTIONS:  
Archive all samples, except for equipment blank (ROW-P2-EB). DIOMs to maximum.

RELINQUISHED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_ Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_  
 Company: \_\_\_\_\_ Company: \_\_\_\_\_

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
09/16/16 10:56

**CHAIN OF CUSTODY**

Lab # Academy COC # 012

**APEX LABS** 12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: MEA Project Mgr: Phil Wiescher Project Name: POR OPP Project # 9003 01 39  
Address: 2001 NW 19th Ave # 200, POX OR Phone: 503 501 5209 Fax: \_\_\_\_\_ Email: Phil.Wiescher@maulfooster.com

Sampled by: ENH/KKR

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST
Row-P2-028-0.5	4/20/16	11:5	S	2	1200-Z 1200-COLS TOTAL DISS TCLP Pb, Cd, Ni, Ti, V, Zn Hg, Mn, Mo, Ni, Fe, Pb, Zn Al, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Ni, Pb, Zn
Row-P2-032-0.5	1/25/16	5	S	2	ANALYSIS REQUEST TCLP Metals (8) RCRA Metals (8) 600 TTO 8082 PCBs 8270 SIMI PAHs 8270 SVOC 8260 RTEX 8260 RBDM VOCs 8260 VOC NWTPH-GX NWTPH-DX NWTPH-HCID
Row-P2-035-0.5	1/26/16	5	S	2	
Row-P2-034-0.5	1/26/16	5	S	2	
Row-P2-033-0.5	1/24/16	5	S	2	
Row-P2-031-0.5	1/25/16	5	S	2	
Row-P2-030-0.5	1/30/16	5	S	2	
Row-P2-024-0.5	1/30/16	5	S	2	
Row-P2-EB	1/30/16	W	3	3	

Normal Turn Around Time (TAT) = 7-10 Business Days

TAT Requested (circle): 3 Day

SPECIAL INSTRUCTIONS:  
Archive all samples, except for Equipment to be sent (Row-P2-EB). Dioxins to Max team.

RECEIVED BY: \_\_\_\_\_ Date: \_\_\_\_\_  
Signature: \_\_\_\_\_ Printed Name: \_\_\_\_\_ Company: \_\_\_\_\_

RELINQUISHED BY: \_\_\_\_\_ Date: 4/20/16  
Signature: [Signature] Printed Name: Kevin Hoover Company: Apex Labs

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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Thursday, July 14, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A6E0248, which was received by the laboratory on 5/5/2016 at 10:20:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

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Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/14/16 10:27

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW001-0.5	A6E0248-01	Sediment	05/04/16 09:00	05/05/16 10:20
ISM-AOI041A-0.5-As Received	A6E0248-02	Sediment	05/04/16 10:00	05/05/16 10:20
ISM-AOI041B-0.5-As Received	A6E0248-04	Sediment	05/04/16 11:00	05/05/16 10:20

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/14/16 10:27

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW001-0.5 (A6E0248-01)</b>			<b>Matrix: Sediment</b>					
Batch: 6050488								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	05/18/16 21:15	PSEP/SM 5310B MOD	

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/14/16 10:27

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW001-0.5 (A6E0248-01)</b>			<b>Matrix: Sediment</b>		<b>Batch: 6050466</b>			
% Solids	82.9	---	1.00	% by Weight	1	05/18/16 08:07	EPA 8000C	Q-38
<b>ISM-AOI041A-0.5-As Received (A6E0248-02)</b>			<b>Matrix: Sediment</b>		<b>Batch: 6050355</b>			
% Solids	82.3	---	1.00	% by Weight	1	05/13/16 08:52	EPA 8000C	
<b>ISM-AOI041B-0.5-As Received (A6E0248-04)</b>			<b>Matrix: Sediment</b>		<b>Batch: 6050355</b>			
% Solids	80.5	---	1.00	% by Weight	1	05/13/16 08:52	EPA 8000C	

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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
06/14/16 10:27

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6050488 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (6050488-BLK1)</b>						Prepared: 05/17/16 16:12 Analyzed: 05/18/16 21:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6050488-BS1)</b>						Prepared: 05/17/16 16:12 Analyzed: 05/18/16 21:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9600	---		mg/kg	1	10000	---	96	85-115%	---	---	
<b>Duplicate (6050488-DUP1)</b>						Prepared: 05/17/16 16:12 Analyzed: 05/18/16 21:15						
<b>QC Source Sample: SS-ROW001-0.5 (A6E0248-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	19000	---	200	mg/kg	1	---	16000	---	---	17	20%	

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Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/14/16 10:27

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6050355 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6050355-DUP1)</b>						Prepared: 05/12/16 12:38 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6D0834-60)												
EPA 8000C												
% Solids	78.6	---	1.00	% by Weight	1	---	79.1	---	---	0.6	10%	
<b>Duplicate (6050355-DUP2)</b>						Prepared: 05/12/16 12:38 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0291-04)												
EPA 8000C												
% Solids	75.9	---	1.00	% by Weight	1	---	76.3	---	---	0.5	10%	
<b>Duplicate (6050355-DUP3)</b>						Prepared: 05/12/16 12:40 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0335-02)												
EPA 8000C												
% Solids	71.0	---	1.00	% by Weight	1	---	71.5	---	---	0.7	10%	
<b>Duplicate (6050355-DUP4)</b>						Prepared: 05/12/16 14:54 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6D0104-06)												
EPA 8000C												
% Solids	95.6	---	1.00	% by Weight	1	---	95.7	---	---	0.1	10%	
<b>Duplicate (6050355-DUP5)</b>						Prepared: 05/12/16 15:42 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0345-06)												
EPA 8000C												
% Solids	77.7	---	1.00	% by Weight	1	---	77.4	---	---	0.4	10%	
<b>Duplicate (6050355-DUP6)</b>						Prepared: 05/12/16 18:17 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0354-02)												
EPA 8000C												
% Solids	77.2	---	1.00	% by Weight	1	---	77.9	---	---	0.9	10%	
<b>Duplicate (6050355-DUP7)</b>						Prepared: 05/12/16 18:17 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0361-02)												
EPA 8000C												
% Solids	87.8	---	1.00	% by Weight	1	---	83.0	---	---	6	10%	
<b>Duplicate (6050355-DUP8)</b>						Prepared: 05/12/16 20:43 Analyzed: 05/13/16 08:52						

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Philip Nerenberg, Lab Director

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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
06/14/16 10:27

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6050355 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6050355-DUP8)</b>						Prepared: 05/12/16 20:43 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0369-02)												
EPA 8000C												
% Solids	91.1	---	1.00	% by Weight	1	---	92.7	---	---	2	10%	
<b>Batch 6050466 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6050466-DUP1)</b>						Prepared: 05/17/16 09:25 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0395-05)												
EPA 8000C												
% Solids	90.8	---	1.00	% by Weight	1	---	91.0	---	---	0.2	10%	Q-38
<b>Duplicate (6050466-DUP2)</b>						Prepared: 05/17/16 09:25 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0423-05)												
EPA 8000C												
% Solids	94.2	---	1.00	% by Weight	1	---	91.4	---	---	3	10%	Q-38
<b>Duplicate (6050466-DUP3)</b>						Prepared: 05/17/16 09:25 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0467-03)												
EPA 8000C												
% Solids	88.4	---	1.00	% by Weight	1	---	88.2	---	---	0.2	10%	Q-38
<b>Duplicate (6050466-DUP4)</b>						Prepared: 05/17/16 13:04 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0481-02)												
EPA 8000C												
% Solids	85.0	---	1.00	% by Weight	1	---	85.5	---	---	0.6	10%	Q-38
<b>Duplicate (6050466-DUP5)</b>						Prepared: 05/17/16 18:11 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0488-01)												
EPA 8000C												
% Solids	83.8	---	1.00	% by Weight	1	---	85.1	---	---	2	10%	Q-38
<b>Duplicate (6050466-DUP6)</b>						Prepared: 05/17/16 18:11 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0496-04)												
EPA 8000C												

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Philip Nerenberg, Lab Director

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 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/14/16 10:27

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6050466 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6050466-DUP6)</b>						Prepared: 05/17/16 18:11 Analyzed: 05/18/16 08:07						
<b>QC Source Sample: Other (A6E0496-04)</b>												
% Solids	83.2	---	1.00	% by Weight	1	---	83.9	---	---	0.8	10%	Q-38
<b>Duplicate (6050466-DUP7)</b>						Prepared: 05/17/16 19:11 Analyzed: 05/18/16 08:07						
<b>QC Source Sample: Other (A6E0501-02)</b>												
<b>EPA 8000C</b>												
% Solids	75.3	---	1.00	% by Weight	1	---	75.2	---	---	0.1	10%	Q-38

Apex Laboratories



Philip Nerenberg, Lab Director

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<b>Maul Foster &amp; Alongi, INC.</b> 2001 NW 19th Ave, STE 200 Portland, OR 97209	Project: <b>Port of Ridgefield ISM</b> Project Number: 9003.01.39 Project Manager: Phil Wiescher	<b>Reported:</b> 06/14/16 10:27
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### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

<b>Prep: PSEP TOC</b>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<b>Batch: 6050488</b>							
A6E0248-01	Sediment	PSEP/SM 5310B MOD	05/04/16 09:00	05/17/16 16:12	5g/5g	5g/5g	NA

#### Percent Dry Weight

<b>Prep: Total Solids (Dry Weight)</b>					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<b>Batch: 6050355</b>							
A6E0248-02	Sediment	EPA 8000C	05/04/16 10:00	05/12/16 15:28	1N/A/1N/A	1N/A/1N/A	NA
A6E0248-04	Sediment	EPA 8000C	05/04/16 11:00	05/12/16 15:28	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 6050466</b>							
A6E0248-01	Sediment	EPA 8000C	05/04/16 09:00	05/17/16 13:05	1N/A/1N/A	1N/A/1N/A	NA

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/14/16 10:27

## Notes and Definitions

### Qualifiers:

Q-38 Oven outside of control limits during drying step.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Apex Laboratories



Philip Nerenberg, Lab Director

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2001 NW 19th Ave, STE 200  
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Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/14/16 10:27

Lab # A6E0248 coc 1 of 1

### CHAIN OF CUSTODY

### APEX LABS

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>MFA</u>		Project Name: <u>Port of Ridgefield</u>		Project # <u>9003.01.39</u>	
Address: <u>Port of Ridgefield</u>		Phone: <u>503-360-5609</u>		Email: <u>port@portridgefield.com</u>	
Sampled by: <u>Phil AN</u>		Project Mgr: <u>Phil Wiescher</u>		Fax:	
Site Location: <u>OR</u>	Other: <u>(MFA)</u>	ANALYSIS REQUEST			
LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	
<u>SS-R00001-0.5</u>	<u>5/14/16</u>	<u>0900</u>	<u>SS</u>	<u>2</u>	<u>720-Z</u>
<u>ISM-ADJ041A-0.5</u>	<u>5/14/16</u>	<u>1000</u>	<u>SS</u>	<u>1</u>	<u>1200-COLS</u>
<u>ISM-ADJ041B-0.5</u>	<u>5/14/16</u>	<u>1100</u>	<u>SS</u>	<u>1</u>	<u>TCLP Metals (8)</u>
<u>SS-ADJ041A-0.5</u>	<u>5/14/16</u>	<u>1145</u>	<u>SS</u>	<u>2</u>	<u>AL, Sn, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Ti, V, Zn</u>
<u>SS-ADJ041B-0.5</u>	<u>5/14/16</u>	<u>1200</u>	<u>SS</u>	<u>2</u>	<u>Priority Metals (13)</u>
<u>SS-ADJ041C-0.5</u>	<u>5/14/16</u>	<u>1215</u>	<u>SS</u>	<u>2</u>	<u>RCRA Metals (8)</u>
<u>SS-ADJ041D-0.5</u>	<u>5/14/16</u>	<u>1230</u>	<u>SS</u>	<u>2</u>	<u>8081 Chlor. Pest</u>
<u>SS-ADJ041E-0.5</u>	<u>5/14/16</u>	<u>1245</u>	<u>SS</u>	<u>2</u>	<u>8082 PCBs</u>
<u>SS-R00001-0.5-Rep</u>	<u>5/14/16</u>	<u>0740</u>	<u>SS</u>	<u>1</u>	<u>8270 SIM PAHS</u>
					<u>8260 VOCs</u>
					<u>8260 HAP VOCs</u>
					<u>8260 RBDN VOCs</u>
					<u>BTEX</u>
					<u>NWTPH-GX</u>
					<u>NWTPH-DX</u>
					<u>NWTPH-ACID</u>
Normal Turn Around Time (TAT) = 5-10 Business Days					SPECIAL INSTRUCTIONS:
TAT Requested (circle)		24 HR	48 HR	72 HR	
		4 DAY	5 DAY	Other:	
SAMPLES ARE HELD FOR 30 DAYS					
RELINQUISHED BY:	Date: <u>5/14/16</u>	Signature: <u>[Signature]</u>	Printed Name: <u>Phil Wiescher</u>	Company: <u>MFA</u>	
RECEIVED BY:	Date:	Signature:	Printed Name:	Company:	

*Philip Nerenberg*



Your Project #: A6E0248  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/06/13**  
Report #: R4026599  
Version: 2 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B6A1069**

**Received: 2016/05/18, 15:50**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2016/05/22	2016/05/27	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2016/06/13	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2016/05/20	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		CJO006			
<b>Sampling Date</b>		2016/05/04 09:00			
<b>COC Number</b>		na			
	<b>UNITS</b>	<b>SS-ROW001-0.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	13	1.0	0.50	4506971
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CJO006							
Sampling Date		2016/05/04 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW001-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.604	0.225	1.98	0.0791	1.00	0.604	N/A	4514488
1,2,3,7,8-Penta CDD *	pg/g	7.29	0.279	9.89	0.0791	1.00	7.29	N/A	4514488
1,2,3,4,7,8-Hexa CDD *	pg/g	11.7	0.465	9.89	0.0791	0.100	1.17	N/A	4514488
1,2,3,6,7,8-Hexa CDD *	pg/g	45.7	0.484	9.89	0.0791	0.100	4.57	N/A	4514488
1,2,3,7,8,9-Hexa CDD *	pg/g	33.2	0.486	9.89	0.0791	0.100	3.32	N/A	4514488
1,2,3,4,6,7,8-Hepta CDD *	pg/g	694	0.220	9.89	0.0791	0.0100	6.94	N/A	4514488
Octa CDD *	pg/g	3660	4.05	19.8	0.158	0.000300	1.10	N/A	4514488
Total Tetra CDD *	pg/g	3.61	0.225	1.98	0.0791	N/A	N/A	5	4514488
Total Penta CDD *	pg/g	36.0	0.279	9.89	0.0791	N/A	N/A	11	4514488
Total Hexa CDD *	pg/g	244	0.480	9.89	0.0791	N/A	N/A	6	4514488
Total Hepta CDD *	pg/g	1170	0.220	9.89	0.0791	N/A	N/A	2	4514488
2,3,7,8-Tetra CDF **	pg/g	<2.00 (1)	2.00	1.98	0.0791	0.100	0.200	N/A	4514488
1,2,3,7,8-Penta CDF **	pg/g	2.07	0.253	9.89	0.0791	0.0300	0.0621	N/A	4514488
2,3,4,7,8-Penta CDF **	pg/g	4.93	0.246	9.89	0.0791	0.300	1.48	N/A	4514488
1,2,3,4,7,8-Hexa CDF **	pg/g	12.1	0.306	9.89	0.0791	0.100	1.21	N/A	4514488
1,2,3,6,7,8-Hexa CDF **	pg/g	8.18	0.318	9.89	0.0791	0.100	0.818	N/A	4514488
2,3,4,6,7,8-Hexa CDF **	pg/g	8.95	0.295	9.89	0.0791	0.100	0.895	N/A	4514488
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.315	0.315	9.89	0.0791	0.100	0.0315	N/A	4514488
1,2,3,4,6,7,8-Hepta CDF **	pg/g	80.7	0.379	9.89	0.0791	0.0100	0.807	N/A	4514488
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.37	0.381	9.89	0.0791	0.0100	0.0537	N/A	4514488
Octa CDF **	pg/g	135	0.732	19.8	0.158	0.000300	0.0405	N/A	4514488
Total Tetra CDF **	pg/g	11.9	0.263	1.98	0.0791	N/A	N/A	6	4514488
Total Penta CDF **	pg/g	96.8	0.249	9.89	0.0791	N/A	N/A	9	4514488
Total Hexa CDF **	pg/g	271	0.308	9.89	0.0791	N/A	N/A	11	4514488
Total Hepta CDF **	pg/g	243	0.380	9.89	0.0791	N/A	N/A	4	4514488
Confirmation 2,3,7,8-Tetra CDF **	pg/g	3.24 (2)	0.14	2.0	1.8	0.100	0.324	N/A	4527404

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.  
(2) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CJO006							
Sampling Date		2016/05/04 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW001-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	30.7	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-1234678 HeptaCDD *	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-1234678 HeptaCDF **	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-123478 HexaCDD *	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-123478 HexaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-1234789 HeptaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-123678 HexaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-123678 HexaCDF **	%	117	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-12378 PentaCDD *	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-12378 PentaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-123789 HexaCDF **	%	131	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-234678 HexaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-23478 PentaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-2378 TetraCDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-2378 TetraCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-OCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4514488
Confirmation C13-2378 TetraCDF **	%	45	N/A	N/A	N/A	N/A	N/A	N/A	4527404

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
N/A = Not Applicable  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CJO006							
Sampling Date		2016/05/04 09:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	SS-ROW001-0.5 Lab-Dup	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.471 (1)	0.471	1.98	0.0792	1.00	0.471	N/A	4514488
1,2,3,7,8-Penta CDD *	pg/g	8.09	0.452	9.90	0.0792	1.00	8.09	N/A	4514488
1,2,3,4,7,8-Hexa CDD *	pg/g	12.2	0.479	9.90	0.0792	0.100	1.22	N/A	4514488
1,2,3,6,7,8-Hexa CDD *	pg/g	45.6	0.499	9.90	0.0792	0.100	4.56	N/A	4514488
1,2,3,7,8,9-Hexa CDD *	pg/g	31.5	0.501	9.90	0.0792	0.100	3.15	N/A	4514488
1,2,3,4,6,7,8-Hepta CDD *	pg/g	685	0.304	9.90	0.0792	0.0100	6.85	N/A	4514488
Octa CDD *	pg/g	3730	2.55	19.8	0.158	0.000300	1.12	N/A	4514488
Total Tetra CDD *	pg/g	3.82	0.254	1.98	0.0792	N/A	N/A	5	4514488
Total Penta CDD *	pg/g	51.4 (2)	0.452	9.90	0.0792	N/A	N/A	12	4514488
Total Hexa CDD *	pg/g	246	0.495	9.90	0.0792	N/A	N/A	7	4514488
Total Hepta CDD *	pg/g	1150	0.304	9.90	0.0792	N/A	N/A	2	4514488
2,3,7,8-Tetra CDF **	pg/g	<2.77 (3)	2.77	1.98	0.0792	0.100	0.277	N/A	4514488
1,2,3,7,8-Penta CDF **	pg/g	3.71	0.426	9.90	0.0792	0.0300	0.111	N/A	4514488
2,3,4,7,8-Penta CDF **	pg/g	7.39	0.414	9.90	0.0792	0.300	2.22	N/A	4514488
1,2,3,4,7,8-Hexa CDF **	pg/g	13.3	0.357	9.90	0.0792	0.100	1.33	N/A	4514488
1,2,3,6,7,8-Hexa CDF **	pg/g	8.71	0.371	9.90	0.0792	0.100	0.871	N/A	4514488
2,3,4,6,7,8-Hexa CDF **	pg/g	10.5	0.344	9.90	0.0792	0.100	1.05	N/A	4514488
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.368	0.368	9.90	0.0792	0.100	0.0368	N/A	4514488
1,2,3,4,6,7,8-Hepta CDF **	pg/g	78.3	0.203	9.90	0.0792	0.0100	0.783	N/A	4514488
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.39	0.204	9.90	0.0792	0.0100	0.0639	N/A	4514488
Octa CDF **	pg/g	130	0.613	19.8	0.158	0.000300	0.0390	N/A	4514488
Total Tetra CDF **	pg/g	16.8 (2)	0.304	1.98	0.0792	N/A	N/A	9	4514488
Total Penta CDF **	pg/g	129 (2)	0.420	9.90	0.0792	N/A	N/A	12	4514488
Total Hexa CDF **	pg/g	282	0.360	9.90	0.0792	N/A	N/A	10	4514488
Total Hepta CDF **	pg/g	219	0.203	9.90	0.0792	N/A	N/A	4	4514488

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.  
(2) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.  
(3) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CJO006							
Sampling Date		2016/05/04 09:00							
COC Number		na	TOXIC EQUIVALENCY				# of		
	UNITS	SS-ROW001-0.5 Lab-Dup	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Confirmation 2,3,7,8-Tetra CDF **	pg/g	4.11 (1)	0.22	2.0	1.8	0.100	0.411	N/A	4527404
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	32.4	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-1234678 HeptaCDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-1234678 HeptaCDF **	%	104	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-123478 HexaCDD *	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-123478 HexaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-1234789 HeptaCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-123678 HexaCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-123678 HexaCDF **	%	105	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-12378 PentaCDD *	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-12378 PentaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-123789 HexaCDF **	%	120	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-234678 HexaCDF **	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-23478 PentaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-2378 TetraCDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-2378 TetraCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4514488
C13-OCDD *	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4514488
Confirmation C13-2378 TetraCDF **	%	43	N/A	N/A	N/A	N/A	N/A	N/A	4527404

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
\*\* CDF = Chloro Dibenzo-p-Furan  
N/A = Not Applicable  
\* CDD = Chloro Dibenzo-p-Dioxin  
(1) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

**TEST SUMMARY**

**Maxxam ID:** CJO006  
**Sample ID:** SS-ROW001-0.5  
**Matrix:** Soil

**Collected:** 2016/05/04  
**Shipped:**  
**Received:** 2016/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4514488	2016/05/22	2016/05/27	Cuong Duc Do
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4527404	N/A	2016/06/13	Kay Shaw
Moisture	BAL	4506971	N/A	2016/05/20	Chun Yan

**Maxxam ID:** CJO006 Dup  
**Sample ID:** SS-ROW001-0.5  
**Matrix:** Soil

**Collected:** 2016/05/04  
**Shipped:**  
**Received:** 2016/05/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4514488	2016/05/27	2016/05/27	Cuong Duc Do
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4527404	N/A	2016/06/13	Kay Shaw

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.9°C
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**Results relate only to the items tested.**



**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4506971	VGS	RPD - Sample/Sample Dup	Moisture	2016/05/20	1.9		%	20
4514488	CD	Spiked Blank	37CL4 2378 Tetra CDD	2016/05/27		98	%	35 - 197
			C13-1234678 HeptaCDD	2016/05/27		72	%	23 - 140
			C13-1234678 HeptaCDF	2016/05/27		90	%	28 - 143
			C13-123478 HexaCDD	2016/05/27		73	%	32 - 141
			C13-123478 HexaCDF	2016/05/27		80	%	26 - 152
			C13-1234789 HeptaCDF	2016/05/27		82	%	26 - 138
			C13-123678 HexaCDD	2016/05/27		94	%	28 - 130
			C13-123678 HexaCDF	2016/05/27		115	%	26 - 123
			C13-12378 PentaCDD	2016/05/27		77	%	25 - 181
			C13-12378 PentaCDF	2016/05/27		78	%	24 - 185
			C13-123789 HexaCDF	2016/05/27		116	%	29 - 147
			C13-234678 HexaCDF	2016/05/27		87	%	28 - 136
			C13-23478 PentaCDF	2016/05/27		78	%	21 - 178
			C13-2378 TetraCDD	2016/05/27		99	%	25 - 164
			C13-2378 TetraCDF	2016/05/27		93	%	24 - 169
			C13-OCDD	2016/05/27		60	%	17 - 157
			2,3,7,8-Tetra CDD	2016/05/27		102	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/05/27		105	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/05/27		118	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/05/27		118	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/05/27		137	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/05/27		112	%	70 - 140
			Octa CDD	2016/05/27		113	%	78 - 144
			2,3,7,8-Tetra CDF	2016/05/27		108	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/05/27		111	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/05/27		108	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/05/27		118	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/05/27		98	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/05/27		118	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/05/27		83	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/05/27		102	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/05/27		107	%	78 - 138
			Octa CDF	2016/05/27		125	%	63 - 170
4514488	CD	Spiked Blank DUP	37CL4 2378 Tetra CDD	2016/05/27		91	%	35 - 197
			C13-1234678 HeptaCDD	2016/05/27		72	%	23 - 140
			C13-1234678 HeptaCDF	2016/05/27		84	%	28 - 143
			C13-123478 HexaCDD	2016/05/27		75	%	32 - 141
			C13-123478 HexaCDF	2016/05/27		79	%	26 - 152
			C13-1234789 HeptaCDF	2016/05/27		87	%	26 - 138
			C13-123678 HexaCDD	2016/05/27		90	%	28 - 130
			C13-123678 HexaCDF	2016/05/27		111	%	26 - 123
			C13-12378 PentaCDD	2016/05/27		80	%	25 - 181
			C13-12378 PentaCDF	2016/05/27		78	%	24 - 185
			C13-123789 HexaCDF	2016/05/27		118	%	29 - 147
			C13-234678 HexaCDF	2016/05/27		86	%	28 - 136
			C13-23478 PentaCDF	2016/05/27		78	%	21 - 178
			C13-2378 TetraCDD	2016/05/27		99	%	25 - 164
			C13-2378 TetraCDF	2016/05/27		87	%	24 - 169
			C13-OCDD	2016/05/27		61	%	17 - 157
			2,3,7,8-Tetra CDD	2016/05/27		105	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/05/27		111	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/05/27		121	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/05/27		124	%	76 - 134

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/05/27		145	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/05/27		119	%	70 - 140
			Octa CDD	2016/05/27		125	%	78 - 144
			2,3,7,8-Tetra CDF	2016/05/27		117	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/05/27		117	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/05/27		118	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/05/27		122	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/05/27		105	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/05/27		117	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/05/27		88	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/05/27		111	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/05/27		113	%	78 - 138
			Octa CDF	2016/05/27		143	%	63 - 170
4514488	CD	RPD	2,3,7,8-Tetra CDD	2016/05/27	2.9		%	25
			1,2,3,7,8-Penta CDD	2016/05/27	5.6		%	25
			1,2,3,4,7,8-Hexa CDD	2016/05/27	2.5		%	25
			1,2,3,6,7,8-Hexa CDD	2016/05/27	5.0		%	25
			1,2,3,7,8,9-Hexa CDD	2016/05/27	5.7		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/05/27	6.1		%	25
			Octa CDD	2016/05/27	10		%	25
			2,3,7,8-Tetra CDF	2016/05/27	8.0		%	25
			1,2,3,7,8-Penta CDF	2016/05/27	5.3		%	25
			2,3,4,7,8-Penta CDF	2016/05/27	8.8		%	25
			1,2,3,4,7,8-Hexa CDF	2016/05/27	3.3		%	25
			1,2,3,6,7,8-Hexa CDF	2016/05/27	6.9		%	25
			2,3,4,6,7,8-Hexa CDF	2016/05/27	0.85		%	25
			1,2,3,7,8,9-Hexa CDF	2016/05/27	5.8		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/05/27	8.5		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/05/27	5.5		%	25
			Octa CDF	2016/05/27	13		%	25
4514488	CD	Method Blank	37CL4 2378 Tetra CDD	2016/05/27		94	%	35 - 197
			C13-1234678 HeptaCDD	2016/05/27		74	%	23 - 140
			C13-1234678 HeptaCDF	2016/05/27		93	%	28 - 143
			C13-123478 HexaCDD	2016/05/27		77	%	32 - 141
			C13-123478 HexaCDF	2016/05/27		81	%	26 - 152
			C13-1234789 HeptaCDF	2016/05/27		89	%	26 - 138
			C13-123678 HexaCDD	2016/05/27		90	%	28 - 130
			C13-123678 HexaCDF	2016/05/27		110	%	26 - 123
			C13-12378 PentaCDD	2016/05/27		78	%	25 - 181
			C13-12378 PentaCDF	2016/05/27		77	%	24 - 185
			C13-123789 HexaCDF	2016/05/27		129	%	29 - 147
			C13-234678 HexaCDF	2016/05/27		88	%	28 - 136
			C13-23478 PentaCDF	2016/05/27		78	%	21 - 178
			C13-2378 TetraCDD	2016/05/27		96	%	25 - 164
			C13-2378 TetraCDF	2016/05/27		88	%	24 - 169
			C13-OCDD	2016/05/27		62	%	17 - 157
			2,3,7,8-Tetra CDD	2016/05/27	<0.210, EDL=0.210		pg/g	
			1,2,3,7,8-Penta CDD	2016/05/27	<0.222, EDL=0.222		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/05/27	<0.145, EDL=0.145		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/05/27	<0.152, EDL=0.152		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/05/27	<0.152, EDL=0.152		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/05/27	<0.251, EDL=0.251		pg/g	
			Octa CDD	2016/05/27	<0.268, EDL=0.268		pg/g	
			Total Tetra CDD	2016/05/27	<0.210, EDL=0.210		pg/g	
			Total Penta CDD	2016/05/27	<0.222, EDL=0.222		pg/g	
			Total Hexa CDD	2016/05/27	<0.150, EDL=0.150		pg/g	
			Total Hepta CDD	2016/05/27	<0.251, EDL=0.251		pg/g	
			2,3,7,8-Tetra CDF	2016/05/27	<0.102, EDL=0.102		pg/g	
			1,2,3,7,8-Penta CDF	2016/05/27	<0.153, EDL=0.153		pg/g	
			2,3,4,7,8-Penta CDF	2016/05/27	<0.148, EDL=0.148		pg/g	
			1,2,3,4,7,8-Hexa CDF	2016/05/27	<0.136, EDL=0.136		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/05/27	<0.141, EDL=0.141		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/05/27	<0.131, EDL=0.131		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/05/27	<0.140, EDL=0.140		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/05/27	<0.0955, EDL=0.0955		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/05/27	<0.0960, EDL=0.0960		pg/g	
			Octa CDF	2016/05/27	<0.185, EDL=0.185		pg/g	
			Total Tetra CDF	2016/05/27	<0.102, EDL=0.102		pg/g	
			Total Penta CDF	2016/05/27	<0.151, EDL=0.151		pg/g	
			Total Hexa CDF	2016/05/27	<0.137, EDL=0.137		pg/g	
			Total Hepta CDF	2016/05/27	<0.0958, EDL=0.0958		pg/g	
4514488	CD	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2016/05/27	NC (1)		%	25
			1,2,3,7,8-Penta CDD	2016/05/27	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2016/05/27	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2016/05/27	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2016/05/27	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/05/27	1.4		%	25
			Octa CDD	2016/05/27	1.8		%	25
			Total Tetra CDD	2016/05/27	NC		%	25
			Total Penta CDD	2016/05/27	NC (2)		%	25
			Total Hexa CDD	2016/05/27	0.81		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Hepta CDD	2016/05/27	1.2		%	25
			2,3,7,8-Tetra CDF	2016/05/27	NC (3)		%	25
			1,2,3,7,8-Penta CDF	2016/05/27	NC		%	25
			2,3,4,7,8-Penta CDF	2016/05/27	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2016/05/27	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2016/05/27	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2016/05/27	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2016/05/27	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/05/27	3.0		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/05/27	NC		%	25
			Octa CDF	2016/05/27	4.4		%	25
			Total Tetra CDF	2016/05/27	34 (2)		%	25
			Total Penta CDF	2016/05/27	28 (2)		%	25
			Total Hexa CDF	2016/05/27	4.1		%	25
			Total Hepta CDF	2016/05/27	10		%	25
4527404	KKS	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/06/13	NC (4)		%	100

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(2) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

(3) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

(4) EMPC / DPE - Diphenylether interference present caused dibenzofuran detected to become a "non-detect" with an elevated detection limit.

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).


\_\_\_\_\_  
Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist



\_\_\_\_\_  
Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

---

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A6E0248  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/07/04**  
Report #: R4051375  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B6C4894**

**Received: 2016/06/17, 14:22**

Sample Matrix: Soil  
# Samples Received: 2

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2016/06/22	2016/06/29	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	1	2016/06/22	2016/06/30	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2016/06/30	BRL SOP-00406	EPA M8290A / M1613
Moisture	2	N/A	2016/06/17	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====  
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		COC475	COC476			
Sampling Date		2016/05/04 10:00	2016/05/04 11:00			
COC Number		NA	NA			
	UNITS	ISM-AOI041A- 0.5-AFTER PROCESSING (A6E0248-03)	ISM-AOI041B- 0.5-AFTER PROCESSING (A6E0248-05)	RDL	MDL	QC Batch
Moisture	%	2.4	2.1	1.0	0.50	4544847
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COC475							
Sampling Date		2016/05/04 10:00							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI041A-0.5-AFTER PROCESSING (A6E0248-03)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.353	0.116	0.198	0.400	1.00	0.353	N/A	4553522
1,2,3,7,8-Penta CDD *	pg/g	1.61	0.104	0.991	0.400	1.00	1.61	N/A	4553522
1,2,3,4,7,8-Hexa CDD *	pg/g	4.04	0.104	0.991	0.400	0.100	0.404	N/A	4553522
1,2,3,6,7,8-Hexa CDD *	pg/g	17.6	0.108	0.991	0.400	0.100	1.76	N/A	4553522
1,2,3,7,8,9-Hexa CDD *	pg/g	11.0	0.112	0.991	0.400	0.100	1.10	N/A	4553522
1,2,3,4,6,7,8-Hepta CDD *	pg/g	415	0.104	0.991	0.400	0.0100	4.15	N/A	4553522
Octa CDD *	pg/g	2530	0.113	1.98	0.800	0.000300	0.759	N/A	4553522
Total Tetra CDD *	pg/g	2.05	0.116	0.198	0.400	N/A	N/A	5	4553522
Total Penta CDD *	pg/g	9.10	0.104	0.991	0.400	N/A	N/A	7	4553522
Total Hexa CDD *	pg/g	98.7	0.113	0.991	0.400	N/A	N/A	7	4553522
Total Hepta CDD *	pg/g	734	0.104	0.991	0.400	N/A	N/A	2	4553522
2,3,7,8-Tetra CDF **	pg/g	0.948	0.110	0.198	0.400	0.100	0.0948	N/A	4553522
1,2,3,7,8-Penta CDF **	pg/g	1.20	0.115	0.991	0.400	0.0300	0.0360	N/A	4553522
2,3,4,7,8-Penta CDF **	pg/g	2.06	0.116	0.991	0.400	0.300	0.618	N/A	4553522
1,2,3,4,7,8-Hexa CDF **	pg/g	8.08	0.109	0.991	0.400	0.100	0.808	N/A	4553522
1,2,3,6,7,8-Hexa CDF **	pg/g	3.64	0.114	0.991	0.400	0.100	0.364	N/A	4553522
2,3,4,6,7,8-Hexa CDF **	pg/g	2.59	0.100	0.991	0.400	0.100	0.259	N/A	4553522
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.285 (1)	0.285	0.991	0.400	0.100	0.0285	N/A	4553522
1,2,3,4,6,7,8-Hepta CDF **	pg/g	49.3	0.111	0.991	0.400	0.0100	0.493	N/A	4553522
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.03	0.116	0.991	0.400	0.0100	0.0303	N/A	4553522
Octa CDF **	pg/g	74.9	0.111	1.98	0.800	0.000300	0.0225	N/A	4553522
Total Tetra CDF **	pg/g	8.72	0.110	0.198	0.400	N/A	N/A	10	4553522
Total Penta CDF **	pg/g	32.2	0.115	0.991	0.400	N/A	N/A	7	4553522
Total Hexa CDF **	pg/g	107	0.108	0.991	0.400	N/A	N/A	7	4553522
Total Hepta CDF **	pg/g	145	0.113	0.991	0.400	N/A	N/A	3	4553522
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.60	0.10	0.99	0.89	0.100	0.0600	N/A	4561286

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COC475							
Sampling Date		2016/05/04 10:00							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI041A-0.5-AFTER PROCESSING (A6E0248-03)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	µg/g	N/A	N/A	N/A	N/A	N/A	12.9	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-1234678 HeptaCDD *	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-1234678 HeptaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-123478 HexaCDD *	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-123478 HexaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-1234789 HeptaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-123678 HexaCDD *	%	69	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-123678 HexaCDF **	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-12378 PentaCDD *	%	64	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-12378 PentaCDF **	%	65	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-123789 HexaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-234678 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-23478 PentaCDF **	%	62	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-2378 TetraCDD *	%	60	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-2378 TetraCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-OCDD *	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4553522
Confirmation C13-2378 TetraCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4561286
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch N/A = Not Applicable * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COC476							
Sampling Date		2016/05/04 11:00							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI041B- 0.5-AFTER PROCESSING (A6E0248-05)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.563	0.117	0.200	0.400	1.00	0.563	N/A	4553522
1,2,3,7,8-Penta CDD *	pg/g	10.9	0.153	0.999	0.400	1.00	10.9	N/A	4553522
1,2,3,4,7,8-Hexa CDD *	pg/g	40.1	0.116	0.999	0.400	0.100	4.01	N/A	4553522
1,2,3,6,7,8-Hexa CDD *	pg/g	284	0.120	0.999	0.400	0.100	28.4	N/A	4553522
1,2,3,7,8,9-Hexa CDD *	pg/g	111	0.125	0.999	0.400	0.100	11.1	N/A	4553522
1,2,3,4,6,7,8-Hepta CDD *	pg/g	5510 (1)	2.06	20.0	0.400	0.0100	55.1	N/A	4553522
Octa CDD *	pg/g	38200 (1)	2.00	40.0	0.800	0.000300	11.5	N/A	4553522
Total Tetra CDD *	pg/g	4.72	0.117	0.200	0.400	N/A	N/A	7	4553522
Total Penta CDD *	pg/g	43.9	0.153	0.999	0.400	N/A	N/A	9	4553522
Total Hexa CDD *	pg/g	1220	0.126	0.999	0.400	N/A	N/A	6	4553522
Total Hepta CDD *	pg/g	9810 (1)	2.06	20.0	0.400	N/A	N/A	2	4553522
2,3,7,8-Tetra CDF **	pg/g	10.9	0.102	0.200	0.400	0.100	1.09	N/A	4553522
1,2,3,7,8-Penta CDF **	pg/g	31.1	0.684	0.999	0.400	0.0300	0.933	N/A	4553522
2,3,4,7,8-Penta CDF **	pg/g	55.6	0.688	0.999	0.400	0.300	16.7	N/A	4553522
1,2,3,4,7,8-Hexa CDF **	pg/g	248	0.103	0.999	0.400	0.100	24.8	N/A	4553522
1,2,3,6,7,8-Hexa CDF **	pg/g	102	0.109	0.999	0.400	0.100	10.2	N/A	4553522
2,3,4,6,7,8-Hexa CDF **	pg/g	56.0	0.0952	0.999	0.400	0.100	5.60	N/A	4553522
1,2,3,7,8,9-Hexa CDF **	pg/g	3.31	0.106	0.999	0.400	0.100	0.331	N/A	4553522
1,2,3,4,6,7,8-Hepta CDF **	pg/g	1010	0.115	0.999	0.400	0.0100	10.1	N/A	4553522
1,2,3,4,7,8,9-Hepta CDF **	pg/g	57.0	0.119	0.999	0.400	0.0100	0.570	N/A	4553522
Octa CDF **	pg/g	752	0.116	2.00	0.800	0.000300	0.226	N/A	4553522
Total Tetra CDF **	pg/g	52.4	0.102	0.200	0.400	N/A	N/A	10	4553522
Total Penta CDF **	pg/g	695	0.686	0.999	0.400	N/A	N/A	11	4553522
Total Hexa CDF **	pg/g	3020	0.103	0.999	0.400	N/A	N/A	11	4553522
Total Hepta CDF **	pg/g	2880	0.117	0.999	0.400	N/A	N/A	4	4553522
Confirmation 2,3,7,8-Tetra CDF **	pg/g	9.10	0.13	1.0	0.90	0.100	0.910	N/A	4561286

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Results from 20xdiln



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COC476							
Sampling Date		2016/05/04 11:00							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ISM-AOI041B- 0.5-AFTER PROCESSING (A6E0248-05)	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	192	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	68	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-1234678 HeptaCDD *	%	92 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-1234678 HeptaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-123478 HexaCDD *	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-123478 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-1234789 HeptaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-123678 HexaCDD *	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-123678 HexaCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-12378 PentaCDD *	%	65	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-12378 PentaCDF **	%	68	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-123789 HexaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-234678 HexaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-23478 PentaCDF **	%	63	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-2378 TetraCDD *	%	61	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-2378 TetraCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4553522
C13-OCDD *	%	93 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4553522
Confirmation C13-2378 TetraCDF **	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4561286

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
N/A = Not Applicable  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Results from 20xdiln

**TEST SUMMARY**

**Maxxam ID:** COC475  
**Sample ID:** ISM-AOI041A-0.5-AFTER PROCESSING (A6E0248-03)  
**Matrix:** Soil

**Collected:** 2016/05/04  
**Shipped:**  
**Received:** 2016/06/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4553522	2016/06/22	2016/06/29	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4561286	N/A	2016/06/30	Vica Cioranic
Moisture	BAL	4544847	N/A	2016/06/17	Chun Yan

**Maxxam ID:** COC476  
**Sample ID:** ISM-AOI041B-0.5-AFTER PROCESSING (A6E0248-05)  
**Matrix:** Soil

**Collected:** 2016/05/04  
**Shipped:**  
**Received:** 2016/06/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4553522	2016/06/22	2016/06/30	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4561286	N/A	2016/06/30	Vica Cioranic
Moisture	BAL	4544847	N/A	2016/06/17	Chun Yan

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.8°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4544847	NS3	RPD - Sample/Sample Dup	Moisture	2016/06/17	3.5		%	20
4553522	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2016/06/29		82	%	35 - 197
			C13-1234678 HeptaCDD	2016/06/29		82	%	23 - 140
			C13-1234678 HeptaCDF	2016/06/29		84	%	28 - 143
			C13-123478 HexaCDD	2016/06/29		83	%	32 - 141
			C13-123478 HexaCDF	2016/06/29		86	%	26 - 152
			C13-1234789 HeptaCDF	2016/06/29		75	%	26 - 138
			C13-123678 HexaCDD	2016/06/29		74	%	28 - 130
			C13-123678 HexaCDF	2016/06/29		79	%	26 - 123
			C13-12378 PentaCDD	2016/06/29		84	%	25 - 181
			C13-12378 PentaCDF	2016/06/29		82	%	24 - 185
			C13-123789 HexaCDF	2016/06/29		83	%	29 - 147
			C13-234678 HexaCDF	2016/06/29		81	%	28 - 136
			C13-23478 PentaCDF	2016/06/29		76	%	21 - 178
			C13-2378 TetraCDD	2016/06/29		68	%	25 - 164
			C13-2378 TetraCDF	2016/06/29		84	%	24 - 169
			C13-OCDD	2016/06/29		63	%	17 - 157
			2,3,7,8-Tetra CDD	2016/06/29		103	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/06/29		91	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/06/29		96	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/06/29		108	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/06/29		109	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/06/29		100	%	70 - 140
			Octa CDD	2016/06/29		114	%	78 - 144
			2,3,7,8-Tetra CDF	2016/06/29		107	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/06/29		100	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/06/29		119	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/06/29		108	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/06/29		113	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/06/29		98	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/06/29		110	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/06/29		95	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/06/29		110	%	78 - 138
			Octa CDF	2016/06/29		106	%	63 - 170
4553522	OBC	Spiked Blank DUP	37CL4 2378 Tetra CDD	2016/06/29		75	%	35 - 197
			C13-1234678 HeptaCDD	2016/06/29		81	%	23 - 140
			C13-1234678 HeptaCDF	2016/06/29		85	%	28 - 143
			C13-123478 HexaCDD	2016/06/29		86	%	32 - 141
			C13-123478 HexaCDF	2016/06/29		89	%	26 - 152
			C13-1234789 HeptaCDF	2016/06/29		80	%	26 - 138
			C13-123678 HexaCDD	2016/06/29		77	%	28 - 130
			C13-123678 HexaCDF	2016/06/29		81	%	26 - 123
			C13-12378 PentaCDD	2016/06/29		81	%	25 - 181
			C13-12378 PentaCDF	2016/06/29		78	%	24 - 185
			C13-123789 HexaCDF	2016/06/29		85	%	29 - 147
			C13-234678 HexaCDF	2016/06/29		86	%	28 - 136
			C13-23478 PentaCDF	2016/06/29		75	%	21 - 178
			C13-2378 TetraCDD	2016/06/29		63	%	25 - 164
			C13-2378 TetraCDF	2016/06/29		78	%	24 - 169
			C13-OCDD	2016/06/29		69	%	17 - 157
			2,3,7,8-Tetra CDD	2016/06/29		107	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/06/29		87	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/06/29		97	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/06/29		107	%	76 - 134

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/06/29		117	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/06/29		107	%	70 - 140
			Octa CDD	2016/06/29		115	%	78 - 144
			2,3,7,8-Tetra CDF	2016/06/29		109	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/06/29		102	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/06/29		110	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/06/29		108	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/06/29		111	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/06/29		105	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/06/29		113	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/06/29		100	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/06/29		112	%	78 - 138
			Octa CDF	2016/06/29		108	%	63 - 170
4553522	OBC	RPD	2,3,7,8-Tetra CDD	2016/06/29	3.8		%	25
			1,2,3,7,8-Penta CDD	2016/06/29	4.5		%	25
			1,2,3,4,7,8-Hexa CDD	2016/06/29	1.0		%	25
			1,2,3,6,7,8-Hexa CDD	2016/06/29	0.93		%	25
			1,2,3,7,8,9-Hexa CDD	2016/06/29	7.1		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/06/29	6.8		%	25
			Octa CDD	2016/06/29	0.87		%	25
			2,3,7,8-Tetra CDF	2016/06/29	1.9		%	25
			1,2,3,7,8-Penta CDF	2016/06/29	2.0		%	25
			2,3,4,7,8-Penta CDF	2016/06/29	7.9		%	25
			1,2,3,4,7,8-Hexa CDF	2016/06/29	0		%	25
			1,2,3,6,7,8-Hexa CDF	2016/06/29	1.8		%	25
			2,3,4,6,7,8-Hexa CDF	2016/06/29	6.9		%	25
			1,2,3,7,8,9-Hexa CDF	2016/06/29	2.7		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/06/29	5.1		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/06/29	1.8		%	25
			Octa CDF	2016/06/29	1.9		%	25
4553522	OBC	Method Blank	37CL4 2378 Tetra CDD	2016/06/29		78	%	35 - 197
			C13-1234678 HeptaCDD	2016/06/29		76	%	23 - 140
			C13-1234678 HeptaCDF	2016/06/29		81	%	28 - 143
			C13-123478 HexaCDD	2016/06/29		78	%	32 - 141
			C13-123478 HexaCDF	2016/06/29		84	%	26 - 152
			C13-1234789 HeptaCDF	2016/06/29		76	%	26 - 138
			C13-123678 HexaCDD	2016/06/29		69	%	28 - 130
			C13-123678 HexaCDF	2016/06/29		82	%	26 - 123
			C13-12378 PentaCDD	2016/06/29		78	%	25 - 181
			C13-12378 PentaCDF	2016/06/29		78	%	24 - 185
			C13-123789 HexaCDF	2016/06/29		80	%	29 - 147
			C13-234678 HexaCDF	2016/06/29		81	%	28 - 136
			C13-23478 PentaCDF	2016/06/29		75	%	21 - 178
			C13-2378 TetraCDD	2016/06/29		62	%	25 - 164
			C13-2378 TetraCDF	2016/06/29		80	%	24 - 169
			C13-OCDD	2016/06/29		58	%	17 - 157
			2,3,7,8-Tetra CDD	2016/06/29	<0.151, EDL=0.151 (1)		pg/g	
			1,2,3,7,8-Penta CDD	2016/06/29	0.532, EDL=0.104		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/06/29	0.662, EDL=0.0950		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/06/29	0.663, EDL=0.0981		pg/g	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/06/29	0.845, EDL=0.102		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/06/29	0.976, EDL=0.109		pg/g	
			Octa CDD	2016/06/29	4.61, EDL=0.106		pg/g	
			Total Tetra CDD	2016/06/29	<0.151, EDL=0.151 (1)		pg/g	
			Total Penta CDD	2016/06/29	0.532, EDL=0.104		pg/g	
			Total Hexa CDD	2016/06/29	2.17, EDL=0.103		pg/g	
			Total Hepta CDD	2016/06/29	0.976, EDL=0.109		pg/g	
			2,3,7,8-Tetra CDF	2016/06/29	0.133, EDL=0.0999		pg/g	
			1,2,3,7,8-Penta CDF	2016/06/29	0.553, EDL=0.109		pg/g	
			2,3,4,7,8-Penta CDF	2016/06/29	<0.521, EDL=0.521 (1)		pg/g	
			1,2,3,4,7,8-Hexa CDF	2016/06/29	<0.583, EDL=0.583 (1)		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/06/29	0.666, EDL=0.110		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/06/29	0.584, EDL=0.0969		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/06/29	0.659, EDL=0.108		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/06/29	0.679, EDL=0.107		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/06/29	0.780, EDL=0.110		pg/g	
			Octa CDF	2016/06/29	1.73, EDL=0.107		pg/g	
			Total Tetra CDF	2016/06/29	0.133, EDL=0.0999		pg/g	
			Total Penta CDF	2016/06/29	0.553, EDL=0.109		pg/g	
			Total Hexa CDF	2016/06/29	1.91, EDL=0.105		pg/g	
			Total Hepta CDF	2016/06/29	1.46, EDL=0.108		pg/g	
4553522	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2016/06/27	NC		%	25
			1,2,3,7,8-Penta CDD	2016/06/27	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2016/06/27	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2016/06/27	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2016/06/27	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/06/27	NC		%	25
			Octa CDD	2016/06/27	NC		%	25
			Total Tetra CDD	2016/06/27	NC		%	25
			Total Penta CDD	2016/06/27	NC		%	25
			Total Hexa CDD	2016/06/27	NC		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Hepta CDD	2016/06/27	NC		%	25
			2,3,7,8-Tetra CDF	2016/06/27	NC		%	25
			1,2,3,7,8-Penta CDF	2016/06/27	NC		%	25
			2,3,4,7,8-Penta CDF	2016/06/27	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2016/06/27	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2016/06/27	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2016/06/27	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2016/06/27	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/06/27	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/06/27	NC		%	25
			Octa CDF	2016/06/27	NC		%	25
			Total Tetra CDF	2016/06/27	NC		%	25
			Total Penta CDF	2016/06/27	NC		%	25
			Total Hexa CDF	2016/06/27	NC		%	25
			Total Hepta CDF	2016/06/27	NC		%	25
			2,3,7,8-Tetra CDD	2016/06/27	NC		%	25
			1,2,3,7,8-Penta CDD	2016/06/27	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2016/06/27	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2016/06/27	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2016/06/27	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/06/27	NC		%	25
			Octa CDD	2016/06/27	NC		%	25
			Total Tetra CDD	2016/06/27	NC		%	25
			Total Penta CDD	2016/06/27	NC		%	25
			Total Hexa CDD	2016/06/27	2.5		%	25
			Total Hepta CDD	2016/06/27	NC		%	25
			2,3,7,8-Tetra CDF	2016/06/27	NC		%	25
			1,2,3,7,8-Penta CDF	2016/06/27	NC		%	25
			2,3,4,7,8-Penta CDF	2016/06/27	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2016/06/27	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2016/06/27	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2016/06/27	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2016/06/27	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/06/27	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/06/27	NC		%	25
			Octa CDF	2016/06/27	NC		%	25
			Total Tetra CDF	2016/06/27	NC		%	25
			Total Penta CDF	2016/06/27	NC		%	25
			Total Hexa CDF	2016/06/27	13		%	25
			Total Hepta CDF	2016/06/27	NC		%	25
4561286	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/06/30	<0.14, EDL=0.14		pg/g	
			Confirmation C13-2378 TetraCDF	2016/06/30		79	%	40 - 135
4561286	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/06/30	NC		%	100

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

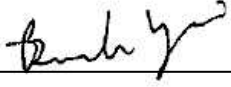
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Cristina Carriere, Scientific Services



Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Tuesday, June 14, 2016

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A6E0248, which was received by the laboratory on 5/5/2016 at 10:20:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

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Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/14/16 10:27

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-ROW001-0.5	A6E0248-01	Sediment	05/04/16 09:00	05/05/16 10:20
ISM-AOI041A-0.5-As Received	A6E0248-02	Sediment	05/04/16 10:00	05/05/16 10:20
ISM-AOI041B-0.5-As Received	A6E0248-04	Sediment	05/04/16 11:00	05/05/16 10:20

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/14/16 10:27

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW001-0.5 (A6E0248-01)</b>			<b>Matrix: Sediment</b>					
Batch: 6050488								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	05/18/16 21:15	PSEP/SM 5310B MOD	

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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/14/16 10:27

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>SS-ROW001-0.5 (A6E0248-01)</b>			<b>Matrix: Sediment</b>		<b>Batch: 6050466</b>			
% Solids	82.9	---	1.00	% by Weight	1	05/18/16 08:07	EPA 8000C	Q-38
<b>ISM-AOI041A-0.5-As Received (A6E0248-02)</b>			<b>Matrix: Sediment</b>		<b>Batch: 6050355</b>			
% Solids	82.3	---	1.00	% by Weight	1	05/13/16 08:52	EPA 8000C	
<b>ISM-AOI041B-0.5-As Received (A6E0248-04)</b>			<b>Matrix: Sediment</b>		<b>Batch: 6050355</b>			
% Solids	80.5	---	1.00	% by Weight	1	05/13/16 08:52	EPA 8000C	

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/14/16 10:27

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6050488 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (6050488-BLK1)</b>						Prepared: 05/17/16 16:12 Analyzed: 05/18/16 21:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6050488-BS1)</b>						Prepared: 05/17/16 16:12 Analyzed: 05/18/16 21:15						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9600	---		mg/kg	1	10000	---	96	85-115%	---	---	
<b>Duplicate (6050488-DUP1)</b>						Prepared: 05/17/16 16:12 Analyzed: 05/18/16 21:15						
<b>QC Source Sample: SS-ROW001-0.5 (A6E0248-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	19000	---	200	mg/kg	1	---	16000	---	---	17	20%	

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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/14/16 10:27

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6050355 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6050355-DUP1)</b>						Prepared: 05/12/16 12:38 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6D0834-60)												
EPA 8000C												
% Solids	78.6	---	1.00	% by Weight	1	---	79.1	---	---	0.6	10%	
<b>Duplicate (6050355-DUP2)</b>						Prepared: 05/12/16 12:38 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0291-04)												
EPA 8000C												
% Solids	75.9	---	1.00	% by Weight	1	---	76.3	---	---	0.5	10%	
<b>Duplicate (6050355-DUP3)</b>						Prepared: 05/12/16 12:40 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0335-02)												
EPA 8000C												
% Solids	71.0	---	1.00	% by Weight	1	---	71.5	---	---	0.7	10%	
<b>Duplicate (6050355-DUP4)</b>						Prepared: 05/12/16 14:54 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6D0104-06)												
EPA 8000C												
% Solids	95.6	---	1.00	% by Weight	1	---	95.7	---	---	0.1	10%	
<b>Duplicate (6050355-DUP5)</b>						Prepared: 05/12/16 15:42 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0345-06)												
EPA 8000C												
% Solids	77.7	---	1.00	% by Weight	1	---	77.4	---	---	0.4	10%	
<b>Duplicate (6050355-DUP6)</b>						Prepared: 05/12/16 18:17 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0354-02)												
EPA 8000C												
% Solids	77.2	---	1.00	% by Weight	1	---	77.9	---	---	0.9	10%	
<b>Duplicate (6050355-DUP7)</b>						Prepared: 05/12/16 18:17 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0361-02)												
EPA 8000C												
% Solids	87.8	---	1.00	% by Weight	1	---	83.0	---	---	6	10%	
<b>Duplicate (6050355-DUP8)</b>						Prepared: 05/12/16 20:43 Analyzed: 05/13/16 08:52						

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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/14/16 10:27

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6050355 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
Duplicate (6050355-DUP8)						Prepared: 05/12/16 20:43 Analyzed: 05/13/16 08:52						
QC Source Sample: Other (A6E0369-02)												
EPA 8000C												
% Solids	91.1	---	1.00	% by Weight	1	---	92.7	---	---	2	10%	
<b>Batch 6050466 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
Duplicate (6050466-DUP1)						Prepared: 05/17/16 09:25 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0395-05)												
EPA 8000C												
% Solids	90.8	---	1.00	% by Weight	1	---	91.0	---	---	0.2	10%	Q-38
Duplicate (6050466-DUP2)						Prepared: 05/17/16 09:25 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0423-05)												
EPA 8000C												
% Solids	94.2	---	1.00	% by Weight	1	---	91.4	---	---	3	10%	Q-38
Duplicate (6050466-DUP3)						Prepared: 05/17/16 09:25 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0467-03)												
EPA 8000C												
% Solids	88.4	---	1.00	% by Weight	1	---	88.2	---	---	0.2	10%	Q-38
Duplicate (6050466-DUP4)						Prepared: 05/17/16 13:04 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0481-02)												
EPA 8000C												
% Solids	85.0	---	1.00	% by Weight	1	---	85.5	---	---	0.6	10%	Q-38
Duplicate (6050466-DUP5)						Prepared: 05/17/16 18:11 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0488-01)												
EPA 8000C												
% Solids	83.8	---	1.00	% by Weight	1	---	85.1	---	---	2	10%	Q-38
Duplicate (6050466-DUP6)						Prepared: 05/17/16 18:11 Analyzed: 05/18/16 08:07						
QC Source Sample: Other (A6E0496-04)												
EPA 8000C												

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 06/14/16 10:27

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6050466 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (6050466-DUP6)</b>						Prepared: 05/17/16 18:11 Analyzed: 05/18/16 08:07						
<b>QC Source Sample: Other (A6E0496-04)</b>												
% Solids	83.2	---	1.00	% by Weight	1	---	83.9	---	---	0.8	10%	Q-38
<b>Duplicate (6050466-DUP7)</b>						Prepared: 05/17/16 19:11 Analyzed: 05/18/16 08:07						
<b>QC Source Sample: Other (A6E0501-02)</b>												
<b>EPA 8000C</b>												
% Solids	75.3	---	1.00	% by Weight	1	---	75.2	---	---	0.1	10%	Q-38

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 06/14/16 10:27

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6050488</b>							
A6E0248-01	Sediment	PSEP/SM 5310B MOD	05/04/16 09:00	05/17/16 16:12	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6050355</b>							
A6E0248-02	Sediment	EPA 8000C	05/04/16 10:00	05/12/16 15:28	1N/A/1N/A	1N/A/1N/A	NA
A6E0248-04	Sediment	EPA 8000C	05/04/16 11:00	05/12/16 15:28	1N/A/1N/A	1N/A/1N/A	NA
<b>Batch: 6050466</b>							
A6E0248-01	Sediment	EPA 8000C	05/04/16 09:00	05/17/16 13:05	1N/A/1N/A	1N/A/1N/A	NA

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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/14/16 10:27

## Notes and Definitions

### Qualifiers:

Q-38 Oven outside of control limits during drying step.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
06/14/16 10:27

Lab # **AC060246** coc 1 of 1  
Project # **9003.01.39**

## CHAIN OF CUSTODY

## APEX LABS

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <b>MFA</b>		Project Name: <b>Port of Ridgefield</b>		Project # <b>9003.01.39</b>	
Address: <b>Port of Ridgefield</b>		Phone: <b>503-360-5207</b>		Email: <b>port@portridgefield.com</b>	
Sampled by: <b>Phil Wiescher</b>		Project Mgr: <b>Phil Wiescher</b>		Fax:	
Site Location: <b>OR</b>	Other: <b>(N/A)</b>	ANALYSIS REQUEST			
SAMPLE ID					
SS-ROU001-0.5	5/14/16 0900 SS 2	MATRIX	# OF CONTAINERS	NWTPH-CD	NWTPH-GX
ISM-ADJ041A-0.5	5/14/16 1000 SS 1				
ISM-ADJ041B-0.5	5/14/16 1100 SS 1				
SS-ADJ041A-0.5	5/14/16 1145 SS 2				
SS-ADJ041B-0.5	5/14/16 1200 SS 2				
SS-ADJ041C-0.5	5/14/16 1215 SS 2				
SS-ADJ041D-0.5	5/14/16 1230 SS 2				
SS-ADJ041E-0.5	5/14/16 1245 SS 2				
SS-RB041-0.5-Rep	5/14/16 0740 SS 1				
Normal Turn Around Time (TAT) = 5-10 Business Days					
TAT Requested (circle)		24 HR	48 HR	72 HR	
SAMPLES ARE HELD FOR 30 DAYS		4 DAY	5 DAY	Other:	
RELINQUISHED BY:		SPECIAL INSTRUCTIONS:			
Signature: <i>[Signature]</i>	Date: <b>5/14/16</b>				
Printed Name: <b>Phil Wiescher</b>	Time: <b>10:27</b>				
RECEIVED BY:					
Signature: <i>[Signature]</i>	Date:				
Printed Name: <b>Phil Wiescher</b>	Time:				
Company: <b>MFA</b>					

*Philip Nerenberg*

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Thursday, September 15, 2016

Madi Novak  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: POR OPP / 9003.01.39

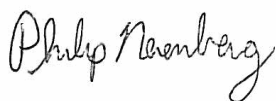
Enclosed are the results of analyses for work order A6H0510, which was received by the laboratory on 8/16/2016 at 10:38:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

---

Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
09/15/16 17:50

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ROW-002N-0.5	A6H0510-01	Soil	08/11/16 16:15	08/16/16 10:38

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 09/15/16 17:50

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>ROW-002N-0.5 (A6H0510-01)</b>								
<b>Matrix: Soil</b>								
Batch: 6080629								
<b>Total Organic Carbon</b>	<b>29000</b>	---	200	mg/kg	1	08/19/16 16:00	PSEP/SM 5310B MOD	

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 09/15/16 17:50

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 6080629 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (6080629-BLK1)</b>						Prepared: 08/17/16 15:30 Analyzed: 08/19/16 16:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (6080629-BS1)</b>						Prepared: 08/17/16 15:30 Analyzed: 08/19/16 16:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9400	---		mg/kg	1	10000	---	94	85-115%	---	---	
<b>Duplicate (6080629-DUP1)</b>						Prepared: 08/17/16 15:30 Analyzed: 08/19/16 16:00						
<b>QC Source Sample: ROW-002N-0.5 (A6H0510-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	43000	---	200	mg/kg	1	---	29000	---	---	37	20%	Q-04



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

**Reported:**  
 09/15/16 17:50

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 6080629</b>							
A6H0510-01	Soil	PSEP/SM 5310B MOD	08/11/16 16:15	08/17/16 15:30	5g/5g	5g/5g	NA

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **POR OPP**  
Project Number: 9003.01.39  
Project Manager: Madi Novak

**Reported:**  
09/15/16 17:50

## Notes and Definitions

### Qualifiers:

Q-04 Spike recovery and/or RPD is outside control limits due to a non-homogeneous sample matrix.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **POR OPP**  
 Project Number: 9003.01.39  
 Project Manager: Madi Novak

Reported:  
 09/15/16 17:50

Lab # 1010510 coc 1 of 1

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 PH: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster & Alongi		Project Mgr: Madi Novak (Ph) 503-718-2323		Project Name: POR OPP		Project # 9003.01.39	
Address: 2001 NW 19th Ave, Ste. 200, Portland, OR		Phone: 503-718-2323		Fax:		Email: paul@maul-foster.com	
Sampled by: EC		ANALYSIS REQUEST					
Site Location: OR	Other: WA	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID
		ROW-002N-0.5	8-11-16	10:15	S 2		NWTPH-DX
							NWTPH-CX
							8260 VOC
							8260 RDM VOCs
							8260 BTEX
							8270 SVOC
							8270 SIM PAHs
							8082 PCBs
							600 TTO
							RCA Metals (8)
							TCLP Metals (8)
							AL, Sb, As, Ba, Be, Bi, Cd, Cr, Cu, Fe, Pb, Hg, Mn, Ni, P, Se, Ag, Na, Ti, V, Zn
							TOTAL DISS TCLP
							1200-COLS
							USEPA 1613
							PER TOC

SPECIAL INSTRUCTIONS:

Normal Turn-Around Time (TAT) = 7-10 Business Days

YES

NO

1 Day 2 Day 3 Day  
 TAT Requested (circle) 4 DAY 5 DAY Other:

SAMPLES ARE HELD FOR 30 DAYS

RECEIVED BY:

Signature: Emily Curtis Date: 8-15-16

Printed Name: Emily Curtis Time: 10:39

Company: Apex Labs

RELINQUISHED BY:

Signature: Madi Novak Date: 8-15-16

Printed Name: Madi Novak Time: 10:39

Company: Apex Labs

RECEIVED BY:

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_

Company: \_\_\_\_\_

*Philip Nerenberg*

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Friday, April 14, 2017

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A7C0432, which was received by the laboratory on 3/14/2017 at 11:25:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

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Apex Laboratories



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---

Philip Nerenberg, Lab Director

Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 04/14/17 09:31

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI056-0.5 - As Received	A7C0432-01	Soil	03/08/17 14:10	03/14/17 11:25
ISM-AOI056-0.5 - After Processing	A7C0432-02	Soil	03/08/17 14:10	03/14/17 11:25
ISM-AOI061-0.5 - As Received	A7C0432-03	Soil	03/08/17 14:30	03/14/17 11:25
ISM-AOI061-0.5 - After Processing	A7C0432-04	Soil	03/08/17 14:30	03/14/17 11:25
ISM-AOI043-0.5 - As Received	A7C0432-05	Soil	03/08/17 09:30	03/14/17 11:25
ISM-AOI043-0.5 - After Processing	A7C0432-06	Soil	03/08/17 09:30	03/14/17 11:25
ISM-AOI049-0.5 - As Received	A7C0432-07	Soil	03/08/17 11:20	03/14/17 11:25
ISM-AOI049-0.5 - After Processing	A7C0432-08	Soil	03/08/17 11:20	03/14/17 11:25
ISM-AOI064-0.5 - As Received	A7C0432-09	Soil	03/08/17 15:00	03/14/17 11:25
ISM-AOI064-0.5 - After Processing	A7C0432-10	Soil	03/08/17 15:00	03/14/17 11:25
ISM-AOI054-0.5 - As Received	A7C0432-11	Soil	03/08/17 13:30	03/14/17 11:25
ISM-AOI054-0.5 - After Processing	A7C0432-12	Soil	03/08/17 13:30	03/14/17 11:25
ISM-AOI044-0.5 - As Received	A7C0432-13	Soil	03/08/17 10:22	03/14/17 11:25
ISM-AOI044-0.5 - After Processing	A7C0432-14	Soil	03/08/17 10:22	03/14/17 11:25
ISM-AOI051-0.5 - As Received	A7C0432-15	Soil	03/08/17 11:50	03/14/17 11:25
ISM-AOI051-0.5 - After Processing	A7C0432-16	Soil	03/08/17 11:50	03/14/17 11:25
ISM-AOI077-0.5 - As Received	A7C0432-17	Soil	03/09/17 13:20	03/14/17 11:25
ISM-AOI077-0.5 - After Processing	A7C0432-18	Soil	03/09/17 13:20	03/14/17 11:25
ISM-AOI072-0.5 - As Received	A7C0432-19	Soil	03/09/17 11:20	03/14/17 11:25
ISM-AOI072-0.5 - After Processing	A7C0432-20	Soil	03/09/17 11:20	03/14/17 11:25
ISM-AOI066-0.5-1 - As Received	A7C0432-21	Soil	03/09/17 10:17	03/14/17 11:25
ISM-AOI066-0.5-1 - After Processing	A7C0432-22	Soil	03/09/17 10:17	03/14/17 11:25
ISM-AOI066-0.5-2 - As Received	A7C0432-23	Soil	03/09/17 10:00	03/14/17 11:25
ISM-AOI066-0.5-2 - After Processing	A7C0432-24	Soil	03/09/17 10:00	03/14/17 11:25
ISM-AOI066-0.5-3 - As Received	A7C0432-25	Soil	03/09/17 09:36	03/14/17 11:25
ISM-AOI066-0.5-3 - After Processing	A7C0432-26	Soil	03/09/17 09:36	03/14/17 11:25
ISM-AOI076-0.5 - As Received	A7C0432-27	Soil	03/09/17 12:45	03/14/17 11:25
ISM-AOI076-0.5 - After Processing	A7C0432-28	Soil	03/09/17 12:45	03/14/17 11:25
ISM-AOI052-0.5 - As Received	A7C0432-29	Soil	03/08/17 12:13	03/14/17 11:25
ISM-AOI052-0.5 - After Processing	A7C0432-30	Soil	03/08/17 12:13	03/14/17 11:25
ISM-AOI067-0.5 - As Received	A7C0432-31	Soil	03/09/17 10:50	03/14/17 11:25
ISM-AOI067-0.5 - After Processing	A7C0432-32	Soil	03/09/17 10:50	03/14/17 11:25
TOC Grind Blank	A7C0432-33	Glass Blank	03/17/17 00:00	03/14/17 11:25

Apex Laboratories

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Philip Nerenberg, Lab Director

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
04/14/17 09:31

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI056-0.5 - After Processing (A7C0432-02)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>22000</b>	---	200	mg/kg	1	03/22/17 15:05	PSEP/SM 5310B MOD	
<b>ISM-AOI061-0.5 - After Processing (A7C0432-04)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	03/22/17 15:05	PSEP/SM 5310B MOD	
<b>ISM-AOI043-0.5 - After Processing (A7C0432-06)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	03/22/17 15:05	PSEP/SM 5310B MOD	
<b>ISM-AOI049-0.5 - After Processing (A7C0432-08)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	03/23/17 15:34	PSEP/SM 5310B MOD	H-08
<b>ISM-AOI064-0.5 - After Processing (A7C0432-10)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	03/22/17 15:05	PSEP/SM 5310B MOD	
<b>ISM-AOI054-0.5 - After Processing (A7C0432-12)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	03/22/17 15:05	PSEP/SM 5310B MOD	
<b>ISM-AOI044-0.5 - After Processing (A7C0432-14)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>23000</b>	---	200	mg/kg	1	03/22/17 15:05	PSEP/SM 5310B MOD	
<b>ISM-AOI051-0.5 - After Processing (A7C0432-16)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>24000</b>	---	200	mg/kg	1	03/23/17 15:34	PSEP/SM 5310B MOD	H-08
<b>ISM-AOI077-0.5 - After Processing (A7C0432-18)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	03/23/17 15:34	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
04/14/17 09:31

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI072-0.5 - After Processing (A7C0432-20)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	03/23/17 15:34	PSEP/SM 5310B MOD	
<b>ISM-AOI066-0.5-1 - After Processing (A7C0432-22)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	03/23/17 15:34	PSEP/SM 5310B MOD	
<b>ISM-AOI066-0.5-2 - After Processing (A7C0432-24)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	03/23/17 15:34	PSEP/SM 5310B MOD	
<b>ISM-AOI066-0.5-3 - After Processing (A7C0432-26)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>24000</b>	---	200	mg/kg	1	03/23/17 15:34	PSEP/SM 5310B MOD	
<b>ISM-AOI076-0.5 - After Processing (A7C0432-28)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>23000</b>	---	200	mg/kg	1	03/23/17 15:34	PSEP/SM 5310B MOD	
<b>ISM-AOI052-0.5 - After Processing (A7C0432-30)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	03/23/17 15:34	PSEP/SM 5310B MOD	H-08
<b>ISM-AOI067-0.5 - After Processing (A7C0432-32)</b>			<b>Matrix: Soil</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>14000</b>	---	200	mg/kg	1	03/23/17 15:34	PSEP/SM 5310B MOD	
<b>TOC Grind Blank (A7C0432-33)</b>			<b>Matrix: Glass Blank</b>					
Batch: 7030835								
<b>Total Organic Carbon</b>	<b>390</b>	---	200	mg/kg	1	03/23/17 15:34	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
04/14/17 09:31

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting			Date Analyzed	Method	Notes
			Limit	Units	Dilution			
<b>ISM-AOI056-0.5 - As Received (A7C0432-01)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	71.7	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI056-0.5 - After Processing (A7C0432-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	96.8	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI061-0.5 - As Received (A7C0432-03)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	78.2	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI061-0.5 - After Processing (A7C0432-04)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.2	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI043-0.5 - As Received (A7C0432-05)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	77.5	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI043-0.5 - After Processing (A7C0432-06)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.3	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI049-0.5 - As Received (A7C0432-07)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	75.6	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI049-0.5 - After Processing (A7C0432-08)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.0	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI064-0.5 - As Received (A7C0432-09)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	74.6	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI064-0.5 - After Processing (A7C0432-10)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.1	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI054-0.5 - As Received (A7C0432-11)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	75.2	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI054-0.5 - After Processing (A7C0432-12)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.0	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI044-0.5 - As Received (A7C0432-13)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	75.1	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI044-0.5 - After Processing (A7C0432-14)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.2	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI051-0.5 - As Received (A7C0432-15)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	74.3	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI051-0.5 - After Processing (A7C0432-16)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.1	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	

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Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
04/14/17 09:31


## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting			Date Analyzed	Method	Notes
			Limit	Units	Dilution			
<b>ISM-AOI077-0.5 - As Received (A7C0432-17)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	76.0	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI077-0.5 - After Processing (A7C0432-18)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.1	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI072-0.5 - As Received (A7C0432-19)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	74.5	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI072-0.5 - After Processing (A7C0432-20)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.1	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI066-0.5-1 - As Received (A7C0432-21)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	76.1	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI066-0.5-1 - After Processing (A7C0432-22)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.1	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI066-0.5-2 - As Received (A7C0432-23)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	76.0	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI066-0.5-2 - After Processing (A7C0432-24)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.3	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI066-0.5-3 - As Received (A7C0432-25)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	75.3	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI066-0.5-3 - After Processing (A7C0432-26)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	97.0	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI076-0.5 - As Received (A7C0432-27)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	72.5	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI076-0.5 - After Processing (A7C0432-28)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	96.5	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI052-0.5 - As Received (A7C0432-29)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	72.5	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI052-0.5 - After Processing (A7C0432-30)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	96.8	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI067-0.5 - As Received (A7C0432-31)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	71.6	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	
<b>ISM-AOI067-0.5 - After Processing (A7C0432-32)</b>			<b>Matrix: Soil</b>		<b>Batch: 7030871</b>			
% Solids	96.8	---	1.00	% by Weight	1	03/23/17 08:10	EPA 8000C	

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Project Manager: Phil Wiescher


Reported:  
04/14/17 09:31

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7030835 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (7030835-BLK1)</b>						Prepared: 03/21/17 15:55 Analyzed: 03/22/17 15:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>Blank (7030835-BLK2)</b>						Prepared: 03/21/17 15:55 Analyzed: 03/23/17 15:34						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (7030835-BS1)</b>						Prepared: 03/21/17 15:55 Analyzed: 03/22/17 15:05						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9400	---		mg/kg	1	10000	---	94	85-115%	---	---	
<b>LCS (7030835-BS2)</b>						Prepared: 03/21/17 15:55 Analyzed: 03/23/17 15:34						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115%	---	---	
<b>Duplicate (7030835-DUP1)</b>						Prepared: 03/21/17 15:55 Analyzed: 03/22/17 15:05						
<b>QC Source Sample: ISM-AOI056-0.5 - After Processing (A7C0432-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	22000	---	200	mg/kg	1	---	22000	---	---	0.6	20%	
<b>Duplicate (7030835-DUP2)</b>						Prepared: 03/21/17 15:55 Analyzed: 03/23/17 15:34						
<b>QC Source Sample: ISM-AOI066-0.5-1 - After Processing (A7C0432-22)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	22000	---	200	mg/kg	1	---	20000	---	---	8	20%	

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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7030871 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (7030871-DUP1)</b>						Prepared: 03/22/17 13:25 Analyzed: 03/23/17 08:10						
QC Source Sample: Other (A7C0645-01)												
EPA 8000C												
% Solids	84.4	---	1.00	% by Weight	1	---	85.1	---	---	0.8	10%	
<b>Duplicate (7030871-DUP2)</b>						Prepared: 03/22/17 13:25 Analyzed: 03/23/17 08:10						
QC Source Sample: Other (A7C0645-15)												
EPA 8000C												
% Solids	79.8	---	1.00	% by Weight	1	---	79.9	---	---	0.1	10%	
<b>Duplicate (7030871-DUP3)</b>						Prepared: 03/22/17 13:25 Analyzed: 03/23/17 08:10						
QC Source Sample: Other (A7C0658-02)												
EPA 8000C												
% Solids	77.6	---	1.00	% by Weight	1	---	79.3	---	---	2	10%	
<b>Duplicate (7030871-DUP4)</b>						Prepared: 03/22/17 16:26 Analyzed: 03/23/17 08:10						
QC Source Sample: ISM-AOI056-0.5 - As Received (A7C0432-01)												
EPA 8000C												
% Solids	70.5	---	1.00	% by Weight	1	---	71.7	---	---	2	10%	
<b>Duplicate (7030871-DUP5)</b>						Prepared: 03/22/17 16:26 Analyzed: 03/23/17 08:10						
QC Source Sample: ISM-AOI072-0.5 - After Processing (A7C0432-20)												
EPA 8000C												
% Solids	97.1	---	1.00	% by Weight	1	---	97.1	---	---	0.03	10%	
<b>Duplicate (7030871-DUP6)</b>						Prepared: 03/22/17 16:26 Analyzed: 03/23/17 08:10						
QC Source Sample: ISM-AOI076-0.5 - After Processing (A7C0432-28)												
EPA 8000C												
% Solids	96.5	---	1.00	% by Weight	1	---	96.5	---	---	0.005	10%	
<b>Duplicate (7030871-DUP7)</b>						Prepared: 03/22/17 16:26 Analyzed: 03/23/17 08:10						
QC Source Sample: ISM-AOI067-0.5 - After Processing (A7C0432-32)												
EPA 8000C												
% Solids	96.8	---	1.00	% by Weight	1	---	96.8	---	---	0.02	10%	
<b>Duplicate (7030871-DUP8)</b>						Prepared: 03/22/17 18:18 Analyzed: 03/23/17 08:10						
QC Source Sample: Other (A7C0671-01)												

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## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7030871 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (7030871-DUP8)</b>						Prepared: 03/22/17 18:18 Analyzed: 03/23/17 08:10						
QC Source Sample: Other (A7C0671-01)												
EPA 8000C												
% Solids	91.7	---	1.00	% by Weight	1	---	91.3	---	---	0.4	10%	
<b>Duplicate (7030871-DUP9)</b>						Prepared: 03/22/17 18:18 Analyzed: 03/23/17 08:10						
QC Source Sample: Other (A7C0692-04)												
EPA 8000C												
% Solids	68.6	---	1.00	% by Weight	1	---	65.7	---	---	4	10%	
<b>Duplicate (7030871-DUPA)</b>						Prepared: 03/22/17 20:03 Analyzed: 03/23/17 08:10						
QC Source Sample: Other (A7C0697-01)												
EPA 8000C												
% Solids	78.3	---	1.00	% by Weight	1	---	78.3	---	---	0.09	10%	
<b>Duplicate (7030871-DUPB)</b>						Prepared: 03/22/17 20:03 Analyzed: 03/23/17 08:10						
QC Source Sample: Other (A7C0704-01)												
EPA 8000C												
% Solids	74.6	---	1.00	% by Weight	1	---	74.8	---	---	0.2	10%	





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## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7030835</b>							
A7C0432-02	Soil	PSEP/SM 5310B MOD	03/08/17 14:10	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-04	Soil	PSEP/SM 5310B MOD	03/08/17 14:30	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-06	Soil	PSEP/SM 5310B MOD	03/08/17 09:30	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-08	Soil	PSEP/SM 5310B MOD	03/08/17 11:20	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-10	Soil	PSEP/SM 5310B MOD	03/08/17 15:00	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-12	Soil	PSEP/SM 5310B MOD	03/08/17 13:30	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-14	Soil	PSEP/SM 5310B MOD	03/08/17 10:22	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-16	Soil	PSEP/SM 5310B MOD	03/08/17 11:50	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-18	Soil	PSEP/SM 5310B MOD	03/09/17 13:20	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-20	Soil	PSEP/SM 5310B MOD	03/09/17 11:20	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-22	Soil	PSEP/SM 5310B MOD	03/09/17 10:17	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-24	Soil	PSEP/SM 5310B MOD	03/09/17 10:00	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-26	Soil	PSEP/SM 5310B MOD	03/09/17 09:36	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-28	Soil	PSEP/SM 5310B MOD	03/09/17 12:45	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-30	Soil	PSEP/SM 5310B MOD	03/08/17 12:13	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-32	Soil	PSEP/SM 5310B MOD	03/09/17 10:50	03/21/17 15:55	5g/5g	5g/5g	NA
A7C0432-33	Glass Blank	PSEP/SM 5310B MOD	03/17/17 00:00	03/21/17 15:55	5g/5g	5g/5g	NA

### Percent Dry Weight

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## SAMPLE PREPARATION INFORMATION

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 7030871							
A7C0432-01	Soil	EPA 8000C	03/08/17 14:10	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-02	Soil	EPA 8000C	03/08/17 14:10	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-03	Soil	EPA 8000C	03/08/17 14:30	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-04	Soil	EPA 8000C	03/08/17 14:30	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-05	Soil	EPA 8000C	03/08/17 09:30	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-06	Soil	EPA 8000C	03/08/17 09:30	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-07	Soil	EPA 8000C	03/08/17 11:20	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-08	Soil	EPA 8000C	03/08/17 11:20	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-09	Soil	EPA 8000C	03/08/17 15:00	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-10	Soil	EPA 8000C	03/08/17 15:00	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-11	Soil	EPA 8000C	03/08/17 13:30	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-12	Soil	EPA 8000C	03/08/17 13:30	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-13	Soil	EPA 8000C	03/08/17 10:22	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-14	Soil	EPA 8000C	03/08/17 10:22	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-15	Soil	EPA 8000C	03/08/17 11:50	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-16	Soil	EPA 8000C	03/08/17 11:50	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-17	Soil	EPA 8000C	03/09/17 13:20	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-18	Soil	EPA 8000C	03/09/17 13:20	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-19	Soil	EPA 8000C	03/09/17 11:20	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-20	Soil	EPA 8000C	03/09/17 11:20	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-21	Soil	EPA 8000C	03/09/17 10:17	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-22	Soil	EPA 8000C	03/09/17 10:17	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-23	Soil	EPA 8000C	03/09/17 10:00	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-24	Soil	EPA 8000C	03/09/17 10:00	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-25	Soil	EPA 8000C	03/09/17 09:36	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-26	Soil	EPA 8000C	03/09/17 09:36	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-27	Soil	EPA 8000C	03/09/17 12:45	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-28	Soil	EPA 8000C	03/09/17 12:45	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-29	Soil	EPA 8000C	03/08/17 12:13	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-30	Soil	EPA 8000C	03/08/17 12:13	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-31	Soil	EPA 8000C	03/09/17 10:50	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA
A7C0432-32	Soil	EPA 8000C	03/09/17 10:50	03/22/17 16:26	1N/A/1N/A	1N/A/1N/A	NA



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
04/14/17 09:31

## Notes and Definitions

### Qualifiers:

H-08 Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
04/14/17 09:31

Lab # A760432 coc 2 of 2

### CHAIN OF CUSTODY

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>Maul Foster &amp; Alongi, Inc.</u>		Project Mgr: <u>Phil Wiescher</u>		Project Name: <u>PORT OFF</u>		Project # <u>9003.01.39</u>		Email: <u>Phil.Wiescher@maulfooster.com</u>																	
Address: <u>2001 NW 19th Ave, Portland, OR 97209</u>		Phone: <u>503.505.2323</u>		Fax: <u></u>		PO# <u></u>																			
Sampled by: <u>EMC/BH/JM</u>																									
Site Location: <u>OR</u> <input type="radio"/> WA <input type="radio"/>																									
Other: <u></u>																									
SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 VOCs Full List	8260 RBDM VOCs	8260 HVOCS	8260 BTEX VOCs	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCRA Metals (8)	TCLP Metals (8)	AL, SB, AS, BA, BE, CA, CR, CO, CU, FE, NI, PB, SE, SG, NA, TL, V, ZN	1200-COLS	1200-Z	USEPA 1631	USEPA 1631 TOC	ISM Processing	
1 ESM-AVE066-0.5-1		3-17-17	1017	So	1																	X	X	X	
2 ESM-AVE066-0.5-2		3-17-17	1000	So	1																	X	X	X	
3 ESM-AVE066-0.5-3		3-17-17	0930	So	1																	X	X	X	
4 ESM-AVE076-0.5		3-17-17	1245	So	1																	X	X	X	
5 ESM-AVE052-0.5		3-17-17	1213	So	1																	X	X	X	
6 ESM-AVE067-0.5		3-17-17	1050	So	1																	X	X	X	
7																									
8																									
9																									
10																									
Normal Turn Around Time (TAT) = 10 Business Days						YES	NO			SPECIAL INSTRUCTIONS: <u>SUD TO Cape free</u>															
TAT Requested (circle)						1 Day	2 Day	3 Day																	
SAMPLES ARE HELD FOR 30 DAYS						4 DAY	5 DAY	Other:																	
RELINQUISHED BY:						RECEIVED BY:				RECEIVED BY:															
Signature: <u>Emily Nerenberg</u>						Signature: <u>[Signature]</u>				Signature:															
Date: <u>3/14/17</u>						Date: <u>3/17</u>				Date:															
Printed Name: <u>Emily Nerenberg</u>						Printed Name: <u>Michael Hinchliffe</u>				Printed Name:															
Time: <u></u>						Time: <u></u>				Time:															
Company: <u>Maul Foster &amp; Alongi, Inc.</u>						Company: <u>Apex Labs</u>				Company:															

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: 9003.01.39

Project Manager: Phil Wiescher

Reported:

04/14/17 09:31

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster + Alongi Element WO#: A7 CO432

Project/Project #: POB OPP/9003.01.39

**Delivery info:**

Date/Time Received: 3-14-17 @ 1125 By: MR

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: MR : 3-14-17 @ 1205

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>5.5</u>	<u>3.9</u>	<u>5.9</u>	<u>4.7</u>			
Received on Ice? (Y/N)	<u>(Y)</u>						
Temp. Blanks? (Y/N)	<u>(Y)</u>						
Ice Type: (Gel/Real/Other)	<u>(Gel)</u>						
Condition:	<u>good</u>	<u>''</u>	<u>''</u>	<u>''</u>			

Cooler out of temp? (Y/N) Possible reason why:

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: CRS : 3/15/17 @ 1040

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

Labeled by: INF Witness: DM Cooler Inspected by: CRS See Project Contact Form: Y

*Philip Nerenberg*

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Friday, June 16, 2017

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39-04

Enclosed are the results of analyses for work order A7E0757, which was received by the laboratory on 5/23/2017 at 3:20:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



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---

Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

**Reported:**  
06/16/17 14:01

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
<b>ISM-AOI073-0.5 - After Processing</b>	A7E0757-03	Soil	05/23/17 11:00	05/23/17 15:20
<b>ISM-AOI075-0.5 - After Processing</b>	A7E0757-05	Soil	05/23/17 11:20	05/23/17 15:20
<b>ISM-AOI068-0.5 - After Processing</b>	A7E0757-07	Soil	05/23/17 11:45	05/23/17 15:20

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 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

**Reported:**  
 06/16/17 14:01

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI073-0.5 - After Processing (A7E0757-03)</b>			<b>Matrix: Soil</b>					
Batch: 7051103								
<b>Total Organic Carbon</b>	<b>17000</b>	---	200	mg/kg	1	05/30/17 14:30	PSEP/SM 5310B MOD	
<b>ISM-AOI075-0.5 - After Processing (A7E0757-05)</b>			<b>Matrix: Soil</b>					
Batch: 7051103								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	05/30/17 14:30	PSEP/SM 5310B MOD	
<b>ISM-AOI068-0.5 - After Processing (A7E0757-07)</b>			<b>Matrix: Soil</b>					
Batch: 7051103								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	05/30/17 14:30	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

**Reported:**  
 06/16/17 14:01

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>ISM-AOI073-0.5 - After Processing (A7E0757-03)</b>			<b>Matrix: Soil</b>		<b>Batch: 7051100</b>			
% Solids	97.6	---	1.00	% by Weight	1	05/26/17 07:37	EPA 8000C	
<b>ISM-AOI075-0.5 - After Processing (A7E0757-05)</b>			<b>Matrix: Soil</b>		<b>Batch: 7051100</b>			
% Solids	97.2	---	1.00	% by Weight	1	05/26/17 07:37	EPA 8000C	
<b>ISM-AOI068-0.5 - After Processing (A7E0757-07)</b>			<b>Matrix: Soil</b>		<b>Batch: 7051100</b>			
% Solids	97.4	---	1.00	% by Weight	1	05/26/17 07:37	EPA 8000C	

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Philip Nerenberg, Lab Director



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 2001 NW 19th Ave, STE 200  
 Portland, OR 97209


Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

Reported:  
 06/16/17 14:01

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7051103 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (7051103-BLK1)</b>						Prepared: 05/25/17 15:20 Analyzed: 05/30/17 14:30						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>Blank (7051103-BLK2)</b>						Prepared: 05/25/17 15:20 Analyzed: 05/30/17 14:30						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	A-01
<b>LCS (7051103-BS1)</b>						Prepared: 05/25/17 15:20 Analyzed: 05/30/17 14:30						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115%	---	---	
<b>Duplicate (7051103-DUP1)</b>						Prepared: 05/25/17 15:20 Analyzed: 05/30/17 14:30						
<b>QC Source Sample: ISM-AOI073-0.5 - After Processing (A7E0757-03)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	16000	---	200	mg/kg	1	---	17000	---	---	4	20%	



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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

Reported:  
06/16/17 14:01

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7051100 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (7051100-DUP1)</b>						Prepared: 05/25/17 13:18 Analyzed: 05/26/17 07:37						
QC Source Sample: ISM-AOI073-0.5 - After Processing (A7E0757-03)												
EPA 8000C												
% Solids	97.6	---	1.00	% by Weight	1	---	97.6	---	---	0.02	10%	
<b>Duplicate (7051100-DUP3)</b>						Prepared: 05/25/17 16:22 Analyzed: 05/26/17 07:37						
QC Source Sample: Other (A7E0820-01)												
EPA 8000C												
% Solids	98.5	---	1.00	% by Weight	1	---	98.4	---	---	0.008	10%	
<b>Duplicate (7051100-DUP4)</b>						Prepared: 05/25/17 16:22 Analyzed: 05/26/17 07:37						
QC Source Sample: Other (A7E0823-05)												
EPA 8000C												
% Solids	75.6	---	1.00	% by Weight	1	---	81.9	---	---	8	10%	
<b>Duplicate (7051100-DUP5)</b>						Prepared: 05/25/17 19:31 Analyzed: 05/26/17 07:37						
QC Source Sample: Other (A7E0830-01)												
EPA 8000C												
% Solids	82.8	---	1.00	% by Weight	1	---	81.4	---	---	2	10%	
<b>Duplicate (7051100-DUP6)</b>						Prepared: 05/25/17 19:32 Analyzed: 05/26/17 07:37						
QC Source Sample: Other (A7E0837-01)												
EPA 8000C												
% Solids	64.1	---	1.00	% by Weight	1	---	63.8	---	---	0.5	10%	
<b>Duplicate (7051100-DUP7)</b>						Prepared: 05/25/17 19:32 Analyzed: 05/26/17 07:37						
QC Source Sample: Other (A7E0845-02)												
EPA 8000C												
% Solids	79.4	---	1.00	% by Weight	1	---	79.4	---	---	0.04	10%	

Apex Laboratories



Philip Nerenberg, Lab Director

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 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

**Reported:**  
 06/16/17 14:01

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7051103</b>							
A7E0757-03	Soil	PSEP/SM 5310B MOD	05/23/17 11:00	05/25/17 15:20	5g/5g	5g/5g	NA
A7E0757-05	Soil	PSEP/SM 5310B MOD	05/23/17 11:20	05/25/17 15:20	5g/5g	5g/5g	NA
A7E0757-07	Soil	PSEP/SM 5310B MOD	05/23/17 11:45	05/25/17 15:20	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7051100</b>							
A7E0757-03	Soil	EPA 8000C	05/23/17 11:00	05/25/17 13:18	1N/A/1N/A	1N/A/1N/A	NA
A7E0757-05	Soil	EPA 8000C	05/23/17 11:20	05/25/17 13:18	1N/A/1N/A	1N/A/1N/A	NA
A7E0757-07	Soil	EPA 8000C	05/23/17 11:45	05/25/17 13:18	1N/A/1N/A	1N/A/1N/A	NA



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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

**Reported:**  
06/16/17 14:01

## Notes and Definitions

### Qualifiers:

A-01 Grind blank.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

Reported:  
06/16/17 14:01

**CHAIN OF CUSTODY**

Company: **MFA**      Project Mgr: **Phil Wiescher**      Project Name: **POB OPP**      Lab # **A7E0757**      COC 1 of 1

Address: **2001 NW 19th Ave PDX 97209**      Phone: **503.561.5209**      Fax:      Project # **9003.01.39-04**      Email: **PhilWiescher@maulalongi.com**

Sampled by: **BEH/AY**      Site Location: **OR**      Other: **WA**

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS			ANALYSIS REQUEST
				YES	NO	NO	
1	5/23/17	1050	WA	2			1200-Z 1200-COLS TOTAL DISS TCLP Se. Ar. Na. TL. V. Zn Hg. Me. Mn. Mo. Ni. Pb. Cr. Co. Cu. Cd. Fe. PC Al. Sb. As. Ba. Be. Cd. TCLP Metals (8) RCRA Metals (8) 600 TTO 8082 PCBs 8270 SIM PAHS 8270 SVOC 8260 BTEX VOCs 8260 HVOCS 8260 RBDY VOCs 8260 VOCs Full List NWTPH-CV NWTPH-DX NWTPH-HCID
2	5/23/17	1100	WA	1			ISM Freshening VOCs PCBs VOCs PCBs VOCs PCBs VOCs PCBs
3	5/23/17	1120	WA	1			
4	5/23/17	1145	WA	1			

SPECIAL INSTRUCTIONS: **RB IS KUNSMER BANK FOR DRUMS  
SUB TO CAFE FEAR**

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle)	1 Day	2 Day	3 Day	4 Day	5 Day	Other:

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: **Philip Nerenberg**      Date: **6/16/17**      Signature: *Philip Nerenberg*      Date: **5/13/17**      Signature: *Phil Wiescher*

RECEIVED BY: **MFA**      Date: **6/16/17**      Signature: *Phil Wiescher*      Date: **5/13/17**      Signature: *Phil Wiescher*

Printed Name: **Philip Nerenberg**      Time: **15:20**      Printed Name: **Phil Wiescher**      Time: **15:40**

Company: **MFA**      Company: **Apex**

*Philip Nerenberg*



Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

Reported:  
 06/16/17 14:01

APEX LABS COOLER RECEIPT FORM

Client: MFA Element WO#: A7 E0757

Project/Project #: 9003.01.39-04

**Delivery info:**

Date/Time Received: 5/23/17 @ 15:20 By: GS

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: GS : 5/23/17 @ 16:23

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)							
Received on Ice? (Y/N)							
Temp. Blanks? (Y/N)	<u>5.6°C</u>						
Ice Type: (Gel/Real/Other)							
Condition:	<u>Good</u>						

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_  
 If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: KAL : 5/23/17 @ 16:30

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: RB label reads: RB-75-15-17  
T on ISM-A01473 -0.5 reads: 1120; ISM-A01475 -0.5 T


Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments:  
reads: 11.00

Do VOA Vials have Visible Headspace? Yes  No  NA   
 Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA   
 Comments: \_\_\_\_\_

Additional Information: \_\_\_\_\_

Labeled by: KF Witness: (M) Cooler Inspected by: KAL See Project Contact Form: Y

Apex Laboratories  
  
 Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Wednesday, July 12, 2017

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A7F0429, which was received by the laboratory on 6/14/2017 at 3:09:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



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---

Philip Nerenberg, Lab Director

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
07/12/17 13:46

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI062-0.5 - After Processing	A7F0429-02	Soil	06/14/17 09:55	06/14/17 15:09
ISM-AOI071-0.5 - After Processing	A7F0429-04	Soil	06/14/17 10:15	06/14/17 15:09
ISM-AOI046-0.5 - After Processing	A7F0429-06	Soil	06/14/17 10:30	06/14/17 15:09
ISM-AOI057-0.5 - After Processing	A7F0429-08	Soil	06/14/17 10:50	06/14/17 15:09
ISM-AOI063-0.5-1 - After Processing	A7F0429-10	Soil	06/14/17 11:15	06/14/17 15:09
ISM-AOI063-0.5-2 - After Processing	A7F0429-12	Soil	06/14/17 11:25	06/14/17 15:09
ISM-AOI063-0.5-3 - After Processing	A7F0429-14	Soil	06/14/17 11:35	06/14/17 15:09

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Philip Nerenberg, Lab Director

Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
07/12/17 13:46

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI062-0.5 - After Processing (A7F0429-02)</b>			<b>Matrix: Soil</b>					
Batch: 7060785								
<b>Total Organic Carbon</b>	<b>28000</b>	---	200	mg/kg	1	06/23/17 16:14	PSEP/SM 5310B MOD	
<b>ISM-AOI071-0.5 - After Processing (A7F0429-04)</b>			<b>Matrix: Soil</b>					
Batch: 7060785								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	06/23/17 16:14	PSEP/SM 5310B MOD	
<b>ISM-AOI046-0.5 - After Processing (A7F0429-06)</b>			<b>Matrix: Soil</b>					
Batch: 7060785								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	06/23/17 16:14	PSEP/SM 5310B MOD	
<b>ISM-AOI057-0.5 - After Processing (A7F0429-08)</b>			<b>Matrix: Soil</b>					
Batch: 7060785								
<b>Total Organic Carbon</b>	<b>25000</b>	---	200	mg/kg	1	06/23/17 16:14	PSEP/SM 5310B MOD	
<b>ISM-AOI063-0.5-1 - After Processing (A7F0429-10)</b>			<b>Matrix: Soil</b>					
Batch: 7060785								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	06/23/17 16:14	PSEP/SM 5310B MOD	
<b>ISM-AOI063-0.5-2 - After Processing (A7F0429-12)</b>			<b>Matrix: Soil</b>					
Batch: 7060785								
<b>Total Organic Carbon</b>	<b>20000</b>	---	200	mg/kg	1	06/23/17 16:14	PSEP/SM 5310B MOD	
<b>ISM-AOI063-0.5-3 - After Processing (A7F0429-14)</b>			<b>Matrix: Soil</b>					
Batch: 7060785								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	06/23/17 16:14	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 07/12/17 13:46

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>ISM-AOI062-0.5 - After Processing (A7F0429-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 7060761</b>			
% Solids	96.0	---	1.00	% by Weight	1	06/20/17 07:25	EPA 8000C	
<b>ISM-AOI071-0.5 - After Processing (A7F0429-04)</b>			<b>Matrix: Soil</b>		<b>Batch: 7060761</b>			
% Solids	96.6	---	1.00	% by Weight	1	06/20/17 07:25	EPA 8000C	
<b>ISM-AOI046-0.5 - After Processing (A7F0429-06)</b>			<b>Matrix: Soil</b>		<b>Batch: 7060761</b>			
% Solids	96.3	---	1.00	% by Weight	1	06/20/17 07:25	EPA 8000C	
<b>ISM-AOI057-0.5 - After Processing (A7F0429-08)</b>			<b>Matrix: Soil</b>		<b>Batch: 7060761</b>			
% Solids	96.6	---	1.00	% by Weight	1	06/20/17 07:25	EPA 8000C	
<b>ISM-AOI063-0.5-1 - After Processing (A7F0429-10)</b>			<b>Matrix: Soil</b>		<b>Batch: 7060761</b>			
% Solids	96.4	---	1.00	% by Weight	1	06/20/17 07:25	EPA 8000C	
<b>ISM-AOI063-0.5-2 - After Processing (A7F0429-12)</b>			<b>Matrix: Soil</b>		<b>Batch: 7060761</b>			
% Solids	94.4	---	1.00	% by Weight	1	06/20/17 07:25	EPA 8000C	
<b>ISM-AOI063-0.5-3 - After Processing (A7F0429-14)</b>			<b>Matrix: Soil</b>		<b>Batch: 7060761</b>			
% Solids	97.0	---	1.00	% by Weight	1	06/20/17 07:25	EPA 8000C	

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209


Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 07/12/17 13:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7060785 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (7060785-BLK1)</b>						Prepared: 06/20/17 09:12 Analyzed: 06/23/17 16:14						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>Blank (7060785-BLK2)</b>						Prepared: 06/20/17 09:12 Analyzed: 06/23/17 16:14						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (7060785-BS1)</b>						Prepared: 06/20/17 09:12 Analyzed: 06/23/17 16:14						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115	---	---	
<b>Duplicate (7060785-DUP1)</b>						Prepared: 06/20/17 09:12 Analyzed: 06/23/17 16:14						
<b>QC Source Sample: ISM-AOI062-0.5 - After Processing (A7F0429-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	27000	---	200	mg/kg	1	---	28000	---	---	5	20%	



Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 07/12/17 13:46

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7060761 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (7060761-DUP1)</b>						Prepared: 06/19/17 12:39 Analyzed: 06/20/17 07:25						
QC Source Sample: ISM-AOI062-0.5 - After Processing (A7F0429-02)												
EPA 8000C												
% Solids	96.0	---	1.00	% by Weight	1	---	96.0	---	---	0.01	10%	
<b>Duplicate (7060761-DUP2)</b>						Prepared: 06/19/17 12:39 Analyzed: 06/20/17 07:25						
QC Source Sample: Other (A7F0478-01)												
EPA 8000C												
% Solids	77.2	---	1.00	% by Weight	1	---	78.4	---	---	1	10%	
<b>Duplicate (7060761-DUP3)</b>						Prepared: 06/19/17 12:39 Analyzed: 06/20/17 07:25						
QC Source Sample: Other (A7F0481-01)												
EPA 8000C												
% Solids	79.2	---	1.00	% by Weight	1	---	82.7	---	---	4	10%	
<b>Duplicate (7060761-DUP4)</b>						Prepared: 06/19/17 12:39 Analyzed: 06/20/17 07:25						
QC Source Sample: Other (A7F0494-01)												
EPA 8000C												
% Solids	78.6	---	1.00	% by Weight	1	---	79.4	---	---	0.9	10%	
<b>Duplicate (7060761-DUP5)</b>						Prepared: 06/19/17 12:39 Analyzed: 06/20/17 07:25						
QC Source Sample: Other (A7F0506-04)												
EPA 8000C												
% Solids	75.5	---	1.00	% by Weight	1	---	75.7	---	---	0.3	10%	
<b>Duplicate (7060761-DUP6)</b>						Prepared: 06/19/17 15:38 Analyzed: 06/20/17 07:25						
QC Source Sample: Other (A7F0525-03)												
EPA 8000C												
% Solids	77.9	---	1.00	% by Weight	1	---	77.7	---	---	0.3	10%	



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 07/12/17 13:46

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

#### Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7060785</b>							
A7F0429-02	Soil	PSEP/SM 5310B MOD	06/14/17 09:55	06/20/17 09:12	5g/5g	5g/5g	NA
A7F0429-04	Soil	PSEP/SM 5310B MOD	06/14/17 10:15	06/20/17 09:12	5g/5g	5g/5g	NA
A7F0429-06	Soil	PSEP/SM 5310B MOD	06/14/17 10:30	06/20/17 09:12	5g/5g	5g/5g	NA
A7F0429-08	Soil	PSEP/SM 5310B MOD	06/14/17 10:50	06/20/17 09:12	5g/5g	5g/5g	NA
A7F0429-10	Soil	PSEP/SM 5310B MOD	06/14/17 11:15	06/20/17 09:12	5g/5g	5g/5g	NA
A7F0429-12	Soil	PSEP/SM 5310B MOD	06/14/17 11:25	06/20/17 09:12	5g/5g	5g/5g	NA
A7F0429-14	Soil	PSEP/SM 5310B MOD	06/14/17 11:35	06/20/17 09:12	5g/5g	5g/5g	NA

### Percent Dry Weight

#### Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7060761</b>							
A7F0429-02	Soil	EPA 8000C	06/14/17 09:55	06/19/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7F0429-04	Soil	EPA 8000C	06/14/17 10:15	06/19/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7F0429-06	Soil	EPA 8000C	06/14/17 10:30	06/19/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7F0429-08	Soil	EPA 8000C	06/14/17 10:50	06/19/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7F0429-10	Soil	EPA 8000C	06/14/17 11:15	06/19/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7F0429-12	Soil	EPA 8000C	06/14/17 11:25	06/19/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7F0429-14	Soil	EPA 8000C	06/14/17 11:35	06/19/17 12:39	1N/A/1N/A	1N/A/1N/A	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher


**Reported:**  
07/12/17 13:46

## Notes and Definitions

### Qualifiers:

### Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- \*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).







**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 07/12/17 13:46

APEX LABS COOLER RECEIPT FORM

Client: MFA Element WO#: A7 F0429

Project/Project #: POR OPP 9003.01.39

**Delivery info:**  
 Date/Time Received: 6/14/17 @ 1509 By: CFH  
 Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other \_\_\_\_\_

**Cooler Inspection** Inspected by: CFH : 6/14/17 @ 1615  
 Chain of Custody Included? Yes  No  Custody Seals? Yes  No   
 Signed/Dated by Client? Yes  No   
 Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)		<u>4.4</u>					
Received on Ice? (Y/N)							
Temp. Blanks? (Y/N)		<u>1.3</u>					
Ice Type: (Gel/Real/Other)							
Condition:		<u>Good</u>					

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_  
 If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: KM : 6/14/17 @ 1647

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_


Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA   
 Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA   
 Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

Labeled by: MF Witness: JS Cooler Inspected by: KM See Project Contact Form: Y

Apex Laboratories  
  
 Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Wednesday, July 26, 2017

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39-04

Enclosed are the results of analyses for work order A7G0292, which was received by the laboratory on 7/12/2017 at 5:55:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



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---

Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

**Reported:**  
07/26/17 12:35

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI004-0.5 - After Processing	A7G0292-02	Soil	07/12/17 11:30	07/12/17 17:55

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

**Reported:**  
 07/26/17 12:35

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI004-0.5 - After Processing (A7G0292-02)</b>			<b>Matrix: Soil</b>					
Batch: 7070772								
<b>Total Organic Carbon</b>	<b>28000</b>	---	200	mg/kg	1	07/23/17 19:30	PSEP/SM 5310B MOD	

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

**Reported:**  
 07/26/17 12:35

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>ISM-AOI004-0.5 - After Processing (A7G0292-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 7070746</b>			
% Solids	97.5	---	1.00	% by Weight	1	07/21/17 07:33	EPA 8000C	

Apex Laboratories



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Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

**Reported:**  
 07/26/17 12:35

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7070772 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (7070772-BLK1)</b>						Prepared: 07/21/17 09:30 Analyzed: 07/23/17 19:30						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>Blank (7070772-BLK2)</b>						Prepared: 07/21/17 09:30 Analyzed: 07/23/17 19:30						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	A-01
<b>LCS (7070772-BS1)</b>						Prepared: 07/21/17 09:30 Analyzed: 07/23/17 19:30						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115	---	---	
<b>Duplicate (7070772-DUP1)</b>						Prepared: 07/21/17 09:30 Analyzed: 07/23/17 19:30						
<b>QC Source Sample: ISM-AOI004-0.5 - After Processing (A7G0292-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>29000</b>	---	200	mg/kg	1	---	28000	---	---	5	20%	



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

Reported:  
 07/26/17 12:35

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7070746 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (7070746-DUP1)</b>						Prepared: 07/20/17 16:47 Analyzed: 07/21/17 07:33						
QC Source Sample: ISM-AOI004-0.5 - After Processing (A7G0292-02)												
EPA 8000C												
% Solids	97.0	---	1.00	% by Weight	1	---	97.5	---	---	0.5	10%	
<b>Duplicate (7070746-DUP2)</b>						Prepared: 07/20/17 16:47 Analyzed: 07/21/17 07:33						
QC Source Sample: Other (A7G0447-01)												
EPA 8000C												
% Solids	76.7	---	1.00	% by Weight	1	---	77.0	---	---	0.4	10%	
<b>Duplicate (7070746-DUP3)</b>						Prepared: 07/20/17 16:47 Analyzed: 07/21/17 07:33						
QC Source Sample: Other (A7G0450-06)												
EPA 8000C												
% Solids	84.8	---	1.00	% by Weight	1	---	88.4	---	---	4	10%	
<b>Duplicate (7070746-DUP4)</b>						Prepared: 07/20/17 16:47 Analyzed: 07/21/17 07:33						
QC Source Sample: Other (A7G0550-02)												
EPA 8000C												
% Solids	77.4	---	1.00	% by Weight	1	---	77.2	---	---	0.2	10%	
<b>Duplicate (7070746-DUP5)</b>						Prepared: 07/20/17 19:01 Analyzed: 07/21/17 07:33						
QC Source Sample: Other (A7G0554-01)												
EPA 8000C												
% Solids	64.1	---	1.00	% by Weight	1	---	65.3	---	---	2	10%	
<b>Duplicate (7070746-DUP6)</b>						Prepared: 07/20/17 19:01 Analyzed: 07/21/17 07:33						
QC Source Sample: Other (A7G0560-03)												
EPA 8000C												
% Solids	92.2	---	1.00	% by Weight	1	---	93.5	---	---	1	10%	
<b>Duplicate (7070746-DUP7)</b>						Prepared: 07/20/17 19:01 Analyzed: 07/21/17 07:33						
QC Source Sample: Other (A7G0563-11)												
EPA 8000C												
% Solids	74.8	---	1.00	% by Weight	1	---	75.3	---	---	0.7	10%	

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Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

**Reported:**  
 07/26/17 12:35

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7070772</b>							
A7G0292-02	Soil	PSEP/SM 5310B MOD	07/12/17 11:30	07/21/17 09:30	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7070746</b>							
A7G0292-02	Soil	EPA 8000C	07/12/17 11:30	07/20/17 16:47	1N/A/1N/A	1N/A/1N/A	NA

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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

Reported:  
07/26/17 12:35

## Notes and Definitions

### Qualifiers:

A-01 Puck mill grind blank.

### Notes and Conventions:

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.

RPD Relative Percent Difference

MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.

WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.

Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

Reported:  
07/26/17 12:35

**CHAIN OF CUSTODY**

A760292

COC \_\_\_\_\_ of \_\_\_\_\_

Lab # \_\_\_\_\_

Ave: 505-407-1034 (mail)

Project Name: Ridgefield opp Project # 9003.01.39-04

Project Mgr: Phil Wiescher Email: pwiescher@maulfooster.com

Address: 2001 NW 14th Ave, Suite 200, Portland, OR 97209 Phone: 971-544-2139 Fax: 971-544-1410

Sampled by: Bleair Paulik & Brent Harmon

Company: MFA

Site Location: OR (WA) Other: \_\_\_\_\_

SAMPLE ID: ISM-A01004-0.5

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST
1	7/14/17	3:05pm	I	1	TCO Res/ISM X WSP4 16138 X
2					
3					
4					
5					
6					
7					
8					
9					
10					

ANALYSIS REQUEST

AL, Sb, As, Ba, Be, Bi, Cd, Cr, Cu, Co, Ca, Ni, Pb, Zn, Hg, Mn, Mo, Ni, N, K, Se, Ag, Na, TL, V, Zn, TOTAL DISS TCLP, 1200-COLS, 1200-Z, WSP4 16138, TCO Res/ISM

SPECIAL INSTRUCTIONS: Sub toxn analysis to Cape Fear  
ISM processing expedited

RECEIVED BY: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_

RELINQUISHED BY: \_\_\_\_\_ Date: 7/12/17 Signature: [Signature]

Printed Name: Charles Hoffmann Time: 1:55

Company: MFA

*Philip Nerenberg*



Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

Reported:  
 07/26/17 12:35

**APEX LABS COOLER RECEIPT FORM**

Client: MFA Element WO#: A7170292

Project/Project #: Ridge Field OPP 9003.01.39-04

**Delivery info:**

Date/Time Received: 7/12/17 @ 1755 By: CFH

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: CFH : 7/12/17 @ 1833

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

Cooler #1 Cooler #2 Cooler #3 Cooler #4 Cooler #5 Cooler #6 Cooler #7

Temperature (deg. C) \_\_\_\_\_

Received on Ice?  (Y/N) \_\_\_\_\_

Temp. Blanks?  (Y/N) 5.8 \_\_\_\_\_

Ice Type:  Gel/Real/Other) \_\_\_\_\_

Condition: Good \_\_\_\_\_

Cooler out of temp?  (Y/N) Possible reason why: \_\_\_\_\_  
 If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No  (NA)

**Samples Inspection:** Inspected by: MS : 7/13/17 @ 9:17

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

Labeled by: \_\_\_\_\_ Witness: \_\_\_\_\_ Cooler Inspected by: \_\_\_\_\_ See Project Contact Form: Y

MF

MS

MS CFH

*Philip Nerenberg*

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Thursday, September 7, 2017

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39-04

Enclosed are the results of analyses for work order A7H0225, which was received by the laboratory on 8/8/2017 at 11:04:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



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---

Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

**Reported:**  
09/07/17 16:15

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI045-0.5 - After Processing	A7H0225-02	Soil	08/07/17 10:30	08/08/17 11:04
ISM-AOI048-0.5 - After Processing	A7H0225-04	Soil	08/07/17 11:00	08/08/17 11:04
ISM-AOI059-0.5 - After Processing	A7H0225-06	Soil	08/07/17 13:15	08/08/17 11:04

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Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

**Reported:**  
 09/07/17 16:15

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI045-0.5 - After Processing (A7H0225-02)</b>			<b>Matrix: Soil</b>					
Batch: 7080567								
<b>Total Organic Carbon</b>	<b>18000</b>	---	200	mg/kg	1	08/11/17 13:00	PSEP/SM 5310B MOD	
<b>ISM-AOI048-0.5 - After Processing (A7H0225-04)</b>			<b>Matrix: Soil</b>					
Batch: 7080567								
<b>Total Organic Carbon</b>	<b>19000</b>	---	200	mg/kg	1	08/11/17 13:00	PSEP/SM 5310B MOD	
<b>ISM-AOI059-0.5 - After Processing (A7H0225-06)</b>			<b>Matrix: Soil</b>					
Batch: 7080567								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	08/11/17 13:00	PSEP/SM 5310B MOD	

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Philip Nerenberg, Lab Director

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 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

**Reported:**  
 09/07/17 16:15

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>ISM-AOI045-0.5 - After Processing (A7H0225-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 7080576</b>			
% Solids	96.7	---	1.00	% by Weight	1	08/11/17 08:13	EPA 8000C	
<b>ISM-AOI048-0.5 - After Processing (A7H0225-04)</b>			<b>Matrix: Soil</b>		<b>Batch: 7080576</b>			
% Solids	96.5	---	1.00	% by Weight	1	08/11/17 08:13	EPA 8000C	
<b>ISM-AOI059-0.5 - After Processing (A7H0225-06)</b>			<b>Matrix: Soil</b>		<b>Batch: 7080576</b>			
% Solids	96.5	---	1.00	% by Weight	1	08/11/17 08:13	EPA 8000C	

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Philip Nerenberg, Lab Director

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 Portland, OR 97209


Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

Reported:  
 09/07/17 16:15

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7080567 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (7080567-BLK1)</b>						Prepared: 08/10/17 11:28 Analyzed: 08/11/17 13:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>Blank (7080567-BLK2)</b>						Prepared: 08/10/17 11:28 Analyzed: 08/11/17 13:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	A-01
<b>LCS (7080567-BS1)</b>						Prepared: 08/10/17 11:28 Analyzed: 08/11/17 13:00						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9400	---		mg/kg	1	10000	---	94	85-115	---	---	
<b>Duplicate (7080567-DUP1)</b>						Prepared: 08/10/17 11:28 Analyzed: 08/11/17 13:00						
<b>QC Source Sample: ISM-AOI045-0.5 - After Processing (A7H0225-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>18000</b>	---	200	mg/kg	1	---	18000	---	---	4	20%	





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Reported:  
 09/07/17 16:15

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7080576 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (7080576-DUP1)</b>						Prepared: 08/10/17 12:01 Analyzed: 08/11/17 08:13						
QC Source Sample: Other (A7H0301-01)												
EPA 8000C												
% Solids	91.7	---	1.00	% by Weight	1	---	91.6	---	---	0.1	10%	
<b>Duplicate (7080576-DUP2)</b>						Prepared: 08/10/17 14:55 Analyzed: 08/11/17 08:13						
QC Source Sample: Other (A7H0314-10)												
EPA 8000C												
% Solids	67.0	---	1.00	% by Weight	1	---	67.2	---	---	0.2	10%	
<b>Duplicate (7080576-DUP3)</b>						Prepared: 08/10/17 14:55 Analyzed: 08/11/17 08:13						
QC Source Sample: Other (A7H0314-24)												
EPA 8000C												
% Solids	89.9	---	1.00	% by Weight	1	---	89.0	---	---	1	10%	
<b>Duplicate (7080576-DUP4)</b>						Prepared: 08/10/17 17:15 Analyzed: 08/11/17 08:13						
QC Source Sample: Other (A7H0328-02)												
EPA 8000C												
% Solids	76.2	---	1.00	% by Weight	1	---	76.5	---	---	0.4	10%	
<b>Duplicate (7080576-DUP5)</b>						Prepared: 08/10/17 17:39 Analyzed: 08/11/17 08:13						
QC Source Sample: Other (A7H0333-02)												
EPA 8000C												
% Solids	84.1	---	1.00	% by Weight	1	---	83.4	---	---	0.8	10%	
<b>Duplicate (7080576-DUP6)</b>						Prepared: 08/10/17 19:15 Analyzed: 08/11/17 08:13						
QC Source Sample: Other (A7H0326-11)												
EPA 8000C												
% Solids	86.2	---	1.00	% by Weight	1	---	88.4	---	---	3	10%	



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 Project Manager: Phil Wiescher

**Reported:**  
 09/07/17 16:15

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7080567</b>							
A7H0225-02	Soil	PSEP/SM 5310B MOD	08/07/17 10:30	08/10/17 11:28	5g/5g	5g/5g	NA
A7H0225-04	Soil	PSEP/SM 5310B MOD	08/07/17 11:00	08/10/17 11:28	5g/5g	5g/5g	NA
A7H0225-06	Soil	PSEP/SM 5310B MOD	08/07/17 13:15	08/10/17 11:28	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7080576</b>							
A7H0225-02	Soil	EPA 8000C	08/07/17 10:30	08/10/17 12:01	1N/A/1N/A	1N/A/1N/A	NA
A7H0225-04	Soil	EPA 8000C	08/07/17 11:00	08/10/17 12:01	1N/A/1N/A	1N/A/1N/A	NA
A7H0225-06	Soil	EPA 8000C	08/07/17 13:15	08/10/17 12:01	1N/A/1N/A	1N/A/1N/A	NA



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Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

Reported:  
09/07/17 16:15

## Notes and Definitions

### Qualifiers:

A-01 Puck mill grind blank

### Notes and Conventions:

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.

RPD Relative Percent Difference

MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.

WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.

Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

Reported:  
09/07/17 16:15

**CHAIN OF CUSTODY**

Company: **MFA** Lab # **AH0225** PO# **9003.01.39-04**

Address: **400 E MILK PLAIN BLVD, VANAS, WA 98660** Project Mgr: **PHIL WIESCHER** Project Name: **PORT OF RIDGEFIELD OPP** Project # **9003.01.39-04**

Phone: **509-694-2691** Fax: **360-936-1958** Email: **PHIL.WIESCHER@MAULFOSTER.COM**

Supplied by: **BEH**

Site Location: **OR** (WA) Other: \_\_\_\_\_

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS		ANALYSIS REQUEST
				YES	NO	
1	9/7/17	10:30	502	1		TOTAL DISS TCEP Hg, Mn, Ni, Pb, Zn Cd, Cr, Cu, Fe, Ni, K AL, Sb, As, Ba, Be, Bi, Br, B, Ca, Cd, Co, Cr, Cu, Fe, Pb, Ph, Pt, Se, Si, Sr, Tl, V, Zn
2	9/7/17	11:00	502	1		TCEP Metals (8) RCEA Metals (8) 600 TIO 8082 PCBs 8270 SIM PAHS 8270 SVOC 8260 BTEX VOCs 8260 HVOCS 8260 RBDN VOCs 8260 VOCs Full List
3	9/7/17	12:15	502	1		WTPH-GX WTPH-DX WTPH-HCID
4						ISM RECOVERIES VSCA 10/15/18 VSCB TR VSCC TR

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day, 2 Day, 3 Day, 4 DAY, 5 DAY, Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS: **SUB TO CARE FEAR**  
**DIOXINS**

RECEIVED BY: **MFA** Date: **9/8/17** Signature: **[Signature]** Date: **9/8/17**

RECEIVED BY: **APCX Labs** Date: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: **BRADY WILKINSON** Time: **11:04** Printed Name: **Michael Mayhew** Time: **11:04**

Company: **MFA** Company: **APCX Labs**

*Philip Nerenberg*

Maul Foster & Alongi, INC.  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

Reported:  
 09/07/17 16:15

APEX LABS COOLER RECEIPT FORM

Client: MFA Element WO#: A7 A7H0225

Project/Project #: Ridgefield ORP/9003.01.39-04

Delivery info:

Date/Time Received: 8-8-17 @ 1104 By: MH

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

Cooler Inspection Inspected by: MH : 8-8-17 @ 1330

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

Cooler #1 Cooler #2 Cooler #3 Cooler #4 Cooler #5 Cooler #6 Cooler #7

Temperature (deg. C) -

Received on Ice? (Y/N) (N)

Temp. Blanks? (Y/N) 5.3

Ice Type: (Gel) Real/Other

Condition: good

Cooler out of temp? (Y/N) (N) Possible reason why:

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA (NA)

Samples Inspection: Inspected by: MH : 8/8/17 @ 14:07

All Samples Intact? Yes  No  Comments:

Bottle Labels/COCs agree? Yes  No  Comments: Label reads ISM-A01059-0.5, Col reads ISM-A01048-0.5 matched by time. 2nd and 3rd

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: sample have same vol.

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments:

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments:

Additional Information:

Labeled by: MH Witness: CB Cooler Inspected by: MH See Project Contact Form: Y

*Philip Nerenberg*

# Apex Labs

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323 Phone  
503-718-0333 Fax

Monday, September 25, 2017

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield ISM / 9003.01.39

Enclosed are the results of analyses for work order A7H0584, which was received by the laboratory on 8/18/2017 at 2:20:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
09/25/17 15:19

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-AOI078-0.5 - After Processing	A7H0584-02	Soil	08/18/17 10:54	08/18/17 14:20

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 09/25/17 15:19

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
<b>ISM-AOI078-0.5 - After Processing (A7H0584-02)</b>			<b>Matrix: Soil</b>					
Batch: 7080900								
<b>Total Organic Carbon</b>	<b>23000</b>	---	200	mg/kg	1	08/24/17 11:40	PSEP/SM 5310B MOD	

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 09/25/17 15:19

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>ISM-AOI078-0.5 - After Processing (A7H0584-02)</b>			<b>Matrix: Soil</b>		<b>Batch: 7080895</b>			
% Solids	97.1	---	1.00	% by Weight	1	08/24/17 07:27	EPA 8000C	

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 09/25/17 15:19

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7080900 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (7080900-BLK1)</b>						Prepared: 08/23/17 13:10 Analyzed: 08/24/17 11:40						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>Blank (7080900-BLK2)</b>						Prepared: 08/23/17 13:10 Analyzed: 08/24/17 11:40						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	A-01
<b>LCS (7080900-BS1)</b>						Prepared: 08/23/17 13:10 Analyzed: 08/24/17 11:40						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9500	---		mg/kg	1	10000	---	95	85-115	---	---	
<b>Duplicate (7080900-DUP1)</b>						Prepared: 08/23/17 13:10 Analyzed: 08/24/17 11:40						
<b>QC Source Sample: ISM-AOI078-0.5 - After Processing (A7H0584-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	<b>24000</b>	---	200	mg/kg	1	---	23000	---	---	0.6	20%	



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
09/25/17 15:19

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7080895 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (7080895-DUP1)</b>						Prepared: 08/23/17 12:40 Analyzed: 08/24/17 07:27						
QC Source Sample: Other (A7H0598-01)												
EPA 8000C												
% Solids	82.8	---	1.00	% by Weight	1	---	83.1	---	---	0.3	10%	
<b>Duplicate (7080895-DUP2)</b>						Prepared: 08/23/17 12:40 Analyzed: 08/24/17 07:27						
QC Source Sample: Other (A7H0602-01)												
EPA 8000C												
% Solids	95.3	---	1.00	% by Weight	1	---	95.3	---	---	0.008	10%	
<b>Duplicate (7080895-DUP3)</b>						Prepared: 08/23/17 12:40 Analyzed: 08/24/17 07:27						
QC Source Sample: Other (A7H0602-20)												
EPA 8000C												
% Solids	78.7	---	1.00	% by Weight	1	---	77.4	---	---	2	10%	
<b>Duplicate (7080895-DUP4)</b>						Prepared: 08/23/17 12:40 Analyzed: 08/24/17 07:27						
QC Source Sample: Other (A7H0631-04)												
EPA 8000C												
% Solids	74.2	---	1.00	% by Weight	1	---	73.4	---	---	1	10%	
<b>Duplicate (7080895-DUP5)</b>						Prepared: 08/23/17 13:04 Analyzed: 08/24/17 07:27						
QC Source Sample: Other (A7H0635-05)												
EPA 8000C												
% Solids	81.1	---	1.00	% by Weight	1	---	79.3	---	---	2	10%	
<b>Duplicate (7080895-DUP6)</b>						Prepared: 08/23/17 17:59 Analyzed: 08/24/17 07:27						
QC Source Sample: Other (A7H0653-01)												
EPA 8000C												
% Solids	75.8	---	1.00	% by Weight	1	---	76.8	---	---	1	10%	

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

**Reported:**  
 09/25/17 15:19

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7080900</b>							
A7H0584-02	Soil	PSEP/SM 5310B MOD	08/18/17 10:54	08/23/17 13:10	5g/5g	5g/5g	NA

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7080895</b>							
A7H0584-02	Soil	EPA 8000C	08/18/17 10:54	08/23/17 14:03	1N/A/1N/A	1N/A/1N/A	NA

Apex Laboratories



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Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

**Reported:**  
09/25/17 15:19

## Notes and Definitions

### Qualifiers:

A-01 Puck mill grind blank

### Notes and Conventions:

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.

RPD Relative Percent Difference

MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.

WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.

Batch In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS  
QC Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.


Blank Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional  
Policy chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).



Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: 9003.01.39  
Project Manager: Phil Wiescher

Reported:  
09/25/17 15:19

COC 1 of 1

Lab # A7H0584

**CHAIN OF CUSTODY**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: HFA Project Mgr: Phil Wiescher Project Name: FOR OIP PO# \_\_\_\_\_ Project # 9003.01.39

Address: 2001 NW 19th Ave, Ste 200, Portland, OR Phone: 503-551-2009 Fax: \_\_\_\_\_ Email: Phil.Wiescher@maulfoster.com

Sampled by: Jackie Hengster

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST
1	09/25/17	15:05	ISM-AIDFB-0.5	1	TCLP Metals (8) RCRA Metals (8) 600 TFO 8082 PCBs 8270 SVOC 8270 STM PAHs 8260 BTEX VOCs 8260 HVOCS 8260 RBDN VOCs 8260 VOCs Full List NWTP-GA NWTP-DN NWTP-HCID
2					1200-Z 1200-COLS TOTAL DISS TCLP Ss, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Hg, Mn, Ni, Mo, Ni, K, Se, Sr, Tl, V, Zn
3					USEPA 14130 USEPA 14130 USEPA 14130

Site Location: OR (WA)  
Other: \_\_\_\_\_

Normal Turn Around Time (TAT) = 10 Business Days  YES  NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Jackie Hengster Date: 09/25/17 Signature: [Signature] Date: 09/25/17  
Printed Name: Jackie Hengster Time: 12:35 Printed Name: Michael Hengster Time: 14:20

RECEIVED BY: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_ Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_  
Company: HFA Company: Apex Labs

SPECIAL INSTRUCTIONS:  
ISM samples by ISM process.

*Philip Nerenberg*

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: 9003.01.39  
 Project Manager: Phil Wiescher

Reported:  
 09/25/17 15:19

APEX LABS COOLER RECEIPT FORM

Client: MFA Element WO#: A7 H0584

Project/Project #: POR ORP 19003.01.39

**Delivery info:**

Date/Time Received: 8-18-17 @ 1420 By: MK

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: MK : 8-18-17 @ 1520

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>-</u>						
Received on Ice? (Y/N)	<u>(Y/N)</u>						
Temp. Blanks? (Y/N)	<u>(Y/N) 5.1</u>						
Ice Type: (Gel/Real/Other)	<u>(Gel)</u>						
Condition:	<u>good</u>						

Temperature (deg. C) -

Received on Ice? (Y/N) (Y/N)

Temp. Blanks? (Y/N) (Y/N) 5.1

Ice Type: (Gel/Real/Other) (Gel)

Condition: good

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA (NA)

**Samples Inspection:** Inspected by: MKS : 8/22/17 @ 9:15

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

Additional Information: \_\_\_\_\_

Labeled by: \_\_\_\_\_ Witness: (Signature) Cooler Inspected by: N/A See Project Contact Form: Y

*Philip Nerenberg*



Your Project #: A6D0774  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/06/16**  
Report #: R4030129  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B6A8212**

**Received: 2016/05/28, 15:15**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2016/05/31	2016/06/12	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2016/06/13	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2016/05/30	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation is a NELAP accredited laboratory. Certificates #04012 and #4079-001. This certificate shall not be reproduced except in full, without the written approval of Maxxam.

**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		CKZ478			
<b>Sampling Date</b>		2016/04/20 09:30			
<b>COC Number</b>		NA			
	<b>UNITS</b>	<b>ROW-P2- 019-0.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	17	1.0	0.50	4517301
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ478							
Sampling Date		2016/04/20 09:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2- 019-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.206	0.126	0.196	0.400	1.00	0.206	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	1.54	0.110	0.982	0.400	1.00	1.54	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	3.72	0.112	0.982	0.400	0.100	0.372	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	15.6	0.116	0.982	0.400	0.100	1.56	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	9.63	0.117	0.982	0.400	0.100	0.963	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	349	0.103	0.982	0.400	0.0100	3.49	N/A	4529924
Octa CDD *	pg/g	2190	0.0760	1.96	0.800	0.000300	0.657	N/A	4529924
Total Tetra CDD *	pg/g	1.45	0.126	0.196	0.400	N/A	N/A	4	4529924
Total Penta CDD *	pg/g	9.54	0.110	0.982	0.400	N/A	N/A	11	4529924
Total Hexa CDD *	pg/g	82.7	0.115	0.982	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	597	0.103	0.982	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	0.954	0.127	0.196	0.400	0.100	0.0954	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	0.914	0.128	0.982	0.400	0.0300	0.0274	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	1.42	0.125	0.982	0.400	0.300	0.426	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	7.39	0.114	0.982	0.400	0.100	0.739	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	3.14	0.118	0.982	0.400	0.100	0.314	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	2.49	0.110	0.982	0.400	0.100	0.249	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	0.120	0.116	0.982	0.400	0.100	0.0120	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	77.2	0.127	0.982	0.400	0.0100	0.772	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	4.21	0.129	0.982	0.400	0.0100	0.0421	N/A	4529924
Octa CDF **	pg/g	258	0.122	1.96	0.800	0.000300	0.0774	N/A	4529924
Total Tetra CDF **	pg/g	8.13	0.127	0.196	0.400	N/A	N/A	11	4529924
Total Penta CDF **	pg/g	17.3	0.126	0.982	0.400	N/A	N/A	8	4529924
Total Hexa CDF **	pg/g	103	0.114	0.982	0.400	N/A	N/A	11	4529924
Total Hepta CDF **	pg/g	257	0.128	0.982	0.400	N/A	N/A	4	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.97	0.18	0.98	0.88	0.100	0.0970	N/A	4538309
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	11.5	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4529924
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ478							
Sampling Date		2016/04/20 09:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2- 019-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	120	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4538309

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** CKZ478  
**Sample ID:** ROW-P2- 019-0.5  
**Matrix:** Soil

**Collected:** 2016/04/20  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/05/31	2016/06/12	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4538309	N/A	2016/06/13	Vica Cioranic
Moisture	BAL	4517301	N/A	2016/05/30	Min Yang

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4517301	NS3	RPD - Sample/Sample Dup	Moisture	2016/05/30	8.2		%	20
4529924	OBC	Matrix Spike	37CL4 2378 Tetra CDD	2016/06/12		96	%	35 - 197
			C13-1234678 HeptaCDD	2016/06/12		90	%	23 - 140
			C13-1234678 HeptaCDF	2016/06/12		91	%	28 - 143
			C13-123478 HexaCDD	2016/06/12		90	%	32 - 141
			C13-123478 HexaCDF	2016/06/12		84	%	26 - 152
			C13-1234789 HeptaCDF	2016/06/12		103	%	26 - 138
			C13-123678 HexaCDD	2016/06/12		92	%	28 - 130
			C13-123678 HexaCDF	2016/06/12		106	%	26 - 123
			C13-12378 PentaCDD	2016/06/12		90	%	25 - 181
			C13-12378 PentaCDF	2016/06/12		77	%	24 - 185
			C13-123789 HexaCDF	2016/06/12		123	%	29 - 147
			C13-234678 HexaCDF	2016/06/12		89	%	28 - 136
			C13-23478 PentaCDF	2016/06/12		78	%	21 - 178
			C13-2378 TetraCDD	2016/06/12		97	%	25 - 164
			C13-2378 TetraCDF	2016/06/12		78	%	24 - 169
			C13-OCDD	2016/06/12		100	%	17 - 157
			2,3,7,8-Tetra CDD	2016/06/12		96	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/06/12		91	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/06/12		93	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/06/12		98	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/06/12		91	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12		101	%	70 - 140
			Octa CDD	2016/06/12		44 (1)	%	78 - 144
			2,3,7,8-Tetra CDF	2016/06/12		97	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/06/12		91	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/06/12		93	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/06/12		91	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/06/12		88	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/06/12		90	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/06/12		95	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12		93	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12		93	%	78 - 138
			Octa CDF	2016/06/12		90	%	63 - 170
4529924	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2016/06/12		92	%	35 - 197
			C13-1234678 HeptaCDD	2016/06/12		72	%	23 - 140
			C13-1234678 HeptaCDF	2016/06/12		74	%	28 - 143
			C13-123478 HexaCDD	2016/06/12		77	%	32 - 141
			C13-123478 HexaCDF	2016/06/12		69	%	26 - 152
			C13-1234789 HeptaCDF	2016/06/12		77	%	26 - 138
			C13-123678 HexaCDD	2016/06/12		80	%	28 - 130
			C13-123678 HexaCDF	2016/06/12		94	%	26 - 123
			C13-12378 PentaCDD	2016/06/12		78	%	25 - 181
			C13-12378 PentaCDF	2016/06/12		68	%	24 - 185
			C13-123789 HexaCDF	2016/06/12		113	%	29 - 147
			C13-234678 HexaCDF	2016/06/12		75	%	28 - 136
			C13-23478 PentaCDF	2016/06/12		72	%	21 - 178
			C13-2378 TetraCDD	2016/06/12		86	%	25 - 164
			C13-2378 TetraCDF	2016/06/12		73	%	24 - 169
			C13-OCDD	2016/06/12		65	%	17 - 157
			2,3,7,8-Tetra CDD	2016/06/12		89	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/06/12		88	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/06/12		87	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/06/12		94	%	76 - 134

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/06/12		95	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12		85	%	70 - 140
			Octa CDD	2016/06/12		94	%	78 - 144
			2,3,7,8-Tetra CDF	2016/06/12		92	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/06/12		93	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/06/12		89	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/06/12		87	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/06/12		108	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/06/12		87	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/06/12		126	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12		98	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12		92	%	78 - 138
			Octa CDF	2016/06/12		91	%	63 - 170
4529924	OBC	Spiked Blank DUP	37CL4 2378 Tetra CDD	2016/06/12		78	%	35 - 197
			C13-1234678 HeptaCDD	2016/06/12		73	%	23 - 140
			C13-1234678 HeptaCDF	2016/06/12		76	%	28 - 143
			C13-123478 HexaCDD	2016/06/12		77	%	32 - 141
			C13-123478 HexaCDF	2016/06/12		69	%	26 - 152
			C13-1234789 HeptaCDF	2016/06/12		77	%	26 - 138
			C13-123678 HexaCDD	2016/06/12		82	%	28 - 130
			C13-123678 HexaCDF	2016/06/12		88	%	26 - 123
			C13-12378 PentaCDD	2016/06/12		75	%	25 - 181
			C13-12378 PentaCDF	2016/06/12		65	%	24 - 185
			C13-123789 HexaCDF	2016/06/12		107	%	29 - 147
			C13-234678 HexaCDF	2016/06/12		74	%	28 - 136
			C13-23478 PentaCDF	2016/06/12		64	%	21 - 178
			C13-2378 TetraCDD	2016/06/12		82	%	25 - 164
			C13-2378 TetraCDF	2016/06/12		67	%	24 - 169
			C13-OCDD	2016/06/12		71	%	17 - 157
			2,3,7,8-Tetra CDD	2016/06/12		108	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/06/12		104	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/06/12		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/06/12		106	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/06/12		105	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12		102	%	70 - 140
			Octa CDD	2016/06/12		109	%	78 - 144
			2,3,7,8-Tetra CDF	2016/06/12		113	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/06/12		103	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/06/12		109	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/06/12		104	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/06/12		104	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/06/12		105	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/06/12		121	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12		107	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12		114	%	78 - 138
			Octa CDF	2016/06/12		110	%	63 - 170
4529924	OBC	RPD	2,3,7,8-Tetra CDD	2016/06/12	19		%	25
			1,2,3,7,8-Penta CDD	2016/06/12	17		%	25
			1,2,3,4,7,8-Hexa CDD	2016/06/12	17		%	25
			1,2,3,6,7,8-Hexa CDD	2016/06/12	12		%	25
			1,2,3,7,8,9-Hexa CDD	2016/06/12	10		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12	18		%	25
			Octa CDD	2016/06/12	15		%	25
			2,3,7,8-Tetra CDF	2016/06/12	20		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8-Penta CDF	2016/06/12	10		%	25
			2,3,4,7,8-Penta CDF	2016/06/12	20		%	25
			1,2,3,4,7,8-Hexa CDF	2016/06/12	18		%	25
			1,2,3,6,7,8-Hexa CDF	2016/06/12	3.8		%	25
			2,3,4,6,7,8-Hexa CDF	2016/06/12	19		%	25
			1,2,3,7,8,9-Hexa CDF	2016/06/12	4.0		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12	8.8		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12	21		%	25
			Octa CDF	2016/06/12	19		%	25
4529924	OBC	Method Blank	37CL4 2378 Tetra CDD	2016/06/12		98	%	35 - 197
			C13-1234678 HeptaCDD	2016/06/12		73	%	23 - 140
			C13-1234678 HeptaCDF	2016/06/12		78	%	28 - 143
			C13-123478 HexaCDD	2016/06/12		80	%	32 - 141
			C13-123478 HexaCDF	2016/06/12		72	%	26 - 152
			C13-1234789 HeptaCDF	2016/06/12		81	%	26 - 138
			C13-123678 HexaCDD	2016/06/12		86	%	28 - 130
			C13-123678 HexaCDF	2016/06/12		95	%	26 - 123
			C13-12378 PentaCDD	2016/06/12		81	%	25 - 181
			C13-12378 PentaCDF	2016/06/12		71	%	24 - 185
			C13-123789 HexaCDF	2016/06/12		114	%	29 - 147
			C13-234678 HexaCDF	2016/06/12		81	%	28 - 136
			C13-23478 PentaCDF	2016/06/12		75	%	21 - 178
			C13-2378 TetraCDD	2016/06/12		93	%	25 - 164
			C13-2378 TetraCDF	2016/06/12		78	%	24 - 169
			C13-OCDD	2016/06/12		70	%	17 - 157
			2,3,7,8-Tetra CDD	2016/06/12	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDD	2016/06/12	<0.0787, EDL=0.0787		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/06/12	<0.107, EDL=0.107		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/06/12	<0.111, EDL=0.111		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/06/12	<0.111, EDL=0.111		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12	<0.104, EDL=0.104		pg/g	
			Octa CDD	2016/06/12	0.294, EDL=0.0965		pg/g	
			Total Tetra CDD	2016/06/12	<0.103, EDL=0.103		pg/g	
			Total Penta CDD	2016/06/12	<0.0787, EDL=0.0787		pg/g	
			Total Hexa CDD	2016/06/12	<0.110, EDL=0.110		pg/g	
			Total Hepta CDD	2016/06/12	<0.104, EDL=0.104		pg/g	
			2,3,7,8-Tetra CDF	2016/06/12	<0.0753, EDL=0.0753		pg/g	
			1,2,3,7,8-Penta CDF	2016/06/12	<0.0973, EDL=0.0973		pg/g	
			2,3,4,7,8-Penta CDF	2016/06/12	<0.0945, EDL=0.0945		pg/g	



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDF	2016/06/12	<0.0743, EDL=0.0743		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/06/12	<0.0768, EDL=0.0768		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/06/12	<0.0715, EDL=0.0715		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/06/12	<0.0757, EDL=0.0757		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12	<0.0827, EDL=0.0827		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12	<0.0844, EDL=0.0844		pg/g	
			Octa CDF	2016/06/12	<0.109, EDL=0.109		pg/g	
			Total Tetra CDF	2016/06/12	<0.0753, EDL=0.0753		pg/g	
			Total Penta CDF	2016/06/12	<0.0959, EDL=0.0959		pg/g	
			Total Hexa CDF	2016/06/12	<0.0745, EDL=0.0745		pg/g	
			Total Hepta CDF	2016/06/12	<0.0836, EDL=0.0836		pg/g	
4529924	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2016/06/12	NC		%	25
			1,2,3,7,8-Penta CDD	2016/06/12	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2016/06/12	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2016/06/12	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2016/06/12	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12	14		%	25
			Octa CDD	2016/06/12	9.9		%	25
			Total Tetra CDD	2016/06/12	NC		%	25
			Total Penta CDD	2016/06/12	NC		%	25
			Total Hexa CDD	2016/06/12	4.7		%	25
			Total Hepta CDD	2016/06/12	4.6		%	25
			2,3,7,8-Tetra CDF	2016/06/12	NC		%	25
			1,2,3,7,8-Penta CDF	2016/06/12	NC		%	25
			2,3,4,7,8-Penta CDF	2016/06/12	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2016/06/12	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2016/06/12	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2016/06/12	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2016/06/12	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12	6.7		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12	NC		%	25
			Octa CDF	2016/06/12	4.1		%	25
			Total Tetra CDF	2016/06/12	22		%	25
			Total Penta CDF	2016/06/12	NC		%	25
			Total Hexa CDF	2016/06/12	3.7		%	25
			Total Hepta CDF	2016/06/12	29 (2)		%	25
4538309	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/06/13	<0.11, EDL=0.11		pg/g	
			Confirmation C13-2378 TetraCDF	2016/06/13		97	%	40 - 135

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date		%		
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
4538309	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/06/13	NC		%	100

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A6D0673  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/06/17**  
Report #: R4032130  
Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B6A8214**

**Received: 2016/05/28, 15:15**

Sample Matrix: Soil  
# Samples Received: 10

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	2	2016/05/31	2016/06/12	BRL SOP-00410	EPA 1613B m
Dioxins/Furans in Soil (1613B) (1)	8	2016/05/31	2016/06/13	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2016/06/13	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	6	N/A	2016/06/14	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2016/06/16	BRL SOP-00406	EPA M8290A / M1613
Moisture	10	N/A	2016/05/30	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		CKZ483	CKZ484	CKZ485	CKZ486	CKZ487			
Sampling Date		2016/04/15 11:30	2016/04/15 11:40	2016/04/15 11:50	2016/04/15 12:00	2016/04/15 12:15			
COC Number		NA	NA	NA	NA	NA			
	<b>UNITS</b>	<b>ROW-P2-007-0.5</b>	<b>ROW-P2-008-0.5</b>	<b>ROW-P2-009-0.5</b>	<b>ROW-P2-010-0.5</b>	<b>ROW-P2-013-0.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	35	37	31	30	22	1.0	0.50	4517301
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

Maxxam ID		CKZ488	CKZ489	CKZ490	CKZ491	CKZ492			
Sampling Date		2016/04/15 12:25	2016/04/15 12:35	2016/04/15 12:45	2016/04/15 13:00	2016/04/15 13:10			
COC Number		NA	NA	NA	NA	NA			
	<b>UNITS</b>	<b>ROW-P2-014-0.5</b>	<b>ROW-P2-012-0.5</b>	<b>ROW-P2-015-0.5</b>	<b>ROW-P2-017-0.5</b>	<b>ROW-P2-016-0.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	18	22	33	21	28	1.0	0.50	4517301
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ483							
Sampling Date		2016/04/15 11:30							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-007-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.311 (1)	0.311	0.199	0.400	1.00	0.311	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	0.990	0.116	0.993	0.400	1.00	0.990	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	2.81	0.0910	0.993	0.400	0.100	0.281	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	13.4	0.0947	0.993	0.400	0.100	1.34	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	8.05	0.0950	0.993	0.400	0.100	0.805	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	335	0.114	0.993	0.400	0.0100	3.35	N/A	4529924
Octa CDD *	pg/g	2860	0.0895	1.99	0.800	0.000300	0.858	N/A	4529924
Total Tetra CDD *	pg/g	0.896	0.121	0.199	0.400	N/A	N/A	3	4529924
Total Penta CDD *	pg/g	5.79	0.116	0.993	0.400	N/A	N/A	10	4529924
Total Hexa CDD *	pg/g	68.0	0.0939	0.993	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	588	0.114	0.993	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	0.897	0.0925	0.199	0.400	0.100	0.0897	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	0.686	0.119	0.993	0.400	0.0300	0.0206	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	1.31	0.116	0.993	0.400	0.300	0.393	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	5.99	0.101	0.993	0.400	0.100	0.599	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	2.26	0.104	0.993	0.400	0.100	0.226	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	1.95	0.0972	0.993	0.400	0.100	0.195	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	0.129	0.103	0.993	0.400	0.100	0.0129	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	54.4	0.0975	0.993	0.400	0.0100	0.544	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.79	0.0995	0.993	0.400	0.0100	0.0379	N/A	4529924
Octa CDF **	pg/g	316	0.0977	1.99	0.800	0.000300	0.0948	N/A	4529924
Total Tetra CDF **	pg/g	6.69	0.0925	0.199	0.400	N/A	N/A	10	4529924
Total Penta CDF **	pg/g	17.0	0.118	0.993	0.400	N/A	N/A	8	4529924
Total Hexa CDF **	pg/g	83.1	0.101	0.993	0.400	N/A	N/A	10	4529924
Total Hepta CDF **	pg/g	210	0.0984	0.993	0.400	N/A	N/A	4	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.72	0.21	0.99	0.89	0.100	0.0720	N/A	4538970
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	10.1	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CKZ483							
<b>Sampling Date</b>		2016/04/15 11:30							
<b>COC Number</b>		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ROW-P2-007-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	67	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	116	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	70	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4538970

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ484							
Sampling Date		2016/04/15 11:40							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-008-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.712	0.231	0.198	0.400	1.00	0.712	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	8.03	0.297	0.991	0.400	1.00	8.03	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	22.7	0.223	0.991	0.400	0.100	2.27	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	83.3	0.232	0.991	0.400	0.100	8.33	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	50.1	0.233	0.991	0.400	0.100	5.01	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	2200 (1)	1.38	9.91	0.400	0.0100	22.0	N/A	4529924
Octa CDD *	pg/g	19700 (1)	1.49	19.8	0.800	0.000300	5.91	N/A	4529924
Total Tetra CDD *	pg/g	2.77	0.231	0.198	0.400	N/A	N/A	4	4529924
Total Penta CDD *	pg/g	32.0	0.297	0.991	0.400	N/A	N/A	10	4529924
Total Hexa CDD *	pg/g	385	0.230	0.991	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	3680 (1)	1.38	9.91	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	2.32	0.166	0.198	0.400	0.100	0.232	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	4.23	0.187	0.991	0.400	0.0300	0.127	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	7.24	0.181	0.991	0.400	0.300	2.17	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	45.2	0.210	0.991	0.400	0.100	4.52	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	17.8	0.217	0.991	0.400	0.100	1.78	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	14.8	0.202	0.991	0.400	0.100	1.48	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	0.533	0.214	0.991	0.400	0.100	0.0533	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	557	0.540	0.991	0.400	0.0100	5.57	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	42.9	0.551	0.991	0.400	0.0100	0.429	N/A	4529924
Octa CDF **	pg/g	2440	0.517	1.98	0.800	0.000300	0.732	N/A	4529924
Total Tetra CDF **	pg/g	28.0	0.166	0.198	0.400	N/A	N/A	12	4529924
Total Penta CDF **	pg/g	110	0.184	0.991	0.400	N/A	N/A	11	4529924
Total Hexa CDF **	pg/g	876	0.211	0.991	0.400	N/A	N/A	11	4529924
Total Hepta CDF **	pg/g	2550	0.545	0.991	0.400	N/A	N/A	4	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.11	0.18	0.99	0.89	0.100	0.211	N/A	4538970
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	69.3	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1)  
\*\* From 10X Dilution \*\*

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ484							
Sampling Date		2016/04/15 11:40							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-008-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDD *	%	84 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	96	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	103	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	104	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	123	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	98 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4538970

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1)  
\*\* From 10X Dilution \*\*

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ485							
Sampling Date		2016/04/15 11:50							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-009-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.855	0.125	0.199	0.400	1.00	0.855	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	7.75	0.110	0.995	0.400	1.00	7.75	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	2.26	0.147	0.995	0.400	0.100	0.226	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	12.0	0.153	0.995	0.400	0.100	1.20	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	7.82	0.154	0.995	0.400	0.100	0.782	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	69.3	0.102	0.995	0.400	0.0100	0.693	N/A	4529924
Octa CDD *	pg/g	467	0.103	1.99	0.800	0.000300	0.140	N/A	4529924
Total Tetra CDD *	pg/g	10.1	0.125	0.199	0.400	N/A	N/A	9	4529924
Total Penta CDD *	pg/g	56.8	0.110	0.995	0.400	N/A	N/A	10	4529924
Total Hexa CDD *	pg/g	118	0.152	0.995	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	133	0.102	0.995	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	7.01	0.156	0.199	0.400	0.100	0.701	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	2.50	0.181	0.995	0.400	0.0300	0.0750	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	18.2	0.175	0.995	0.400	0.300	5.46	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	42.6	0.143	0.995	0.400	0.100	4.26	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	20.3	0.148	0.995	0.400	0.100	2.03	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	26.1	0.138	0.995	0.400	0.100	2.61	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	0.270	0.146	0.995	0.400	0.100	0.0270	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	39.0	0.126	0.995	0.400	0.0100	0.390	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	8.15	0.128	0.995	0.400	0.0100	0.0815	N/A	4529924
Octa CDF **	pg/g	23.2	0.122	1.99	0.800	0.000300	0.00696	N/A	4529924
Total Tetra CDF **	pg/g	133	0.156	0.199	0.400	N/A	N/A	11	4529924
Total Penta CDF **	pg/g	368	0.178	0.995	0.400	N/A	N/A	8	4529924
Total Hexa CDF **	pg/g	535	0.143	0.995	0.400	N/A	N/A	11	4529924
Total Hepta CDF **	pg/g	93.0	0.127	0.995	0.400	N/A	N/A	3	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	3.54	0.32	0.99	0.89	0.100	0.354	N/A	4538970
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	26.9	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4529924
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ485							
Sampling Date		2016/04/15 11:50							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-009-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	106	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	127	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4538970

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ486							
Sampling Date		2016/04/15 12:00							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-010-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.105	0.105	0.199	0.400	1.00	0.105	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	0.391	0.0992	0.993	0.400	1.00	0.391	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	0.842	0.154	0.993	0.400	0.100	0.0842	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	5.05	0.160	0.993	0.400	0.100	0.505	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	2.89	0.161	0.993	0.400	0.100	0.289	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	118	0.269	0.993	0.400	0.0100	1.18	N/A	4529924
Octa CDD *	pg/g	810	0.442	1.99	0.800	0.000300	0.243	N/A	4529924
Total Tetra CDD *	pg/g	0.162	0.105	0.199	0.400	N/A	N/A	1	4529924
Total Penta CDD *	pg/g	2.70	0.0992	0.993	0.400	N/A	N/A	7	4529924
Total Hexa CDD *	pg/g	33.4	0.159	0.993	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	174	0.269	0.993	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	0.392	0.118	0.199	0.400	0.100	0.0392	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	0.424	0.155	0.993	0.400	0.0300	0.0127	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	0.500	0.151	0.993	0.400	0.300	0.150	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	2.45	0.122	0.993	0.400	0.100	0.245	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	1.04	0.126	0.993	0.400	0.100	0.104	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	0.721	0.118	0.993	0.400	0.100	0.0721	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	0.136	0.125	0.993	0.400	0.100	0.0136	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	15.3	0.184	0.993	0.400	0.0100	0.153	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.945	0.188	0.993	0.400	0.0100	0.00945	N/A	4529924
Octa CDF **	pg/g	19.5	0.119	1.99	0.800	0.000300	0.00585	N/A	4529924
Total Tetra CDF **	pg/g	1.76	0.118	0.199	0.400	N/A	N/A	6	4529924
Total Penta CDF **	pg/g	5.84	0.153	0.993	0.400	N/A	N/A	7	4529924
Total Hexa CDF **	pg/g	33.1	0.123	0.993	0.400	N/A	N/A	9	4529924
Total Hepta CDF **	pg/g	37.2	0.186	0.993	0.400	N/A	N/A	3	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.30 (1)	0.30	0.99	0.89	0.100	0.0300	N/A	4543753
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	3.59	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.



**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CKZ486							
<b>Sampling Date</b>		2016/04/15 12:00							
<b>COC Number</b>		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ROW-P2-010-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	96	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	111	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	127	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	103	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4543753

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ487							
Sampling Date		2016/04/15 12:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-013-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.110	0.110	0.199	0.400	1.00	0.110	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	0.506	0.132	0.994	0.400	1.00	0.506	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	1.28	0.106	0.994	0.400	0.100	0.128	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	5.15	0.110	0.994	0.400	0.100	0.515	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	3.52	0.110	0.994	0.400	0.100	0.352	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	116	0.142	0.994	0.400	0.0100	1.16	N/A	4529924
Octa CDD *	pg/g	720	0.0994	1.99	0.800	0.000300	0.216	N/A	4529924
Total Tetra CDD *	pg/g	0.340	0.110	0.199	0.400	N/A	N/A	2	4529924
Total Penta CDD *	pg/g	2.12	0.132	0.994	0.400	N/A	N/A	4	4529924
Total Hexa CDD *	pg/g	27.9	0.109	0.994	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	184	0.142	0.994	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	0.333	0.111	0.199	0.400	0.100	0.0333	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	<0.330 (1)	0.330	0.994	0.400	0.0300	0.00990	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	0.405	0.111	0.994	0.400	0.300	0.122	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	2.03	0.137	0.994	0.400	0.100	0.203	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	0.821	0.142	0.994	0.400	0.100	0.0821	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	0.654	0.132	0.994	0.400	0.100	0.0654	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.140	0.140	0.994	0.400	0.100	0.0140	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	13.5	0.100	0.994	0.400	0.0100	0.135	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.862	0.102	0.994	0.400	0.0100	0.00862	N/A	4529924
Octa CDF **	pg/g	32.4	0.137	1.99	0.800	0.000300	0.00972	N/A	4529924
Total Tetra CDF **	pg/g	1.08	0.111	0.199	0.400	N/A	N/A	4	4529924
Total Penta CDF **	pg/g	4.06	0.113	0.994	0.400	N/A	N/A	6	4529924
Total Hexa CDF **	pg/g	22.9	0.137	0.994	0.400	N/A	N/A	8	4529924
Total Hepta CDF **	pg/g	26.4	0.101	0.994	0.400	N/A	N/A	3	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.25	0.10	0.99	0.89	0.100	0.0250	N/A	4538309
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	3.66	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) RT>2 seconds - PCDD/DF analysis-Peak maxima of monitored ions exceeds 2 seconds

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CKZ487							
<b>Sampling Date</b>		2016/04/15 12:15							
<b>COC Number</b>		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ROW-P2-013-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDD *	%	61	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	121	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4538309

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ487							
Sampling Date		2016/04/15 12:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-013-0.5 Lab-Dup	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.120	0.120	0.199	0.400	1.00	0.120	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	0.604	0.124	0.994	0.400	1.00	0.604	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	1.23	0.127	0.994	0.400	0.100	0.123	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	4.88	0.132	0.994	0.400	0.100	0.488	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	3.45	0.133	0.994	0.400	0.100	0.345	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	101	0.0822	0.994	0.400	0.0100	1.01	N/A	4529924
Octa CDD *	pg/g	652	0.121	1.99	0.800	0.000300	0.196	N/A	4529924
Total Tetra CDD *	pg/g	0.154	0.120	0.199	0.400	N/A	N/A	1	4529924
Total Penta CDD *	pg/g	2.52	0.124	0.994	0.400	N/A	N/A	5	4529924
Total Hexa CDD *	pg/g	26.6	0.131	0.994	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	176	0.0822	0.994	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	0.340	0.105	0.199	0.400	0.100	0.0340	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	0.385	0.118	0.994	0.400	0.0300	0.0116	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	0.588	0.115	0.994	0.400	0.300	0.176	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	2.08	0.111	0.994	0.400	0.100	0.208	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	0.860	0.114	0.994	0.400	0.100	0.0860	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	0.848	0.106	0.994	0.400	0.100	0.0848	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	0.203	0.113	0.994	0.400	0.100	0.0203	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	12.6	0.134	0.994	0.400	0.0100	0.126	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.980	0.137	0.994	0.400	0.0100	0.00980	N/A	4529924
Octa CDF **	pg/g	31.1	0.143	1.99	0.800	0.000300	0.00933	N/A	4529924
Total Tetra CDF **	pg/g	1.34	0.105	0.199	0.400	N/A	N/A	6	4529924
Total Penta CDF **	pg/g	4.20	0.116	0.994	0.400	N/A	N/A	6	4529924
Total Hexa CDF **	pg/g	22.1	0.111	0.994	0.400	N/A	N/A	9	4529924
Total Hepta CDF **	pg/g	35.5 (1)	0.136	0.994	0.400	N/A	N/A	4	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.24	0.11	0.99	0.89	0.100	0.0240	N/A	4538309
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	3.64	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CKZ487							
<b>Sampling Date</b>		2016/04/15 12:15							
<b>COC Number</b>		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ROW-P2-013-0.5 Lab-Dup</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	106	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	123	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4538309

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ488							
Sampling Date		2016/04/15 12:25							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-014-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.177	0.132	0.198	0.400	1.00	0.177	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	1.04	0.103	0.992	0.400	1.00	1.04	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	2.36	0.121	0.992	0.400	0.100	0.236	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	10.3	0.126	0.992	0.400	0.100	1.03	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	6.10	0.127	0.992	0.400	0.100	0.610	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	234	0.0985	0.992	0.400	0.0100	2.34	N/A	4529924
Octa CDD *	pg/g	1310	0.0835	1.98	0.800	0.000300	0.393	N/A	4529924
Total Tetra CDD *	pg/g	0.522	0.132	0.198	0.400	N/A	N/A	3	4529924
Total Penta CDD *	pg/g	4.85	0.103	0.992	0.400	N/A	N/A	9	4529924
Total Hexa CDD *	pg/g	53.7	0.125	0.992	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	413	0.0985	0.992	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	0.468	0.112	0.198	0.400	0.100	0.0468	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	0.871	0.126	0.992	0.400	0.0300	0.0261	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	1.23	0.122	0.992	0.400	0.300	0.369	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	5.25	0.100	0.992	0.400	0.100	0.525	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	2.01	0.104	0.992	0.400	0.100	0.201	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	1.69	0.0963	0.992	0.400	0.100	0.169	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	0.248	0.102	0.992	0.400	0.100	0.0248	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	29.1	0.109	0.992	0.400	0.0100	0.291	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	1.86	0.112	0.992	0.400	0.0100	0.0186	N/A	4529924
Octa CDF **	pg/g	51.8	0.106	1.98	0.800	0.000300	0.0155	N/A	4529924
Total Tetra CDF **	pg/g	2.94	0.112	0.198	0.400	N/A	N/A	7	4529924
Total Penta CDF **	pg/g	11.6	0.124	0.992	0.400	N/A	N/A	8	4529924
Total Hexa CDF **	pg/g	54.4	0.100	0.992	0.400	N/A	N/A	9	4529924
Total Hepta CDF **	pg/g	79.6	0.111	0.992	0.400	N/A	N/A	4	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.54	0.15	0.99	0.89	0.100	0.0540	N/A	4543753
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	7.52	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4529924
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ488							
Sampling Date		2016/04/15 12:25							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-014-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	96	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	107	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	125	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4543753

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ489							
Sampling Date		2016/04/15 12:35							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-012-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.421	0.111	0.197	0.400	1.00	0.421	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	1.48	0.118	0.986	0.400	1.00	1.48	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	3.19	0.128	0.986	0.400	0.100	0.319	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	13.2	0.133	0.986	0.400	0.100	1.32	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	8.36	0.134	0.986	0.400	0.100	0.836	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	287	0.128	0.986	0.400	0.0100	2.87	N/A	4529924
Octa CDD *	pg/g	1570	0.0818	1.97	0.800	0.000300	0.471	N/A	4529924
Total Tetra CDD *	pg/g	0.964	0.111	0.197	0.400	N/A	N/A	3	4529924
Total Penta CDD *	pg/g	8.26	0.118	0.986	0.400	N/A	N/A	9	4529924
Total Hexa CDD *	pg/g	73.4	0.132	0.986	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	498	0.128	0.986	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	1.08	0.117	0.197	0.400	0.100	0.108	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	1.06	0.125	0.986	0.400	0.0300	0.0318	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	1.55	0.121	0.986	0.400	0.300	0.465	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	7.00	0.115	0.986	0.400	0.100	0.700	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	2.81	0.119	0.986	0.400	0.100	0.281	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	2.01	0.110	0.986	0.400	0.100	0.201	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	0.183	0.117	0.986	0.400	0.100	0.0183	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	34.7	0.135	0.986	0.400	0.0100	0.347	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.05	0.138	0.986	0.400	0.0100	0.0205	N/A	4529924
Octa CDF **	pg/g	55.2	0.105	1.97	0.800	0.000300	0.0166	N/A	4529924
Total Tetra CDF **	pg/g	4.84	0.117	0.197	0.400	N/A	N/A	9	4529924
Total Penta CDF **	pg/g	17.8	0.123	0.986	0.400	N/A	N/A	9	4529924
Total Hexa CDF **	pg/g	73.1	0.115	0.986	0.400	N/A	N/A	10	4529924
Total Hepta CDF **	pg/g	89.1	0.137	0.986	0.400	N/A	N/A	4	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.50	0.23	0.99	0.89	0.100	0.0500	N/A	4538970
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	9.85	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4529924
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ489							
Sampling Date		2016/04/15 12:35							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-012-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	106	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	122	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	96	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4538970

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ490							
Sampling Date		2016/04/15 12:45							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-015-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.156 (1)	0.156	0.200	0.400	1.00	0.156	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	1.44	0.123	0.998	0.400	1.00	1.44	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	3.38	0.129	0.998	0.400	0.100	0.338	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	15.4	0.134	0.998	0.400	0.100	1.54	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	8.88	0.134	0.998	0.400	0.100	0.888	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	308	0.126	0.998	0.400	0.0100	3.08	N/A	4529924
Octa CDD *	pg/g	1860	0.0998	2.00	0.800	0.000300	0.558	N/A	4529924
Total Tetra CDD *	pg/g	0.973	0.113	0.200	0.400	N/A	N/A	3	4529924
Total Penta CDD *	pg/g	7.83	0.123	0.998	0.400	N/A	N/A	10	4529924
Total Hexa CDD *	pg/g	79.1	0.133	0.998	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	531	0.126	0.998	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	0.768	0.129	0.200	0.400	0.100	0.0768	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	0.830	0.115	0.998	0.400	0.0300	0.0249	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	1.20	0.111	0.998	0.400	0.300	0.360	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	5.78	0.116	0.998	0.400	0.100	0.578	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	2.28	0.120	0.998	0.400	0.100	0.228	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	1.77	0.111	0.998	0.400	0.100	0.177	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	0.126	0.118	0.998	0.400	0.100	0.0126	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	43.3	0.0912	0.998	0.400	0.0100	0.433	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.58	0.0930	0.998	0.400	0.0100	0.0258	N/A	4529924
Octa CDF **	pg/g	93.2	0.118	2.00	0.800	0.000300	0.0280	N/A	4529924
Total Tetra CDF **	pg/g	4.96	0.129	0.200	0.400	N/A	N/A	9	4529924
Total Penta CDF **	pg/g	14.6	0.113	0.998	0.400	N/A	N/A	9	4529924
Total Hexa CDF **	pg/g	73.5	0.116	0.998	0.400	N/A	N/A	10	4529924
Total Hepta CDF **	pg/g	120	0.0921	0.998	0.400	N/A	N/A	4	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.537	0.095	0.99	0.89	0.100	0.0537	N/A	4538309
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	9.92	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ490							
Sampling Date		2016/04/15 12:45							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-015-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	96	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	104	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	115	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	130	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	104	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4538309
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ491							
Sampling Date		2016/04/15 13:00							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-017-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.380	0.139	0.198	0.400	1.00	0.380	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	5.51	0.123	0.990	0.400	1.00	5.51	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	18.5	0.109	0.990	0.400	0.100	1.85	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	105	0.113	0.990	0.400	0.100	10.5	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	46.6	0.114	0.990	0.400	0.100	4.66	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	2440 (1)	2.06	19.8	0.400	0.0100	24.4	N/A	4529924
Octa CDD *	pg/g	14100 (1)	1.83	39.6	0.800	0.000300	4.23	N/A	4529924
Total Tetra CDD *	pg/g	2.62	0.139	0.198	0.400	N/A	N/A	6	4529924
Total Penta CDD *	pg/g	24.5	0.123	0.990	0.400	N/A	N/A	11	4529924
Total Hexa CDD *	pg/g	451	0.112	0.990	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	4280 (1)	2.06	19.8	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	4.78	0.128	0.198	0.400	0.100	0.478	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	9.67	0.111	0.990	0.400	0.0300	0.290	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	15.7	0.108	0.990	0.400	0.300	4.71	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	82.2	0.0981	0.990	0.400	0.100	8.22	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	29.2	0.101	0.990	0.400	0.100	2.92	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	17.6	0.0944	0.990	0.400	0.100	1.76	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	0.959	0.100	0.990	0.400	0.100	0.0959	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	302	0.112	0.990	0.400	0.0100	3.02	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	17.8	0.114	0.990	0.400	0.0100	0.178	N/A	4529924
Octa CDF **	pg/g	283	0.140	1.98	0.800	0.000300	0.0849	N/A	4529924
Total Tetra CDF **	pg/g	25.9	0.128	0.198	0.400	N/A	N/A	12	4529924
Total Penta CDF **	pg/g	141	0.110	0.990	0.400	N/A	N/A	13	4529924
Total Hexa CDF **	pg/g	785	0.0984	0.990	0.400	N/A	N/A	11	4529924
Total Hepta CDF **	pg/g	756	0.113	0.990	0.400	N/A	N/A	4	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	3.98	0.15	0.99	0.89	0.100	0.398	N/A	4538970
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	73.2	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 20X DILUTION



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ491							
Sampling Date		2016/04/15 13:00							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-017-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	103	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	105	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	123	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4538970
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CKZ492							
Sampling Date		2016/04/15 13:10							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-016-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	2.12	0.121	0.199	0.400	1.00	2.12	N/A	4529924
1,2,3,7,8-Penta CDD *	pg/g	32.2	0.109	0.997	0.400	1.00	32.2	N/A	4529924
1,2,3,4,7,8-Hexa CDD *	pg/g	93.0	0.0892	0.997	0.400	0.100	9.30	N/A	4529924
1,2,3,6,7,8-Hexa CDD *	pg/g	606	0.0928	0.997	0.400	0.100	60.6	N/A	4529924
1,2,3,7,8,9-Hexa CDD *	pg/g	223	0.0932	0.997	0.400	0.100	22.3	N/A	4529924
1,2,3,4,6,7,8-Hepta CDD *	pg/g	2440 (1)	2.06	19.9	0.400	0.0100	24.4	N/A	4529924
Octa CDD *	pg/g	14100 (1)	1.83	39.9	0.800	0.000300	4.23	N/A	4529924
Total Tetra CDD *	pg/g	6.04	0.121	0.199	0.400	N/A	N/A	6	4529924
Total Penta CDD *	pg/g	107	0.109	0.997	0.400	N/A	N/A	12	4529924
Total Hexa CDD *	pg/g	2260	0.0921	0.997	0.400	N/A	N/A	7	4529924
Total Hepta CDD *	pg/g	4280 (1)	2.06	19.9	0.400	N/A	N/A	2	4529924
2,3,7,8-Tetra CDF **	pg/g	52.3	0.126	0.199	0.400	0.100	5.23	N/A	4529924
1,2,3,7,8-Penta CDF **	pg/g	135	0.134	0.997	0.400	0.0300	4.05	N/A	4529924
2,3,4,7,8-Penta CDF **	pg/g	107	0.130	0.997	0.400	0.300	32.1	N/A	4529924
1,2,3,4,7,8-Hexa CDF **	pg/g	393	0.0969	0.997	0.400	0.100	39.3	N/A	4529924
1,2,3,6,7,8-Hexa CDF **	pg/g	130	0.100	0.997	0.400	0.100	13.0	N/A	4529924
2,3,4,6,7,8-Hexa CDF **	pg/g	74.4	0.0932	0.997	0.400	0.100	7.44	N/A	4529924
1,2,3,7,8,9-Hexa CDF **	pg/g	13.2	0.0988	0.997	0.400	0.100	1.32	N/A	4529924
1,2,3,4,6,7,8-Hepta CDF **	pg/g	1800	0.0895	0.997	0.400	0.0100	18.0	N/A	4529924
1,2,3,4,7,8,9-Hepta CDF **	pg/g	71.4	0.0913	0.997	0.400	0.0100	0.714	N/A	4529924
Octa CDF **	pg/g	1570	0.135	1.99	0.800	0.000300	0.471	N/A	4529924
Total Tetra CDF **	pg/g	110	0.126	0.199	0.400	N/A	N/A	12	4529924
Total Penta CDF **	pg/g	988	0.132	0.997	0.400	N/A	N/A	14	4529924
Total Hexa CDF **	pg/g	5990	0.0972	0.997	0.400	N/A	N/A	11	4529924
Total Hepta CDF **	pg/g	5620	0.0904	0.997	0.400	N/A	N/A	4	4529924
Confirmation 2,3,7,8-Tetra CDF **	pg/g	56.7	0.20	1.0	0.90	0.100	5.67	N/A	4538970
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	277	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) 20X DILUTION

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CKZ492							
<b>Sampling Date</b>		2016/04/15 13:10							
<b>COC Number</b>		NA				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ROW-P2-016-0.5</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234678 HeptaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123478 HexaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-1234789 HeptaCDF **	%	108	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDD *	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123678 HexaCDF **	%	108	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDD *	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-12378 PentaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-123789 HexaCDF **	%	127	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-234678 HexaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-23478 PentaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDD *	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-2378 TetraCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4529924
C13-OCDD *	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4529924
Confirmation C13-2378 TetraCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4538970

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** CKZ483  
**Sample ID:** ROW-P2-007-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/05/31	2016/06/13	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4538970	N/A	2016/06/14	Kay Shaw
Moisture	BAL	4517301	N/A	2016/05/30	Min Yang

**Maxxam ID:** CKZ484  
**Sample ID:** ROW-P2-008-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/05/31	2016/06/13	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4538970	N/A	2016/06/14	Kay Shaw
Moisture	BAL	4517301	N/A	2016/05/30	Min Yang

**Maxxam ID:** CKZ485  
**Sample ID:** ROW-P2-009-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/05/31	2016/06/13	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4538970	N/A	2016/06/14	Kay Shaw
Moisture	BAL	4517301	N/A	2016/05/30	Min Yang

**Maxxam ID:** CKZ486  
**Sample ID:** ROW-P2-010-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/05/31	2016/06/13	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4543753	N/A	2016/06/16	Vica Cioranic
Moisture	BAL	4517301	N/A	2016/05/30	Min Yang

**Maxxam ID:** CKZ487  
**Sample ID:** ROW-P2-013-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/05/31	2016/06/12	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4538309	N/A	2016/06/13	Vica Cioranic
Moisture	BAL	4517301	N/A	2016/05/30	Min Yang

**Maxxam ID:** CKZ487 Dup  
**Sample ID:** ROW-P2-013-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/06/08	2016/06/12	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4538309	N/A	2016/06/13	Vica Cioranic

**TEST SUMMARY**

**Maxxam ID:** CKZ488  
**Sample ID:** ROW-P2-014-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/05/31	2016/06/13	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4543753	N/A	2016/06/16	Vica Cioranic
Moisture	BAL	4517301	N/A	2016/05/30	Min Yang

**Maxxam ID:** CKZ489  
**Sample ID:** ROW-P2-012-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/05/31	2016/06/13	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4538970	N/A	2016/06/14	Kay Shaw
Moisture	BAL	4517301	N/A	2016/05/30	Min Yang

**Maxxam ID:** CKZ490  
**Sample ID:** ROW-P2-015-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/05/31	2016/06/12	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4538309	N/A	2016/06/13	Vica Cioranic
Moisture	BAL	4517301	N/A	2016/05/30	Min Yang

**Maxxam ID:** CKZ491  
**Sample ID:** ROW-P2-017-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/05/31	2016/06/13	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4538970	N/A	2016/06/14	Kay Shaw
Moisture	BAL	4517301	N/A	2016/05/30	Min Yang

**Maxxam ID:** CKZ492  
**Sample ID:** ROW-P2-016-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4529924	2016/05/31	2016/06/13	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4538970	N/A	2016/06/14	Kay Shaw
Moisture	BAL	4517301	N/A	2016/05/30	Min Yang

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C
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Report revised to reflect addition of 2,3,7,8 TCDF confirmation results for samples CKZ486 and CKZ488 missed in original report.

**Results relate only to the items tested.**



**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4517301	NS3	RPD - Sample/Sample Dup	Moisture	2016/05/30	8.2		%	20
4529924	OBC	Matrix Spike	37CL4 2378 Tetra CDD	2016/06/12		96	%	35 - 197
			C13-1234678 HeptaCDD	2016/06/12		90	%	23 - 140
			C13-1234678 HeptaCDF	2016/06/12		91	%	28 - 143
			C13-123478 HexaCDD	2016/06/12		90	%	32 - 141
			C13-123478 HexaCDF	2016/06/12		84	%	26 - 152
			C13-1234789 HeptaCDF	2016/06/12		103	%	26 - 138
			C13-123678 HexaCDD	2016/06/12		92	%	28 - 130
			C13-123678 HexaCDF	2016/06/12		106	%	26 - 123
			C13-12378 PentaCDD	2016/06/12		90	%	25 - 181
			C13-12378 PentaCDF	2016/06/12		77	%	24 - 185
			C13-123789 HexaCDF	2016/06/12		123	%	29 - 147
			C13-234678 HexaCDF	2016/06/12		89	%	28 - 136
			C13-23478 PentaCDF	2016/06/12		78	%	21 - 178
			C13-2378 TetraCDD	2016/06/12		97	%	25 - 164
			C13-2378 TetraCDF	2016/06/12		78	%	24 - 169
			C13-OCDD	2016/06/12		100	%	17 - 157
4529924	OBC	Matrix Spike(CKZ490)	2,3,7,8-Tetra CDD	2016/06/12		96	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/06/12		91	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/06/12		93	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/06/12		98	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/06/12		91	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12		101	%	70 - 140
			Octa CDD	2016/06/12		44 (1)	%	78 - 144
			2,3,7,8-Tetra CDF	2016/06/12		97	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/06/12		91	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/06/12		93	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/06/12		91	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/06/12		88	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/06/12		90	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/06/12		95	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12		93	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12		93	%	78 - 138
			Octa CDF	2016/06/12		90	%	63 - 170
4529924	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2016/06/12		92	%	35 - 197
			C13-1234678 HeptaCDD	2016/06/12		72	%	23 - 140
			C13-1234678 HeptaCDF	2016/06/12		74	%	28 - 143
			C13-123478 HexaCDD	2016/06/12		77	%	32 - 141
			C13-123478 HexaCDF	2016/06/12		69	%	26 - 152
			C13-1234789 HeptaCDF	2016/06/12		77	%	26 - 138
			C13-123678 HexaCDD	2016/06/12		80	%	28 - 130
			C13-123678 HexaCDF	2016/06/12		94	%	26 - 123
			C13-12378 PentaCDD	2016/06/12		78	%	25 - 181
			C13-12378 PentaCDF	2016/06/12		68	%	24 - 185
			C13-123789 HexaCDF	2016/06/12		113	%	29 - 147
			C13-234678 HexaCDF	2016/06/12		75	%	28 - 136
			C13-23478 PentaCDF	2016/06/12		72	%	21 - 178
			C13-2378 TetraCDD	2016/06/12		86	%	25 - 164
			C13-2378 TetraCDF	2016/06/12		73	%	24 - 169
			C13-OCDD	2016/06/12		65	%	17 - 157
			2,3,7,8-Tetra CDD	2016/06/12		89	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/06/12		88	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/06/12		87	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/06/12		94	%	76 - 134

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date		%		
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/06/12		95	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12		85	%	70 - 140
			Octa CDD	2016/06/12		94	%	78 - 144
			2,3,7,8-Tetra CDF	2016/06/12		92	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/06/12		93	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/06/12		89	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/06/12		87	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/06/12		108	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/06/12		87	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/06/12		126	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12		98	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12		92	%	78 - 138
			Octa CDF	2016/06/12		91	%	63 - 170
4529924	OBC	Spiked Blank DUP	37CL4 2378 Tetra CDD	2016/06/12		78	%	35 - 197
			C13-1234678 HeptaCDD	2016/06/12		73	%	23 - 140
			C13-1234678 HeptaCDF	2016/06/12		76	%	28 - 143
			C13-123478 HexaCDD	2016/06/12		77	%	32 - 141
			C13-123478 HexaCDF	2016/06/12		69	%	26 - 152
			C13-1234789 HeptaCDF	2016/06/12		77	%	26 - 138
			C13-123678 HexaCDD	2016/06/12		82	%	28 - 130
			C13-123678 HexaCDF	2016/06/12		88	%	26 - 123
			C13-12378 PentaCDD	2016/06/12		75	%	25 - 181
			C13-12378 PentaCDF	2016/06/12		65	%	24 - 185
			C13-123789 HexaCDF	2016/06/12		107	%	29 - 147
			C13-234678 HexaCDF	2016/06/12		74	%	28 - 136
			C13-23478 PentaCDF	2016/06/12		64	%	21 - 178
			C13-2378 TetraCDD	2016/06/12		82	%	25 - 164
			C13-2378 TetraCDF	2016/06/12		67	%	24 - 169
			C13-OCDD	2016/06/12		71	%	17 - 157
			2,3,7,8-Tetra CDD	2016/06/12		108	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/06/12		104	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/06/12		103	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/06/12		106	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/06/12		105	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12		102	%	70 - 140
			Octa CDD	2016/06/12		109	%	78 - 144
			2,3,7,8-Tetra CDF	2016/06/12		113	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/06/12		103	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/06/12		109	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/06/12		104	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/06/12		104	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/06/12		105	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/06/12		121	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12		107	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12		114	%	78 - 138
			Octa CDF	2016/06/12		110	%	63 - 170
4529924	OBC	RPD	2,3,7,8-Tetra CDD	2016/06/12	19		%	25
			1,2,3,7,8-Penta CDD	2016/06/12	17		%	25
			1,2,3,4,7,8-Hexa CDD	2016/06/12	17		%	25
			1,2,3,6,7,8-Hexa CDD	2016/06/12	12		%	25
			1,2,3,7,8,9-Hexa CDD	2016/06/12	10		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12	18		%	25
			Octa CDD	2016/06/12	15		%	25
			2,3,7,8-Tetra CDF	2016/06/12	20		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8-Penta CDF	2016/06/12	10		%	25
			2,3,4,7,8-Penta CDF	2016/06/12	20		%	25
			1,2,3,4,7,8-Hexa CDF	2016/06/12	18		%	25
			1,2,3,6,7,8-Hexa CDF	2016/06/12	3.8		%	25
			2,3,4,6,7,8-Hexa CDF	2016/06/12	19		%	25
			1,2,3,7,8,9-Hexa CDF	2016/06/12	4.0		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12	8.8		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12	21		%	25
			Octa CDF	2016/06/12	19		%	25
4529924	OBC	Method Blank	37CL4 2378 Tetra CDD	2016/06/12		98	%	35 - 197
			C13-1234678 HeptaCDD	2016/06/12		73	%	23 - 140
			C13-1234678 HeptaCDF	2016/06/12		78	%	28 - 143
			C13-123478 HexaCDD	2016/06/12		80	%	32 - 141
			C13-123478 HexaCDF	2016/06/12		72	%	26 - 152
			C13-1234789 HeptaCDF	2016/06/12		81	%	26 - 138
			C13-123678 HexaCDD	2016/06/12		86	%	28 - 130
			C13-123678 HexaCDF	2016/06/12		95	%	26 - 123
			C13-12378 PentaCDD	2016/06/12		81	%	25 - 181
			C13-12378 PentaCDF	2016/06/12		71	%	24 - 185
			C13-123789 HexaCDF	2016/06/12		114	%	29 - 147
			C13-234678 HexaCDF	2016/06/12		81	%	28 - 136
			C13-23478 PentaCDF	2016/06/12		75	%	21 - 178
			C13-2378 TetraCDD	2016/06/12		93	%	25 - 164
			C13-2378 TetraCDF	2016/06/12		78	%	24 - 169
			C13-OCDD	2016/06/12		70	%	17 - 157
			2,3,7,8-Tetra CDD	2016/06/12	<0.103, EDL=0.103		pg/g	
			1,2,3,7,8-Penta CDD	2016/06/12	<0.0787, EDL=0.0787		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/06/12	<0.107, EDL=0.107		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/06/12	<0.111, EDL=0.111		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/06/12	<0.111, EDL=0.111		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12	<0.104, EDL=0.104		pg/g	
			Octa CDD	2016/06/12	0.294, EDL=0.0965		pg/g	
			Total Tetra CDD	2016/06/12	<0.103, EDL=0.103		pg/g	
			Total Penta CDD	2016/06/12	<0.0787, EDL=0.0787		pg/g	
			Total Hexa CDD	2016/06/12	<0.110, EDL=0.110		pg/g	
			Total Hepta CDD	2016/06/12	<0.104, EDL=0.104		pg/g	
			2,3,7,8-Tetra CDF	2016/06/12	<0.0753, EDL=0.0753		pg/g	
			1,2,3,7,8-Penta CDF	2016/06/12	<0.0973, EDL=0.0973		pg/g	
			2,3,4,7,8-Penta CDF	2016/06/12	<0.0945, EDL=0.0945		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDF	2016/06/12	<0.0743, EDL=0.0743		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/06/12	<0.0768, EDL=0.0768		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/06/12	<0.0715, EDL=0.0715		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/06/12	<0.0757, EDL=0.0757		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12	<0.0827, EDL=0.0827		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12	<0.0844, EDL=0.0844		pg/g	
			Octa CDF	2016/06/12	<0.109, EDL=0.109		pg/g	
			Total Tetra CDF	2016/06/12	<0.0753, EDL=0.0753		pg/g	
			Total Penta CDF	2016/06/12	<0.0959, EDL=0.0959		pg/g	
			Total Hexa CDF	2016/06/12	<0.0745, EDL=0.0745		pg/g	
			Total Hepta CDF	2016/06/12	<0.0836, EDL=0.0836		pg/g	
4529924	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2016/06/12	NC		%	25
			1,2,3,7,8-Penta CDD	2016/06/12	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2016/06/12	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2016/06/12	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2016/06/12	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/06/12	14		%	25
			Octa CDD	2016/06/12	9.9		%	25
			Total Tetra CDD	2016/06/12	NC		%	25
			Total Penta CDD	2016/06/12	NC		%	25
			Total Hexa CDD	2016/06/12	4.7		%	25
			Total Hepta CDD	2016/06/12	4.6		%	25
			2,3,7,8-Tetra CDF	2016/06/12	NC		%	25
			1,2,3,7,8-Penta CDF	2016/06/12	NC		%	25
			2,3,4,7,8-Penta CDF	2016/06/12	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2016/06/12	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2016/06/12	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2016/06/12	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2016/06/12	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/06/12	6.7		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/06/12	NC		%	25
			Octa CDF	2016/06/12	4.1		%	25
			Total Tetra CDF	2016/06/12	22		%	25
			Total Penta CDF	2016/06/12	NC		%	25
			Total Hexa CDF	2016/06/12	3.7		%	25
			Total Hepta CDF	2016/06/12	29 (2)		%	25
4538309	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/06/13	<0.11, EDL=0.11		pg/g	
			Confirmation C13-2378 TetraCDF	2016/06/13		97	%	40 - 135
4538309	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/06/13	NC		%	100
4538970	KKS	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/06/14	<0.16, EDL=0.16		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4543753	VCI	Method Blank	Confirmation C13-2378 TetraCDF	2016/06/14		47	%	40 - 135
			Confirmation 2,3,7,8-Tetra CDF	2016/06/16	<0.41, EDL=0.41		pg/g	
			Confirmation C13-2378 TetraCDF	2016/06/16		68	%	40 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

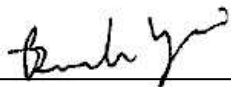
(2) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



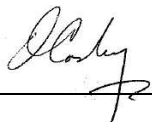
Brad Newman, Scientific Specialist



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A6D0673  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/07/07**  
Report #: R4055528  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B6C5685**

**Received: 2016/06/18, 12:39**

Sample Matrix: Soil  
# Samples Received: 2

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	2	2016/06/30	2016/07/05	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	2	N/A	2016/07/06	BRL SOP-00406	EPA M8290A / M1613
Moisture	2	N/A	2016/06/22	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		COG252	COG253			
<b>Sampling Date</b>		2016/04/15 11:05	2016/04/15 11:20			
<b>COC Number</b>		na	na			
	<b>UNITS</b>	<b>ROW-P2-011A-0.5</b>	<b>ROW-P2-011B-0.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	22	18	1.0	0.50	4550287
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COG252							
Sampling Date		2016/04/15 11:05							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-011A-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.614	0.121	0.200	0.0400	1.00	0.614	N/A	4561055
1,2,3,7,8-Penta CDD *	pg/g	12.0	0.120	0.999	0.0400	1.00	12.0	N/A	4561055
1,2,3,4,7,8-Hexa CDD *	pg/g	45.2	0.162	0.999	0.0400	0.100	4.52	N/A	4561055
1,2,3,6,7,8-Hexa CDD *	pg/g	305	0.166	0.999	0.0400	0.100	30.5	N/A	4561055
1,2,3,7,8,9-Hexa CDD *	pg/g	122	0.161	0.999	0.0400	0.100	12.2	N/A	4561055
1,2,3,4,6,7,8-Hepta CDD *	pg/g	5290 (1)	0.981	9.99	0.0400	0.0100	52.9	N/A	4561055
Octa CDD *	pg/g	29400 (1)	3.32	20.0	0.0800	0.000300	8.82	N/A	4561055
Total Tetra CDD *	pg/g	3.59	0.121	0.200	0.0400	N/A	N/A	6	4561055
Total Penta CDD *	pg/g	40.1	0.120	0.999	0.0400	N/A	N/A	12	4561055
Total Hexa CDD *	pg/g	1110	0.163	0.999	0.0400	N/A	N/A	7	4561055
Total Hepta CDD *	pg/g	8920 (1)	0.981	9.99	0.0400	N/A	N/A	2	4561055
2,3,7,8-Tetra CDF **	pg/g	10.1	0.0860	0.200	0.0400	0.100	1.01	N/A	4561055
1,2,3,7,8-Penta CDF **	pg/g	29.0	0.129	0.999	0.0400	0.0300	0.870	N/A	4561055
2,3,4,7,8-Penta CDF **	pg/g	47.8	0.126	0.999	0.0400	0.300	14.3	N/A	4561055
1,2,3,4,7,8-Hexa CDF **	pg/g	228	0.280	0.999	0.0400	0.100	22.8	N/A	4561055
1,2,3,6,7,8-Hexa CDF **	pg/g	83.8	0.291	0.999	0.0400	0.100	8.38	N/A	4561055
2,3,4,6,7,8-Hexa CDF **	pg/g	47.9	0.278	0.999	0.0400	0.100	4.79	N/A	4561055
1,2,3,7,8,9-Hexa CDF **	pg/g	3.68	0.278	0.999	0.0400	0.100	0.368	N/A	4561055
1,2,3,4,6,7,8-Hepta CDF **	pg/g	813	0.178	0.999	0.0400	0.0100	8.13	N/A	4561055
1,2,3,4,7,8,9-Hepta CDF **	pg/g	58.9	0.192	0.999	0.0400	0.0100	0.589	N/A	4561055
Octa CDF **	pg/g	714	0.184	2.00	0.0800	0.000300	0.214	N/A	4561055
Total Tetra CDF **	pg/g	26.9	0.0860	0.200	0.0400	N/A	N/A	12	4561055
Total Penta CDF **	pg/g	234	0.127	0.999	0.0400	N/A	N/A	10	4561055
Total Hexa CDF **	pg/g	1560	0.282	0.999	0.0400	N/A	N/A	11	4561055
Total Hepta CDF **	pg/g	2180	0.184	0.999	0.0400	N/A	N/A	4	4561055
Confirmation 2,3,7,8-Tetra CDF **	pg/g	9.01	0.11	1.0	0.90	0.100	0.901	N/A	4568571
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	183	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzop-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzop-Furan  
(1) \*\* From 10X Dilution \*\*

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COG252							
Sampling Date		2016/04/15 11:05							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-011A-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-1234678 HeptaCDD *	%	132 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-1234678 HeptaCDF **	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123478 HexaCDD *	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123478 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-1234789 HeptaCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123678 HexaCDD *	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123678 HexaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-12378 PentaCDD *	%	112	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-12378 PentaCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123789 HexaCDF **	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-234678 HexaCDF **	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-23478 PentaCDF **	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-2378 TetraCDD *	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-2378 TetraCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-OCDD *	%	144 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4561055
Confirmation C13-2378 TetraCDF **	%	104	N/A	N/A	N/A	N/A	N/A	N/A	4568571
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan (1) ** From 10X Dilution **									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COG252							
Sampling Date		2016/04/15 11:05							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-011A-0.5 Lab-Dup	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.540	0.118	0.200	0.0400	1.00	0.540	N/A	4561055
1,2,3,7,8-Penta CDD *	pg/g	11.1	0.117	1.00	0.0400	1.00	11.1	N/A	4561055
1,2,3,4,7,8-Hexa CDD *	pg/g	42.6	0.0636	1.00	0.0400	0.100	4.26	N/A	4561055
1,2,3,6,7,8-Hexa CDD *	pg/g	302	0.0655	1.00	0.0400	0.100	30.2	N/A	4561055
1,2,3,7,8,9-Hexa CDD *	pg/g	112	0.0632	1.00	0.0400	0.100	11.2	N/A	4561055
1,2,3,4,6,7,8-Hepta CDD *	pg/g	5260 (1)	0.661	10.0	0.0400	0.0100	52.6	N/A	4561055
Octa CDD *	pg/g	32000 (1)	3.09	20.0	0.0800	0.000300	9.60	N/A	4561055
Total Tetra CDD *	pg/g	3.79	0.118	0.200	0.0400	N/A	N/A	9	4561055
Total Penta CDD *	pg/g	43.3	0.117	1.00	0.0400	N/A	N/A	11	4561055
Total Hexa CDD *	pg/g	1080	0.0641	1.00	0.0400	N/A	N/A	7	4561055
Total Hepta CDD *	pg/g	8960 (1)	0.661	10.0	0.0400	N/A	N/A	2	4561055
2,3,7,8-Tetra CDF **	pg/g	9.30	0.136	0.200	0.0400	0.100	0.930	N/A	4561055
1,2,3,7,8-Penta CDF **	pg/g	27.1	0.0933	1.00	0.0400	0.0300	0.813	N/A	4561055
2,3,4,7,8-Penta CDF **	pg/g	47.4	0.0908	1.00	0.0400	0.300	14.2	N/A	4561055
1,2,3,4,7,8-Hexa CDF **	pg/g	232	0.230	1.00	0.0400	0.100	23.2	N/A	4561055
1,2,3,6,7,8-Hexa CDF **	pg/g	87.2	0.239	1.00	0.0400	0.100	8.72	N/A	4561055
2,3,4,6,7,8-Hexa CDF **	pg/g	40.6	0.229	1.00	0.0400	0.100	4.06	N/A	4561055
1,2,3,7,8,9-Hexa CDF **	pg/g	3.27	0.228	1.00	0.0400	0.100	0.327	N/A	4561055
1,2,3,4,6,7,8-Hepta CDF **	pg/g	804	0.182	1.00	0.0400	0.0100	8.04	N/A	4561055
1,2,3,4,7,8,9-Hepta CDF **	pg/g	58.2	0.196	1.00	0.0400	0.0100	0.582	N/A	4561055
Octa CDF **	pg/g	716	0.153	2.00	0.0800	0.000300	0.215	N/A	4561055
Total Tetra CDF **	pg/g	32.6	0.136	0.200	0.0400	N/A	N/A	13	4561055
Total Penta CDF **	pg/g	304 (2)	0.0921	1.00	0.0400	N/A	N/A	12	4561055
Total Hexa CDF **	pg/g	2120 (2)	0.232	1.00	0.0400	N/A	N/A	11	4561055
Total Hepta CDF **	pg/g	2170	0.189	1.00	0.0400	N/A	N/A	4	4561055
Confirmation 2,3,7,8-Tetra CDF **	pg/g	11.4	0.11	1.0	0.90	0.100	1.14	N/A	4568571
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	181	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 10X Dilution \*\*  
(2) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		COG252							
<b>Sampling Date</b>		2016/04/15 11:05							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		# of	
	<b>UNITS</b>	<b>ROW-P2-011A-0.5 Lab-Dup</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-1234678 HeptaCDD *	%	116 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-1234678 HeptaCDF **	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123478 HexaCDD *	%	106	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123478 HexaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-1234789 HeptaCDF **	%	96	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123678 HexaCDD *	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123678 HexaCDF **	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-12378 PentaCDD *	%	112	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-12378 PentaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123789 HexaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-234678 HexaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-23478 PentaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-2378 TetraCDD *	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-2378 TetraCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-OCDD *	%	121 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4561055
Confirmation C13-2378 TetraCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4568571

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 10X Dilution \*\*



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COG253							
Sampling Date		2016/04/15 11:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-011B-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.815	0.102	0.200	0.0400	1.00	0.815	N/A	4561055
1,2,3,7,8-Penta CDD *	pg/g	8.77	0.0965	0.999	0.0400	1.00	8.77	N/A	4561055
1,2,3,4,7,8-Hexa CDD *	pg/g	27.0	0.0975	0.999	0.0400	0.100	2.70	N/A	4561055
1,2,3,6,7,8-Hexa CDD *	pg/g	150	0.100	0.999	0.0400	0.100	15.0	N/A	4561055
1,2,3,7,8,9-Hexa CDD *	pg/g	65.1	0.0969	0.999	0.0400	0.100	6.51	N/A	4561055
1,2,3,4,6,7,8-Hepta CDD *	pg/g	2880 (1)	0.607	9.99	0.0400	0.0100	28.8	N/A	4561055
Octa CDD *	pg/g	16500 (1)	2.36	20.0	0.0799	0.000300	4.95	N/A	4561055
Total Tetra CDD *	pg/g	4.93	0.102	0.200	0.0400	N/A	N/A	9	4561055
Total Penta CDD *	pg/g	30.8	0.0965	0.999	0.0400	N/A	N/A	11	4561055
Total Hexa CDD *	pg/g	579	0.0982	0.999	0.0400	N/A	N/A	8	4561055
Total Hepta CDD *	pg/g	4920 (1)	0.607	9.99	0.0400	N/A	N/A	2	4561055
2,3,7,8-Tetra CDF **	pg/g	6.48	0.107	0.200	0.0400	0.100	0.648	N/A	4561055
1,2,3,7,8-Penta CDF **	pg/g	14.6	0.104	0.999	0.0400	0.0300	0.438	N/A	4561055
2,3,4,7,8-Penta CDF **	pg/g	25.9	0.101	0.999	0.0400	0.300	7.77	N/A	4561055
1,2,3,4,7,8-Hexa CDF **	pg/g	119	0.108	0.999	0.0400	0.100	11.9	N/A	4561055
1,2,3,6,7,8-Hexa CDF **	pg/g	48.0	0.112	0.999	0.0400	0.100	4.80	N/A	4561055
2,3,4,6,7,8-Hexa CDF **	pg/g	26.0	0.107	0.999	0.0400	0.100	2.60	N/A	4561055
1,2,3,7,8,9-Hexa CDF **	pg/g	1.94	0.107	0.999	0.0400	0.100	0.194	N/A	4561055
1,2,3,4,6,7,8-Hepta CDF **	pg/g	426	0.104	0.999	0.0400	0.0100	4.26	N/A	4561055
1,2,3,4,7,8,9-Hepta CDF **	pg/g	30.1	0.112	0.999	0.0400	0.0100	0.301	N/A	4561055
Octa CDF **	pg/g	370	0.100	2.00	0.0799	0.000300	0.111	N/A	4561055
Total Tetra CDF **	pg/g	25.1	0.107	0.200	0.0400	N/A	N/A	12	4561055
Total Penta CDF **	pg/g	139	0.103	0.999	0.0400	N/A	N/A	11	4561055
Total Hexa CDF **	pg/g	839	0.108	0.999	0.0400	N/A	N/A	12	4561055
Total Hepta CDF **	pg/g	1130	0.108	0.999	0.0400	N/A	N/A	4	4561055
Confirmation 2,3,7,8-Tetra CDF **	pg/g	6.23	0.12	1.0	0.90	0.100	0.623	N/A	4568571
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	101	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzop-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzop-Furan  
(1) From 10x dilution.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COG253							
Sampling Date		2016/04/15 11:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-011B-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-1234678 HeptaCDD *	%	103 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-1234678 HeptaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123478 HexaCDD *	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123478 HexaCDF **	%	67	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-1234789 HeptaCDF **	%	70	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123678 HexaCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123678 HexaCDF **	%	66	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-12378 PentaCDD *	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-12378 PentaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123789 HexaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-234678 HexaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-23478 PentaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-2378 TetraCDD *	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-2378 TetraCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-OCDD *	%	114 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4561055
Confirmation C13-2378 TetraCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4568571
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan (1) From 10x dilution.									

**TEST SUMMARY**

**Maxxam ID:** COG252  
**Sample ID:** ROW-P2-011A-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4561055	2016/06/30	2016/07/05	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4568571	N/A	2016/07/06	Vica Cioranic
Moisture	BAL	4550287	N/A	2016/06/22	Shivani Desai

**Maxxam ID:** COG252 Dup  
**Sample ID:** ROW-P2-011A-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4561055	2016/06/30	2016/07/05	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4568571	N/A	2016/07/06	Vica Cioranic

**Maxxam ID:** COG253  
**Sample ID:** ROW-P2-011B-0.5  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4561055	2016/06/30	2016/07/05	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4568571	N/A	2016/07/06	Vica Cioranic
Moisture	BAL	4550287	N/A	2016/06/22	Shivani Desai

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.5°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4550287	CYN	RPD - Sample/Sample Dup	Moisture	2016/06/22	2.3		%	20
4561055	OBC	Matrix Spike	37CL4 2378 Tetra CDD	2016/07/05		95	%	35 - 197
			C13-1234678 HeptaCDD	2016/07/05		91	%	23 - 140
			C13-1234678 HeptaCDF	2016/07/05		83	%	28 - 143
			C13-123478 HexaCDD	2016/07/05		92	%	32 - 141
			C13-123478 HexaCDF	2016/07/05		75	%	26 - 152
			C13-1234789 HeptaCDF	2016/07/05		78	%	26 - 138
			C13-123678 HexaCDD	2016/07/05		93	%	28 - 130
			C13-123678 HexaCDF	2016/07/05		71	%	26 - 123
			C13-12378 PentaCDD	2016/07/05		111	%	25 - 181
			C13-12378 PentaCDF	2016/07/05		90	%	24 - 185
			C13-123789 HexaCDF	2016/07/05		87	%	29 - 147
			C13-234678 HexaCDF	2016/07/05		82	%	28 - 136
			C13-23478 PentaCDF	2016/07/05		92	%	21 - 178
			C13-2378 TetraCDD	2016/07/05		89	%	25 - 164
			C13-2378 TetraCDF	2016/07/05		90	%	24 - 169
			C13-OCDD	2016/07/05		96	%	17 - 157
4561055	OBC	Matrix Spike(COG253)	2,3,7,8-Tetra CDD	2016/07/05		92	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/07/05		81	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/07/05		93	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/07/05		105	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/07/05		105	%	64 - 162
			Total Tetra CDD	2016/07/05		19	%	N/A
			Total Penta CDD	2016/07/05		89	%	N/A
			Total Hexa CDD	2016/07/05		545	%	N/A
			Total Hepta CDD	2016/07/05		2890	%	N/A
			2,3,7,8-Tetra CDF	2016/07/05		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/07/05		92	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/07/05		99	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/07/05		114	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/07/05		114	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/07/05		108	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/07/05		97	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05		114	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05		103	%	78 - 138
			Octa CDF	2016/07/05		105	%	63 - 170
			Total Tetra CDF	2016/07/05		26	%	N/A
			Total Penta CDF	2016/07/05		231	%	N/A
			Total Hexa CDF	2016/07/05		627	%	N/A
			Total Hepta CDF	2016/07/05		672	%	N/A
4561055	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2016/07/05		85	%	35 - 197
			C13-1234678 HeptaCDD	2016/07/05		105	%	23 - 140
			C13-1234678 HeptaCDF	2016/07/05		49	%	28 - 143
			C13-123478 HexaCDD	2016/07/05		96	%	32 - 141
			C13-123478 HexaCDF	2016/07/05		43	%	26 - 152
			C13-1234789 HeptaCDF	2016/07/05		91	%	26 - 138
			C13-123678 HexaCDD	2016/07/05		98	%	28 - 130
			C13-123678 HexaCDF	2016/07/05		42	%	26 - 123
			C13-12378 PentaCDD	2016/07/05		113	%	25 - 181
			C13-12378 PentaCDF	2016/07/05		92	%	24 - 185
			C13-123789 HexaCDF	2016/07/05		96	%	29 - 147
			C13-234678 HexaCDF	2016/07/05		103	%	28 - 136
			C13-23478 PentaCDF	2016/07/05		94	%	21 - 178
			C13-2378 TetraCDD	2016/07/05		85	%	25 - 164

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-2378 TetraCDF	2016/07/05		88	%	24 - 169
			C13-OCDD	2016/07/05		108	%	17 - 157
			2,3,7,8-Tetra CDD	2016/07/05		95	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/07/05		82	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/07/05		91	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/07/05		108	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/07/05		109	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05		91	%	70 - 140
			Octa CDD	2016/07/05		97	%	78 - 144
			2,3,7,8-Tetra CDF	2016/07/05		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/07/05		87	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/07/05		97	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/07/05		102	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/07/05		102	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/07/05		110	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/07/05		94	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05		92	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05		103	%	78 - 138
			Octa CDF	2016/07/05		98	%	63 - 170
4561055	OBC	Spiked Blank DUP	37CL4 2378 Tetra CDD	2016/07/05		83	%	35 - 197
			C13-1234678 HeptaCDD	2016/07/05		104	%	23 - 140
			C13-1234678 HeptaCDF	2016/07/05		52	%	28 - 143
			C13-123478 HexaCDD	2016/07/05		100	%	32 - 141
			C13-123478 HexaCDF	2016/07/05		45	%	26 - 152
			C13-1234789 HeptaCDF	2016/07/05		92	%	26 - 138
			C13-123678 HexaCDD	2016/07/05		93	%	28 - 130
			C13-123678 HexaCDF	2016/07/05		43	%	26 - 123
			C13-12378 PentaCDD	2016/07/05		108	%	25 - 181
			C13-12378 PentaCDF	2016/07/05		89	%	24 - 185
			C13-123789 HexaCDF	2016/07/05		94	%	29 - 147
			C13-234678 HexaCDF	2016/07/05		96	%	28 - 136
			C13-23478 PentaCDF	2016/07/05		88	%	21 - 178
			C13-2378 TetraCDD	2016/07/05		83	%	25 - 164
			C13-2378 TetraCDF	2016/07/05		85	%	24 - 169
			C13-OCDD	2016/07/05		107	%	17 - 157
			2,3,7,8-Tetra CDD	2016/07/05		98	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/07/05		82	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/07/05		93	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/07/05		110	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/07/05		117	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05		94	%	70 - 140
			Octa CDD	2016/07/05		100	%	78 - 144
			2,3,7,8-Tetra CDF	2016/07/05		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/07/05		85	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/07/05		99	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/07/05		105	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/07/05		110	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/07/05		118	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/07/05		97	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05		95	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05		103	%	78 - 138
			Octa CDF	2016/07/05		102	%	63 - 170
4561055	OBC	RPD	2,3,7,8-Tetra CDD	2016/07/05	3.1		%	25
			1,2,3,7,8-Penta CDD	2016/07/05	0		%	25



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2016/07/05	2.2		%	25
			1,2,3,6,7,8-Hexa CDD	2016/07/05	1.8		%	25
			1,2,3,7,8,9-Hexa CDD	2016/07/05	7.1		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05	3.2		%	25
			Octa CDD	2016/07/05	3.0		%	25
			2,3,7,8-Tetra CDF	2016/07/05	0		%	25
			1,2,3,7,8-Penta CDF	2016/07/05	2.3		%	25
			2,3,4,7,8-Penta CDF	2016/07/05	2.0		%	25
			1,2,3,4,7,8-Hexa CDF	2016/07/05	2.9		%	25
			1,2,3,6,7,8-Hexa CDF	2016/07/05	7.5		%	25
			2,3,4,6,7,8-Hexa CDF	2016/07/05	7.0		%	25
			1,2,3,7,8,9-Hexa CDF	2016/07/05	3.1		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05	3.2		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05	0		%	25
			Octa CDF	2016/07/05	4.0		%	25
4561055	OBC	Method Blank	37CL4 2378 Tetra CDD	2016/07/05		81	%	35 - 197
			C13-1234678 HeptaCDD	2016/07/05		94	%	23 - 140
			C13-1234678 HeptaCDF	2016/07/05		75	%	28 - 143
			C13-123478 HexaCDD	2016/07/05		94	%	32 - 141
			C13-123478 HexaCDF	2016/07/05		70	%	26 - 152
			C13-1234789 HeptaCDF	2016/07/05		84	%	26 - 138
			C13-123678 HexaCDD	2016/07/05		90	%	28 - 130
			C13-123678 HexaCDF	2016/07/05		64	%	26 - 123
			C13-12378 PentaCDD	2016/07/05		105	%	25 - 181
			C13-12378 PentaCDF	2016/07/05		83	%	24 - 185
			C13-123789 HexaCDF	2016/07/05		88	%	29 - 147
			C13-234678 HexaCDF	2016/07/05		80	%	28 - 136
			C13-23478 PentaCDF	2016/07/05		87	%	21 - 178
			C13-2378 TetraCDD	2016/07/05		80	%	25 - 164
			C13-2378 TetraCDF	2016/07/05		83	%	24 - 169
			C13-OCDD	2016/07/05		97	%	17 - 157
			2,3,7,8-Tetra CDD	2016/07/05	<0.0683, EDL=0.0683		pg/g	
			1,2,3,7,8-Penta CDD	2016/07/05	<0.0858, EDL=0.0858		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/07/05	<0.0749, EDL=0.0749		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/07/05	<0.0771, EDL=0.0771		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/07/05	<0.0744, EDL=0.0744		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05	<0.0990, EDL=0.0990 (1)		pg/g	
			Octa CDD	2016/07/05	0.382, EDL=0.106		pg/g	
			Total Tetra CDD	2016/07/05	<0.106, EDL=0.106 (1)		pg/g	
			Total Penta CDD	2016/07/05	<0.0858, EDL=0.0858		pg/g	
			Total Hexa CDD	2016/07/05	<0.261, EDL=0.261 (1)		pg/g	
			Total Hepta CDD	2016/07/05	<0.0990, EDL=0.0990 (1)		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			2,3,7,8-Tetra CDF	2016/07/05	<0.0629, EDL=0.0629		pg/g	
			1,2,3,7,8-Penta CDF	2016/07/05	<0.0610, EDL=0.0610		pg/g	
			2,3,4,7,8-Penta CDF	2016/07/05	<0.0594, EDL=0.0594		pg/g	
			1,2,3,4,7,8-Hexa CDF	2016/07/05	<0.0794, EDL=0.0794		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/07/05	<0.0825, EDL=0.0825		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/07/05	<0.0789, EDL=0.0789		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/07/05	<0.0787, EDL=0.0787		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05	<0.112, EDL=0.112		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05	<0.121, EDL=0.121		pg/g	
			Octa CDF	2016/07/05	<0.127, EDL=0.127		pg/g	
			Total Tetra CDF	2016/07/05	<0.0629, EDL=0.0629		pg/g	
			Total Penta CDF	2016/07/05	<0.0602, EDL=0.0602		pg/g	
			Total Hexa CDF	2016/07/05	<0.0798, EDL=0.0798		pg/g	
			Total Hepta CDF	2016/07/05	<0.117, EDL=0.117		pg/g	
4561055	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2016/07/05	NC		%	25
			1,2,3,7,8-Penta CDD	2016/07/05	7.8		%	25
			1,2,3,4,7,8-Hexa CDD	2016/07/05	5.9		%	25
			1,2,3,6,7,8-Hexa CDD	2016/07/05	1.1		%	25
			1,2,3,7,8,9-Hexa CDD	2016/07/05	8.5		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05	0.50 (2)		%	25
			Octa CDD	2016/07/05	8.5 (2)		%	25
			Total Tetra CDD	2016/07/05	5.5		%	25
			Total Penta CDD	2016/07/05	7.9		%	25
			Total Hexa CDD	2016/07/05	2.4		%	25
			Total Hepta CDD	2016/07/05	0.48 (2)		%	25
			2,3,7,8-Tetra CDF	2016/07/05	8.3		%	25
			1,2,3,7,8-Penta CDF	2016/07/05	6.9		%	25
			2,3,4,7,8-Penta CDF	2016/07/05	0.83		%	25
			1,2,3,4,7,8-Hexa CDF	2016/07/05	1.9		%	25
			1,2,3,6,7,8-Hexa CDF	2016/07/05	4.0		%	25
			2,3,4,6,7,8-Hexa CDF	2016/07/05	17		%	25
			1,2,3,7,8,9-Hexa CDF	2016/07/05	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05	1.1		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05	1.1		%	25
			Octa CDF	2016/07/05	0.15		%	25
			Total Tetra CDF	2016/07/05	19		%	25
			Total Penta CDF	2016/07/05	26 (3)		%	25
			Total Hexa CDF	2016/07/05	30 (3)		%	25
			Total Hepta CDF	2016/07/05	0.045		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4568571	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/07/06	<0.11, EDL=0.11		pg/g	
			Confirmation C13-2378 TetraCDF	2016/07/06		98	%	40 - 135
4568571	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/07/06	23		%	100

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

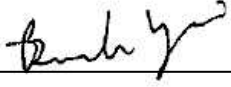
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(2) \*\* From 10X Dilution \*\*

(3) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Cristina Carriere, Scientific Services



Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: A6D0774  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/07/07**  
Report #: R4055534  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B6C5686**

**Received: 2016/06/18, 12:39**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2016/06/30	2016/07/05	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2016/07/06	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2016/06/22	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		COG254			
<b>Sampling Date</b>		2016/04/20 09:45			
<b>COC Number</b>		na			
	<b>UNITS</b>	<b>ROW-P2-018-0.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	17	1.0	0.50	4550287
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COG254							
Sampling Date		2016/04/20 09:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-018-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.405	0.105	0.200	0.0400	1.00	0.405	N/A	4561055
1,2,3,7,8-Penta CDD *	pg/g	1.41	0.106	1.00	0.0400	1.00	1.41	N/A	4561055
1,2,3,4,7,8-Hexa CDD *	pg/g	2.22	0.106	1.00	0.0400	0.100	0.222	N/A	4561055
1,2,3,6,7,8-Hexa CDD *	pg/g	10.4	0.109	1.00	0.0400	0.100	1.04	N/A	4561055
1,2,3,7,8,9-Hexa CDD *	pg/g	6.32	0.105	1.00	0.0400	0.100	0.632	N/A	4561055
1,2,3,4,6,7,8-Hepta CDD *	pg/g	209	0.0945	1.00	0.0400	0.0100	2.09	N/A	4561055
Octa CDD *	pg/g	1210	0.101	2.00	0.0800	0.000300	0.363	N/A	4561055
Total Tetra CDD *	pg/g	1.99	0.105	0.200	0.0400	N/A	N/A	5	4561055
Total Penta CDD *	pg/g	7.31	0.106	1.00	0.0400	N/A	N/A	10	4561055
Total Hexa CDD *	pg/g	50.9	0.107	1.00	0.0400	N/A	N/A	6	4561055
Total Hepta CDD *	pg/g	350	0.0945	1.00	0.0400	N/A	N/A	2	4561055
2,3,7,8-Tetra CDF **	pg/g	2.18	0.101	0.200	0.0400	0.100	0.218	N/A	4561055
1,2,3,7,8-Penta CDF **	pg/g	0.783	0.108	1.00	0.0400	0.0300	0.0235	N/A	4561055
2,3,4,7,8-Penta CDF **	pg/g	1.35	0.105	1.00	0.0400	0.300	0.405	N/A	4561055
1,2,3,4,7,8-Hexa CDF **	pg/g	5.01	0.105	1.00	0.0400	0.100	0.501	N/A	4561055
1,2,3,6,7,8-Hexa CDF **	pg/g	2.38	0.109	1.00	0.0400	0.100	0.238	N/A	4561055
2,3,4,6,7,8-Hexa CDF **	pg/g	1.75	0.104	1.00	0.0400	0.100	0.175	N/A	4561055
1,2,3,7,8,9-Hexa CDF **	pg/g	1.27	0.104	1.00	0.0400	0.100	0.127	N/A	4561055
1,2,3,4,6,7,8-Hepta CDF **	pg/g	39.5	0.0975	1.00	0.0400	0.0100	0.395	N/A	4561055
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.52	0.105	1.00	0.0400	0.0100	0.0252	N/A	4561055
Octa CDF **	pg/g	71.8	0.104	2.00	0.0800	0.000300	0.0215	N/A	4561055
Total Tetra CDF **	pg/g	8.62	0.101	0.200	0.0400	N/A	N/A	9	4561055
Total Penta CDF **	pg/g	8.17	0.106	1.00	0.0400	N/A	N/A	8	4561055
Total Hexa CDF **	pg/g	40.0	0.105	1.00	0.0400	N/A	N/A	11	4561055
Total Hepta CDF **	pg/g	114	0.101	1.00	0.0400	N/A	N/A	4	4561055
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.84	0.10	1.0	0.90	0.100	0.184	N/A	4568571
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	8.26	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4561055
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		COG254							
Sampling Date		2016/04/20 09:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-018-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-1234678 HeptaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123478 HexaCDD *	%	96	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123478 HexaCDF **	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-1234789 HeptaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123678 HexaCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123678 HexaCDF **	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-12378 PentaCDD *	%	114	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-12378 PentaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-123789 HexaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-234678 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-23478 PentaCDF **	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-2378 TetraCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-2378 TetraCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4561055
C13-OCDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4561055
Confirmation C13-2378 TetraCDF **	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4568571

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** COG254  
**Sample ID:** ROW-P2-018-0.5  
**Matrix:** Soil

**Collected:** 2016/04/20  
**Shipped:**  
**Received:** 2016/06/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4561055	2016/06/30	2016/07/05	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4568571	N/A	2016/07/06	Vica Cioranic
Moisture	BAL	4550287	N/A	2016/06/22	Shivani Desai

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.5°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4550287	CYN	RPD - Sample/Sample Dup	Moisture	2016/06/22	2.3		%	20
4561055	OBC	Matrix Spike	37CL4 2378 Tetra CDD	2016/07/05		95	%	35 - 197
			C13-1234678 HeptaCDD	2016/07/05		91	%	23 - 140
			C13-1234678 HeptaCDF	2016/07/05		83	%	28 - 143
			C13-123478 HexaCDD	2016/07/05		92	%	32 - 141
			C13-123478 HexaCDF	2016/07/05		75	%	26 - 152
			C13-1234789 HeptaCDF	2016/07/05		78	%	26 - 138
			C13-123678 HexaCDD	2016/07/05		93	%	28 - 130
			C13-123678 HexaCDF	2016/07/05		71	%	26 - 123
			C13-12378 PentaCDD	2016/07/05		111	%	25 - 181
			C13-12378 PentaCDF	2016/07/05		90	%	24 - 185
			C13-123789 HexaCDF	2016/07/05		87	%	29 - 147
			C13-234678 HexaCDF	2016/07/05		82	%	28 - 136
			C13-23478 PentaCDF	2016/07/05		92	%	21 - 178
			C13-2378 TetraCDD	2016/07/05		89	%	25 - 164
			C13-2378 TetraCDF	2016/07/05		90	%	24 - 169
			C13-OCDD	2016/07/05		96	%	17 - 157
			2,3,7,8-Tetra CDD	2016/07/05		92	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/07/05		81	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/07/05		93	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/07/05		105	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/07/05		105	%	64 - 162
			Total Tetra CDD	2016/07/05		19	%	N/A
			Total Penta CDD	2016/07/05		89	%	N/A
			Total Hexa CDD	2016/07/05		545	%	N/A
			Total Hepta CDD	2016/07/05		2890	%	N/A
			2,3,7,8-Tetra CDF	2016/07/05		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/07/05		92	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/07/05		99	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/07/05		114	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/07/05		114	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/07/05		108	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/07/05		97	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05		114	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05		103	%	78 - 138
			Octa CDF	2016/07/05		105	%	63 - 170
			Total Tetra CDF	2016/07/05		26	%	N/A
			Total Penta CDF	2016/07/05		231	%	N/A
			Total Hexa CDF	2016/07/05		627	%	N/A
			Total Hepta CDF	2016/07/05		672	%	N/A
4561055	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2016/07/05		85	%	35 - 197
			C13-1234678 HeptaCDD	2016/07/05		105	%	23 - 140
			C13-1234678 HeptaCDF	2016/07/05		49	%	28 - 143
			C13-123478 HexaCDD	2016/07/05		96	%	32 - 141
			C13-123478 HexaCDF	2016/07/05		43	%	26 - 152
			C13-1234789 HeptaCDF	2016/07/05		91	%	26 - 138
			C13-123678 HexaCDD	2016/07/05		98	%	28 - 130
			C13-123678 HexaCDF	2016/07/05		42	%	26 - 123
			C13-12378 PentaCDD	2016/07/05		113	%	25 - 181
			C13-12378 PentaCDF	2016/07/05		92	%	24 - 185
			C13-123789 HexaCDF	2016/07/05		96	%	29 - 147
			C13-234678 HexaCDF	2016/07/05		103	%	28 - 136
			C13-23478 PentaCDF	2016/07/05		94	%	21 - 178
			C13-2378 TetraCDD	2016/07/05		85	%	25 - 164

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-2378 TetraCDF	2016/07/05		88	%	24 - 169
			C13-OCDD	2016/07/05		108	%	17 - 157
			2,3,7,8-Tetra CDD	2016/07/05		95	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/07/05		82	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/07/05		91	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/07/05		108	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/07/05		109	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05		91	%	70 - 140
			Octa CDD	2016/07/05		97	%	78 - 144
			2,3,7,8-Tetra CDF	2016/07/05		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/07/05		87	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/07/05		97	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/07/05		102	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/07/05		102	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/07/05		110	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/07/05		94	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05		92	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05		103	%	78 - 138
			Octa CDF	2016/07/05		98	%	63 - 170
4561055	OBC	Spiked Blank DUP	37CL4 2378 Tetra CDD	2016/07/05		83	%	35 - 197
			C13-1234678 HeptaCDD	2016/07/05		104	%	23 - 140
			C13-1234678 HeptaCDF	2016/07/05		52	%	28 - 143
			C13-123478 HexaCDD	2016/07/05		100	%	32 - 141
			C13-123478 HexaCDF	2016/07/05		45	%	26 - 152
			C13-1234789 HeptaCDF	2016/07/05		92	%	26 - 138
			C13-123678 HexaCDD	2016/07/05		93	%	28 - 130
			C13-123678 HexaCDF	2016/07/05		43	%	26 - 123
			C13-12378 PentaCDD	2016/07/05		108	%	25 - 181
			C13-12378 PentaCDF	2016/07/05		89	%	24 - 185
			C13-123789 HexaCDF	2016/07/05		94	%	29 - 147
			C13-234678 HexaCDF	2016/07/05		96	%	28 - 136
			C13-23478 PentaCDF	2016/07/05		88	%	21 - 178
			C13-2378 TetraCDD	2016/07/05		83	%	25 - 164
			C13-2378 TetraCDF	2016/07/05		85	%	24 - 169
			C13-OCDD	2016/07/05		107	%	17 - 157
			2,3,7,8-Tetra CDD	2016/07/05		98	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/07/05		82	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/07/05		93	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/07/05		110	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/07/05		117	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05		94	%	70 - 140
			Octa CDD	2016/07/05		100	%	78 - 144
			2,3,7,8-Tetra CDF	2016/07/05		98	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/07/05		85	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/07/05		99	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/07/05		105	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/07/05		110	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/07/05		118	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/07/05		97	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05		95	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05		103	%	78 - 138
			Octa CDF	2016/07/05		102	%	63 - 170
4561055	OBC	RPD	2,3,7,8-Tetra CDD	2016/07/05	3.1		%	25
			1,2,3,7,8-Penta CDD	2016/07/05	0		%	25



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDD	2016/07/05	2.2		%	25
			1,2,3,6,7,8-Hexa CDD	2016/07/05	1.8		%	25
			1,2,3,7,8,9-Hexa CDD	2016/07/05	7.1		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05	3.2		%	25
			Octa CDD	2016/07/05	3.0		%	25
			2,3,7,8-Tetra CDF	2016/07/05	0		%	25
			1,2,3,7,8-Penta CDF	2016/07/05	2.3		%	25
			2,3,4,7,8-Penta CDF	2016/07/05	2.0		%	25
			1,2,3,4,7,8-Hexa CDF	2016/07/05	2.9		%	25
			1,2,3,6,7,8-Hexa CDF	2016/07/05	7.5		%	25
			2,3,4,6,7,8-Hexa CDF	2016/07/05	7.0		%	25
			1,2,3,7,8,9-Hexa CDF	2016/07/05	3.1		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05	3.2		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05	0		%	25
			Octa CDF	2016/07/05	4.0		%	25
4561055	OBC	Method Blank	37CL4 2378 Tetra CDD	2016/07/05		81	%	35 - 197
			C13-1234678 HeptaCDD	2016/07/05		94	%	23 - 140
			C13-1234678 HeptaCDF	2016/07/05		75	%	28 - 143
			C13-123478 HexaCDD	2016/07/05		94	%	32 - 141
			C13-123478 HexaCDF	2016/07/05		70	%	26 - 152
			C13-1234789 HeptaCDF	2016/07/05		84	%	26 - 138
			C13-123678 HexaCDD	2016/07/05		90	%	28 - 130
			C13-123678 HexaCDF	2016/07/05		64	%	26 - 123
			C13-12378 PentaCDD	2016/07/05		105	%	25 - 181
			C13-12378 PentaCDF	2016/07/05		83	%	24 - 185
			C13-123789 HexaCDF	2016/07/05		88	%	29 - 147
			C13-234678 HexaCDF	2016/07/05		80	%	28 - 136
			C13-23478 PentaCDF	2016/07/05		87	%	21 - 178
			C13-2378 TetraCDD	2016/07/05		80	%	25 - 164
			C13-2378 TetraCDF	2016/07/05		83	%	24 - 169
			C13-OCDD	2016/07/05		97	%	17 - 157
			2,3,7,8-Tetra CDD	2016/07/05	<0.0683, EDL=0.0683		pg/g	
			1,2,3,7,8-Penta CDD	2016/07/05	<0.0858, EDL=0.0858		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/07/05	<0.0749, EDL=0.0749		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/07/05	<0.0771, EDL=0.0771		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/07/05	<0.0744, EDL=0.0744		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05	<0.0990, EDL=0.0990 (1)		pg/g	
			Octa CDD	2016/07/05	0.382, EDL=0.106		pg/g	
			Total Tetra CDD	2016/07/05	<0.106, EDL=0.106 (1)		pg/g	
			Total Penta CDD	2016/07/05	<0.0858, EDL=0.0858		pg/g	
			Total Hexa CDD	2016/07/05	<0.261, EDL=0.261 (1)		pg/g	
			Total Hepta CDD	2016/07/05	<0.0990, EDL=0.0990 (1)		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			2,3,7,8-Tetra CDF	2016/07/05	<0.0629, EDL=0.0629		pg/g	
			1,2,3,7,8-Penta CDF	2016/07/05	<0.0610, EDL=0.0610		pg/g	
			2,3,4,7,8-Penta CDF	2016/07/05	<0.0594, EDL=0.0594		pg/g	
			1,2,3,4,7,8-Hexa CDF	2016/07/05	<0.0794, EDL=0.0794		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/07/05	<0.0825, EDL=0.0825		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/07/05	<0.0789, EDL=0.0789		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/07/05	<0.0787, EDL=0.0787		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05	<0.112, EDL=0.112		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05	<0.121, EDL=0.121		pg/g	
			Octa CDF	2016/07/05	<0.127, EDL=0.127		pg/g	
			Total Tetra CDF	2016/07/05	<0.0629, EDL=0.0629		pg/g	
			Total Penta CDF	2016/07/05	<0.0602, EDL=0.0602		pg/g	
			Total Hexa CDF	2016/07/05	<0.0798, EDL=0.0798		pg/g	
			Total Hepta CDF	2016/07/05	<0.117, EDL=0.117		pg/g	
4561055	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2016/07/05	NC		%	25
			1,2,3,7,8-Penta CDD	2016/07/05	7.8		%	25
			1,2,3,4,7,8-Hexa CDD	2016/07/05	5.9		%	25
			1,2,3,6,7,8-Hexa CDD	2016/07/05	1.1		%	25
			1,2,3,7,8,9-Hexa CDD	2016/07/05	8.5		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/07/05	0.50 (2)		%	25
			Octa CDD	2016/07/05	8.5 (2)		%	25
			Total Tetra CDD	2016/07/05	5.5		%	25
			Total Penta CDD	2016/07/05	7.9		%	25
			Total Hexa CDD	2016/07/05	2.4		%	25
			Total Hepta CDD	2016/07/05	0.48 (2)		%	25
			2,3,7,8-Tetra CDF	2016/07/05	8.3		%	25
			1,2,3,7,8-Penta CDF	2016/07/05	6.9		%	25
			2,3,4,7,8-Penta CDF	2016/07/05	0.83		%	25
			1,2,3,4,7,8-Hexa CDF	2016/07/05	1.9		%	25
			1,2,3,6,7,8-Hexa CDF	2016/07/05	4.0		%	25
			2,3,4,6,7,8-Hexa CDF	2016/07/05	17		%	25
			1,2,3,7,8,9-Hexa CDF	2016/07/05	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/07/05	1.1		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/07/05	1.1		%	25
			Octa CDF	2016/07/05	0.15		%	25
			Total Tetra CDF	2016/07/05	19		%	25
			Total Penta CDF	2016/07/05	26 (3)		%	25
			Total Hexa CDF	2016/07/05	30 (3)		%	25
			Total Hepta CDF	2016/07/05	0.045		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4568571	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/07/06	<0.11, EDL=0.11		pg/g	
			Confirmation C13-2378 TetraCDF	2016/07/06		98	%	40 - 135
4568571	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/07/06	23		%	100

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

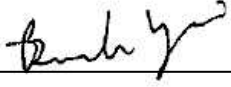
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(2) \*\* From 10X Dilution \*\*

(3) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Branko Vrzic, A.S.C.T., Senior Analyst, HRMS Services



Cristina Carriere, Scientific Services



Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: A6H0510  
Your C.O.C. #: NA

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/09/14**  
Report #: R4166900  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B6H4471**

**Received: 2016/08/17, 13:24**

Sample Matrix: Soil  
# Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	1	2016/08/22	2016/08/29	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2016/08/30	BRL SOP-00406	EPA M8290A / M1613
Moisture	1	N/A	2016/08/19	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**RESULTS OF ANALYSES OF SOIL**

<b>Maxxam ID</b>		CXC980			
<b>Sampling Date</b>		2016/08/11 16:15			
<b>COC Number</b>		NA			
	<b>UNITS</b>	<b>ROW-002N-0.5</b>	<b>RDL</b>	<b>MDL</b>	<b>QC Batch</b>
Moisture	%	3.0	1.0	0.50	4627152
RDL = Reportable Detection Limit QC Batch = Quality Control Batch					



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXC980							
Sampling Date		2016/08/11 16:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-002N-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.572	0.173	0.999	0.0399	1.00	0.572	N/A	4637992
1,2,3,7,8-Penta CDD *	pg/g	4.99	0.124	4.99	0.0399	1.00	4.99	N/A	4637992
1,2,3,4,7,8-Hexa CDD *	pg/g	7.70	0.156	4.99	0.0399	0.100	0.770	N/A	4637992
1,2,3,6,7,8-Hexa CDD *	pg/g	35.2	0.163	4.99	0.0399	0.100	3.52	N/A	4637992
1,2,3,7,8,9-Hexa CDD *	pg/g	23.1	0.166	4.99	0.0399	0.100	2.31	N/A	4637992
1,2,3,4,6,7,8-Hepta CDD *	pg/g	477	0.183	4.99	0.0399	0.0100	4.77	N/A	4637992
Octa CDD *	pg/g	2710	0.433	9.99	0.0799	0.000300	0.813	N/A	4637992
Total Tetra CDD *	pg/g	7.91	0.173	0.999	0.0399	N/A	N/A	7	4637992
Total Penta CDD *	pg/g	29.3	0.124	4.99	0.0399	N/A	N/A	11	4637992
Total Hexa CDD *	pg/g	169	0.164	4.99	0.0399	N/A	N/A	6	4637992
Total Hepta CDD *	pg/g	802	0.183	4.99	0.0399	N/A	N/A	2	4637992
2,3,7,8-Tetra CDF **	pg/g	<2.96 (1)	2.96	0.999	0.0399	0.100	0.296	N/A	4637992
1,2,3,7,8-Penta CDF **	pg/g	2.10	0.186	4.99	0.0399	0.0300	0.0630	N/A	4637992
2,3,4,7,8-Penta CDF **	pg/g	6.75	0.177	4.99	0.0399	0.300	2.03	N/A	4637992
1,2,3,4,7,8-Hexa CDF **	pg/g	12.1	0.102	4.99	0.0399	0.100	1.21	N/A	4637992
1,2,3,6,7,8-Hexa CDF **	pg/g	11.6	0.108	4.99	0.0399	0.100	1.16	N/A	4637992
2,3,4,6,7,8-Hexa CDF **	pg/g	10.6	0.0999	4.99	0.0399	0.100	1.06	N/A	4637992
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.284 (2)	0.284	4.99	0.0399	0.100	0.0284	N/A	4637992
1,2,3,4,6,7,8-Hepta CDF **	pg/g	72.1	0.172	4.99	0.0399	0.0100	0.721	N/A	4637992
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.05	0.176	4.99	0.0399	0.0100	0.0505	N/A	4637992
Octa CDF **	pg/g	78.0	0.174	9.99	0.0799	0.000300	0.0234	N/A	4637992
Total Tetra CDF **	pg/g	95.3	0.169	0.999	0.0399	N/A	N/A	14	4637992
Total Penta CDF **	pg/g	368	0.182	4.99	0.0399	N/A	N/A	10	4637992
Total Hexa CDF **	pg/g	330	0.104	4.99	0.0399	N/A	N/A	10	4637992
Total Hepta CDF **	pg/g	191	0.174	4.99	0.0399	N/A	N/A	4	4637992
Confirmation 2,3,7,8-Tetra CDF **	pg/g	4.21	0.11	1.0	0.90	0.100	0.421	N/A	4642777
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	24.5	N/A	N/A

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin

N/A = Not Applicable

\*\* CDF = Chloro Dibenzo-p-Furan

(1) RT > 3 seconds - PCDD/DF analysis - Peak detected exceeds expected retention time (from internal standard) by greater than 3 seconds.

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXC980							
Sampling Date		2016/08/11 16:15							
COC Number		NA				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-002N-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-1234678 HeptaCDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-1234678 HeptaCDF **	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-123478 HexaCDD *	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-123478 HexaCDF **	%	66	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-1234789 HeptaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-123678 HexaCDD *	%	67	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-123678 HexaCDF **	%	66	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-12378 PentaCDD *	%	104	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-12378 PentaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-123789 HexaCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-234678 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-23478 PentaCDF **	%	112	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-2378 TetraCDD *	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-2378 TetraCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4637992
C13-OCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4637992
Confirmation C13-2378 TetraCDF **	%	61	N/A	N/A	N/A	N/A	N/A	N/A	4642777

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** CXC980  
**Sample ID:** ROW-002N-0.5  
**Matrix:** Soil

**Collected:** 2016/08/11  
**Shipped:**  
**Received:** 2016/08/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4637992	2016/08/22	2016/08/29	Cathy Xu
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4642777	N/A	2016/08/30	Vica Cioranic
Moisture	BAL	4627152	N/A	2016/08/19	Shyanika Patel

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.9°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4627152	NS3	RPD - Sample/Sample Dup	Moisture	2016/08/19	0.58		%	20
4637992	CXU	Matrix Spike	37CL4 2378 Tetra CDD	2016/08/27		91	%	35 - 197
			C13-1234678 HeptaCDD	2016/08/27		79	%	23 - 140
			C13-1234678 HeptaCDF	2016/08/27		60	%	28 - 143
			C13-123478 HexaCDD	2016/08/27		82	%	32 - 141
			C13-123478 HexaCDF	2016/08/27		63	%	26 - 152
			C13-1234789 HeptaCDF	2016/08/27		62	%	26 - 138
			C13-123678 HexaCDD	2016/08/27		72	%	28 - 130
			C13-123678 HexaCDF	2016/08/27		64	%	26 - 123
			C13-12378 PentaCDD	2016/08/27		113	%	25 - 181
			C13-12378 PentaCDF	2016/08/27		82	%	24 - 185
			C13-123789 HexaCDF	2016/08/27		76	%	29 - 147
			C13-234678 HexaCDF	2016/08/27		78	%	28 - 136
			C13-23478 PentaCDF	2016/08/27		84	%	21 - 178
			C13-2378 TetraCDD	2016/08/27		85	%	25 - 164
			C13-2378 TetraCDF	2016/08/27		78	%	24 - 169
			C13-OCDD	2016/08/27		66	%	17 - 157
			2,3,7,8-Tetra CDD	2016/08/27		97	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/08/27		82	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/08/27		93	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/08/27		103	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/08/27		114	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/08/27		92	%	70 - 140
			Octa CDD	2016/08/27		98	%	78 - 144
			2,3,7,8-Tetra CDF	2016/08/27		105	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/08/27		92	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/08/27		109	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/08/27		102	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/08/27		98	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/08/27		91	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/08/27		94	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/08/27		95	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/08/27		99	%	78 - 138
			Octa CDF	2016/08/27		84	%	63 - 170
4637992	CXU	Spiked Blank	37CL4 2378 Tetra CDD	2016/08/27		88	%	35 - 197
			C13-1234678 HeptaCDD	2016/08/27		81	%	23 - 140
			C13-1234678 HeptaCDF	2016/08/27		62	%	28 - 143
			C13-123478 HexaCDD	2016/08/27		82	%	32 - 141
			C13-123478 HexaCDF	2016/08/27		64	%	26 - 152
			C13-1234789 HeptaCDF	2016/08/27		63	%	26 - 138
			C13-123678 HexaCDD	2016/08/27		69	%	28 - 130
			C13-123678 HexaCDF	2016/08/27		66	%	26 - 123
			C13-12378 PentaCDD	2016/08/27		109	%	25 - 181
			C13-12378 PentaCDF	2016/08/27		80	%	24 - 185
			C13-123789 HexaCDF	2016/08/27		77	%	29 - 147
			C13-234678 HexaCDF	2016/08/27		82	%	28 - 136
			C13-23478 PentaCDF	2016/08/27		81	%	21 - 178
			C13-2378 TetraCDD	2016/08/27		85	%	25 - 164
			C13-2378 TetraCDF	2016/08/27		77	%	24 - 169
			C13-OCDD	2016/08/27		66	%	17 - 157
			2,3,7,8-Tetra CDD	2016/08/27		96	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/08/27		82	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/08/27		91	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/08/27		109	%	76 - 134

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/08/27		118	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/08/27		87	%	70 - 140
			Octa CDD	2016/08/27		92	%	78 - 144
			2,3,7,8-Tetra CDF	2016/08/27		102	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/08/27		92	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/08/27		107	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/08/27		101	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/08/27		96	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/08/27		91	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/08/27		94	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/08/27		95	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/08/27		99	%	78 - 138
			Octa CDF	2016/08/27		86	%	63 - 170
4637992	CXU	Spiked Blank DUP	37CL4 2378 Tetra CDD	2016/08/27		94	%	35 - 197
			C13-1234678 HeptaCDD	2016/08/27		85	%	23 - 140
			C13-1234678 HeptaCDF	2016/08/27		64	%	28 - 143
			C13-123478 HexaCDD	2016/08/27		85	%	32 - 141
			C13-123478 HexaCDF	2016/08/27		66	%	26 - 152
			C13-1234789 HeptaCDF	2016/08/27		67	%	26 - 138
			C13-123678 HexaCDD	2016/08/27		72	%	28 - 130
			C13-123678 HexaCDF	2016/08/27		68	%	26 - 123
			C13-12378 PentaCDD	2016/08/27		116	%	25 - 181
			C13-12378 PentaCDF	2016/08/27		84	%	24 - 185
			C13-123789 HexaCDF	2016/08/27		78	%	29 - 147
			C13-234678 HexaCDF	2016/08/27		85	%	28 - 136
			C13-23478 PentaCDF	2016/08/27		84	%	21 - 178
			C13-2378 TetraCDD	2016/08/27		86	%	25 - 164
			C13-2378 TetraCDF	2016/08/27		79	%	24 - 169
			C13-OCDD	2016/08/27		69	%	17 - 157
			2,3,7,8-Tetra CDD	2016/08/27		97	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/08/27		83	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/08/27		92	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/08/27		106	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/08/27		118	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/08/27		88	%	70 - 140
			Octa CDD	2016/08/27		91	%	78 - 144
			2,3,7,8-Tetra CDF	2016/08/27		104	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/08/27		91	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/08/27		107	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/08/27		101	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/08/27		98	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/08/27		91	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/08/27		97	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/08/27		95	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/08/27		100	%	78 - 138
			Octa CDF	2016/08/27		84	%	63 - 170
4637992	CXU	RPD	2,3,7,8-Tetra CDD	2016/08/27	1.0		%	25
			1,2,3,7,8-Penta CDD	2016/08/27	1.2		%	25
			1,2,3,4,7,8-Hexa CDD	2016/08/27	1.1		%	25
			1,2,3,6,7,8-Hexa CDD	2016/08/27	2.8		%	25
			1,2,3,7,8,9-Hexa CDD	2016/08/27	0		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/08/27	1.1		%	25
			Octa CDD	2016/08/27	1.1		%	25
			2,3,7,8-Tetra CDF	2016/08/27	1.9		%	25



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8-Penta CDF	2016/08/27	1.1		%	25
			2,3,4,7,8-Penta CDF	2016/08/27	0		%	25
			1,2,3,4,7,8-Hexa CDF	2016/08/27	0		%	25
			1,2,3,6,7,8-Hexa CDF	2016/08/27	2.1		%	25
			2,3,4,6,7,8-Hexa CDF	2016/08/27	0		%	25
			1,2,3,7,8,9-Hexa CDF	2016/08/27	3.1		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/08/27	0		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/08/27	1.0		%	25
			Octa CDF	2016/08/27	2.4		%	25
4637992	CXU	Method Blank	37CL4 2378 Tetra CDD	2016/08/27		95	%	35 - 197
			C13-1234678 HeptaCDD	2016/08/27		80	%	23 - 140
			C13-1234678 HeptaCDF	2016/08/27		61	%	28 - 143
			C13-123478 HexaCDD	2016/08/27		79	%	32 - 141
			C13-123478 HexaCDF	2016/08/27		64	%	26 - 152
			C13-1234789 HeptaCDF	2016/08/27		62	%	26 - 138
			C13-123678 HexaCDD	2016/08/27		70	%	28 - 130
			C13-123678 HexaCDF	2016/08/27		64	%	26 - 123
			C13-12378 PentaCDD	2016/08/27		108	%	25 - 181
			C13-12378 PentaCDF	2016/08/27		79	%	24 - 185
			C13-123789 HexaCDF	2016/08/27		74	%	29 - 147
			C13-234678 HexaCDF	2016/08/27		80	%	28 - 136
			C13-23478 PentaCDF	2016/08/27		79	%	21 - 178
			C13-2378 TetraCDD	2016/08/27		83	%	25 - 164
			C13-2378 TetraCDF	2016/08/27		76	%	24 - 169
			C13-OCDD	2016/08/27		64	%	17 - 157
			2,3,7,8-Tetra CDD	2016/08/27	<0.113, EDL=0.113		pg/g	
			1,2,3,7,8-Penta CDD	2016/08/27	<0.150, EDL=0.150		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/08/27	<0.0822, EDL=0.0822		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/08/27	<0.0860, EDL=0.0860		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/08/27	<0.0873, EDL=0.0873		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/08/27	<0.0793, EDL=0.0793		pg/g	
			Octa CDD	2016/08/27	0.268, EDL=0.104		pg/g	
			Total Tetra CDD	2016/08/27	<0.113, EDL=0.113		pg/g	
			Total Penta CDD	2016/08/27	<0.150, EDL=0.150		pg/g	
			Total Hexa CDD	2016/08/27	<0.143, EDL=0.143 (1)		pg/g	
			Total Hepta CDD	2016/08/27	<0.0793, EDL=0.0793		pg/g	
			2,3,7,8-Tetra CDF	2016/08/27	<0.0795, EDL=0.0795		pg/g	
			1,2,3,7,8-Penta CDF	2016/08/27	<0.134, EDL=0.134		pg/g	
			2,3,4,7,8-Penta CDF	2016/08/27	<0.128, EDL=0.128		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDF	2016/08/27	<0.111, EDL=0.111		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/08/27	<0.118, EDL=0.118		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/08/27	<0.109, EDL=0.109		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/08/27	<0.116, EDL=0.116		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/08/27	0.146, EDL=0.0564		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/08/27	<0.0576, EDL=0.0576		pg/g	
			Octa CDF	2016/08/27	<0.130, EDL=0.130		pg/g	
			Total Tetra CDF	2016/08/27	<0.0795, EDL=0.0795		pg/g	
			Total Penta CDF	2016/08/27	<0.131, EDL=0.131		pg/g	
			Total Hexa CDF	2016/08/27	<0.113, EDL=0.113		pg/g	
			Total Hepta CDF	2016/08/27	0.146, EDL=0.0570		pg/g	
4637992	CXU	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2016/08/27	NC		%	25
			1,2,3,7,8-Penta CDD	2016/08/27	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2016/08/27	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2016/08/27	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2016/08/27	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/08/27	NC		%	25
			Octa CDD	2016/08/27	33 (2)		%	25
			Total Tetra CDD	2016/08/27	NC		%	25
			Total Penta CDD	2016/08/27	NC		%	25
			Total Hexa CDD	2016/08/27	NC		%	25
			Total Hepta CDD	2016/08/27	NC		%	25
			2,3,7,8-Tetra CDF	2016/08/27	NC		%	25
			1,2,3,7,8-Penta CDF	2016/08/27	NC		%	25
			2,3,4,7,8-Penta CDF	2016/08/27	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2016/08/27	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2016/08/27	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2016/08/27	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2016/08/27	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/08/27	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/08/27	NC		%	25
			Octa CDF	2016/08/27	NC		%	25
			Total Tetra CDF	2016/08/27	NC		%	25
			Total Penta CDF	2016/08/27	NC		%	25
			Total Hexa CDF	2016/08/27	NC		%	25
			Total Hepta CDF	2016/08/27	NC		%	25
4642777	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/08/29	<0.21, EDL=0.21		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC				Date		%		
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
			Confirmation C13-2378 TetraCDF	2016/08/29		87	%	40 - 135

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(2) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Your Project #: A6D0774  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/09/14**  
Report #: R4166884  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B6H7368**

**Received: 2016/08/20, 12:48**

Sample Matrix: Soil  
# Samples Received: 5

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) Low Level (1)	5	2016/08/31	2016/09/10	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	N/A	2016/09/05	BRL SOP-00406	EPA M8290A / M1613
2378TCDF Confirmation (M8290A/M1613)	4	N/A	2016/09/12	BRL SOP-00406	EPA M8290A / M1613
Moisture	5	N/A	2016/08/24	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

=====  
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		CXR603	CXR604	CXR605	CXR606	CXR607			
Sampling Date		2016/04/20 10:00	2016/04/20 10:10	2016/04/20 10:20	2016/04/20 12:30	2016/04/20 12:40			
COC Number		na	na	na	na	na			
	UNITS	ROW-P2-021-0.5	ROW-P2-020-0.5	ROW-P2-022-0.5	ROW-P2-034-0.5	ROW-P2-033-0.5	RDL	MDL	QC Batch
Moisture	%	14	23	6.1	16	16	1.0	0.50	4633004
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXR603							
Sampling Date		2016/04/20 10:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-021-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.539	0.0967	0.196	0.0392	1.00	0.539	N/A	4654695
1,2,3,7,8-Penta CDD *	pg/g	3.46	0.116	0.981	0.0392	1.00	3.46	N/A	4654695
1,2,3,4,7,8-Hexa CDD *	pg/g	7.64	0.109	0.981	0.0392	0.100	0.764	N/A	4654695
1,2,3,6,7,8-Hexa CDD *	pg/g	43.2	0.111	0.981	0.0392	0.100	4.32	N/A	4654695
1,2,3,7,8,9-Hexa CDD *	pg/g	20.3	0.108	0.981	0.0392	0.100	2.03	N/A	4654695
1,2,3,4,6,7,8-Hepta CDD *	pg/g	857	0.110	0.981	0.0392	0.0100	8.57	N/A	4654695
Octa CDD *	pg/g	5520 (1)	1.11	19.6	0.0785	0.000300	1.66	N/A	4654695
Total Tetra CDD *	pg/g	5.19	0.0967	0.196	0.0392	N/A	N/A	10	4654695
Total Penta CDD *	pg/g	16.6	0.116	0.981	0.0392	N/A	N/A	11	4654695
Total Hexa CDD *	pg/g	175	0.110	0.981	0.0392	N/A	N/A	7	4654695
Total Hepta CDD *	pg/g	1430	0.110	0.981	0.0392	N/A	N/A	2	4654695
2,3,7,8-Tetra CDF **	pg/g	2.20	0.118	0.196	0.0392	0.100	0.220	N/A	4654695
1,2,3,7,8-Penta CDF **	pg/g	3.43	0.109	0.981	0.0392	0.0300	0.103	N/A	4654695
2,3,4,7,8-Penta CDF **	pg/g	6.46	0.109	0.981	0.0392	0.300	1.94	N/A	4654695
1,2,3,4,7,8-Hexa CDF **	pg/g	34.0	0.0984	0.981	0.0392	0.100	3.40	N/A	4654695
1,2,3,6,7,8-Hexa CDF **	pg/g	12.8	0.0990	0.981	0.0392	0.100	1.28	N/A	4654695
2,3,4,6,7,8-Hexa CDF **	pg/g	5.49	0.0929	0.981	0.0392	0.100	0.549	N/A	4654695
1,2,3,7,8,9-Hexa CDF **	pg/g	0.430	0.0952	0.981	0.0392	0.100	0.0430	N/A	4654695
1,2,3,4,6,7,8-Hepta CDF **	pg/g	175	0.0948	0.981	0.0392	0.0100	1.75	N/A	4654695
1,2,3,4,7,8,9-Hepta CDF **	pg/g	11.6	0.0912	0.981	0.0392	0.0100	0.116	N/A	4654695
Octa CDF **	pg/g	373	0.107	1.96	0.0785	0.000300	0.112	N/A	4654695
Total Tetra CDF **	pg/g	19.5	0.118	0.196	0.0392	N/A	N/A	15	4654695
Total Penta CDF **	pg/g	123	0.109	0.981	0.0392	N/A	N/A	11	4654695
Total Hexa CDF **	pg/g	352	0.0963	0.981	0.0392	N/A	N/A	12	4654695
Total Hepta CDF **	pg/g	589	0.0929	0.981	0.0392	N/A	N/A	4	4654695
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.63	0.11	0.98	0.88	0.100	0.163	N/A	4658219
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	30.8	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 10X Dilution \*\*

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXR603							
Sampling Date		2016/04/20 10:00							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-021-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234789 HeptaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDD *	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDD *	%	110	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDF **	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123789 HexaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-234678 HexaCDF **	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-23478 PentaCDF **	%	96	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-OCDD *	%	107 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4654695
Confirmation C13-2378 TetraCDF **	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4658219
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan (1) ** From 10X Dilution **									

### DIOXINS AND FURANS BY HRMS (SOIL)

Maxxam ID		CXR604							
Sampling Date		2016/04/20 10:10							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-020-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.771	0.307	0.198	0.0395	1.00	0.771	N/A	4654695
1,2,3,7,8-Penta CDD *	pg/g	1.26	0.103	0.989	0.0395	1.00	1.26	N/A	4654695
1,2,3,4,7,8-Hexa CDD *	pg/g	2.50	0.108	0.989	0.0395	0.100	0.250	N/A	4654695
1,2,3,6,7,8-Hexa CDD *	pg/g	21.0	0.110	0.989	0.0395	0.100	2.10	N/A	4654695
1,2,3,7,8,9-Hexa CDD *	pg/g	7.44	0.107	0.989	0.0395	0.100	0.744	N/A	4654695
1,2,3,4,6,7,8-Hepta CDD *	pg/g	454	0.117	0.989	0.0395	0.0100	4.54	N/A	4654695
Octa CDD *	pg/g	3710	0.421	1.98	0.0791	0.000300	1.11	N/A	4654695
Total Tetra CDD *	pg/g	11.7	0.307	0.198	0.0395	N/A	N/A	9	4654695
Total Penta CDD *	pg/g	9.29	0.103	0.989	0.0395	N/A	N/A	10	4654695
Total Hexa CDD *	pg/g	85.7	0.110	0.989	0.0395	N/A	N/A	6	4654695
Total Hepta CDD *	pg/g	947	0.117	0.989	0.0395	N/A	N/A	2	4654695
2,3,7,8-Tetra CDF **	pg/g	1.52	0.0844	0.198	0.0395	0.100	0.152	N/A	4654695
1,2,3,7,8-Penta CDF **	pg/g	1.17	0.0984	0.989	0.0395	0.0300	0.0351	N/A	4654695
2,3,4,7,8-Penta CDF **	pg/g	1.89	0.0984	0.989	0.0395	0.300	0.567	N/A	4654695
1,2,3,4,7,8-Hexa CDF **	pg/g	8.59	0.129	0.989	0.0395	0.100	0.859	N/A	4654695
1,2,3,6,7,8-Hexa CDF **	pg/g	3.45	0.129	0.989	0.0395	0.100	0.345	N/A	4654695
2,3,4,6,7,8-Hexa CDF **	pg/g	2.49	0.121	0.989	0.0395	0.100	0.249	N/A	4654695
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.124	0.124	0.989	0.0395	0.100	0.0124	N/A	4654695
1,2,3,4,6,7,8-Hepta CDF **	pg/g	110	0.126	0.989	0.0395	0.0100	1.10	N/A	4654695
1,2,3,4,7,8,9-Hepta CDF **	pg/g	7.07	0.121	0.989	0.0395	0.0100	0.0707	N/A	4654695
Octa CDF **	pg/g	528	0.190	1.98	0.0791	0.000300	0.158	N/A	4654695
Total Tetra CDF **	pg/g	15.1	0.0844	0.198	0.0395	N/A	N/A	14	4654695
Total Penta CDF **	pg/g	48.4	0.0984	0.989	0.0395	N/A	N/A	9	4654695
Total Hexa CDF **	pg/g	165	0.126	0.989	0.0395	N/A	N/A	10	4654695
Total Hepta CDF **	pg/g	404	0.123	0.989	0.0395	N/A	N/A	4	4654695
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.25	0.093	0.99	0.89	0.100	0.125	N/A	4658219
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	14.3	N/A	N/A

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

\* CDD = Chloro Dibenzo-p-Dioxin

N/A = Not Applicable

\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXR604							
Sampling Date		2016/04/20 10:10							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-020-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	26 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234789 HeptaCDF **	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDD *	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDD *	%	105	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123789 HexaCDF **	%	47	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-234678 HexaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-23478 PentaCDF **	%	105	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDD *	%	24 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-OCDD *	%	50	N/A	N/A	N/A	N/A	N/A	N/A	4654695
Confirmation C13-2378 TetraCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4658219
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan (1) Recovery outside method acceptance criteria due to matrix effects									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXR604							
Sampling Date		2016/04/20 10:10							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-020-0.5 Lab-Dup	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.787	0.183	0.199	0.0398	1.00	0.787	N/A	4654695
1,2,3,7,8-Penta CDD *	pg/g	1.26	0.129	0.996	0.0398	1.00	1.26	N/A	4654695
1,2,3,4,7,8-Hexa CDD *	pg/g	2.65	0.167	0.996	0.0398	0.100	0.265	N/A	4654695
1,2,3,6,7,8-Hexa CDD *	pg/g	21.9	0.170	0.996	0.0398	0.100	2.19	N/A	4654695
1,2,3,7,8,9-Hexa CDD *	pg/g	7.15	0.165	0.996	0.0398	0.100	0.715	N/A	4654695
1,2,3,4,6,7,8-Hepta CDD *	pg/g	501	0.139	0.996	0.0398	0.0100	5.01	N/A	4654695
Octa CDD *	pg/g	3830	0.510	1.99	0.0797	0.000300	1.15	N/A	4654695
Total Tetra CDD *	pg/g	3.43 (1)	0.183	0.199	0.0398	N/A	N/A	5	4654695
Total Penta CDD *	pg/g	9.95	0.129	0.996	0.0398	N/A	N/A	9	4654695
Total Hexa CDD *	pg/g	86.7	0.169	0.996	0.0398	N/A	N/A	6	4654695
Total Hepta CDD *	pg/g	984	0.139	0.996	0.0398	N/A	N/A	2	4654695
2,3,7,8-Tetra CDF **	pg/g	1.57	0.181	0.199	0.0398	0.100	0.157	N/A	4654695
1,2,3,7,8-Penta CDF **	pg/g	1.28	0.121	0.996	0.0398	0.0300	0.0384	N/A	4654695
2,3,4,7,8-Penta CDF **	pg/g	1.92	0.121	0.996	0.0398	0.300	0.576	N/A	4654695
1,2,3,4,7,8-Hexa CDF **	pg/g	8.55	0.140	0.996	0.0398	0.100	0.855	N/A	4654695
1,2,3,6,7,8-Hexa CDF **	pg/g	3.57	0.141	0.996	0.0398	0.100	0.357	N/A	4654695
2,3,4,6,7,8-Hexa CDF **	pg/g	2.81	0.132	0.996	0.0398	0.100	0.281	N/A	4654695
1,2,3,7,8,9-Hexa CDF **	pg/g	0.246	0.136	0.996	0.0398	0.100	0.0246	N/A	4654695
1,2,3,4,6,7,8-Hepta CDF **	pg/g	103	0.115	0.996	0.0398	0.0100	1.03	N/A	4654695
1,2,3,4,7,8,9-Hepta CDF **	pg/g	7.09	0.111	0.996	0.0398	0.0100	0.0709	N/A	4654695
Octa CDF **	pg/g	363 (1)	0.212	1.99	0.0797	0.000300	0.109	N/A	4654695
Total Tetra CDF **	pg/g	16.6	0.181	0.199	0.0398	N/A	N/A	14	4654695
Total Penta CDF **	pg/g	55.2	0.121	0.996	0.0398	N/A	N/A	8	4654695
Total Hexa CDF **	pg/g	153	0.137	0.996	0.0398	N/A	N/A	10	4654695
Total Hepta CDF **	pg/g	386	0.113	0.996	0.0398	N/A	N/A	4	4654695
Confirmation 2,3,7,8-Tetra CDF **	pg/g	1.16	0.10	1.0	0.90	0.100	0.116	N/A	4658219
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	14.8	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
Lab-Dup = Laboratory Initiated Duplicate  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CXR604							
<b>Sampling Date</b>		2016/04/20 10:10							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ROW-P2-020-0.5 Lab-Dup</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDF **	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234789 HeptaCDF **	%	64	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDD *	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123789 HexaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-234678 HexaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-23478 PentaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDD *	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-OCDD *	%	63	N/A	N/A	N/A	N/A	N/A	N/A	4654695
Confirmation C13-2378 TetraCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4658219

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 Lab-Dup = Laboratory Initiated Duplicate  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 N/A = Not Applicable  
 \*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXR605							
Sampling Date		2016/04/20 10:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-022-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.461	0.196	0.199	0.0398	1.00	0.461	N/A	4654695
1,2,3,7,8-Penta CDD *	pg/g	0.355	0.185	0.996	0.0398	1.00	0.355	N/A	4654695
1,2,3,4,7,8-Hexa CDD *	pg/g	0.483	0.152	0.996	0.0398	0.100	0.0483	N/A	4654695
1,2,3,6,7,8-Hexa CDD *	pg/g	2.64	0.154	0.996	0.0398	0.100	0.264	N/A	4654695
1,2,3,7,8,9-Hexa CDD *	pg/g	1.89	0.150	0.996	0.0398	0.100	0.189	N/A	4654695
1,2,3,4,6,7,8-Hepta CDD *	pg/g	88.6	0.236	0.996	0.0398	0.0100	0.886	N/A	4654695
Octa CDD *	pg/g	844	0.295	1.99	0.0797	0.000300	0.253	N/A	4654695
Total Tetra CDD *	pg/g	0.461	0.196	0.199	0.0398	N/A	N/A	1	4654695
Total Penta CDD *	pg/g	1.25	0.185	0.996	0.0398	N/A	N/A	3	4654695
Total Hexa CDD *	pg/g	16.5	0.153	0.996	0.0398	N/A	N/A	5	4654695
Total Hepta CDD *	pg/g	160	0.236	0.996	0.0398	N/A	N/A	2	4654695
2,3,7,8-Tetra CDF **	pg/g	0.317	0.180	0.199	0.0398	0.100	0.0317	N/A	4654695
1,2,3,7,8-Penta CDF **	pg/g	<0.132	0.132	0.996	0.0398	0.0300	0.00396	N/A	4654695
2,3,4,7,8-Penta CDF **	pg/g	0.439	0.132	0.996	0.0398	0.300	0.132	N/A	4654695
1,2,3,4,7,8-Hexa CDF **	pg/g	1.27	0.130	0.996	0.0398	0.100	0.127	N/A	4654695
1,2,3,6,7,8-Hexa CDF **	pg/g	0.775	0.131	0.996	0.0398	0.100	0.0775	N/A	4654695
2,3,4,6,7,8-Hexa CDF **	pg/g	<0.490 (1)	0.490	0.996	0.0398	0.100	0.0490	N/A	4654695
1,2,3,7,8,9-Hexa CDF **	pg/g	<0.126	0.126	0.996	0.0398	0.100	0.0126	N/A	4654695
1,2,3,4,6,7,8-Hepta CDF **	pg/g	11.8	0.112	0.996	0.0398	0.0100	0.118	N/A	4654695
1,2,3,4,7,8,9-Hepta CDF **	pg/g	0.864	0.108	0.996	0.0398	0.0100	0.00864	N/A	4654695
Octa CDF **	pg/g	33.5	0.217	1.99	0.0797	0.000300	0.0101	N/A	4654695
Total Tetra CDF **	pg/g	4.88	0.180	0.199	0.0398	N/A	N/A	6	4654695
Total Penta CDF **	pg/g	18.1	0.132	0.996	0.0398	N/A	N/A	5	4654695
Total Hexa CDF **	pg/g	23.0	0.127	0.996	0.0398	N/A	N/A	9	4654695
Total Hepta CDF **	pg/g	37.4	0.110	0.996	0.0398	N/A	N/A	4	4654695
Confirmation 2,3,7,8-Tetra CDF **	pg/g	<0.35	0.35	1.0	0.90	0.100	0.0350	N/A	4658219
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	3.03	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXR605							
Sampling Date		2016/04/20 10:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-022-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDD *	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDF **	%	70	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234789 HeptaCDF **	%	70	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDD *	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123789 HexaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-234678 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-23478 PentaCDF **	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDD *	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDF **	%	73	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-OCDD *	%	56	N/A	N/A	N/A	N/A	N/A	N/A	4654695
Confirmation C13-2378 TetraCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4658219

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXR606							
Sampling Date		2016/04/20 12:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-034-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.596	0.149	0.199	0.0399	1.00	0.596	N/A	4654695
1,2,3,7,8-Penta CDD *	pg/g	3.76	0.100	0.997	0.0399	1.00	3.76	N/A	4654695
1,2,3,4,7,8-Hexa CDD *	pg/g	7.67	0.139	0.997	0.0399	0.100	0.767	N/A	4654695
1,2,3,6,7,8-Hexa CDD *	pg/g	42.4	0.141	0.997	0.0399	0.100	4.24	N/A	4654695
1,2,3,7,8,9-Hexa CDD *	pg/g	22.5	0.137	0.997	0.0399	0.100	2.25	N/A	4654695
1,2,3,4,6,7,8-Hepta CDD *	pg/g	804	0.338	0.997	0.0399	0.0100	8.04	N/A	4654695
Octa CDD *	pg/g	4820 (1)	1.04	19.9	0.0798	0.000300	1.45	N/A	4654695
Total Tetra CDD *	pg/g	6.70	0.149	0.199	0.0399	N/A	N/A	7	4654695
Total Penta CDD *	pg/g	21.9	0.100	0.997	0.0399	N/A	N/A	10	4654695
Total Hexa CDD *	pg/g	186	0.141	0.997	0.0399	N/A	N/A	6	4654695
Total Hepta CDD *	pg/g	1380	0.338	0.997	0.0399	N/A	N/A	2	4654695
2,3,7,8-Tetra CDF **	pg/g	3.72	0.0907	0.199	0.0399	0.100	0.372	N/A	4654695
1,2,3,7,8-Penta CDF **	pg/g	2.92	0.156	0.997	0.0399	0.0300	0.0876	N/A	4654695
2,3,4,7,8-Penta CDF **	pg/g	6.82	0.156	0.997	0.0399	0.300	2.05	N/A	4654695
1,2,3,4,7,8-Hexa CDF **	pg/g	26.3	0.155	0.997	0.0399	0.100	2.63	N/A	4654695
1,2,3,6,7,8-Hexa CDF **	pg/g	12.3	0.156	0.997	0.0399	0.100	1.23	N/A	4654695
2,3,4,6,7,8-Hexa CDF **	pg/g	7.18	0.146	0.997	0.0399	0.100	0.718	N/A	4654695
1,2,3,7,8,9-Hexa CDF **	pg/g	0.413	0.150	0.997	0.0399	0.100	0.0413	N/A	4654695
1,2,3,4,6,7,8-Hepta CDF **	pg/g	131	0.0875	0.997	0.0399	0.0100	1.31	N/A	4654695
1,2,3,4,7,8,9-Hepta CDF **	pg/g	7.22	0.0842	0.997	0.0399	0.0100	0.0722	N/A	4654695
Octa CDF **	pg/g	124	0.103	1.99	0.0798	0.000300	0.0372	N/A	4654695
Total Tetra CDF **	pg/g	54.3	0.0907	0.199	0.0399	N/A	N/A	15	4654695
Total Penta CDF **	pg/g	214	0.156	0.997	0.0399	N/A	N/A	11	4654695
Total Hexa CDF **	pg/g	326	0.151	0.997	0.0399	N/A	N/A	11	4654695
Total Hepta CDF **	pg/g	330	0.0858	0.997	0.0399	N/A	N/A	4	4654695
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.52	0.14	1.0	0.90	0.100	0.252	N/A	4658219
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	29.5	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 10X Dilution \*\*

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXR606							
Sampling Date		2016/04/20 12:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-034-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDD *	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDD *	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDF **	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234789 HeptaCDF **	%	71	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDD *	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123789 HexaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-234678 HexaCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-23478 PentaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDD *	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-OCDD *	%	81 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4654695
Confirmation C13-2378 TetraCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4658219
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan (1) ** From 10X Dilution **									

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXR607							
Sampling Date		2016/04/20 12:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-033-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.616	0.232	0.197	0.0394	1.00	0.616	N/A	4654695
1,2,3,7,8-Penta CDD *	pg/g	7.40	0.136	0.985	0.0394	1.00	7.40	N/A	4654695
1,2,3,4,7,8-Hexa CDD *	pg/g	20.0	0.356	0.985	0.0394	0.100	2.00	N/A	4654695
1,2,3,6,7,8-Hexa CDD *	pg/g	150	0.361	0.985	0.0394	0.100	15.0	N/A	4654695
1,2,3,7,8,9-Hexa CDD *	pg/g	53.8	0.351	0.985	0.0394	0.100	5.38	N/A	4654695
1,2,3,4,6,7,8-Hepta CDD *	pg/g	2810 (1)	1.18	9.85	0.0394	0.0100	28.1	N/A	4654695
Octa CDD *	pg/g	19300 (1)	1.27	19.7	0.0788	0.000300	5.79	N/A	4654695
Total Tetra CDD *	pg/g	14.2	0.232	0.197	0.0394	N/A	N/A	8	4654695
Total Penta CDD *	pg/g	46.4	0.136	0.985	0.0394	N/A	N/A	12	4654695
Total Hexa CDD *	pg/g	609	0.359	0.985	0.0394	N/A	N/A	7	4654695
Total Hepta CDD *	pg/g	4640 (1)	1.18	9.85	0.0394	N/A	N/A	2	4654695
2,3,7,8-Tetra CDF **	pg/g	8.00	0.162	0.197	0.0394	0.100	0.800	N/A	4654695
1,2,3,7,8-Penta CDF **	pg/g	13.9	0.207	0.985	0.0394	0.0300	0.417	N/A	4654695
2,3,4,7,8-Penta CDF **	pg/g	30.3	0.207	0.985	0.0394	0.300	9.09	N/A	4654695
1,2,3,4,7,8-Hexa CDF **	pg/g	126	0.133	0.985	0.0394	0.100	12.6	N/A	4654695
1,2,3,6,7,8-Hexa CDF **	pg/g	51.2	0.134	0.985	0.0394	0.100	5.12	N/A	4654695
2,3,4,6,7,8-Hexa CDF **	pg/g	28.5	0.126	0.985	0.0394	0.100	2.85	N/A	4654695
1,2,3,7,8,9-Hexa CDF **	pg/g	1.71	0.129	0.985	0.0394	0.100	0.171	N/A	4654695
1,2,3,4,6,7,8-Hepta CDF **	pg/g	514	0.319	0.985	0.0394	0.0100	5.14	N/A	4654695
1,2,3,4,7,8,9-Hepta CDF **	pg/g	31.1	0.306	0.985	0.0394	0.0100	0.311	N/A	4654695
Octa CDF **	pg/g	433	0.243	1.97	0.0788	0.000300	0.130	N/A	4654695
Total Tetra CDF **	pg/g	163	0.162	0.197	0.0394	N/A	N/A	16	4654695
Total Penta CDF **	pg/g	888	0.207	0.985	0.0394	N/A	N/A	11	4654695
Total Hexa CDF **	pg/g	1610	0.131	0.985	0.0394	N/A	N/A	12	4654695
Total Hepta CDF **	pg/g	1400	0.312	0.985	0.0394	N/A	N/A	4	4654695
Confirmation 2,3,7,8-Tetra CDF **	pg/g	9.56	0.24	0.99	0.89	0.100	0.956	N/A	4658219
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	101	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) \*\* From 10X Dilution \*\*

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CXR607							
Sampling Date		2016/04/20 12:40							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-033-0.5	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	51	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDD *	%	69 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234678 HeptaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123478 HexaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-1234789 HeptaCDF **	%	65	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123678 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDD *	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-12378 PentaCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-123789 HexaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-234678 HexaCDF **	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-23478 PentaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDD *	%	47	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-2378 TetraCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4654695
C13-OCDD *	%	52 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4654695
Confirmation C13-2378 TetraCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4658219
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan (1) ** From 10X Dilution **									



**TEST SUMMARY**

**Maxxam ID:** CXR603  
**Sample ID:** ROW-P2-021-0.5  
**Matrix:** Soil

**Collected:** 2016/04/20  
**Shipped:**  
**Received:** 2016/08/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B) Low Level	HRMS/MS	4654695	2016/08/31	2016/09/10	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4658219	N/A	2016/09/12	Vica Cioranic
Moisture	BAL	4633004	N/A	2016/08/24	Shivani Desai

**Maxxam ID:** CXR604  
**Sample ID:** ROW-P2-020-0.5  
**Matrix:** Soil

**Collected:** 2016/04/20  
**Shipped:**  
**Received:** 2016/08/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B) Low Level	HRMS/MS	4654695	2016/08/31	2016/09/10	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4658219	N/A	2016/09/05	Vica Cioranic
Moisture	BAL	4633004	N/A	2016/08/24	Shivani Desai

**Maxxam ID:** CXR604 Dup  
**Sample ID:** ROW-P2-020-0.5  
**Matrix:** Soil

**Collected:** 2016/04/20  
**Shipped:**  
**Received:** 2016/08/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B) Low Level	HRMS/MS	4654695	2016/08/31	2016/09/10	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4658219	N/A	2016/09/12	Vica Cioranic

**Maxxam ID:** CXR605  
**Sample ID:** ROW-P2-022-0.5  
**Matrix:** Soil

**Collected:** 2016/04/20  
**Shipped:**  
**Received:** 2016/08/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B) Low Level	HRMS/MS	4654695	2016/08/31	2016/09/10	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4658219	N/A	2016/09/12	Vica Cioranic
Moisture	BAL	4633004	N/A	2016/08/24	Shivani Desai

**Maxxam ID:** CXR606  
**Sample ID:** ROW-P2-034-0.5  
**Matrix:** Soil

**Collected:** 2016/04/20  
**Shipped:**  
**Received:** 2016/08/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B) Low Level	HRMS/MS	4654695	2016/08/31	2016/09/10	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4658219	N/A	2016/09/12	Vica Cioranic
Moisture	BAL	4633004	N/A	2016/08/24	Shivani Desai

**Maxxam ID:** CXR607  
**Sample ID:** ROW-P2-033-0.5  
**Matrix:** Soil

**Collected:** 2016/04/20  
**Shipped:**  
**Received:** 2016/08/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B) Low Level	HRMS/MS	4654695	2016/08/31	2016/09/10	Owen Cosby
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4658219	N/A	2016/09/12	Vica Cioranic
Moisture	BAL	4633004	N/A	2016/08/24	Shivani Desai

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.4°C
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**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4633004	VGS	RPD - Sample/Sample Dup	Moisture	2016/08/24	1.8		%	20
4654695	OBC	Matrix Spike	37CL4 2378 Tetra CDD	2016/09/10		88	%	35 - 197
			C13-1234678 HeptaCDD	2016/09/10		99 (1)	%	23 - 140
			C13-1234678 HeptaCDF	2016/09/10		78	%	28 - 143
			C13-123478 HexaCDD	2016/09/10		96	%	32 - 141
			C13-123478 HexaCDF	2016/09/10		80	%	26 - 152
			C13-1234789 HeptaCDF	2016/09/10		80	%	26 - 138
			C13-123678 HexaCDD	2016/09/10		81	%	28 - 130
			C13-123678 HexaCDF	2016/09/10		80	%	26 - 123
			C13-12378 PentaCDD	2016/09/10		110	%	25 - 181
			C13-12378 PentaCDF	2016/09/10		99	%	24 - 185
			C13-123789 HexaCDF	2016/09/10		84	%	29 - 147
			C13-234678 HexaCDF	2016/09/10		91	%	28 - 136
			C13-23478 PentaCDF	2016/09/10		97	%	21 - 178
			C13-2378 TetraCDD	2016/09/10		87	%	25 - 164
			C13-2378 TetraCDF	2016/09/10		87	%	24 - 169
			C13-OCDD	2016/09/10		95 (1)	%	17 - 157
4654695	OBC	Matrix Spike(CXR607)	2,3,7,8-Tetra CDD	2016/09/10		100	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/09/10		84	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/09/10		87	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/09/10		123	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/09/10		120	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/09/10		352 (2)	%	70 - 140
			Octa CDD	2016/09/10		239 (2)	%	78 - 144
			2,3,7,8-Tetra CDF	2016/09/10		105	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/09/10		91	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/09/10		122	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/09/10		122	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/09/10		114	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/09/10		116	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/09/10		105	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/09/10		139 (3)	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/09/10		103	%	78 - 138
			Octa CDF	2016/09/10		64	%	63 - 170
4654695	OBC	Spiked Blank	37CL4 2378 Tetra CDD	2016/09/10		77	%	35 - 197
			C13-1234678 HeptaCDD	2016/09/10		76	%	23 - 140
			C13-1234678 HeptaCDF	2016/09/10		67	%	28 - 143
			C13-123478 HexaCDD	2016/09/10		89	%	32 - 141
			C13-123478 HexaCDF	2016/09/10		72	%	26 - 152
			C13-1234789 HeptaCDF	2016/09/10		66	%	26 - 138
			C13-123678 HexaCDD	2016/09/10		77	%	28 - 130
			C13-123678 HexaCDF	2016/09/10		73	%	26 - 123
			C13-12378 PentaCDD	2016/09/10		92	%	25 - 181
			C13-12378 PentaCDF	2016/09/10		83	%	24 - 185
			C13-123789 HexaCDF	2016/09/10		74	%	29 - 147
			C13-234678 HexaCDF	2016/09/10		85	%	28 - 136
			C13-23478 PentaCDF	2016/09/10		83	%	21 - 178
			C13-2378 TetraCDD	2016/09/10		71	%	25 - 164
			C13-2378 TetraCDF	2016/09/10		70	%	24 - 169
			C13-OCDD	2016/09/10		64	%	17 - 157
			2,3,7,8-Tetra CDD	2016/09/10		102	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/09/10		86	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/09/10		89	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/09/10		103	%	76 - 134

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/09/10		106	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/09/10		100	%	70 - 140
			Octa CDD	2016/09/10		98	%	78 - 144
			2,3,7,8-Tetra CDF	2016/09/10		103	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/09/10		89	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/09/10		109	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/09/10		112	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/09/10		110	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/09/10		104	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/09/10		101	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/09/10		110	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/09/10		103	%	78 - 138
			Octa CDF	2016/09/10		100	%	63 - 170
4654695	OBC	Spiked Blank DUP	37CL4 2378 Tetra CDD	2016/09/10		79	%	35 - 197
			C13-1234678 HeptaCDD	2016/09/10		73	%	23 - 140
			C13-1234678 HeptaCDF	2016/09/10		67	%	28 - 143
			C13-123478 HexaCDD	2016/09/10		86	%	32 - 141
			C13-123478 HexaCDF	2016/09/10		69	%	26 - 152
			C13-1234789 HeptaCDF	2016/09/10		64	%	26 - 138
			C13-123678 HexaCDD	2016/09/10		68	%	28 - 130
			C13-123678 HexaCDF	2016/09/10		71	%	26 - 123
			C13-12378 PentaCDD	2016/09/10		92	%	25 - 181
			C13-12378 PentaCDF	2016/09/10		83	%	24 - 185
			C13-123789 HexaCDF	2016/09/10		70	%	29 - 147
			C13-234678 HexaCDF	2016/09/10		79	%	28 - 136
			C13-23478 PentaCDF	2016/09/10		92	%	21 - 178
			C13-2378 TetraCDD	2016/09/10		73	%	25 - 164
			C13-2378 TetraCDF	2016/09/10		73	%	24 - 169
			C13-OCDD	2016/09/10		63	%	17 - 157
			2,3,7,8-Tetra CDD	2016/09/10		101	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/09/10		86	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/09/10		88	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/09/10		113	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/09/10		117	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/09/10		96	%	70 - 140
			Octa CDD	2016/09/10		99	%	78 - 144
			2,3,7,8-Tetra CDF	2016/09/10		103	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/09/10		92	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/09/10		112	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/09/10		113	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/09/10		104	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/09/10		100	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/09/10		108	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/09/10		111	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/09/10		104	%	78 - 138
			Octa CDF	2016/09/10		101	%	63 - 170
4654695	OBC	RPD	2,3,7,8-Tetra CDD	2016/09/10	0.99		%	25
			1,2,3,7,8-Penta CDD	2016/09/10	0		%	25
			1,2,3,4,7,8-Hexa CDD	2016/09/10	1.1		%	25
			1,2,3,6,7,8-Hexa CDD	2016/09/10	9.3		%	25
			1,2,3,7,8,9-Hexa CDD	2016/09/10	9.9		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/09/10	4.1		%	25
			Octa CDD	2016/09/10	1.0		%	25
			2,3,7,8-Tetra CDF	2016/09/10	0		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8-Penta CDF	2016/09/10	3.3		%	25
			2,3,4,7,8-Penta CDF	2016/09/10	2.7		%	25
			1,2,3,4,7,8-Hexa CDF	2016/09/10	0.89		%	25
			1,2,3,6,7,8-Hexa CDF	2016/09/10	5.6		%	25
			2,3,4,6,7,8-Hexa CDF	2016/09/10	3.9		%	25
			1,2,3,7,8,9-Hexa CDF	2016/09/10	6.7		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/09/10	0.90		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/09/10	0.97		%	25
			Octa CDF	2016/09/10	1.0		%	25
4654695	OBC	Method Blank	37CL4 2378 Tetra CDD	2016/09/10		82	%	35 - 197
			C13-1234678 HeptaCDD	2016/09/10		78	%	23 - 140
			C13-1234678 HeptaCDF	2016/09/10		70	%	28 - 143
			C13-123478 HexaCDD	2016/09/10		92	%	32 - 141
			C13-123478 HexaCDF	2016/09/10		75	%	26 - 152
			C13-1234789 HeptaCDF	2016/09/10		68	%	26 - 138
			C13-123678 HexaCDD	2016/09/10		82	%	28 - 130
			C13-123678 HexaCDF	2016/09/10		78	%	26 - 123
			C13-12378 PentaCDD	2016/09/10		106	%	25 - 181
			C13-12378 PentaCDF	2016/09/10		95	%	24 - 185
			C13-123789 HexaCDF	2016/09/10		77	%	29 - 147
			C13-234678 HexaCDF	2016/09/10		89	%	28 - 136
			C13-23478 PentaCDF	2016/09/10		91	%	21 - 178
			C13-2378 TetraCDD	2016/09/10		77	%	25 - 164
			C13-2378 TetraCDF	2016/09/10		83	%	24 - 169
			C13-OCDD	2016/09/10		64	%	17 - 157
			2,3,7,8-Tetra CDD	2016/09/10	<0.0954, EDL=0.0954		pg/g	
			1,2,3,7,8-Penta CDD	2016/09/10	<0.101, EDL=0.101		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/09/10	<0.0814, EDL=0.0814		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/09/10	<0.0827, EDL=0.0827		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/09/10	<0.0804, EDL=0.0804		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/09/10	<0.0697, EDL=0.0697		pg/g	
			Octa CDD	2016/09/10	<0.130, EDL=0.130 (4)		pg/g	
			Total Tetra CDD	2016/09/10	<0.287, EDL=0.287 (4)		pg/g	
			Total Penta CDD	2016/09/10	<0.139, EDL=0.139 (4)		pg/g	
			Total Hexa CDD	2016/09/10	<0.296, EDL=0.296 (4)		pg/g	
			Total Hepta CDD	2016/09/10	<0.0697, EDL=0.0697		pg/g	
			2,3,7,8-Tetra CDF	2016/09/10	<0.0762, EDL=0.0762		pg/g	
			1,2,3,7,8-Penta CDF	2016/09/10	<0.0844, EDL=0.0844		pg/g	
			2,3,4,7,8-Penta CDF	2016/09/10	<0.0844, EDL=0.0844		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDF	2016/09/10	<0.0908, EDL=0.0908		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/09/10	<0.0915, EDL=0.0915		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/09/10	<0.0858, EDL=0.0858		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/09/10	<0.0879, EDL=0.0879		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/09/10	<0.115, EDL=0.115		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/09/10	<0.110, EDL=0.110		pg/g	
			Octa CDF	2016/09/10	<0.122, EDL=0.122		pg/g	
			Total Tetra CDF	2016/09/10	<0.0884, EDL=0.0884 (4)		pg/g	
			Total Penta CDF	2016/09/10	<0.0844, EDL=0.0844		pg/g	
			Total Hexa CDF	2016/09/10	<0.0890, EDL=0.0890		pg/g	
			Total Hepta CDF	2016/09/10	<0.113, EDL=0.113		pg/g	
4654695	OBC	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2016/09/10	NC		%	25
			1,2,3,7,8-Penta CDD	2016/09/10	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2016/09/10	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2016/09/10	4.2		%	25
			1,2,3,7,8,9-Hexa CDD	2016/09/10	4.0		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/09/10	9.8		%	25
			Octa CDD	2016/09/10	3.3		%	25
			Total Tetra CDD	2016/09/10	109 (5)		%	25
			Total Penta CDD	2016/09/10	6.8		%	25
			Total Hexa CDD	2016/09/10	1.2		%	25
			Total Hepta CDD	2016/09/10	3.8		%	25
			2,3,7,8-Tetra CDF	2016/09/10	3.3		%	25
			1,2,3,7,8-Penta CDF	2016/09/10	NC		%	25
			2,3,4,7,8-Penta CDF	2016/09/10	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2016/09/10	0.42		%	25
			1,2,3,6,7,8-Hexa CDF	2016/09/10	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2016/09/10	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2016/09/10	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/09/10	6.9		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/09/10	0.30		%	25
			Octa CDF	2016/09/10	37 (5)		%	25
			Total Tetra CDF	2016/09/10	9.6		%	25
			Total Penta CDF	2016/09/10	13		%	25
			Total Hexa CDF	2016/09/10	7.7		%	25
			Total Hepta CDF	2016/09/10	4.6		%	25
4658219	VCI	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/09/12	<0.13, EDL=0.13		pg/g	
			Confirmation C13-2378 TetraCDF	2016/09/12		90	%	40 - 135



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4658219	VCI	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/09/12	NC		%	100
<p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.</p> <p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).</p> <p>(1) ** From 10X Dilution **</p> <p>(2) ** From 10X Dilution **Recovery outside method acceptance criteria due to matrix effects</p> <p>(3) Recovery outside method acceptance criteria due to matrix effects</p> <p>(4) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.</p> <p>(5) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.</p>								

**VALIDATION SIGNATURE PAGE**

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist



Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Your Project #: A6D0673  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/05/24**  
Report #: R4002099  
Version: 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B681136**

**Received: 2016/04/22, 14:52**

Sample Matrix: Soil  
# Samples Received: 7

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Dioxins/Furans in Soil (1613B) (1)	7	2016/04/28	2016/05/06	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	6	N/A	2016/05/09	BRL SOP-00406	EPA M8290A / M1613
Moisture	7	N/A	2016/04/26	CAM SOP-00445	Carter 2nd ed 51.2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Melissa DiGrazia, Project Manager - ATUT  
Email: MDiGrazia@maxxam.ca  
Phone# (905) 817-5700

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**RESULTS OF ANALYSES OF SOIL**

Maxxam ID		CFX527	CFX528	CFX529	CFX530	CFX531			
Sampling Date		2016/04/15 09:20	2016/04/15 09:35	2016/04/15 09:50	2016/04/15 09:50	2016/04/15 10:05			
COC Number		na	na	na	na	na			
	UNITS	ROW-P2-006-0.5 A6D0673-01	ROW-P2-003-0.5 A6D0673-02	ROW-P2-002-0.5 A6D0673-03	ROW-P2-002-0.5 -DUP A6D0673-04	ROW-P2-001-0.5 A6D0673-05	RDL	MDL	QC Batch
Moisture	%	26	25	18	39	8.3	1.0	0.50	4472698
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									

Maxxam ID		CFX532	CFX533			
Sampling Date		2016/04/15 10:45	2016/04/15 10:55			
COC Number		na	na			
	UNITS	ROW-P2-005-0.5 A6D0673-06	ROW-P2-004-0.5 A6D0673-07	RDL	MDL	QC Batch
Moisture	%	34	22	1.0	0.50	4472698
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX527							
Sampling Date		2016/04/15 09:20							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-006-0.5 A6D0673-01	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.339	0.101	0.999	0.0400	1.00	0.339	N/A	4481308
1,2,3,7,8-Penta CDD *	pg/g	2.36	0.102	4.99	0.0400	1.00	2.36	N/A	4481308
1,2,3,4,7,8-Hexa CDD *	pg/g	5.25	0.0995	4.99	0.0400	0.100	0.525	N/A	4481308
1,2,3,6,7,8-Hexa CDD *	pg/g	23.6	0.104	4.99	0.0400	0.100	2.36	N/A	4481308
1,2,3,7,8,9-Hexa CDD *	pg/g	14.4	0.104	4.99	0.0400	0.100	1.44	N/A	4481308
1,2,3,4,6,7,8-Hepta CDD *	pg/g	499	0.109	4.99	0.0400	0.0100	4.99	N/A	4481308
Octa CDD *	pg/g	3460	0.104	9.99	0.0799	0.000300	1.04	N/A	4481308
Total Tetra CDD *	pg/g	2.72	0.101	0.999	0.0400	N/A	N/A	6	4481308
Total Penta CDD *	pg/g	12.7	0.102	4.99	0.0400	N/A	N/A	10	4481308
Total Hexa CDD *	pg/g	125	0.103	4.99	0.0400	N/A	N/A	7	4481308
Total Hepta CDD *	pg/g	829	0.109	4.99	0.0400	N/A	N/A	2	4481308
2,3,7,8-Tetra CDF **	pg/g	1.49	0.101	0.999	0.0400	0.100	0.149	N/A	4481308
1,2,3,7,8-Penta CDF **	pg/g	1.97	0.104	4.99	0.0400	0.0300	0.0591	N/A	4481308
2,3,4,7,8-Penta CDF **	pg/g	4.05	0.101	4.99	0.0400	0.300	1.22	N/A	4481308
1,2,3,4,7,8-Hexa CDF **	pg/g	17.9	0.108	4.99	0.0400	0.100	1.79	N/A	4481308
1,2,3,6,7,8-Hexa CDF **	pg/g	6.21	0.112	4.99	0.0400	0.100	0.621	N/A	4481308
2,3,4,6,7,8-Hexa CDF **	pg/g	3.91	0.104	4.99	0.0400	0.100	0.391	N/A	4481308
1,2,3,7,8,9-Hexa CDF **	pg/g	0.334	0.111	4.99	0.0400	0.100	0.0334	N/A	4481308
1,2,3,4,6,7,8-Hepta CDF **	pg/g	86.3	0.103	4.99	0.0400	0.0100	0.863	N/A	4481308
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.29	0.104	4.99	0.0400	0.0100	0.0529	N/A	4481308
Octa CDF **	pg/g	137	0.109	9.99	0.0799	0.000300	0.0411	N/A	4481308
Total Tetra CDF **	pg/g	15.5	0.101	0.999	0.0400	N/A	N/A	13	4481308
Total Penta CDF **	pg/g	78.2	0.102	4.99	0.0400	N/A	N/A	9	4481308
Total Hexa CDF **	pg/g	181	0.109	4.99	0.0400	N/A	N/A	10	4481308
Total Hepta CDF **	pg/g	233	0.103	4.99	0.0400	N/A	N/A	3	4481308
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.834	0.095	1.0	0.90	0.100	0.0834	N/A	4492141
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	18.2	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CFX527							
<b>Sampling Date</b>		2016/04/15 09:20							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ROW-P2-006-0.5 A6D0673-01</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDD *	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234789 HeptaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDD *	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123789 HexaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-234678 HexaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-23478 PentaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-OCDD *	%	105	N/A	N/A	N/A	N/A	N/A	N/A	4481308
Confirmation C13-2378 TetraCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4492141

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX528							
Sampling Date		2016/04/15 09:35							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-003-0.5 A6D0673-02	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.614	0.103	0.998	0.0399	1.00	0.614	N/A	4481308
1,2,3,7,8-Penta CDD *	pg/g	4.59	0.107	4.99	0.0399	1.00	4.59	N/A	4481308
1,2,3,4,7,8-Hexa CDD *	pg/g	13.2	0.0978	4.99	0.0399	0.100	1.32	N/A	4481308
1,2,3,6,7,8-Hexa CDD *	pg/g	76.6	0.102	4.99	0.0399	0.100	7.66	N/A	4481308
1,2,3,7,8,9-Hexa CDD *	pg/g	35.5	0.102	4.99	0.0399	0.100	3.55	N/A	4481308
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1580	0.101	4.99	0.0399	0.0100	15.8	N/A	4481308
Octa CDD *	pg/g	10500 (1)	2.26	99.8	0.0798	0.000300	3.15	N/A	4481308
Total Tetra CDD *	pg/g	6.11	0.103	0.998	0.0399	N/A	N/A	9	4481308
Total Penta CDD *	pg/g	23.4	0.107	4.99	0.0399	N/A	N/A	9	4481308
Total Hexa CDD *	pg/g	334	0.101	4.99	0.0399	N/A	N/A	7	4481308
Total Hepta CDD *	pg/g	2660	0.101	4.99	0.0399	N/A	N/A	2	4481308
2,3,7,8-Tetra CDF **	pg/g	3.93	0.109	0.998	0.0399	0.100	0.393	N/A	4481308
1,2,3,7,8-Penta CDF **	pg/g	6.72	0.108	4.99	0.0399	0.0300	0.202	N/A	4481308
2,3,4,7,8-Penta CDF **	pg/g	11.0	0.105	4.99	0.0399	0.300	3.30	N/A	4481308
1,2,3,4,7,8-Hexa CDF **	pg/g	50.4	0.105	4.99	0.0399	0.100	5.04	N/A	4481308
1,2,3,6,7,8-Hexa CDF **	pg/g	20.3	0.110	4.99	0.0399	0.100	2.03	N/A	4481308
2,3,4,6,7,8-Hexa CDF **	pg/g	10.9	0.102	4.99	0.0399	0.100	1.09	N/A	4481308
1,2,3,7,8,9-Hexa CDF **	pg/g	0.958	0.109	4.99	0.0399	0.100	0.0958	N/A	4481308
1,2,3,4,6,7,8-Hepta CDF **	pg/g	213	0.109	4.99	0.0399	0.0100	2.13	N/A	4481308
1,2,3,4,7,8,9-Hepta CDF **	pg/g	12.1	0.109	4.99	0.0399	0.0100	0.121	N/A	4481308
Octa CDF **	pg/g	197	0.106	9.98	0.0798	0.000300	0.0591	N/A	4481308
Total Tetra CDF **	pg/g	32.8	0.109	0.998	0.0399	N/A	N/A	14	4481308
Total Penta CDF **	pg/g	132	0.107	4.99	0.0399	N/A	N/A	12	4481308
Total Hexa CDF **	pg/g	507	0.106	4.99	0.0399	N/A	N/A	11	4481308
Total Hepta CDF **	pg/g	564	0.109	4.99	0.0399	N/A	N/A	4	4481308
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.74	0.13	1.0	0.90	0.100	0.274	N/A	4492141

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) From 10x dilution.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX528							
Sampling Date		2016/04/15 09:35							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-003-0.5 A6D0673-02	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	51.0	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234789 HeptaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDD *	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123789 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-234678 HexaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-23478 PentaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-OCDD *	%	94 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
Confirmation C13-2378 TetraCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4492141

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
N/A = Not Applicable  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) From 10x dilution.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX529							
Sampling Date		2016/04/15 09:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-002-0.5 A6D0673-03	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.36	0.108	1.00	0.0400	1.00	1.36	N/A	4481308
1,2,3,7,8-Penta CDD *	pg/g	4.56	0.106	5.00	0.0400	1.00	4.56	N/A	4481308
1,2,3,4,7,8-Hexa CDD *	pg/g	4.76	0.104	5.00	0.0400	0.100	0.476	N/A	4481308
1,2,3,6,7,8-Hexa CDD *	pg/g	22.8	0.108	5.00	0.0400	0.100	2.28	N/A	4481308
1,2,3,7,8,9-Hexa CDD *	pg/g	12.5	0.109	5.00	0.0400	0.100	1.25	N/A	4481308
1,2,3,4,6,7,8-Hepta CDD *	pg/g	472	0.106	5.00	0.0400	0.0100	4.72	N/A	4481308
Octa CDD *	pg/g	3400	0.107	10.0	0.0800	0.000300	1.02	N/A	4481308
Total Tetra CDD *	pg/g	11.4	0.108	1.00	0.0400	N/A	N/A	9	4481308
Total Penta CDD *	pg/g	37.6	0.106	5.00	0.0400	N/A	N/A	11	4481308
Total Hexa CDD *	pg/g	137	0.108	5.00	0.0400	N/A	N/A	7	4481308
Total Hepta CDD *	pg/g	822	0.106	5.00	0.0400	N/A	N/A	2	4481308
2,3,7,8-Tetra CDF **	pg/g	6.78	0.105	1.00	0.0400	0.100	0.678	N/A	4481308
1,2,3,7,8-Penta CDF **	pg/g	2.82	0.103	5.00	0.0400	0.0300	0.0846	N/A	4481308
2,3,4,7,8-Penta CDF **	pg/g	7.97	0.101	5.00	0.0400	0.300	2.39	N/A	4481308
1,2,3,4,7,8-Hexa CDF **	pg/g	16.8	0.103	5.00	0.0400	0.100	1.68	N/A	4481308
1,2,3,6,7,8-Hexa CDF **	pg/g	7.61	0.107	5.00	0.0400	0.100	0.761	N/A	4481308
2,3,4,6,7,8-Hexa CDF **	pg/g	7.34	0.0994	5.00	0.0400	0.100	0.734	N/A	4481308
1,2,3,7,8,9-Hexa CDF **	pg/g	0.613	0.106	5.00	0.0400	0.100	0.0613	N/A	4481308
1,2,3,4,6,7,8-Hepta CDF **	pg/g	64.9	0.111	5.00	0.0400	0.0100	0.649	N/A	4481308
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.65	0.112	5.00	0.0400	0.0100	0.0565	N/A	4481308
Octa CDF **	pg/g	109	0.106	10.0	0.0800	0.000300	0.0327	N/A	4481308
Total Tetra CDF **	pg/g	63.8	0.105	1.00	0.0400	N/A	N/A	15	4481308
Total Penta CDF **	pg/g	130	0.102	5.00	0.0400	N/A	N/A	10	4481308
Total Hexa CDF **	pg/g	221	0.104	5.00	0.0400	N/A	N/A	11	4481308
Total Hepta CDF **	pg/g	195	0.111	5.00	0.0400	N/A	N/A	4	4481308
Confirmation 2,3,7,8-Tetra CDF **	pg/g	3.63	0.14	1.0	0.90	0.100	0.363	N/A	4492141
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	22.5	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CFX529							
<b>Sampling Date</b>		2016/04/15 09:50							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ROW-P2-002-0.5 A6D0673-03</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234789 HeptaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDD *	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123789 HexaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-234678 HexaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-23478 PentaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-OCDD *	%	103	N/A	N/A	N/A	N/A	N/A	N/A	4481308
Confirmation C13-2378 TetraCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4492141

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX529							
Sampling Date		2016/04/15 09:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-002-0.5 A6D0673-03 Lab-Dup	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.50	0.106	1.00	0.0400	1.00	1.50	N/A	4481308
1,2,3,7,8-Penta CDD *	pg/g	5.02	0.106	5.00	0.0400	1.00	5.02	N/A	4481308
1,2,3,4,7,8-Hexa CDD *	pg/g	7.24 (1)	1.03	50.0	0.0400	0.100	0.724	N/A	4481308
1,2,3,6,7,8-Hexa CDD *	pg/g	23.5 (1)	1.07	50.0	0.0400	0.100	2.35	N/A	4481308
1,2,3,7,8,9-Hexa CDD *	pg/g	14.6 (1)	1.07	50.0	0.0400	0.100	1.46	N/A	4481308
1,2,3,4,6,7,8-Hepta CDD *	pg/g	524 (1)	1.29	50.0	0.0400	0.0100	5.24	N/A	4481308
Octa CDD *	pg/g	4010 (1)	1.44	100	0.0800	0.000300	1.20	N/A	4481308
Total Tetra CDD *	pg/g	12.7	0.106	1.00	0.0400	N/A	N/A	9	4481308
Total Penta CDD *	pg/g	40.4	0.106	5.00	0.0400	N/A	N/A	11	4481308
Total Hexa CDD *	pg/g	150 (1)	1.06	50.0	0.0400	N/A	N/A	6	4481308
Total Hepta CDD *	pg/g	955 (1)	1.29	50.0	0.0400	N/A	N/A	2	4481308
2,3,7,8-Tetra CDF **	pg/g	7.25	0.105	1.00	0.0400	0.100	0.725	N/A	4481308
1,2,3,7,8-Penta CDF **	pg/g	2.99	0.108	5.00	0.0400	0.0300	0.0897	N/A	4481308
2,3,4,7,8-Penta CDF **	pg/g	8.66	0.105	5.00	0.0400	0.300	2.60	N/A	4481308
1,2,3,4,7,8-Hexa CDF **	pg/g	21.7 (1)	1.03	50.0	0.0400	0.100	2.17	N/A	4481308
1,2,3,6,7,8-Hexa CDF **	pg/g	8.43 (1)	1.07	50.0	0.0400	0.100	0.843	N/A	4481308
2,3,4,6,7,8-Hexa CDF **	pg/g	8.98 (1)	0.992	50.0	0.0400	0.100	0.898	N/A	4481308
1,2,3,7,8,9-Hexa CDF **	pg/g	1.58 (1)	1.06	50.0	0.0400	0.100	0.158	N/A	4481308
1,2,3,4,6,7,8-Hepta CDF **	pg/g	76.0 (1)	1.26	50.0	0.0400	0.0100	0.760	N/A	4481308
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.51 (1)	1.26	50.0	0.0400	0.0100	0.0651	N/A	4481308
Octa CDF **	pg/g	150 (2)	1.92	100	0.0800	0.000300	0.0450	N/A	4481308
Total Tetra CDF **	pg/g	61.2	0.105	1.00	0.0400	N/A	N/A	14	4481308
Total Penta CDF **	pg/g	139	0.107	5.00	0.0400	N/A	N/A	12	4481308

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

Lab-Dup = Laboratory Initiated Duplicate

\* CDD = Chloro Dibenzo-p-Dioxin

N/A = Not Applicable

\*\* CDF = Chloro Dibenzo-p-Furan

(1) From 10x dilution.

(2) From 10x dilution.

Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX529							
Sampling Date		2016/04/15 09:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-002-0.5 A6D0673-03 Lab-Dup	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Total Hexa CDF **	pg/g	285 (1)	1.04	50.0	0.0400	N/A	N/A	10	4481308
Total Hepta CDF **	pg/g	225 (2)	1.26	50.0	0.0400	N/A	N/A	3	4481308
Confirmation 2,3,7,8-Tetra CDF **	pg/g	3.74	0.16	1.0	0.90	0.100	0.374	N/A	4492141
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	25.5	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	85 (2)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDD *	%	90 (2)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDF **	%	93 (2)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDD *	%	89 (2)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDF **	%	82 (2)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234789 HeptaCDF **	%	97 (2)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDD *	%	103 (2)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDF **	%	95 (2)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDD *	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123789 HexaCDF **	%	89 (2)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-234678 HexaCDF **	%	58 (2)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-23478 PentaCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-OCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4481308
Confirmation C13-2378 TetraCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4492141
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate ** CDF = Chloro Dibenzo-p-Furan N/A = Not Applicable * CDD = Chloro Dibenzo-p-Dioxin (1) From 10x dilution.  Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity. (2) From 10x dilution.									



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX530							
Sampling Date		2016/04/15 09:50							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-002-0.5 -DUP A6D0673-04	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	1.33	0.100	1.00	0.0400	1.00	1.33	N/A	4481308
1,2,3,7,8-Penta CDD *	pg/g	4.44	0.106	5.00	0.0400	1.00	4.44	N/A	4481308
1,2,3,4,7,8-Hexa CDD *	pg/g	4.52	0.0986	5.00	0.0400	0.100	0.452	N/A	4481308
1,2,3,6,7,8-Hexa CDD *	pg/g	23.0	0.103	5.00	0.0400	0.100	2.30	N/A	4481308
1,2,3,7,8,9-Hexa CDD *	pg/g	12.1	0.103	5.00	0.0400	0.100	1.21	N/A	4481308
1,2,3,4,6,7,8-Hepta CDD *	pg/g	451	0.103	5.00	0.0400	0.0100	4.51	N/A	4481308
Octa CDD *	pg/g	3450	0.106	10.0	0.0800	0.000300	1.04	N/A	4481308
Total Tetra CDD *	pg/g	10.2	0.100	1.00	0.0400	N/A	N/A	9	4481308
Total Penta CDD *	pg/g	37.1	0.106	5.00	0.0400	N/A	N/A	11	4481308
Total Hexa CDD *	pg/g	133	0.102	5.00	0.0400	N/A	N/A	6	4481308
Total Hepta CDD *	pg/g	776	0.103	5.00	0.0400	N/A	N/A	2	4481308
2,3,7,8-Tetra CDF **	pg/g	6.06	0.105	1.00	0.0400	0.100	0.606	N/A	4481308
1,2,3,7,8-Penta CDF **	pg/g	2.74	0.105	5.00	0.0400	0.0300	0.0822	N/A	4481308
2,3,4,7,8-Penta CDF **	pg/g	7.65	0.102	5.00	0.0400	0.300	2.30	N/A	4481308
1,2,3,4,7,8-Hexa CDF **	pg/g	16.5	0.102	5.00	0.0400	0.100	1.65	N/A	4481308
1,2,3,6,7,8-Hexa CDF **	pg/g	7.68	0.106	5.00	0.0400	0.100	0.768	N/A	4481308
2,3,4,6,7,8-Hexa CDF **	pg/g	7.37	0.0984	5.00	0.0400	0.100	0.737	N/A	4481308
1,2,3,7,8,9-Hexa CDF **	pg/g	0.553	0.105	5.00	0.0400	0.100	0.0553	N/A	4481308
1,2,3,4,6,7,8-Hepta CDF **	pg/g	63.4	0.0939	5.00	0.0400	0.0100	0.634	N/A	4481308
1,2,3,4,7,8,9-Hepta CDF **	pg/g	5.51	0.0945	5.00	0.0400	0.0100	0.0551	N/A	4481308
Octa CDF **	pg/g	126	0.105	10.0	0.0800	0.000300	0.0378	N/A	4481308
Total Tetra CDF **	pg/g	54.4	0.105	1.00	0.0400	N/A	N/A	14	4481308
Total Penta CDF **	pg/g	111	0.103	5.00	0.0400	N/A	N/A	11	4481308
Total Hexa CDF **	pg/g	215	0.103	5.00	0.0400	N/A	N/A	11	4481308
Total Hepta CDF **	pg/g	194	0.0942	5.00	0.0400	N/A	N/A	4	4481308
Confirmation 2,3,7,8-Tetra CDF **	pg/g	3.15	0.14	1.0	0.90	0.100	0.315	N/A	4492141
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	21.9	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CFX530							
<b>Sampling Date</b>		2016/04/15 09:50							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ROW-P2-002-0.5 -DUP A6D0673-04</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDD *	%	97	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234789 HeptaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123789 HexaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-234678 HexaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-23478 PentaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-OCDD *	%	103	N/A	N/A	N/A	N/A	N/A	N/A	4481308
Confirmation C13-2378 TetraCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4492141

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX531							
Sampling Date		2016/04/15 10:05							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-001-0.5 A6D0673-05	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.128	0.128	1.00	0.0400	1.00	0.128	N/A	4481308
1,2,3,7,8-Penta CDD *	pg/g	2.32	0.125	5.00	0.0400	1.00	2.32	N/A	4481308
1,2,3,4,7,8-Hexa CDD *	pg/g	6.55	0.127	5.00	0.0400	0.100	0.655	N/A	4481308
1,2,3,6,7,8-Hexa CDD *	pg/g	32.7	0.132	5.00	0.0400	0.100	3.27	N/A	4481308
1,2,3,7,8,9-Hexa CDD *	pg/g	15.6	0.133	5.00	0.0400	0.100	1.56	N/A	4481308
1,2,3,4,6,7,8-Hepta CDD *	pg/g	669	0.0992	5.00	0.0400	0.0100	6.69	N/A	4481308
Octa CDD *	pg/g	5280	0.0934	10.0	0.0800	0.000300	1.58	N/A	4481308
Total Tetra CDD *	pg/g	0.439	0.128	1.00	0.0400	N/A	N/A	2	4481308
Total Penta CDD *	pg/g	7.29	0.125	5.00	0.0400	N/A	N/A	8	4481308
Total Hexa CDD *	pg/g	137	0.131	5.00	0.0400	N/A	N/A	7	4481308
Total Hepta CDD *	pg/g	1150	0.0992	5.00	0.0400	N/A	N/A	2	4481308
2,3,7,8-Tetra CDF **	pg/g	0.829	0.112	1.00	0.0400	0.100	0.0829	N/A	4481308
1,2,3,7,8-Penta CDF **	pg/g	3.64	0.0963	5.00	0.0400	0.0300	0.109	N/A	4481308
2,3,4,7,8-Penta CDF **	pg/g	5.91	0.0935	5.00	0.0400	0.300	1.77	N/A	4481308
1,2,3,4,7,8-Hexa CDF **	pg/g	25.4	0.0985	5.00	0.0400	0.100	2.54	N/A	4481308
1,2,3,6,7,8-Hexa CDF **	pg/g	9.76	0.102	5.00	0.0400	0.100	0.976	N/A	4481308
2,3,4,6,7,8-Hexa CDF **	pg/g	5.27	0.0948	5.00	0.0400	0.100	0.527	N/A	4481308
1,2,3,7,8,9-Hexa CDF **	pg/g	0.526	0.101	5.00	0.0400	0.100	0.0526	N/A	4481308
1,2,3,4,6,7,8-Hepta CDF **	pg/g	108	0.105	5.00	0.0400	0.0100	1.08	N/A	4481308
1,2,3,4,7,8,9-Hepta CDF **	pg/g	6.68	0.106	5.00	0.0400	0.0100	0.0668	N/A	4481308
Octa CDF **	pg/g	99.8	0.113	10.0	0.0800	0.000300	0.0299	N/A	4481308
Total Tetra CDF **	pg/g	6.03	0.112	1.00	0.0400	N/A	N/A	7	4481308
Total Penta CDF **	pg/g	92.1	0.0949	5.00	0.0400	N/A	N/A	10	4481308
Total Hexa CDF **	pg/g	283	0.0991	5.00	0.0400	N/A	N/A	11	4481308
Total Hepta CDF **	pg/g	295	0.105	5.00	0.0400	N/A	N/A	4	4481308
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	23.4	N/A	N/A

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

<b>Maxxam ID</b>		CFX531							
<b>Sampling Date</b>		2016/04/15 10:05							
<b>COC Number</b>		na				<b>TOXIC EQUIVALENCY</b>		<b># of</b>	
	<b>UNITS</b>	<b>ROW-P2-001-0.5 A6D0673-05</b>	<b>EDL</b>	<b>RDL</b>	<b>MDL</b>	<b>TEF (2005 WHO)</b>	<b>TEQ(DL)</b>	<b>Isomers</b>	<b>QC Batch</b>

<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDD *	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234789 HeptaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDD *	%	96	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDF **	%	76	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123789 HexaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-234678 HexaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-23478 PentaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-OCDD *	%	112	N/A	N/A	N/A	N/A	N/A	N/A	4481308

EDL = Estimated Detection Limit  
 RDL = Reportable Detection Limit  
 TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
 The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
 WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
 QC Batch = Quality Control Batch  
 \* CDD = Chloro Dibenzo-p-Dioxin  
 N/A = Not Applicable  
 \*\* CDF = Chloro Dibenzo-p-Furan

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX532							
Sampling Date		2016/04/15 10:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-005-0.5 A6D0673-06	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	<0.306 (1)	0.306	0.998	0.0399	1.00	0.306	N/A	4481308
1,2,3,7,8-Penta CDD *	pg/g	4.38	0.104	4.99	0.0399	1.00	4.38	N/A	4481308
1,2,3,4,7,8-Hexa CDD *	pg/g	12.2	0.0979	4.99	0.0399	0.100	1.22	N/A	4481308
1,2,3,6,7,8-Hexa CDD *	pg/g	75.0	0.102	4.99	0.0399	0.100	7.50	N/A	4481308
1,2,3,7,8,9-Hexa CDD *	pg/g	32.8	0.102	4.99	0.0399	0.100	3.28	N/A	4481308
1,2,3,4,6,7,8-Hepta CDD *	pg/g	1440	0.104	4.99	0.0399	0.0100	14.4	N/A	4481308
Octa CDD *	pg/g	9270 (2)	22.7	99.8	0.0798	0.000300	2.78	N/A	4481308
Total Tetra CDD *	pg/g	1.46	0.102	0.998	0.0399	N/A	N/A	5	4481308
Total Penta CDD *	pg/g	17.1	0.104	4.99	0.0399	N/A	N/A	12	4481308
Total Hexa CDD *	pg/g	303	0.101	4.99	0.0399	N/A	N/A	7	4481308
Total Hepta CDD *	pg/g	2350	0.104	4.99	0.0399	N/A	N/A	2	4481308
2,3,7,8-Tetra CDF **	pg/g	2.80	0.106	0.998	0.0399	0.100	0.280	N/A	4481308
1,2,3,7,8-Penta CDF **	pg/g	6.35	0.111	4.99	0.0399	0.0300	0.191	N/A	4481308
2,3,4,7,8-Penta CDF **	pg/g	9.81	0.108	4.99	0.0399	0.300	2.94	N/A	4481308
1,2,3,4,7,8-Hexa CDF **	pg/g	40.4	0.106	4.99	0.0399	0.100	4.04	N/A	4481308
1,2,3,6,7,8-Hexa CDF **	pg/g	16.4	0.110	4.99	0.0399	0.100	1.64	N/A	4481308
2,3,4,6,7,8-Hexa CDF **	pg/g	10.6	0.102	4.99	0.0399	0.100	1.06	N/A	4481308
1,2,3,7,8,9-Hexa CDF **	pg/g	1.01	0.109	4.99	0.0399	0.100	0.101	N/A	4481308
1,2,3,4,6,7,8-Hepta CDF **	pg/g	197	0.0990	4.99	0.0399	0.0100	1.97	N/A	4481308
1,2,3,4,7,8,9-Hepta CDF **	pg/g	10.6	0.0996	4.99	0.0399	0.0100	0.106	N/A	4481308
Octa CDF **	pg/g	157	0.105	9.98	0.0798	0.000300	0.0471	N/A	4481308
Total Tetra CDF **	pg/g	13.7	0.106	0.998	0.0399	N/A	N/A	14	4481308
Total Penta CDF **	pg/g	102	0.109	4.99	0.0399	N/A	N/A	12	4481308
Total Hexa CDF **	pg/g	464	0.107	4.99	0.0399	N/A	N/A	11	4481308
Total Hepta CDF **	pg/g	510	0.0993	4.99	0.0399	N/A	N/A	4	4481308
Confirmation 2,3,7,8-Tetra CDF **	pg/g	2.56	0.13	1.0	0.90	0.100	0.256	N/A	4492141

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.  
(2) From 10x dilution.

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX532							
Sampling Date		2016/04/15 10:45							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-005-0.5 A6D0673-06	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	46.2	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	101	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDF **	%	77	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234789 HeptaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDD *	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123789 HexaCDF **	%	78	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-234678 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-23478 PentaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-OCDD *	%	65 (1)	N/A	N/A	N/A	N/A	N/A	N/A	4481308
Confirmation C13-2378 TetraCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4492141

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
N/A = Not Applicable  
\* CDD = Chloro Dibenzo-p-Dioxin  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) From 10x dilution.



**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX533							
Sampling Date		2016/04/15 10:55							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-004-0.5 A6D0673-07	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	0.235	0.145	1.00	0.0400	1.00	0.235	N/A	4481308
1,2,3,7,8-Penta CDD *	pg/g	1.50	0.116	5.00	0.0400	1.00	1.50	N/A	4481308
1,2,3,4,7,8-Hexa CDD *	pg/g	3.70	0.108	5.00	0.0400	0.100	0.370	N/A	4481308
1,2,3,6,7,8-Hexa CDD *	pg/g	29.0	0.113	5.00	0.0400	0.100	2.90	N/A	4481308
1,2,3,7,8,9-Hexa CDD *	pg/g	9.64	0.113	5.00	0.0400	0.100	0.964	N/A	4481308
1,2,3,4,6,7,8-Hepta CDD *	pg/g	568	0.153	5.00	0.0400	0.0100	5.68	N/A	4481308
Octa CDD *	pg/g	5400 (1)	16.9	100	0.0800	0.000300	1.62	N/A	4481308
Total Tetra CDD *	pg/g	0.992	0.145	1.00	0.0400	N/A	N/A	4	4481308
Total Penta CDD *	pg/g	5.29	0.116	5.00	0.0400	N/A	N/A	6	4481308
Total Hexa CDD *	pg/g	101	0.112	5.00	0.0400	N/A	N/A	7	4481308
Total Hepta CDD *	pg/g	962	0.153	5.00	0.0400	N/A	N/A	2	4481308
2,3,7,8-Tetra CDF **	pg/g	1.04	0.125	1.00	0.0400	0.100	0.104	N/A	4481308
1,2,3,7,8-Penta CDF **	pg/g	1.83	0.105	5.00	0.0400	0.0300	0.0549	N/A	4481308
2,3,4,7,8-Penta CDF **	pg/g	1.92	0.102	5.00	0.0400	0.300	0.576	N/A	4481308
1,2,3,4,7,8-Hexa CDF **	pg/g	7.27	0.114	5.00	0.0400	0.100	0.727	N/A	4481308
1,2,3,6,7,8-Hexa CDF **	pg/g	3.32	0.119	5.00	0.0400	0.100	0.332	N/A	4481308
2,3,4,6,7,8-Hexa CDF **	pg/g	2.43	0.110	5.00	0.0400	0.100	0.243	N/A	4481308
1,2,3,7,8,9-Hexa CDF **	pg/g	0.368	0.118	5.00	0.0400	0.100	0.0368	N/A	4481308
1,2,3,4,6,7,8-Hepta CDF **	pg/g	58.3	0.138	5.00	0.0400	0.0100	0.583	N/A	4481308
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.07	0.139	5.00	0.0400	0.0100	0.0307	N/A	4481308
Octa CDF **	pg/g	88.6	0.111	10.0	0.0800	0.000300	0.0266	N/A	4481308
Total Tetra CDF **	pg/g	4.00	0.125	1.00	0.0400	N/A	N/A	10	4481308
Total Penta CDF **	pg/g	33.6	0.104	5.00	0.0400	N/A	N/A	10	4481308
Total Hexa CDF **	pg/g	131	0.115	5.00	0.0400	N/A	N/A	11	4481308
Total Hepta CDF **	pg/g	177	0.139	5.00	0.0400	N/A	N/A	4	4481308
Confirmation 2,3,7,8-Tetra CDF **	pg/g	0.70	0.13	1.0	0.90	0.100	0.0700	N/A	4492141

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan  
(1) From 10X dilution

**DIOXINS AND FURANS BY HRMS (SOIL)**

Maxxam ID		CFX533							
Sampling Date		2016/04/15 10:55							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-004-0.5 A6D0673-07	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	15.9	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234678 HeptaCDF **	%	75	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123478 HexaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-1234789 HeptaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123678 HexaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-12378 PentaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-123789 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-234678 HexaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-23478 PentaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-2378 TetraCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	4481308
C13-OCDD *	%	105	N/A	N/A	N/A	N/A	N/A	N/A	4481308
Confirmation C13-2378 TetraCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	4492141
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch N/A = Not Applicable * CDD = Chloro Dibenzo-p-Dioxin ** CDF = Chloro Dibenzo-p-Furan									

**TEST SUMMARY**

**Maxxam ID:** CFX527  
**Sample ID:** ROW-P2-006-0.5 A6D0673-01  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/04/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4481308	2016/04/28	2016/05/06	Branko Vrzic
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4492141	N/A	2016/05/09	Leila Azzam
Moisture	BAL	4472698	N/A	2016/04/26	Valentina Kaftani

**Maxxam ID:** CFX528  
**Sample ID:** ROW-P2-003-0.5 A6D0673-02  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/04/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4481308	2016/04/28	2016/05/06	Branko Vrzic
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4492141	N/A	2016/05/09	Leila Azzam
Moisture	BAL	4472698	N/A	2016/04/26	Valentina Kaftani

**Maxxam ID:** CFX529  
**Sample ID:** ROW-P2-002-0.5 A6D0673-03  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/04/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4481308	2016/04/28	2016/05/06	Branko Vrzic
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4492141	N/A	2016/05/09	Leila Azzam
Moisture	BAL	4472698	N/A	2016/04/26	Valentina Kaftani

**Maxxam ID:** CFX529 Dup  
**Sample ID:** ROW-P2-002-0.5 A6D0673-03  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/04/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4481308	2016/04/28	2016/05/09	Branko Vrzic
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4492141	N/A	2016/05/09	Leila Azzam

**Maxxam ID:** CFX530  
**Sample ID:** ROW-P2-002-0.5-DUP A6D0673-04  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/04/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4481308	2016/04/28	2016/05/06	Branko Vrzic
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4492141	N/A	2016/05/09	Leila Azzam
Moisture	BAL	4472698	N/A	2016/04/26	Valentina Kaftani

**Maxxam ID:** CFX531  
**Sample ID:** ROW-P2-001-0.5 A6D0673-05  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/04/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4481308	2016/04/28	2016/05/06	Branko Vrzic
Moisture	BAL	4472698	N/A	2016/04/26	Valentina Kaftani

**TEST SUMMARY**

**Maxxam ID:** CFX532  
**Sample ID:** ROW-P2-005-0.5 A6D0673-06  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/04/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4481308	2016/04/28	2016/05/06	Branko Vrzic
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4492141	N/A	2016/05/09	Leila Azzam
Moisture	BAL	4472698	N/A	2016/04/26	Valentina Kaftani

**Maxxam ID:** CFX533  
**Sample ID:** ROW-P2-004-0.5 A6D0673-07  
**Matrix:** Soil

**Collected:** 2016/04/15  
**Shipped:**  
**Received:** 2016/04/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	4481308	2016/04/28	2016/05/06	Branko Vrzic
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	4492141	N/A	2016/05/09	Leila Azzam
Moisture	BAL	4472698	N/A	2016/04/26	Valentina Kaftani

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.6°C
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Report revised to reflect changes to sampling dates.

**Results relate only to the items tested.**

**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4472698	DSR	RPD - Sample/Sample Dup	Moisture	2016/04/26	2.1		%	20
4481308	BY	Matrix Spike	37CL4 2378 Tetra CDD	2016/05/06		91	%	35 - 197
			C13-1234678 HeptaCDD	2016/05/06		90	%	23 - 140
			C13-1234678 HeptaCDF	2016/05/06		79	%	28 - 143
			C13-123478 HexaCDD	2016/05/06		84	%	32 - 141
			C13-123478 HexaCDF	2016/05/06		81	%	26 - 152
			C13-1234789 HeptaCDF	2016/05/06		87	%	26 - 138
			C13-123678 HexaCDD	2016/05/06		88	%	28 - 130
			C13-123678 HexaCDF	2016/05/06		88	%	26 - 123
			C13-12378 PentaCDD	2016/05/06		96	%	25 - 181
			C13-12378 PentaCDF	2016/05/06		79	%	24 - 185
			C13-123789 HexaCDF	2016/05/06		83	%	29 - 147
			C13-234678 HexaCDF	2016/05/06		84	%	28 - 136
			C13-23478 PentaCDF	2016/05/06		82	%	21 - 178
			C13-2378 TetraCDD	2016/05/06		88	%	25 - 164
			C13-2378 TetraCDF	2016/05/06		83	%	24 - 169
			C13-OCDD	2016/05/06		103	%	17 - 157
4481308	BY	Matrix Spike(CFX531)	2,3,7,8-Tetra CDD	2016/05/06		105	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/05/06		93	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/05/06		106	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/05/06		104	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/05/06		117	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/05/06		47 (1)	%	70 - 140
			2,3,7,8-Tetra CDF	2016/05/06		99	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/05/06		105	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/05/06		103	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/05/06		108	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/05/06		104	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/05/06		103	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/05/06		106	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/05/06		91	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/05/06		101	%	78 - 138
			Octa CDF	2016/05/06		100	%	63 - 170
4481308	BY	Spiked Blank	37CL4 2378 Tetra CDD	2016/05/06		91	%	35 - 197
			C13-1234678 HeptaCDD	2016/05/06		91	%	23 - 140
			C13-1234678 HeptaCDF	2016/05/06		74	%	28 - 143
			C13-123478 HexaCDD	2016/05/06		83	%	32 - 141
			C13-123478 HexaCDF	2016/05/06		79	%	26 - 152
			C13-1234789 HeptaCDF	2016/05/06		81	%	26 - 138
			C13-123678 HexaCDD	2016/05/06		91	%	28 - 130
			C13-123678 HexaCDF	2016/05/06		86	%	26 - 123
			C13-12378 PentaCDD	2016/05/06		93	%	25 - 181
			C13-12378 PentaCDF	2016/05/06		75	%	24 - 185
			C13-123789 HexaCDF	2016/05/06		79	%	29 - 147
			C13-234678 HexaCDF	2016/05/06		87	%	28 - 136
			C13-23478 PentaCDF	2016/05/06		78	%	21 - 178
			C13-2378 TetraCDD	2016/05/06		82	%	25 - 164
			C13-2378 TetraCDF	2016/05/06		78	%	24 - 169
			C13-OCDD	2016/05/06		90	%	17 - 157
			2,3,7,8-Tetra CDD	2016/05/06		108	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/05/06		96	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/05/06		105	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/05/06		109	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/05/06		121	%	64 - 162



**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2016/05/06		102	%	70 - 140
			Octa CDD	2016/05/06		115	%	78 - 144
			2,3,7,8-Tetra CDF	2016/05/06		103	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/05/06		106	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/05/06		104	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/05/06		109	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/05/06		109	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/05/06		104	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/05/06		118	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/05/06		115	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/05/06		115	%	78 - 138
			Octa CDF	2016/05/06		110	%	63 - 170
4481308	BY	Spiked Blank DUP	37CL4 2378 Tetra CDD	2016/05/06		77	%	35 - 197
			C13-1234678 HeptaCDD	2016/05/06		86	%	23 - 140
			C13-1234678 HeptaCDF	2016/05/06		75	%	28 - 143
			C13-123478 HexaCDD	2016/05/06		81	%	32 - 141
			C13-123478 HexaCDF	2016/05/06		77	%	26 - 152
			C13-1234789 HeptaCDF	2016/05/06		83	%	26 - 138
			C13-123678 HexaCDD	2016/05/06		87	%	28 - 130
			C13-123678 HexaCDF	2016/05/06		79	%	26 - 123
			C13-12378 PentaCDD	2016/05/06		95	%	25 - 181
			C13-12378 PentaCDF	2016/05/06		76	%	24 - 185
			C13-123789 HexaCDF	2016/05/06		79	%	29 - 147
			C13-234678 HexaCDF	2016/05/06		82	%	28 - 136
			C13-23478 PentaCDF	2016/05/06		78	%	21 - 178
			C13-2378 TetraCDD	2016/05/06		80	%	25 - 164
			C13-2378 TetraCDF	2016/05/06		75	%	24 - 169
			C13-OCDD	2016/05/06		92	%	17 - 157
			2,3,7,8-Tetra CDD	2016/05/06		104	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/05/06		92	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/05/06		105	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/05/06		105	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/05/06		116	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/05/06		108	%	70 - 140
			Octa CDD	2016/05/06		105	%	78 - 144
			2,3,7,8-Tetra CDF	2016/05/06		104	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/05/06		106	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/05/06		105	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/05/06		109	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/05/06		115	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/05/06		107	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/05/06		107	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/05/06		110	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/05/06		107	%	78 - 138
			Octa CDF	2016/05/06		103	%	63 - 170
4481308	BY	RPD	2,3,7,8-Tetra CDD	2016/05/06	3.8		%	25
			1,2,3,7,8-Penta CDD	2016/05/06	4.3		%	25
			1,2,3,4,7,8-Hexa CDD	2016/05/06	0		%	25
			1,2,3,6,7,8-Hexa CDD	2016/05/06	3.7		%	25
			1,2,3,7,8,9-Hexa CDD	2016/05/06	4.2		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/05/06	5.7		%	25
			Octa CDD	2016/05/06	9.1		%	25
			2,3,7,8-Tetra CDF	2016/05/06	0.97		%	25
			1,2,3,7,8-Penta CDF	2016/05/06	0		%	25

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			2,3,4,7,8-Penta CDF	2016/05/06	0.96		%	25
			1,2,3,4,7,8-Hexa CDF	2016/05/06	0		%	25
			1,2,3,6,7,8-Hexa CDF	2016/05/06	5.4		%	25
			2,3,4,6,7,8-Hexa CDF	2016/05/06	2.8		%	25
			1,2,3,7,8,9-Hexa CDF	2016/05/06	9.8		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/05/06	4.4		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/05/06	7.2		%	25
			Octa CDF	2016/05/06	6.6		%	25
4481308	BY	Method Blank	37CL4 2378 Tetra CDD	2016/05/06		86	%	35 - 197
			C13-1234678 HeptaCDD	2016/05/06		95	%	23 - 140
			C13-1234678 HeptaCDF	2016/05/06		80	%	28 - 143
			C13-123478 HexaCDD	2016/05/06		90	%	32 - 141
			C13-123478 HexaCDF	2016/05/06		85	%	26 - 152
			C13-1234789 HeptaCDF	2016/05/06		91	%	26 - 138
			C13-123678 HexaCDD	2016/05/06		93	%	28 - 130
			C13-123678 HexaCDF	2016/05/06		89	%	26 - 123
			C13-12378 PentaCDD	2016/05/06		91	%	25 - 181
			C13-12378 PentaCDF	2016/05/06		73	%	24 - 185
			C13-123789 HexaCDF	2016/05/06		89	%	29 - 147
			C13-234678 HexaCDF	2016/05/06		91	%	28 - 136
			C13-23478 PentaCDF	2016/05/06		77	%	21 - 178
			C13-2378 TetraCDD	2016/05/06		86	%	25 - 164
			C13-2378 TetraCDF	2016/05/06		80	%	24 - 169
			C13-OCDD	2016/05/06		95	%	17 - 157
			2,3,7,8-Tetra CDD	2016/05/06	<0.136, EDL=0.136		pg/g	
			1,2,3,7,8-Penta CDD	2016/05/06	<0.111, EDL=0.111		pg/g	
			1,2,3,4,7,8-Hexa CDD	2016/05/06	<0.0950, EDL=0.0950		pg/g	
			1,2,3,6,7,8-Hexa CDD	2016/05/06	<0.0990, EDL=0.0990		pg/g	
			1,2,3,7,8,9-Hexa CDD	2016/05/06	<0.0994, EDL=0.0994		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2016/05/06	<0.116, EDL=0.116		pg/g	
			Octa CDD	2016/05/06	0.282, EDL=0.125		pg/g	
			Total Tetra CDD	2016/05/06	<0.136, EDL=0.136		pg/g	
			Total Penta CDD	2016/05/06	<0.111, EDL=0.111		pg/g	
			Total Hexa CDD	2016/05/06	<0.0982, EDL=0.0982		pg/g	
			Total Hepta CDD	2016/05/06	<0.116, EDL=0.116		pg/g	
			2,3,7,8-Tetra CDF	2016/05/06	<0.0837, EDL=0.0837		pg/g	
			1,2,3,7,8-Penta CDF	2016/05/06	<0.108, EDL=0.108		pg/g	
			2,3,4,7,8-Penta CDF	2016/05/06	<0.105, EDL=0.105		pg/g	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDF	2016/05/06	<0.0935, EDL=0.0935		pg/g	
			1,2,3,6,7,8-Hexa CDF	2016/05/06	<0.0971, EDL=0.0971		pg/g	
			2,3,4,6,7,8-Hexa CDF	2016/05/06	<0.0901, EDL=0.0901		pg/g	
			1,2,3,7,8,9-Hexa CDF	2016/05/06	<0.0962, EDL=0.0962		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2016/05/06	<0.0789, EDL=0.0789		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2016/05/06	<0.0793, EDL=0.0793		pg/g	
			Octa CDF	2016/05/06	<0.127, EDL=0.127		pg/g	
			Total Tetra CDF	2016/05/06	<0.0837, EDL=0.0837		pg/g	
			Total Penta CDF	2016/05/06	<0.106, EDL=0.106		pg/g	
			Total Hexa CDF	2016/05/06	<0.0942, EDL=0.0942		pg/g	
			Total Hepta CDF	2016/05/06	<0.0791, EDL=0.0791		pg/g	
4481308	BY	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2016/05/09	NC		%	25
			1,2,3,7,8-Penta CDD	2016/05/09	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2016/05/09	NC (2)		%	25
			1,2,3,6,7,8-Hexa CDD	2016/05/09	NC (2)		%	25
			1,2,3,7,8,9-Hexa CDD	2016/05/09	NC (2)		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/05/09	10 (2)		%	25
			Octa CDD	2016/05/09	17 (2)		%	25
			Total Tetra CDD	2016/05/09	11		%	25
			Total Penta CDD	2016/05/09	7.1		%	25
			Total Hexa CDD	2016/05/09	NC (2)		%	25
			Total Hepta CDD	2016/05/09	15 (2)		%	25
			2,3,7,8-Tetra CDF	2016/05/09	6.7		%	25
			1,2,3,7,8-Penta CDF	2016/05/09	NC		%	25
			2,3,4,7,8-Penta CDF	2016/05/09	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2016/05/09	NC (2)		%	25
			1,2,3,6,7,8-Hexa CDF	2016/05/09	NC (2)		%	25
			2,3,4,6,7,8-Hexa CDF	2016/05/09	NC (2)		%	25
			1,2,3,7,8,9-Hexa CDF	2016/05/09	NC (2)		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/05/09	NC (2)		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/05/09	NC (2)		%	25
			Octa CDF	2016/05/09	NC (3)		%	25
			Total Tetra CDF	2016/05/09	4.2		%	25
			Total Penta CDF	2016/05/09	6.7		%	25
			Total Hexa CDF	2016/05/09	25 (3)		%	25
			Total Hepta CDF	2016/05/09	NC (2)		%	25
4492141	LAZ	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2016/05/09	<0.12, EDL=0.12		pg/g	
			Confirmation C13-2378 TetraCDF	2016/05/09		89	%	40 - 135
4492141	LAZ	RPD - Sample/Sample Dup	Confirmation 2,3,7,8-Tetra CDF	2016/05/09	NC		%	100

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Confirmation 2,3,7,8-Tetra CDF	2016/05/09	NC		%	100

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Recovery below method acceptance criteria due to matrix effects

(2) From 10x dilution.

(3) From 10x dilution. Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Cristina Carriere, Scientific Services



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Kay Shaw, C. Chem, Sr Scientific Specialist, HRMS Services



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



SUBCONTRACT ORDER

Apex Laboratories  
A6D0673

SENDING LABORATORY:

Apex Laboratories  
12232 S.W. Garden Place  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 718-0333  
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Maxxam Analytics  
C/O UPS DEPOT 931 Bailey Ave  
Buffalo, NY 14206  
Phone: (800) 668-0639  
Fax: (905) 332-9169

22-Apr-16 14:52  
Melissa DiGrazia  
  
B681136  
MAF ENV-857

Sample Name: Row-P2-006-0.5 Sedimen Sampled: 04/15/16 09:20 (A6D0673-01)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) Containers Supplied: (B)8 oz Glass Jar	04/29/16 17:00	10/12/16 09:20	Maxxam

Sample Name: Row-P2-003-0.5 Sedimen Sampled: 04/15/16 09:35 (A6D0673-02)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) Containers Supplied: (B)8 oz Glass Jar	04/29/16 17:00	10/12/16 09:35	Maxxam

Sample Name: Row-P2-002-0.5 Sedimen Sampled: 04/15/16 09:50 (A6D0673-03)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) Containers Supplied: (B)8 oz Glass Jar	04/29/16 17:00	10/12/16 09:50	Maxxam

Sample Name: Row-P2-002-0.5-Dup Sedimen Sampled: 04/15/16 09:50 (A6D0673-04)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) Containers Supplied: (B)8 oz Glass Jar	04/29/16 17:00	10/12/16 09:50	Maxxam



Standard TAT

*Kang*  
4/21/16

FedEx

Released By <i>FedEx</i>	Date	Received By <i>[Signature]</i>	Date 2016/04/22 14:52
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1.9/2.3/3.7







Your Project #: A6D0774  
Your C.O.C. #: na

**Attention: Philip Nerenberg**

Apex Laboratories  
12232 SW Garden Place  
Tigard, OR  
USA 97223

**Report Date: 2016/05/09**  
Report #: R3986959  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B683145**

**Received: 2016/04/26, 15:55**

Sample Matrix: Water  
# Samples Received: 1

Analyses	Date		Laboratory Method	Reference
	Quantity Extracted	Date Analyzed		
Dioxins/Furans in Water (1613B) (1)	1	2016/04/27	2016/05/05 BRL SOP-00410	EPA 1613B m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Melissa DiGrazia, Project Manager - ATUT

Email: MDiGrazia@maxxam.ca

Phone# (905) 817-5700

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		CGH595							
Sampling Date		2016/04/20 13:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-EB	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	<1.18	1.18	10.5	4.00	1.00	1.18	N/A	4483933
1,2,3,7,8-Penta CDD *	pg/L	<1.26	1.26	52.6	4.00	1.00	1.26	N/A	4483933
1,2,3,4,7,8-Hexa CDD *	pg/L	<1.13	1.13	52.6	4.00	0.100	0.113	N/A	4483933
1,2,3,6,7,8-Hexa CDD *	pg/L	<1.18	1.18	52.6	4.00	0.100	0.118	N/A	4483933
1,2,3,7,8,9-Hexa CDD *	pg/L	<1.18	1.18	52.6	4.00	0.100	0.118	N/A	4483933
1,2,3,4,6,7,8-Hepta CDD *	pg/L	<1.13	1.13	52.6	4.00	0.0100	0.0113	N/A	4483933
Octa CDD *	pg/L	<1.44	1.44	105	8.00	0.000300	0.000432	N/A	4483933
Total Tetra CDD *	pg/L	<1.18	1.18	10.5	4.00	N/A	N/A	0	4483933
Total Penta CDD *	pg/L	<1.26	1.26	52.6	4.00	N/A	N/A	0	4483933
Total Hexa CDD *	pg/L	<1.17	1.17	52.6	4.00	N/A	N/A	0	4483933
Total Hepta CDD *	pg/L	<1.13	1.13	52.6	4.00	N/A	N/A	0	4483933
2,3,7,8-Tetra CDF **	pg/L	<1.17	1.17	10.5	4.00	0.100	0.117	N/A	4483933
1,2,3,7,8-Penta CDF **	pg/L	<1.16	1.16	52.6	4.00	0.0300	0.0348	N/A	4483933
2,3,4,7,8-Penta CDF **	pg/L	<1.13	1.13	52.6	4.00	0.300	0.339	N/A	4483933
1,2,3,4,7,8-Hexa CDF **	pg/L	<1.13	1.13	52.6	4.00	0.100	0.113	N/A	4483933
1,2,3,6,7,8-Hexa CDF **	pg/L	<1.17	1.17	52.6	4.00	0.100	0.117	N/A	4483933
2,3,4,6,7,8-Hexa CDF **	pg/L	<1.09	1.09	52.6	4.00	0.100	0.109	N/A	4483933
1,2,3,7,8,9-Hexa CDF **	pg/L	<1.16	1.16	52.6	4.00	0.100	0.116	N/A	4483933
1,2,3,4,6,7,8-Hepta CDF **	pg/L	<1.09	1.09	52.6	4.00	0.0100	0.0109	N/A	4483933
1,2,3,4,7,8,9-Hepta CDF **	pg/L	<1.10	1.10	52.6	4.00	0.0100	0.0110	N/A	4483933
Octa CDF **	pg/L	<1.27	1.27	105	8.00	0.000300	0.000381	N/A	4483933
Total Tetra CDF **	pg/L	<1.17	1.17	10.5	4.00	N/A	N/A	0	4483933
Total Penta CDF **	pg/L	<1.15	1.15	52.6	4.00	N/A	N/A	0	4483933
Total Hexa CDF **	pg/L	<1.14	1.14	52.6	4.00	N/A	N/A	0	4483933
Total Hepta CDF **	pg/L	<1.09	1.09	52.6	4.00	N/A	N/A	0	4483933
TOTAL TOXIC EQUIVALENCY	pg/L	N/A	N/A	N/A	N/A	N/A	3.77	N/A	N/A
<b>Surrogate Recovery (%)</b>									
37CL4 2378 Tetra CDD *	%	100	N/A	N/A	N/A	N/A	N/A	N/A	4483933
EDL = Estimated Detection Limit RDL = Reportable Detection Limit TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested. WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds QC Batch = Quality Control Batch * CDD = Chloro Dibenzo-p-Dioxin N/A = Not Applicable ** CDF = Chloro Dibenzo-p-Furan									

**DIOXINS AND FURANS BY HRMS (WATER)**

Maxxam ID		CGH595							
Sampling Date		2016/04/20 13:30							
COC Number		na				TOXIC EQUIVALENCY		# of	
	UNITS	ROW-P2-EB	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDD *	%	112	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-1234678 HeptaCDF **	%	102	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-123478 HexaCDD *	%	107	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-123478 HexaCDF **	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-1234789 HeptaCDF **	%	106	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-123678 HexaCDD *	%	112	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-123678 HexaCDF **	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-12378 PentaCDD *	%	104	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-12378 PentaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-123789 HexaCDF **	%	99	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-234678 HexaCDF **	%	103	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-23478 PentaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-2378 TetraCDD *	%	96	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-2378 TetraCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	4483933
C13-OCDD *	%	111	N/A	N/A	N/A	N/A	N/A	N/A	4483933

EDL = Estimated Detection Limit  
RDL = Reportable Detection Limit  
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,  
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.  
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds  
QC Batch = Quality Control Batch  
\* CDD = Chloro Dibenzo-p-Dioxin  
N/A = Not Applicable  
\*\* CDF = Chloro Dibenzo-p-Furan

**TEST SUMMARY**

**Maxxam ID:** CGH595  
**Sample ID:** ROW-P2-EB  
**Matrix:** Water

**Collected:** 2016/04/20  
**Shipped:**  
**Received:** 2016/04/26

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	4483933	2016/04/27	2016/05/05	Branko Vrzic

**GENERAL COMMENTS**

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.2°C
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**Results relate only to the items tested.**



**QUALITY ASSURANCE REPORT**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4483933	BY	Spiked Blank	37CL4 2378 Tetra CDD	2016/05/04		82	%	35 - 197
			C13-1234678 HeptaCDD	2016/05/04		82	%	23 - 140
			C13-1234678 HeptaCDF	2016/05/04		82	%	28 - 143
			C13-123478 HexaCDD	2016/05/04		78	%	32 - 141
			C13-123478 HexaCDF	2016/05/04		72	%	26 - 152
			C13-1234789 HeptaCDF	2016/05/04		67	%	28 - 143
			C13-123678 HexaCDD	2016/05/04		83	%	28 - 130
			C13-123678 HexaCDF	2016/05/04		77	%	26 - 123
			C13-12378 PentaCDD	2016/05/04		100	%	25 - 181
			C13-12378 PentaCDF	2016/05/04		80	%	24 - 185
			C13-123789 HexaCDF	2016/05/04		78	%	28 - 136
			C13-234678 HexaCDF	2016/05/04		74	%	29 - 147
			C13-23478 PentaCDF	2016/05/04		84	%	21 - 178
			C13-2378 TetraCDD	2016/05/04		76	%	24 - 164
			C13-2378 TetraCDF	2016/05/04		76	%	24 - 169
			C13-OCDD	2016/05/04		100	%	17 - 157
			2,3,7,8-Tetra CDD	2016/05/04		110	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/05/04		95	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/05/04		105	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/05/04		111	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2016/05/04		123	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2016/05/04		109	%	70 - 140
			Octa CDD	2016/05/04		110	%	78 - 144
			2,3,7,8-Tetra CDF	2016/05/04		104	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/05/04		107	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/05/04		102	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/05/04		107	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/05/04		105	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/05/04		120	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/05/04		104	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/05/04		108	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/05/04		110	%	78 - 138
Octa CDF	2016/05/04		110	%	63 - 170			
4483933	BY	Spiked Blank DUP	37CL4 2378 Tetra CDD	2016/05/04		96	%	35 - 197
			C13-1234678 HeptaCDD	2016/05/04		97	%	23 - 140
			C13-1234678 HeptaCDF	2016/05/04		89	%	28 - 143
			C13-123478 HexaCDD	2016/05/04		79	%	32 - 141
			C13-123478 HexaCDF	2016/05/04		73	%	26 - 152
			C13-1234789 HeptaCDF	2016/05/04		76	%	28 - 143
			C13-123678 HexaCDD	2016/05/04		79	%	28 - 130
			C13-123678 HexaCDF	2016/05/04		73	%	26 - 123
			C13-12378 PentaCDD	2016/05/04		103	%	25 - 181
			C13-12378 PentaCDF	2016/05/04		81	%	24 - 185
			C13-123789 HexaCDF	2016/05/04		75	%	28 - 136
			C13-234678 HexaCDF	2016/05/04		72	%	29 - 147
			C13-23478 PentaCDF	2016/05/04		84	%	21 - 178
			C13-2378 TetraCDD	2016/05/04		91	%	24 - 164
			C13-2378 TetraCDF	2016/05/04		74	%	24 - 169
			C13-OCDD	2016/05/04		93	%	17 - 157
			2,3,7,8-Tetra CDD	2016/05/04		125	%	67 - 158
			1,2,3,7,8-Penta CDD	2016/05/04		108	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2016/05/04		118	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2016/05/04		126	%	76 - 134
1,2,3,7,8,9-Hexa CDD	2016/05/04		124	%	64 - 162			

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,6,7,8-Hepta CDD	2016/05/04		112	%	70 - 140
			Octa CDD	2016/05/04		123	%	78 - 144
			2,3,7,8-Tetra CDF	2016/05/04		118	%	75 - 158
			1,2,3,7,8-Penta CDF	2016/05/04		121	%	80 - 134
			2,3,4,7,8-Penta CDF	2016/05/04		118	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2016/05/04		120	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2016/05/04		127	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2016/05/04		128	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2016/05/04		118	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2016/05/04		110	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2016/05/04		125	%	78 - 138
			Octa CDF	2016/05/04		125	%	63 - 170
4483933	BY	RPD	2,3,7,8-Tetra CDD	2016/05/04	13		%	25
			1,2,3,7,8-Penta CDD	2016/05/04	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2016/05/04	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2016/05/04	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2016/05/04	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2016/05/04	NC		%	25
			Octa CDD	2016/05/04	NC		%	25
			2,3,7,8-Tetra CDF	2016/05/04	13		%	25
			1,2,3,7,8-Penta CDF	2016/05/04	NC		%	25
			2,3,4,7,8-Penta CDF	2016/05/04	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2016/05/04	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2016/05/04	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2016/05/04	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2016/05/04	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2016/05/04	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2016/05/04	NC		%	25
			Octa CDF	2016/05/04	NC		%	25
4483933	BY	Method Blank	37CL4 2378 Tetra CDD	2016/05/05		103	%	35 - 197
			C13-1234678 HeptaCDD	2016/05/05		97	%	23 - 140
			C13-1234678 HeptaCDF	2016/05/05		104	%	28 - 143
			C13-123478 HexaCDD	2016/05/05		101	%	32 - 141
			C13-123478 HexaCDF	2016/05/05		97	%	26 - 152
			C13-1234789 HeptaCDF	2016/05/05		98	%	28 - 143
			C13-123678 HexaCDD	2016/05/05		118	%	28 - 130
			C13-123678 HexaCDF	2016/05/05		111	%	26 - 123
			C13-12378 PentaCDD	2016/05/05		108	%	25 - 181
			C13-12378 PentaCDF	2016/05/05		93	%	24 - 185
			C13-123789 HexaCDF	2016/05/05		105	%	28 - 136
			C13-234678 HexaCDF	2016/05/05		102	%	29 - 147
			C13-23478 PentaCDF	2016/05/05		97	%	21 - 178
			C13-2378 TetraCDD	2016/05/05		101	%	24 - 164
			C13-2378 TetraCDF	2016/05/05		99	%	24 - 169
			C13-OCDD	2016/05/05		104	%	17 - 157
			2,3,7,8-Tetra CDD	2016/05/05	<1.56, EDL=1.56		pg/L	
			1,2,3,7,8-Penta CDD	2016/05/05	<1.50, EDL=1.50		pg/L	
			1,2,3,4,7,8-Hexa CDD	2016/05/05	<1.21, EDL=1.21		pg/L	
			1,2,3,6,7,8-Hexa CDD	2016/05/05	<1.26, EDL=1.26		pg/L	

**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,7,8,9-Hexa CDD	2016/05/05	<1.27, EDL=1.27		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2016/05/05	<1.24, EDL=1.24		pg/L	
			Octa CDD	2016/05/05	<1.60, EDL=1.60		pg/L	
			Total Tetra CDD	2016/05/05	<1.56, EDL=1.56		pg/L	
			Total Penta CDD	2016/05/05	<1.50, EDL=1.50		pg/L	
			Total Hexa CDD	2016/05/05	<1.25, EDL=1.25		pg/L	
			Total Hepta CDD	2016/05/05	<1.24, EDL=1.24		pg/L	
			2,3,7,8-Tetra CDF	2016/05/05	<1.24, EDL=1.24		pg/L	
			1,2,3,7,8-Penta CDF	2016/05/05	<1.34, EDL=1.34		pg/L	
			2,3,4,7,8-Penta CDF	2016/05/05	<1.31, EDL=1.31		pg/L	
			1,2,3,4,7,8-Hexa CDF	2016/05/05	<1.15, EDL=1.15		pg/L	
			1,2,3,6,7,8-Hexa CDF	2016/05/05	<1.19, EDL=1.19		pg/L	
			2,3,4,6,7,8-Hexa CDF	2016/05/05	<1.11, EDL=1.11		pg/L	
			1,2,3,7,8,9-Hexa CDF	2016/05/05	<1.18, EDL=1.18		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2016/05/05	<1.25, EDL=1.25		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2016/05/05	<1.26, EDL=1.26		pg/L	
			Octa CDF	2016/05/05	<1.42, EDL=1.42		pg/L	
			Total Tetra CDF	2016/05/05	<1.24, EDL=1.24		pg/L	
			Total Penta CDF	2016/05/05	<1.33, EDL=1.33		pg/L	
			Total Hexa CDF	2016/05/05	<1.16, EDL=1.16		pg/L	
			Total Hepta CDF	2016/05/05	<1.26, EDL=1.26		pg/L	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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Owen Cosby, BSc.C.Chem, Supervisor, HRMS Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

March 27, 2017

Mr. Philip Nerenberg  
Apex Laboratories  
12232 S.W. Garden Place  
Portland, Oregon 97223

Re: POR DXN  
Work Order: 10575  
SDG: A7C0432

Dear Mr. Nerenberg:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on March 23, 2017. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,



Cynde Larkins  
Project Manager

Enclosures

SUBCONTRACT ORDER

Apex Laboratories  
A7C0432

3/25/17  
WAT

**SENDING LABORATORY:**

Apex Laboratories  
12232 S.W. Garden Place  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 718-0333  
Project Manager: Philip Nerenberg

**RECEIVING LABORATORY:**

Cape Fear Analytical, LLC  
3306 Kitty Hawk Rd Suite 120  
Wilmington, NC 28405  
Phone : (910) 795-0421  
Fax: -


CFA WO# 10575

Sample Name:	Soil	After ISM Processing	Sampled:	
ISM-AOI056-0.5 - After Processing			03/08/17 14:10	(A7C0432-02)
Analysis	Due	Expires	Comments	
1613B Dioxins and Furans (SUB)	03/27/17 17:00	09/04/17 14:10	Low Level Standard Required, A, B, C, D	
<i>Containers Supplied:</i>				
(A)40 mL VOA - Non Preserved				
(B)40 mL VOA - Non Preserved				
(C)40 mL VOA - Non Preserved				
(D)40 mL VOA - Non Preserved				

Sample Name:	Soil	After ISM Processing	Sampled:	
ISM-AOI061-0.5 - After Processing			03/08/17 14:30	(A7C0432-04)
Analysis	Due	Expires	Comments	
1613B Dioxins and Furans (SUB)	03/27/17 17:00	09/04/17 14:30	Low Level Standard Required, A, B, C, D	
<i>Containers Supplied:</i>				
(A)40 mL VOA - Non Preserved				
(B)40 mL VOA - Non Preserved				
(C)40 mL VOA - Non Preserved				
(D)40 mL VOA - Non Preserved				

Sample Name:	Soil	After ISM Processing	Sampled:	
ISM-AOI043-0.5 - After Processing			03/08/17 09:30	(A7C0432-06)
Analysis	Due	Expires	Comments	
1613B Dioxins and Furans (SUB)	03/27/17 17:00	09/04/17 09:30	Low Level Standard Required, A, B, C, D	
<i>Containers Supplied:</i>				
(A)40 mL VOA - Non Preserved				
(B)40 mL VOA - Non Preserved				
(C)40 mL VOA - Non Preserved				
(D)40 mL VOA - Non Preserved				

Standard  
TAT

Released By  Date 3/25/17

UPS (Shipper)

UPS (Shipper)

Received By  Date 23 Mar 2017 9:55

Released By \_\_\_\_\_ Date \_\_\_\_\_

Received By \_\_\_\_\_ Date \_\_\_\_\_

4.9x0.1 = 5.0°C



**SUBCONTRACT ORDER**

Apex Laboratories

A7C0432

CFA WO #10575

**Sample Name:** ISM-AOI049-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/08/17 11:20      (A7C0432-08)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	03/27/17 17:00	09/04/17 11:20	Low Level Standard Required, A, B, C, D
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

**Sample Name:** ISM-AOI064-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/08/17 15:00      (A7C0432-10)



Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	03/27/17 17:00	09/04/17 15:00	Low Level Standard Required, A, B, C, D
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

**Sample Name:** ISM-AOI054-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/08/17 13:30      (A7C0432-12)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	03/27/17 17:00	09/04/17 13:30	Low Level Standard Required, A, B, C, D
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

**Sample Name:** ISM-AOI044-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/08/17 10:22      (A7C0432-14)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	03/27/17 17:00	09/04/17 10:22	Low Level Standard Required, A, B, C, D
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

	3/22/17	UPS (Shipper)	
Released By	Date	Received By	Date
UPS (Shipper)			23 Mar 2017 9:55
Released By	Date	Received By	Date

**SUBCONTRACT ORDER**

Apex Laboratories

A7C0432

**Sample Name:** ISM-AOI051-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/08/17 11:50      (A7C0432-16)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b> <i>Containers Supplied:</i> (A)40 mL VOA - Non Preserved (B)40 mL VOA - Non Preserved (C)40 mL VOA - Non Preserved (D)40 mL VOA - Non Preserved	03/27/17 17:00	09/04/17 11:50	Low Level Standard Required, A, B, C, D

**Sample Name:** ISM-AOI077-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/09/17 13:20      (A7C0432-18)



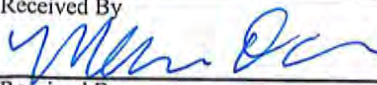
Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b> <i>Containers Supplied:</i> (A)40 mL VOA - Non Preserved (B)40 mL VOA - Non Preserved (C)40 mL VOA - Non Preserved (D)40 mL VOA - Non Preserved	03/27/17 17:00	09/05/17 13:20	Low Level Standard Required, A, B, C, D

**Sample Name:** ISM-AOI072-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/09/17 11:20      (A7C0432-20)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b> <i>Containers Supplied:</i> (A)40 mL VOA - Non Preserved (B)40 mL VOA - Non Preserved (C)40 mL VOA - Non Preserved (D)40 mL VOA - Non Preserved	03/27/17 17:00	09/05/17 11:20	Low Level Standard Required, A, B, C, D

**Sample Name:** ISM-AOI066-0.5-1 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/09/17 10:17      (A7C0432-22)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b> <i>Containers Supplied:</i> (A)40 mL VOA - Non Preserved (B)40 mL VOA - Non Preserved (C)40 mL VOA - Non Preserved (D)40 mL VOA - Non Preserved	03/27/17 17:00	09/05/17 10:17	Low Level Standard Required, A, B, C, D

		UPS (Shipper)	
Released By	Date	Received By	Date
UPS (Shipper)			23 Mar 2017 9:55
Released By	Date	Received By	Date



**SUBCONTRACT ORDER**

Apex Laboratories

A7C0432

CFA WO# 10575

**Sample Name:** ISM-AOI066-0.5-2 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/09/17 10:00      (A7C0432-24)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	03/27/17 17:00	09/05/17 10:00	Low Level Standard Required, A, B, C, D
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

**Sample Name:** ISM-AOI066-0.5-3 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/09/17 09:36      (A7C0432-26)



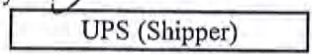

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	03/27/17 17:00	09/05/17 09:36	Low Level Standard Required, A, B, C, D
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

**Sample Name:** ISM-AOI076-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/09/17 12:45      (A7C0432-28)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	03/27/17 17:00	09/05/17 12:45	Low Level Standard Required, A, B, C, D
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

**Sample Name:** ISM-AOI052-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 03/08/17 12:13      (A7C0432-30)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	03/27/17 17:00	09/04/17 12:13	Low Level Standard Required, A, B, C, D
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

Released By 	Date 3/22/17	UPS (Shipper)	Received By 	Date 23 Mar 2017 9:55
Released By 	Date	UPS (Shipper)	Received By 	Date

SUBCONTRACT ORDER



Apex Laboratories

A7C0432

CFA WO#10575

Sample Name: ISM-AOI067-0.5 - After Processing      Soil      After ISM Processing  
Sampled: 03/09/17 10:50      (A7C0432-32)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b> <i>Containers Supplied:</i> (A)40 mL VOA - Non Preserved (B)40 mL VOA - Non Preserved (C)40 mL VOA - Non Preserved (D)40 mL VOA - Non Preserved	03/27/17 17:00	09/05/17 10:50	Low Level Standard Required, A, B, C, D

Released By:  Date: 3/22/17  
Received By: UPS (Shipper) Date: \_\_\_\_\_  
Released By: UPS (Shipper) Date: \_\_\_\_\_  
Received By:  Date: 23 Nov 2017 9:55

**SAMPLE RECEIPT CHECKLIST**  
Cape Fear Analytical

Client: APEX Work Order: 10575

Shipping Company: Feed EX Date/Time Received: 23 Mar 2017 9:55

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?			<input checked="" type="checkbox"/>
Samples < 2x background?			<input checked="" type="checkbox"/>

\* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?			<input checked="" type="checkbox"/>

Air Witness: \_\_\_\_\_

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken damaged container leaking container other(describe)
2 Chain of Custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within 0-6°C?	<input checked="" type="checkbox"/>			Preservation Method: ice bags blue ice dry ice none other (describe) <u>4.9 + 0.1 = 5.0°C</u>
4 Aqueous samples found to have visible solids?		<input checked="" type="checkbox"/>		Sample IDs, containers affected:
5 Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample IDs, containers affected and pH observed: If preservative added, Lot#:
6 Samples requiring preservation have no residual chlorine?		<input checked="" type="checkbox"/>		Sample IDs, containers affected: If preservative added, Lot#:
7 Samples received within holding time?	<input checked="" type="checkbox"/>			Sample IDs, tests affected:
8 Sample IDs on COC match IDs on containers?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:
9 Date & time of COC match date & time on containers?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:
10 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			List type and number of containers / Sample IDs, containers affected: <u>4 - 40ml vials each (clear)</u>
11 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

Checklist performed by: Initials: MJO Date: 23 Mar 2017

# **High Resolution Dioxins and Furans Analysis**



# Case Narrative

**HDOX Case Narrative  
Apex Laboratories (APEX)  
SDG A7C0432  
Work Order 10575**

**Method/Analysis Information**

**Product:** Dioxins/Furans by EPA Method 1613B in Solids  
Analytical Method: EPA Method 1613B  
Extraction Method: SW846 3540C  
Analytical Batch Number: 34313  
Clean Up Batch Number: 34312  
Extraction Batch Number: 34311

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in Method 1613B:

<b>Sample ID</b>	<b>Client ID</b>
10575001	ISM-AOI056-0.5 - After Processing
10575002	ISM-AOI061-0.5 - After Processing
10575003	ISM-AOI043-0.5 - After Processing
10575004	ISM-AOI049-0.5 - After Processing
10575005	ISM-AOI064-0.5 - After Processing
10575006	ISM-AOI054-0.5 - After Processing
10575007	ISM-AOI044-0.5 - After Processing
10575008	ISM-AOI051-0.5 - After Processing
10575009	ISM-AOI077-0.5 - After Processing
10575010	ISM-AOI072-0.5 - After Processing
10575011	ISM-AOI066-0.5-1 - After Processing
10575012	ISM-AOI066-0.5-2 - After Processing
10575013	ISM-AOI066-0.5-3 - After Processing
10575014	ISM-AOI076-0.5 - After Processing
10575015	ISM-AOI052-0.5 - After Processing
10575016	ISM-AOI067-0.5 - After Processing
12018333	Method Blank (MB)
12018334	Laboratory Control Sample (LCS)
12018335	Laboratory Control Sample Duplicate (LCSD)
12018336	10575002(ISM-AOI061-0.5 - After Processing) Matrix Spike (MS)
12018337	10575002(ISM-AOI061-0.5 - After Processing) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 14.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

### **Calibration Information**

#### **Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

#### **Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

### **Quality Control (QC) Information**

#### **Certification Statement**

The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

#### **Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

#### **Surrogate Recoveries**

All surrogate recoveries were within the established acceptance criteria for this SDG.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

#### **Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits.

#### **LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

#### **QC Sample Designation**

Sample 10575002 (ISM-AOI061-0.5 - After Processing)- Batch 34313 was selected for analysis as the matrix spike and matrix spike duplicate.

#### **Matrix Spike (MS) Recovery Statement**

One analyte recovered outside the acceptance limits. 12018336 (ISM-AOI061-0.5 - After Processing)- Batch 34313.

**Matrix Spike Duplicate (MSD) Recovery Statement**

Two analytes recovered outside the acceptance limits. 12018337 (ISM-AOI061-0.5 - After Processing)- Batch 34313.

**MS/MSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the MS and MSD met the acceptance limits.

**Technical Information****Holding Time Specifications**

CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

**Analytical Comments**

Diphenyl ether (DPE) interferences were detected in the samples. Where a total peak could be completely attributed to the DPE, the concentration was removed from the total homolog sum. If the concentration could not be completely attributed to the DPE, or where the DPE co-eluted with a 2378-substituted furan peak, by professional judgment the peak may be left in the report. In both cases, the concentration is flagged with a P and should be considered an estimate

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

**Miscellaneous Information****Nonconformance (NCR) Documentation**

A NCR was not required for this SDG.

**Manual Integrations**

Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

**Sample preparation**

No difficulties were encountered during sample preparation.

### **Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

# **Sample Data Summary**



## Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

### Qualifier Definition Report for

APEX001 Apex Laboratories

Client SDG: A7C0432 CFA Work Order: 10575

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- E Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- J Value is estimated
- K Estimated Maximum Possible Concentration
- U Analyte was analyzed for, but not detected above the specified detection limit.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

**Review/Validation**

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

**Signature:** 

**Name:** Heather Patterson

**Date:** 14 APR 2017

**Title:** Group Leader

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575001	<b>Date Collected:</b> 03/08/2017 14:10	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3.2
<b>Client ID:</b> ISM-AOI056-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 14:41	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 13.12 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	K	0.472	pg/g	0.244	0.394
40321-76-4	1,2,3,7,8-PeCDD		3.16	pg/g	0.301	1.97
39227-28-6	1,2,3,4,7,8-HxCDD		6.35	pg/g	0.601	1.97
57653-85-7	1,2,3,6,7,8-HxCDD		26.5	pg/g	0.513	1.97
19408-74-3	1,2,3,7,8,9-HxCDD	K	12.0	pg/g	0.578	1.97
35822-46-9	1,2,3,4,6,7,8-HpCDD		740	pg/g	1.62	1.97
3268-87-9	1,2,3,4,6,7,8,9-OCDD	E	4640	pg/g	2.27	3.94
51207-31-9	2,3,7,8-TCDF		0.938	pg/g	0.425	0.394
57117-41-6	1,2,3,7,8-PeCDF	J	1.92	pg/g	0.222	1.97
57117-31-4	2,3,4,7,8-PeCDF		5.51	pg/g	0.194	1.97
70648-26-9	1,2,3,4,7,8-HxCDF		14.9	pg/g	0.532	1.97
57117-44-9	1,2,3,6,7,8-HxCDF		6.84	pg/g	0.527	1.97
60851-34-5	2,3,4,6,7,8-HxCDF		8.57	pg/g	0.562	1.97
72918-21-9	1,2,3,7,8,9-HxCDF		3.44	pg/g	0.731	1.97
67562-39-4	1,2,3,4,6,7,8-HpCDF		106	pg/g	0.699	1.97
55673-89-7	1,2,3,4,7,8,9-HpCDF		5.68	pg/g	1.15	1.97
39001-02-0	1,2,3,4,6,7,8,9-OCDF		108	pg/g	0.710	3.94
41903-57-5	Total TeCDD	K	3.42	pg/g	0.244	0.787
36088-22-9	Total PeCDD	K	16.7	pg/g	0.301	3.94
34465-46-8	Total HxCDD	K	137	pg/g	0.513	3.94
37871-00-4	Total HpCDD		1280	pg/g	1.62	3.94
30402-14-3	Total TeCDF	K	12.0	pg/g	0.425	0.787
30402-15-4	Total PeCDF		83.1	pg/g	0.123	3.94
55684-94-1	Total HxCDF		197	pg/g	0.527	3.94
38998-75-3	Total HpCDF	K	294	pg/g	0.699	3.94
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		23.2	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		23.2	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		139	157	pg/g	88.6	(25%-164%)
13C-1,2,3,7,8-PeCDD		126	157	pg/g	80.1	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		118	157	pg/g	75.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		140	157	pg/g	88.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		130	157	pg/g	82.4	(23%-140%)
13C-OCDD		294	315	pg/g	93.4	(17%-157%)
13C-2,3,7,8-TCDF		121	157	pg/g	77.1	(24%-169%)
13C-1,2,3,7,8-PeCDF		130	157	pg/g	82.5	(24%-185%)
13C-2,3,4,7,8-PeCDF		132	157	pg/g	83.5	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		111	157	pg/g	70.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		120	157	pg/g	76.4	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		116	157	pg/g	73.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		124	157	pg/g	78.8	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575001	<b>Date Collected:</b> 03/08/2017 14:10	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3.2
<b>Client ID:</b> ISM-AOI056-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 14:41	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 13.12 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%      Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			116	157	pg/g	73.6      (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			106	157	pg/g	67.5      (26%-138%)
37Cl-2,3,7,8-TCDD			12.6	15.7	pg/g	79.8      (35%-197%)

- Comments:**
- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
  - J** Value is estimated
  - K** Estimated Maximum Possible Concentration
  - U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575001	<b>Date Collected:</b> 03/08/2017 14:10	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3.2
<b>Client ID:</b> ISM-AOI056-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 16:06	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b11apr17a-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 13.12 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		0.934	pg/g	0.140	0.394

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575002	<b>Date Collected:</b> 03/08/2017 14:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.5
<b>Client ID:</b> ISM-AOI061-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 15:30	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-6		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.12 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.472	pg/g	0.472	0.461
40321-76-4	1,2,3,7,8-PeCDD	J	2.04	pg/g	0.400	2.31
39227-28-6	1,2,3,4,7,8-HxCDD		4.09	pg/g	0.773	2.31
57653-85-7	1,2,3,6,7,8-HxCDD		22.3	pg/g	0.693	2.31
19408-74-3	1,2,3,7,8,9-HxCDD		8.28	pg/g	0.762	2.31
35822-46-9	1,2,3,4,6,7,8-HpCDD		835	pg/g	3.43	2.31
3268-87-9	1,2,3,4,6,7,8,9-OCDD	E	10700	pg/g	4.87	4.61
51207-31-9	2,3,7,8-TCDF	K	1.16	pg/g	0.804	0.461
57117-41-6	1,2,3,7,8-PeCDF	J	1.80	pg/g	0.349	2.31
57117-31-4	2,3,4,7,8-PeCDF		3.75	pg/g	0.284	2.31
70648-26-9	1,2,3,4,7,8-HxCDF		9.75	pg/g	0.747	2.31
57117-44-9	1,2,3,6,7,8-HxCDF		4.81	pg/g	0.743	2.31
60851-34-5	2,3,4,6,7,8-HxCDF		5.97	pg/g	0.765	2.31
72918-21-9	1,2,3,7,8,9-HxCDF		3.53	pg/g	1.23	2.31
67562-39-4	1,2,3,4,6,7,8-HpCDF		104	pg/g	1.12	2.31
55673-89-7	1,2,3,4,7,8,9-HpCDF		7.09	pg/g	1.92	2.31
39001-02-0	1,2,3,4,6,7,8,9-OCDF		378	pg/g	1.71	4.61
41903-57-5	Total TeCDD	K	2.12	pg/g	0.472	0.922
36088-22-9	Total PeCDD	K	11.3	pg/g	0.400	4.61
34465-46-8	Total HxCDD		95.4	pg/g	0.693	4.61
37871-00-4	Total HpCDD		1410	pg/g	3.43	4.61
30402-14-3	Total TeCDF	K	5.25	pg/g	0.804	0.922
30402-15-4	Total PeCDF	K	54.1	pg/g	0.218	4.61
55684-94-1	Total HxCDF		180	pg/g	0.743	4.61
38998-75-3	Total HpCDF		410	pg/g	1.12	4.61
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		22.0	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		22.2	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		133	184	pg/g	72.2	(25%-164%)
13C-1,2,3,7,8-PeCDD		144	184	pg/g	78.1	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		132	184	pg/g	71.8	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		157	184	pg/g	85.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		133	184	pg/g	71.9	(23%-140%)
13C-OCDD		323	369	pg/g	87.5	(17%-157%)
13C-2,3,7,8-TCDF		120	184	pg/g	65.0	(24%-169%)
13C-1,2,3,7,8-PeCDF		138	184	pg/g	74.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		150	184	pg/g	81.4	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		121	184	pg/g	65.7	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		132	184	pg/g	71.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		133	184	pg/g	71.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		131	184	pg/g	70.8	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575002	<b>Date Collected:</b> 03/08/2017 14:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.5
<b>Client ID:</b> ISM-AOI061-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 15:30	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-6		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.12 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			129	184	pg/g	69.9 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			115	184	pg/g	62.2 (26%-138%)
37Cl-2,3,7,8-TCDD			12.4	18.4	pg/g	67.2 (35%-197%)

- Comments:**
- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
  - J** Value is estimated
  - K** Estimated Maximum Possible Concentration
  - U** Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575002	<b>Date Collected:</b> 03/08/2017 14:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.5
<b>Client ID:</b> ISM-AOI061-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 16:26	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b11apr17a-10		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.12 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF	K	1.10	pg/g	0.350	0.461

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575003	<b>Date Collected:</b> 03/08/2017 09:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.5
<b>Client ID:</b> ISM-AOI043-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 17:55	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 13.79 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	K	0.469	pg/g	0.283	0.372
40321-76-4	1,2,3,7,8-PeCDD		3.15	pg/g	0.274	1.86
39227-28-6	1,2,3,4,7,8-HxCDD		3.67	pg/g	0.533	1.86
57653-85-7	1,2,3,6,7,8-HxCDD		17.6	pg/g	0.492	1.86
19408-74-3	1,2,3,7,8,9-HxCDD		10.4	pg/g	0.535	1.86
35822-46-9	1,2,3,4,6,7,8-HpCDD		360	pg/g	1.65	1.86
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2110	pg/g	2.71	3.72
51207-31-9	2,3,7,8-TCDF		0.973	pg/g	0.535	0.372
57117-41-6	1,2,3,7,8-PeCDF	JK	1.35	pg/g	0.290	1.86
57117-31-4	2,3,4,7,8-PeCDF		8.23	pg/g	0.257	1.86
70648-26-9	1,2,3,4,7,8-HxCDF		7.06	pg/g	0.411	1.86
57117-44-9	1,2,3,6,7,8-HxCDF		5.09	pg/g	0.425	1.86
60851-34-5	2,3,4,6,7,8-HxCDF		7.46	pg/g	0.414	1.86
72918-21-9	1,2,3,7,8,9-HxCDF		2.19	pg/g	0.602	1.86
67562-39-4	1,2,3,4,6,7,8-HpCDF		52.5	pg/g	0.601	1.86
55673-89-7	1,2,3,4,7,8,9-HpCDF		3.36	pg/g	1.03	1.86
39001-02-0	1,2,3,4,6,7,8,9-OCDF		51.3	pg/g	0.736	3.72
41903-57-5	Total TeCDD	K	4.61	pg/g	0.283	0.744
36088-22-9	Total PeCDD		17.1	pg/g	0.274	3.72
34465-46-8	Total HxCDD		90.3	pg/g	0.492	3.72
37871-00-4	Total HpCDD		614	pg/g	1.65	3.72
30402-14-3	Total TeCDF	KP	38.8	pg/g	0.535	0.744
30402-15-4	Total PeCDF	KP	154	pg/g	0.165	3.72
55684-94-1	Total HxCDF	KP	138	pg/g	0.411	3.72
38998-75-3	Total HpCDF		137	pg/g	0.601	3.72
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		16.4	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		16.4	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		124	149	pg/g	83.4	(25%-164%)
13C-1,2,3,7,8-PeCDD		122	149	pg/g	82.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		110	149	pg/g	74.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		121	149	pg/g	81.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		116	149	pg/g	78.0	(23%-140%)
13C-OCDD		250	297	pg/g	83.9	(17%-157%)
13C-2,3,7,8-TCDF		112	149	pg/g	75.2	(24%-169%)
13C-1,2,3,7,8-PeCDF		118	149	pg/g	79.0	(24%-185%)
13C-2,3,4,7,8-PeCDF		124	149	pg/g	83.3	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		101	149	pg/g	67.9	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		105	149	pg/g	70.8	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		108	149	pg/g	72.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		113	149	pg/g	75.8	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575003	<b>Date Collected:</b> 03/08/2017 09:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.5
<b>Client ID:</b> ISM-AOI043-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 17:55	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 13.79 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			104	149	pg/g	69.9 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			101	149	pg/g	67.8 (26%-138%)
37Cl-2,3,7,8-TCDD			11.6	14.9	pg/g	77.9 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- P** Diphenyl ether interference is present; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575003	<b>Date Collected:</b> 03/08/2017 09:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.5
<b>Client ID:</b> ISM-AOI043-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 17:26	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b11apr17a-13		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 13.79 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		0.971	pg/g	0.347	0.372

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575004	<b>Date Collected:</b> 03/08/2017 11:20	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3.1
<b>Client ID:</b> ISM-AOI049-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 18:43	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-10		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 14.55 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.193	pg/g	0.160	0.355
40321-76-4	1,2,3,7,8-PeCDD	J	0.505	pg/g	0.204	1.77
39227-28-6	1,2,3,4,7,8-HxCDD	JK	0.809	pg/g	0.248	1.77
57653-85-7	1,2,3,6,7,8-HxCDD		3.47	pg/g	0.223	1.77
19408-74-3	1,2,3,7,8,9-HxCDD		1.97	pg/g	0.245	1.77
35822-46-9	1,2,3,4,6,7,8-HpCDD		99.5	pg/g	0.742	1.77
3268-87-9	1,2,3,4,6,7,8,9-OCDD		784	pg/g	1.65	3.55
51207-31-9	2,3,7,8-TCDF	K	0.383	pg/g	0.328	0.355
57117-41-6	1,2,3,7,8-PeCDF	J	0.460	pg/g	0.153	1.77
57117-31-4	2,3,4,7,8-PeCDF	J	0.894	pg/g	0.122	1.77
70648-26-9	1,2,3,4,7,8-HxCDF	J	1.58	pg/g	0.187	1.77
57117-44-9	1,2,3,6,7,8-HxCDF	J	0.904	pg/g	0.192	1.77
60851-34-5	2,3,4,6,7,8-HxCDF	J	1.08	pg/g	0.190	1.77
72918-21-9	1,2,3,7,8,9-HxCDF	J	0.446	pg/g	0.265	1.77
67562-39-4	1,2,3,4,6,7,8-HpCDF		17.7	pg/g	0.302	1.77
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	1.01	pg/g	0.461	1.77
39001-02-0	1,2,3,4,6,7,8,9-OCDF		26.8	pg/g	0.498	3.55
41903-57-5	Total TeCDD	K	1.76	pg/g	0.160	0.709
36088-22-9	Total PeCDD		4.38	pg/g	0.204	3.55
34465-46-8	Total HxCDD	K	23.2	pg/g	0.223	3.55
37871-00-4	Total HpCDD		191	pg/g	0.742	3.55
30402-14-3	Total TeCDF	K	4.21	pg/g	0.328	0.709
30402-15-4	Total PeCDF	K	13.7	pg/g	0.0763	3.55
55684-94-1	Total HxCDF	K	23.2	pg/g	0.187	3.55
38998-75-3	Total HpCDF		48.8	pg/g	0.302	3.55
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		3.47	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		3.47	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		118	142	pg/g	83.1	(25%-164%)
13C-1,2,3,7,8-PeCDD		114	142	pg/g	80.0	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		104	142	pg/g	73.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		110	142	pg/g	77.9	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		102	142	pg/g	71.7	(23%-140%)
13C-OCDD		213	284	pg/g	75.2	(17%-157%)
13C-2,3,7,8-TCDF		102	142	pg/g	71.7	(24%-169%)
13C-1,2,3,7,8-PeCDF		111	142	pg/g	77.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		115	142	pg/g	81.1	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		91.4	142	pg/g	64.4	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		98.9	142	pg/g	69.7	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		102	142	pg/g	72.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		111	142	pg/g	78.5	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575004	<b>Date Collected:</b> 03/08/2017 11:20	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3.1
<b>Client ID:</b> ISM-AOI049-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 18:43	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-10		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 14.55 g	

CAS No.	Parname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			96.6	142	pg/g	68.1 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			92.3	142	pg/g	65.1 (26%-138%)
37Cl-2,3,7,8-TCDD			11.2	14.2	pg/g	78.7 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration



**Hi-Res Dioxins/Furans  
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Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575005	<b>Date Collected:</b> 03/08/2017 15:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI064-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 19:32	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-11		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 12.24 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		3.42	pg/g	0.200	0.420
40321-76-4	1,2,3,7,8-PeCDD	J	1.01	pg/g	0.324	2.10
39227-28-6	1,2,3,4,7,8-HxCDD	JK	1.73	pg/g	0.514	2.10
57653-85-7	1,2,3,6,7,8-HxCDD	K	6.74	pg/g	0.471	2.10
19408-74-3	1,2,3,7,8,9-HxCDD	K	2.98	pg/g	0.513	2.10
35822-46-9	1,2,3,4,6,7,8-HpCDD		187	pg/g	1.01	2.10
3268-87-9	1,2,3,4,6,7,8,9-OCDD		1450	pg/g	2.08	4.20
51207-31-9	2,3,7,8-TCDF		0.595	pg/g	0.365	0.420
57117-41-6	1,2,3,7,8-PeCDF	JK	0.813	pg/g	0.188	2.10
57117-31-4	2,3,4,7,8-PeCDF		6.74	pg/g	0.156	2.10
70648-26-9	1,2,3,4,7,8-HxCDF		4.56	pg/g	0.331	2.10
57117-44-9	1,2,3,6,7,8-HxCDF		2.70	pg/g	0.341	2.10
60851-34-5	2,3,4,6,7,8-HxCDF		4.92	pg/g	0.341	2.10
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.50	pg/g	0.497	2.10
67562-39-4	1,2,3,4,6,7,8-HpCDF		35.1	pg/g	0.405	2.10
55673-89-7	1,2,3,4,7,8,9-HpCDF		2.47	pg/g	0.595	2.10
39001-02-0	1,2,3,4,6,7,8,9-OCDF		72.7	pg/g	0.719	4.20
41903-57-5	Total TeCDD	K	5.82	pg/g	0.200	0.840
36088-22-9	Total PeCDD		7.60	pg/g	0.324	4.20
34465-46-8	Total HxCDD	K	37.4	pg/g	0.471	4.20
37871-00-4	Total HpCDD		325	pg/g	1.01	4.20
30402-14-3	Total TeCDF	KP	22.8	pg/g	0.365	0.840
30402-15-4	Total PeCDF	KP	109	pg/g	0.120	4.20
55684-94-1	Total HxCDF	KP	89.1	pg/g	0.331	4.20
38998-75-3	Total HpCDF		116	pg/g	0.405	4.20
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		11.7	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		11.7	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		149	168	pg/g	88.4	(25%-164%)
13C-1,2,3,7,8-PeCDD		140	168	pg/g	83.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		126	168	pg/g	75.1	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		142	168	pg/g	84.7	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		134	168	pg/g	79.6	(23%-140%)
13C-OCDD		281	336	pg/g	83.5	(17%-157%)
13C-2,3,7,8-TCDF		130	168	pg/g	77.1	(24%-169%)
13C-1,2,3,7,8-PeCDF		134	168	pg/g	79.6	(24%-185%)
13C-2,3,4,7,8-PeCDF		137	168	pg/g	81.7	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		116	168	pg/g	68.9	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		119	168	pg/g	70.7	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		123	168	pg/g	72.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		131	168	pg/g	78.0	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575005	<b>Date Collected:</b> 03/08/2017 15:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI064-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 19:32	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-11		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 12.24 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			117	168	pg/g	69.9 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			117	168	pg/g	69.5 (26%-138%)
37Cl-2,3,7,8-TCDD			13.7	16.8	pg/g	81.4 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- P** Diphenyl ether interference is present; value is estimated

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575006	<b>Date Collected:</b> 03/08/2017 13:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI054-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 20:20	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-12		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.5 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.27	pg/g	0.270	0.447
40321-76-4	1,2,3,7,8-PeCDD	J	0.625	pg/g	0.301	2.24
39227-28-6	1,2,3,4,7,8-HxCDD	JK	0.750	pg/g	0.349	2.24
57653-85-7	1,2,3,6,7,8-HxCDD	J	2.15	pg/g	0.333	2.24
19408-74-3	1,2,3,7,8,9-HxCDD	J	1.40	pg/g	0.356	2.24
35822-46-9	1,2,3,4,6,7,8-HpCDD		63.7	pg/g	0.931	2.24
3268-87-9	1,2,3,4,6,7,8,9-OCDD		503	pg/g	2.63	4.47
51207-31-9	2,3,7,8-TCDF	J	0.444	pg/g	0.392	0.447
57117-41-6	1,2,3,7,8-PeCDF	U	0.288	pg/g	0.288	2.24
57117-31-4	2,3,4,7,8-PeCDF	J	0.718	pg/g	0.234	2.24
70648-26-9	1,2,3,4,7,8-HxCDF	JK	1.16	pg/g	0.374	2.24
57117-44-9	1,2,3,6,7,8-HxCDF	JK	0.684	pg/g	0.383	2.24
60851-34-5	2,3,4,6,7,8-HxCDF	JK	0.739	pg/g	0.390	2.24
72918-21-9	1,2,3,7,8,9-HxCDF	U	0.539	pg/g	0.539	2.24
67562-39-4	1,2,3,4,6,7,8-HpCDF		11.3	pg/g	0.419	2.24
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	0.605	pg/g	0.605	2.24
39001-02-0	1,2,3,4,6,7,8,9-OCDF		25.7	pg/g	0.881	4.47
41903-57-5	Total TeCDD	K	2.22	pg/g	0.270	0.895
36088-22-9	Total PeCDD	K	4.51	pg/g	0.301	4.47
34465-46-8	Total HxCDD	K	17.0	pg/g	0.333	4.47
37871-00-4	Total HpCDD		114	pg/g	0.931	4.47
30402-14-3	Total TeCDF	K	4.25	pg/g	0.392	0.895
30402-15-4	Total PeCDF		9.02	pg/g	0.122	4.47
55684-94-1	Total HxCDF	K	13.8	pg/g	0.374	4.47
38998-75-3	Total HpCDF		31.4	pg/g	0.419	4.47
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		2.48	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		2.65	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		141	179	pg/g	79.0	(25%-164%)
13C-1,2,3,7,8-PeCDD		144	179	pg/g	80.7	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		131	179	pg/g	73.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		153	179	pg/g	85.3	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		134	179	pg/g	74.9	(23%-140%)
13C-OCDD		254	358	pg/g	70.8	(17%-157%)
13C-2,3,7,8-TCDF		127	179	pg/g	71.0	(24%-169%)
13C-1,2,3,7,8-PeCDF		140	179	pg/g	78.0	(24%-185%)
13C-2,3,4,7,8-PeCDF		149	179	pg/g	83.3	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		123	179	pg/g	68.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		129	179	pg/g	72.1	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		132	179	pg/g	73.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		138	179	pg/g	76.9	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575006	<b>Date Collected:</b> 03/08/2017 13:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI054-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 20:20	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-12		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.5 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			123	179	pg/g	68.7 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			124	179	pg/g	69.3 (26%-138%)
37Cl-2,3,7,8-TCDD			13.2	17.9	pg/g	74.0 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575007	<b>Date Collected:</b> 03/08/2017 10:22	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.7
<b>Client ID:</b> ISM-AOI044-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 21:09	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-13		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 12.14 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		0.998	pg/g	0.305	0.423
40321-76-4	1,2,3,7,8-PeCDD	JK	1.36	pg/g	0.379	2.12
39227-28-6	1,2,3,4,7,8-HxCDD	J	1.79	pg/g	0.501	2.12
57653-85-7	1,2,3,6,7,8-HxCDD		7.51	pg/g	0.435	2.12
19408-74-3	1,2,3,7,8,9-HxCDD	K	4.23	pg/g	0.488	2.12
35822-46-9	1,2,3,4,6,7,8-HpCDD		184	pg/g	1.02	2.12
3268-87-9	1,2,3,4,6,7,8,9-OCDD		1240	pg/g	2.83	4.23
51207-31-9	2,3,7,8-TCDF	K	0.713	pg/g	0.468	0.423
57117-41-6	1,2,3,7,8-PeCDF	J	0.927	pg/g	0.279	2.12
57117-31-4	2,3,4,7,8-PeCDF	J	1.94	pg/g	0.239	2.12
70648-26-9	1,2,3,4,7,8-HxCDF		3.87	pg/g	0.386	2.12
57117-44-9	1,2,3,6,7,8-HxCDF	J	1.87	pg/g	0.379	2.12
60851-34-5	2,3,4,6,7,8-HxCDF		2.44	pg/g	0.376	2.12
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.18	pg/g	0.547	2.12
67562-39-4	1,2,3,4,6,7,8-HpCDF		29.2	pg/g	0.412	2.12
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	1.60	pg/g	0.667	2.12
39001-02-0	1,2,3,4,6,7,8,9-OCDF		47.5	pg/g	0.815	4.23
41903-57-5	Total TeCDD	K	3.69	pg/g	0.305	0.847
36088-22-9	Total PeCDD	K	10.1	pg/g	0.379	4.23
34465-46-8	Total HxCDD	K	48.0	pg/g	0.435	4.23
37871-00-4	Total HpCDD		334	pg/g	1.02	4.23
30402-14-3	Total TeCDF	K	10.5	pg/g	0.468	0.847
30402-15-4	Total PeCDF	K	30.5	pg/g	0.122	4.23
55684-94-1	Total HxCDF		52.1	pg/g	0.376	4.23
38998-75-3	Total HpCDF		85.4	pg/g	0.412	4.23
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		7.87	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		7.87	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		145	169	pg/g	85.3	(25%-164%)
13C-1,2,3,7,8-PeCDD		135	169	pg/g	79.8	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		134	169	pg/g	79.0	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		142	169	pg/g	83.6	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		132	169	pg/g	78.2	(23%-140%)
13C-OCDD		270	339	pg/g	79.8	(17%-157%)
13C-2,3,7,8-TCDF		129	169	pg/g	76.4	(24%-169%)
13C-1,2,3,7,8-PeCDF		135	169	pg/g	79.5	(24%-185%)
13C-2,3,4,7,8-PeCDF		139	169	pg/g	82.2	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		120	169	pg/g	71.1	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		127	169	pg/g	75.1	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		130	169	pg/g	77.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		130	169	pg/g	76.8	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575007	<b>Date Collected:</b> 03/08/2017 10:22	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.7
<b>Client ID:</b> ISM-AOI044-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 21:09	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-13		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 12.14 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			122	169	pg/g	72.2 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			119	169	pg/g	70.1 (26%-138%)
37Cl-2,3,7,8-TCDD			13.5	16.9	pg/g	79.6 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575008	<b>Date Collected:</b> 03/08/2017 11:50	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI051-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 21:57	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-14		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.58 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		1.23	pg/g	0.313	0.445
40321-76-4	1,2,3,7,8-PeCDD	U	0.587	pg/g	0.587	2.22
39227-28-6	1,2,3,4,7,8-HxCDD	J	1.19	pg/g	0.512	2.22
57653-85-7	1,2,3,6,7,8-HxCDD		3.50	pg/g	0.457	2.22
19408-74-3	1,2,3,7,8,9-HxCDD		2.45	pg/g	0.503	2.22
35822-46-9	1,2,3,4,6,7,8-HpCDD		102	pg/g	1.26	2.22
3268-87-9	1,2,3,4,6,7,8,9-OCDD		796	pg/g	1.89	4.45
51207-31-9	2,3,7,8-TCDF	U	0.539	pg/g	0.539	0.445
57117-41-6	1,2,3,7,8-PeCDF	J	0.587	pg/g	0.242	2.22
57117-31-4	2,3,4,7,8-PeCDF	J	1.79	pg/g	0.205	2.22
70648-26-9	1,2,3,4,7,8-HxCDF		3.99	pg/g	0.354	2.22
57117-44-9	1,2,3,6,7,8-HxCDF	JK	1.48	pg/g	0.358	2.22
60851-34-5	2,3,4,6,7,8-HxCDF	J	1.64	pg/g	0.363	2.22
72918-21-9	1,2,3,7,8,9-HxCDF	J	0.984	pg/g	0.521	2.22
67562-39-4	1,2,3,4,6,7,8-HpCDF		25.3	pg/g	0.404	2.22
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	1.41	pg/g	0.681	2.22
39001-02-0	1,2,3,4,6,7,8,9-OCDF		41.7	pg/g	0.941	4.45
41903-57-5	Total TeCDD	K	2.69	pg/g	0.313	0.889
36088-22-9	Total PeCDD	J	4.23	pg/g	0.587	4.45
34465-46-8	Total HxCDD		26.2	pg/g	0.457	4.45
37871-00-4	Total HpCDD		180	pg/g	1.26	4.45
30402-14-3	Total TeCDF	K	5.16	pg/g	0.539	0.889
30402-15-4	Total PeCDF	K	22.9	pg/g	0.132	4.45
55684-94-1	Total HxCDF	K	39.5	pg/g	0.354	4.45
38998-75-3	Total HpCDF		72.0	pg/g	0.404	4.45
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		4.84	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		5.16	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		140	178	pg/g	78.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		148	178	pg/g	83.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		127	178	pg/g	71.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		154	178	pg/g	86.3	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		136	178	pg/g	76.3	(23%-140%)
13C-OCDD		275	356	pg/g	77.4	(17%-157%)
13C-2,3,7,8-TCDF		122	178	pg/g	68.8	(24%-169%)
13C-1,2,3,7,8-PeCDF		140	178	pg/g	78.7	(24%-185%)
13C-2,3,4,7,8-PeCDF		149	178	pg/g	83.7	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		118	178	pg/g	66.5	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		128	178	pg/g	71.9	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		128	178	pg/g	72.2	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		138	178	pg/g	77.5	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575008	<b>Date Collected:</b> 03/08/2017 11:50	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI051-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 21:57	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-14		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.58 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			128	178	pg/g	71.7 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			122	178	pg/g	68.4 (26%-138%)
37Cl-2,3,7,8-TCDD			12.8	17.8	pg/g	71.7 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575009	<b>Date Collected:</b> 03/09/2017 13:20	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3
<b>Client ID:</b> ISM-AOI077-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 00:30	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.26 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.304	pg/g	0.121	0.458
40321-76-4	1,2,3,7,8-PeCDD	J	1.47	pg/g	0.180	2.29
39227-28-6	1,2,3,4,7,8-HxCDD		2.71	pg/g	0.355	2.29
57653-85-7	1,2,3,6,7,8-HxCDD		12.3	pg/g	0.331	2.29
19408-74-3	1,2,3,7,8,9-HxCDD		6.26	pg/g	0.359	2.29
35822-46-9	1,2,3,4,6,7,8-HpCDD		316	pg/g	0.968	2.29
3268-87-9	1,2,3,4,6,7,8,9-OCDD		1740	pg/g	1.44	4.58
51207-31-9	2,3,7,8-TCDF		0.977	pg/g	0.155	0.458
57117-41-6	1,2,3,7,8-PeCDF	J	1.46	pg/g	0.123	2.29
57117-31-4	2,3,4,7,8-PeCDF		4.42	pg/g	0.0988	2.29
70648-26-9	1,2,3,4,7,8-HxCDF		7.83	pg/g	0.260	2.29
57117-44-9	1,2,3,6,7,8-HxCDF		3.97	pg/g	0.273	2.29
60851-34-5	2,3,4,6,7,8-HxCDF		5.50	pg/g	0.264	2.29
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.97	pg/g	0.372	2.29
67562-39-4	1,2,3,4,6,7,8-HpCDF		59.5	pg/g	0.337	2.29
55673-89-7	1,2,3,4,7,8,9-HpCDF		2.93	pg/g	0.523	2.29
39001-02-0	1,2,3,4,6,7,8,9-OCDF		49.4	pg/g	0.395	4.58
41903-57-5	Total TeCDD	K	3.77	pg/g	0.121	0.915
36088-22-9	Total PeCDD	K	12.5	pg/g	0.180	4.58
34465-46-8	Total HxCDD	K	70.8	pg/g	0.331	4.58
37871-00-4	Total HpCDD		536	pg/g	0.968	4.58
30402-14-3	Total TeCDF	K	17.7	pg/g	0.155	0.915
30402-15-4	Total PeCDF	K	60.1	pg/g	0.0536	4.58
55684-94-1	Total HxCDF		103	pg/g	0.260	4.58
38998-75-3	Total HpCDF		139	pg/g	0.337	4.58
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		11.6	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		11.6	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		135	183	pg/g	73.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		130	183	pg/g	70.9	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		120	183	pg/g	65.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		137	183	pg/g	74.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		129	183	pg/g	70.3	(23%-140%)
13C-OCDD		282	366	pg/g	77.1	(17%-157%)
13C-2,3,7,8-TCDF		117	183	pg/g	64.2	(24%-169%)
13C-1,2,3,7,8-PeCDF		131	183	pg/g	71.6	(24%-185%)
13C-2,3,4,7,8-PeCDF		132	183	pg/g	72.4	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		111	183	pg/g	60.5	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		114	183	pg/g	62.3	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		118	183	pg/g	64.5	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		128	183	pg/g	69.7	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575009	<b>Date Collected:</b> 03/09/2017 13:20	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3
<b>Client ID:</b> ISM-AOI077-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 00:30	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.26 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			115	183	pg/g	62.8 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			116	183	pg/g	63.1 (26%-138%)
37Cl-2,3,7,8-TCDD			12.2	18.3	pg/g	66.5 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575009	<b>Date Collected:</b> 03/09/2017 13:20	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3
<b>Client ID:</b> ISM-AOI077-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 17:46	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b11apr17a-14		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.26 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		1.00	pg/g	0.340	0.458

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575010	<b>Date Collected:</b> 03/09/2017 11:20	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3
<b>Client ID:</b> ISM-AOI072-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 01:18	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.68 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.302	pg/g	0.110	0.441
40321-76-4	1,2,3,7,8-PeCDD	JK	1.37	pg/g	0.165	2.21
39227-28-6	1,2,3,4,7,8-HxCDD		2.52	pg/g	0.267	2.21
57653-85-7	1,2,3,6,7,8-HxCDD		12.6	pg/g	0.249	2.21
19408-74-3	1,2,3,7,8,9-HxCDD		6.40	pg/g	0.270	2.21
35822-46-9	1,2,3,4,6,7,8-HpCDD		349	pg/g	0.913	2.21
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2470	pg/g	1.46	4.41
51207-31-9	2,3,7,8-TCDF	JK	0.383	pg/g	0.178	0.441
57117-41-6	1,2,3,7,8-PeCDF	J	0.676	pg/g	0.116	2.21
57117-31-4	2,3,4,7,8-PeCDF	J	1.38	pg/g	0.0983	2.21
70648-26-9	1,2,3,4,7,8-HxCDF		3.31	pg/g	0.279	2.21
57117-44-9	1,2,3,6,7,8-HxCDF	J	2.20	pg/g	0.282	2.21
60851-34-5	2,3,4,6,7,8-HxCDF		2.75	pg/g	0.286	2.21
72918-21-9	1,2,3,7,8,9-HxCDF	J	0.948	pg/g	0.417	2.21
67562-39-4	1,2,3,4,6,7,8-HpCDF		49.9	pg/g	0.311	2.21
55673-89-7	1,2,3,4,7,8,9-HpCDF		4.19	pg/g	0.478	2.21
39001-02-0	1,2,3,4,6,7,8,9-OCDF		160	pg/g	0.440	4.41
41903-57-5	Total TeCDD	K	2.37	pg/g	0.110	0.883
36088-22-9	Total PeCDD	K	10.1	pg/g	0.165	4.41
34465-46-8	Total HxCDD		74.3	pg/g	0.249	4.41
37871-00-4	Total HpCDD		627	pg/g	0.913	4.41
30402-14-3	Total TeCDF	K	8.11	pg/g	0.178	0.883
30402-15-4	Total PeCDF	K	23.3	pg/g	0.0526	4.41
55684-94-1	Total HxCDF		62.5	pg/g	0.279	4.41
38998-75-3	Total HpCDF		165	pg/g	0.311	4.41
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		10.0	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		10.0	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		163	177	pg/g	92.3	(25%-164%)
13C-1,2,3,7,8-PeCDD		151	177	pg/g	85.4	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		150	177	pg/g	84.9	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		161	177	pg/g	91.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		164	177	pg/g	92.9	(23%-140%)
13C-OCDD		357	353	pg/g	101	(17%-157%)
13C-2,3,7,8-TCDF		142	177	pg/g	80.5	(24%-169%)
13C-1,2,3,7,8-PeCDF		150	177	pg/g	85.1	(24%-185%)
13C-2,3,4,7,8-PeCDF		151	177	pg/g	85.7	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		140	177	pg/g	79.3	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		142	177	pg/g	80.4	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		148	177	pg/g	84.1	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		156	177	pg/g	88.3	(29%-147%)



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575010	<b>Date Collected:</b> 03/09/2017 11:20	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3
<b>Client ID:</b> ISM-AOI072-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 01:18	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.68 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			144	177	pg/g	81.7 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			144	177	pg/g	81.3 (26%-138%)
37Cl-2,3,7,8-TCDD			15.0	17.7	pg/g	84.8 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575011	<b>Date Collected:</b> 03/09/2017 10:17	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.7
<b>Client ID:</b> ISM-AOI066-0.5-1 - After Processin		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 02:07	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.37 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.280	pg/g	0.161	0.452
40321-76-4	1,2,3,7,8-PeCDD	J	2.16	pg/g	0.226	2.26
39227-28-6	1,2,3,4,7,8-HxCDD		4.97	pg/g	0.456	2.26
57653-85-7	1,2,3,6,7,8-HxCDD		17.4	pg/g	0.427	2.26
19408-74-3	1,2,3,7,8,9-HxCDD		12.0	pg/g	0.461	2.26
35822-46-9	1,2,3,4,6,7,8-HpCDD		595	pg/g	1.23	2.26
3268-87-9	1,2,3,4,6,7,8,9-OCDD	E	3880	pg/g	2.10	4.52
51207-31-9	2,3,7,8-TCDF		0.834	pg/g	0.365	0.452
57117-41-6	1,2,3,7,8-PeCDF	J	2.15	pg/g	0.183	2.26
57117-31-4	2,3,4,7,8-PeCDF		2.75	pg/g	0.158	2.26
70648-26-9	1,2,3,4,7,8-HxCDF		7.50	pg/g	0.304	2.26
57117-44-9	1,2,3,6,7,8-HxCDF		6.39	pg/g	0.316	2.26
60851-34-5	2,3,4,6,7,8-HxCDF		6.05	pg/g	0.316	2.26
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.83	pg/g	0.436	2.26
67562-39-4	1,2,3,4,6,7,8-HpCDF		80.1	pg/g	0.418	2.26
55673-89-7	1,2,3,4,7,8,9-HpCDF		5.50	pg/g	0.599	2.26
39001-02-0	1,2,3,4,6,7,8,9-OCDF		118	pg/g	0.528	4.52
41903-57-5	Total TeCDD	K	4.73	pg/g	0.161	0.904
36088-22-9	Total PeCDD	K	16.8	pg/g	0.226	4.52
34465-46-8	Total HxCDD		106	pg/g	0.427	4.52
37871-00-4	Total HpCDD		947	pg/g	1.23	4.52
30402-14-3	Total TeCDF	K	13.7	pg/g	0.365	0.904
30402-15-4	Total PeCDF		44.1	pg/g	0.100	4.52
55684-94-1	Total HxCDF	K	112	pg/g	0.304	4.52
38998-75-3	Total HpCDF		203	pg/g	0.418	4.52
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		17.0	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		17.0	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		166	181	pg/g	91.7	(25%-164%)
13C-1,2,3,7,8-PeCDD		152	181	pg/g	84.0	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		139	181	pg/g	76.9	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		150	181	pg/g	83.0	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		151	181	pg/g	83.4	(23%-140%)
13C-OCDD		334	362	pg/g	92.4	(17%-157%)
13C-2,3,7,8-TCDF		143	181	pg/g	79.1	(24%-169%)
13C-1,2,3,7,8-PeCDF		150	181	pg/g	82.8	(24%-185%)
13C-2,3,4,7,8-PeCDF		155	181	pg/g	85.7	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		130	181	pg/g	72.0	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		128	181	pg/g	70.5	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		133	181	pg/g	73.6	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		143	181	pg/g	79.2	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575011	<b>Date Collected:</b> 03/09/2017 10:17	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.7
<b>Client ID:</b> ISM-AOI066-0.5-1 - After Processin		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 02:07	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.37 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			130	181	pg/g	71.7 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			134	181	pg/g	73.9 (26%-138%)
37Cl-2,3,7,8-TCDD			15.2	18.1	pg/g	83.8 (35%-197%)

**Comments:**

- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- J** Value is estimated
- K** Estimated Maximum Possible Concentration

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575012	<b>Date Collected:</b> 03/09/2017 10:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.7
<b>Client ID:</b> ISM-AOI066-0.5-2 - After Processin		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 02:55	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.24 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		0.536	pg/g	0.0872	0.457
40321-76-4	1,2,3,7,8-PeCDD		5.59	pg/g	0.106	2.29
39227-28-6	1,2,3,4,7,8-HxCDD		13.8	pg/g	0.408	2.29
57653-85-7	1,2,3,6,7,8-HxCDD		44.4	pg/g	0.384	2.29
19408-74-3	1,2,3,7,8,9-HxCDD		30.6	pg/g	0.415	2.29
35822-46-9	1,2,3,4,6,7,8-HpCDD		1600	pg/g	1.28	2.29
3268-87-9	1,2,3,4,6,7,8,9-OCDD	E	12500	pg/g	1.68	4.57
51207-31-9	2,3,7,8-TCDF		1.32	pg/g	0.260	0.457
57117-41-6	1,2,3,7,8-PeCDF		4.24	pg/g	0.0947	2.29
57117-31-4	2,3,4,7,8-PeCDF		5.84	pg/g	0.0828	2.29
70648-26-9	1,2,3,4,7,8-HxCDF		23.4	pg/g	0.238	2.29
57117-44-9	1,2,3,6,7,8-HxCDF		11.4	pg/g	0.243	2.29
60851-34-5	2,3,4,6,7,8-HxCDF		11.3	pg/g	0.256	2.29
72918-21-9	1,2,3,7,8,9-HxCDF		6.01	pg/g	0.333	2.29
67562-39-4	1,2,3,4,6,7,8-HpCDF		243	pg/g	0.327	2.29
55673-89-7	1,2,3,4,7,8,9-HpCDF		15.8	pg/g	0.494	2.29
39001-02-0	1,2,3,4,6,7,8,9-OCDF		339	pg/g	0.435	4.57
41903-57-5	Total TeCDD	K	8.20	pg/g	0.0872	0.914
36088-22-9	Total PeCDD		25.2	pg/g	0.106	4.57
34465-46-8	Total HxCDD		231	pg/g	0.384	4.57
37871-00-4	Total HpCDD	E	2540	pg/g	1.28	4.57
30402-14-3	Total TeCDF	K	20.6	pg/g	0.260	0.914
30402-15-4	Total PeCDF	K	78.4	pg/g	0.0574	4.57
55684-94-1	Total HxCDF	K	307	pg/g	0.238	4.57
38998-75-3	Total HpCDF		674	pg/g	0.327	4.57
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		44.6	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		44.6	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		168	183	pg/g	91.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		156	183	pg/g	85.3	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		157	183	pg/g	85.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		154	183	pg/g	84.0	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		169	183	pg/g	92.2	(23%-140%)
13C-OCDD		400	366	pg/g	109	(17%-157%)
13C-2,3,7,8-TCDF		146	183	pg/g	79.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		153	183	pg/g	83.4	(24%-185%)
13C-2,3,4,7,8-PeCDF		159	183	pg/g	87.0	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		139	183	pg/g	75.8	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		137	183	pg/g	74.9	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		143	183	pg/g	78.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		152	183	pg/g	83.2	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575012	<b>Date Collected:</b> 03/09/2017 10:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.7
<b>Client ID:</b> ISM-AOI066-0.5-2 - After Processin	<b>Method:</b> EPA Method 1613B	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Run Date:</b> 04/11/2017 02:55	<b>Prep Method:</b> SW846 3540C	<b>Dilution:</b> 1
<b>Data File:</b> b10apr17b_2-5	<b>Prep Aliquot:</b> 11.24 g	
<b>Prep Batch:</b> 34311		
<b>Prep Date:</b> 02-APR-17		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			142	183	pg/g	77.8 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			149	183	pg/g	81.4 (26%-138%)
37Cl-2,3,7,8-TCDD			15.8	18.3	pg/g	86.2 (35%-197%)

**Comments:**

- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575012	<b>Date Collected:</b> 03/09/2017 10:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.7
<b>Client ID:</b> ISM-AOI066-0.5-2 - After Processin		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 18:26	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b11apr17a-16		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.24 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		1.31	pg/g	0.214	0.457

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575013	<b>Date Collected:</b> 03/09/2017 09:36	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.6
<b>Client ID:</b> ISM-AOI066-0.5-3 - After Processin		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 03:44	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-6		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 10.7 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.263	pg/g	0.115	0.480
40321-76-4	1,2,3,7,8-PeCDD		2.67	pg/g	0.141	2.40
39227-28-6	1,2,3,4,7,8-HxCDD		6.51	pg/g	0.422	2.40
57653-85-7	1,2,3,6,7,8-HxCDD		21.1	pg/g	0.397	2.40
19408-74-3	1,2,3,7,8,9-HxCDD		14.1	pg/g	0.428	2.40
35822-46-9	1,2,3,4,6,7,8-HpCDD		777	pg/g	1.18	2.40
3268-87-9	1,2,3,4,6,7,8,9-OCDD	E	5200	pg/g	1.31	4.80
51207-31-9	2,3,7,8-TCDF	K	0.531	pg/g	0.240	0.480
57117-41-6	1,2,3,7,8-PeCDF	J	1.80	pg/g	0.152	2.40
57117-31-4	2,3,4,7,8-PeCDF		2.54	pg/g	0.125	2.40
70648-26-9	1,2,3,4,7,8-HxCDF		8.98	pg/g	0.221	2.40
57117-44-9	1,2,3,6,7,8-HxCDF		6.37	pg/g	0.221	2.40
60851-34-5	2,3,4,6,7,8-HxCDF		6.33	pg/g	0.217	2.40
72918-21-9	1,2,3,7,8,9-HxCDF	J	2.32	pg/g	0.322	2.40
67562-39-4	1,2,3,4,6,7,8-HpCDF		108	pg/g	0.416	2.40
55673-89-7	1,2,3,4,7,8,9-HpCDF		7.00	pg/g	0.633	2.40
39001-02-0	1,2,3,4,6,7,8,9-OCDF		167	pg/g	0.572	4.80
41903-57-5	Total TeCDD	K	1.87	pg/g	0.115	0.959
36088-22-9	Total PeCDD	K	14.0	pg/g	0.141	4.80
34465-46-8	Total HxCDD		124	pg/g	0.397	4.80
37871-00-4	Total HpCDD		1220	pg/g	1.18	4.80
30402-14-3	Total TeCDF	K	5.99	pg/g	0.240	0.959
30402-15-4	Total PeCDF		40.5	pg/g	0.0641	4.80
55684-94-1	Total HxCDF	K	134	pg/g	0.217	4.80
38998-75-3	Total HpCDF	K	279	pg/g	0.416	4.80
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		20.9	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		20.9	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		171	192	pg/g	89.4	(25%-164%)
13C-1,2,3,7,8-PeCDD		167	192	pg/g	86.8	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		149	192	pg/g	77.7	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		163	192	pg/g	84.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		164	192	pg/g	85.5	(23%-140%)
13C-OCDD		359	384	pg/g	93.6	(17%-157%)
13C-2,3,7,8-TCDF		149	192	pg/g	77.7	(24%-169%)
13C-1,2,3,7,8-PeCDF		161	192	pg/g	84.1	(24%-185%)
13C-2,3,4,7,8-PeCDF		168	192	pg/g	87.5	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		140	192	pg/g	73.1	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		140	192	pg/g	73.0	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		146	192	pg/g	76.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		152	192	pg/g	79.2	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575013	<b>Date Collected:</b> 03/09/2017 09:36	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.6
<b>Client ID:</b> ISM-AOI066-0.5-3 - After Processin		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 03:44	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-6		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 10.7 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%      Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			141	192	pg/g	73.3      (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			145	192	pg/g	75.6      (26%-138%)
37Cl-2,3,7,8-TCDD			15.9	19.2	pg/g	83.0      (35%-197%)

**Comments:**

- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- J** Value is estimated
- K** Estimated Maximum Possible Concentration

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575014	<b>Date Collected:</b> 03/09/2017 12:45	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI076-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 04:32	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-7		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.33 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.311	pg/g	0.0964	0.454
40321-76-4	1,2,3,7,8-PeCDD	J	1.60	pg/g	0.0977	2.27
39227-28-6	1,2,3,4,7,8-HxCDD		2.33	pg/g	0.175	2.27
57653-85-7	1,2,3,6,7,8-HxCDD		10.3	pg/g	0.161	2.27
19408-74-3	1,2,3,7,8,9-HxCDD		5.81	pg/g	0.175	2.27
35822-46-9	1,2,3,4,6,7,8-HpCDD		256	pg/g	0.505	2.27
3268-87-9	1,2,3,4,6,7,8,9-OCDD		1520	pg/g	1.01	4.54
51207-31-9	2,3,7,8-TCDF		1.20	pg/g	0.202	0.454
57117-41-6	1,2,3,7,8-PeCDF	J	1.62	pg/g	0.133	2.27
57117-31-4	2,3,4,7,8-PeCDF		3.00	pg/g	0.118	2.27
70648-26-9	1,2,3,4,7,8-HxCDF		5.50	pg/g	0.144	2.27
57117-44-9	1,2,3,6,7,8-HxCDF		3.20	pg/g	0.154	2.27
60851-34-5	2,3,4,6,7,8-HxCDF		3.67	pg/g	0.146	2.27
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.26	pg/g	0.220	2.27
67562-39-4	1,2,3,4,6,7,8-HpCDF		42.9	pg/g	0.194	2.27
55673-89-7	1,2,3,4,7,8,9-HpCDF		2.30	pg/g	0.303	2.27
39001-02-0	1,2,3,4,6,7,8,9-OCDF		60.6	pg/g	0.329	4.54
41903-57-5	Total TeCDD	K	6.53	pg/g	0.0964	0.908
36088-22-9	Total PeCDD		14.2	pg/g	0.0977	4.54
34465-46-8	Total HxCDD	K	59.3	pg/g	0.161	4.54
37871-00-4	Total HpCDD		439	pg/g	0.505	4.54
30402-14-3	Total TeCDF	K	19.3	pg/g	0.202	0.908
30402-15-4	Total PeCDF	K	38.1	pg/g	0.0289	4.54
55684-94-1	Total HxCDF	K	75.6	pg/g	0.144	4.54
38998-75-3	Total HpCDF		113	pg/g	0.194	4.54
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		9.68	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		9.68	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		150	182	pg/g	82.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		157	182	pg/g	86.5	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		140	182	pg/g	77.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		146	182	pg/g	80.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		145	182	pg/g	80.0	(23%-140%)
13C-OCDD		306	363	pg/g	84.1	(17%-157%)
13C-2,3,7,8-TCDF		130	182	pg/g	71.5	(24%-169%)
13C-1,2,3,7,8-PeCDF		152	182	pg/g	83.5	(24%-185%)
13C-2,3,4,7,8-PeCDF		162	182	pg/g	89.2	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		128	182	pg/g	70.7	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		125	182	pg/g	68.7	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		131	182	pg/g	72.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		142	182	pg/g	78.4	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575014	<b>Date Collected:</b> 03/09/2017 12:45	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI076-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 04:32	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-7		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.33 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%      Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			132	182	pg/g	72.9      (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			133	182	pg/g	73.1      (26%-138%)
37Cl-2,3,7,8-TCDD			14.1	18.2	pg/g	77.5      (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575014	<b>Date Collected:</b> 03/09/2017 12:45	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI076-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 18:46	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b11apr17a-17		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.33 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		1.35	pg/g	0.276	0.454

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575015	<b>Date Collected:</b> 03/08/2017 12:13	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI052-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 05:20	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 10.63 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		1.21	pg/g	0.107	0.484
40321-76-4	1,2,3,7,8-PeCDD	J	0.905	pg/g	0.127	2.42
39227-28-6	1,2,3,4,7,8-HxCDD	J	1.39	pg/g	0.258	2.42
57653-85-7	1,2,3,6,7,8-HxCDD		6.59	pg/g	0.242	2.42
19408-74-3	1,2,3,7,8,9-HxCDD		3.26	pg/g	0.262	2.42
35822-46-9	1,2,3,4,6,7,8-HpCDD		170	pg/g	0.622	2.42
3268-87-9	1,2,3,4,6,7,8,9-OCDD		1160	pg/g	0.957	4.84
51207-31-9	2,3,7,8-TCDF		0.599	pg/g	0.191	0.484
57117-41-6	1,2,3,7,8-PeCDF	JK	0.585	pg/g	0.0887	2.42
57117-31-4	2,3,4,7,8-PeCDF	J	1.78	pg/g	0.0769	2.42
70648-26-9	1,2,3,4,7,8-HxCDF	J	1.99	pg/g	0.137	2.42
57117-44-9	1,2,3,6,7,8-HxCDF	J	1.56	pg/g	0.144	2.42
60851-34-5	2,3,4,6,7,8-HxCDF	J	2.19	pg/g	0.146	2.42
72918-21-9	1,2,3,7,8,9-HxCDF	J	0.608	pg/g	0.202	2.42
67562-39-4	1,2,3,4,6,7,8-HpCDF		30.0	pg/g	0.163	2.42
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	1.36	pg/g	0.246	2.42
39001-02-0	1,2,3,4,6,7,8,9-OCDF		55.8	pg/g	0.333	4.84
41903-57-5	Total TeCDD	K	3.55	pg/g	0.107	0.969
36088-22-9	Total PeCDD	K	7.66	pg/g	0.127	4.84
34465-46-8	Total HxCDD		38.6	pg/g	0.242	4.84
37871-00-4	Total HpCDD		299	pg/g	0.622	4.84
30402-14-3	Total TeCDF	K	7.95	pg/g	0.191	0.969
30402-15-4	Total PeCDF	K	24.7	pg/g	0.0386	4.84
55684-94-1	Total HxCDF		45.6	pg/g	0.137	4.84
38998-75-3	Total HpCDF	K	86.7	pg/g	0.163	4.84
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		6.86	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		6.86	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		160	194	pg/g	82.6	(25%-164%)
13C-1,2,3,7,8-PeCDD		166	194	pg/g	85.5	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		159	194	pg/g	81.9	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		159	194	pg/g	82.0	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		165	194	pg/g	85.2	(23%-140%)
13C-OCDD		343	388	pg/g	88.4	(17%-157%)
13C-2,3,7,8-TCDF		139	194	pg/g	71.7	(24%-169%)
13C-1,2,3,7,8-PeCDF		164	194	pg/g	84.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		169	194	pg/g	87.2	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		142	194	pg/g	73.4	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		143	194	pg/g	73.9	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		149	194	pg/g	77.1	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		155	194	pg/g	80.2	(29%-147%)



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575015	<b>Date Collected:</b> 03/08/2017 12:13	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI052-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 05:20	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 10.63 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			146	194	pg/g	75.5 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			152	194	pg/g	78.4 (26%-138%)
37Cl-2,3,7,8-TCDD			15.4	19.4	pg/g	79.3 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575016	<b>Date Collected:</b> 03/09/2017 10:50	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3.3
<b>Client ID:</b> ISM-AOI067-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 06:09	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 13.42 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.111	pg/g	0.0592	0.385
40321-76-4	1,2,3,7,8-PeCDD	JK	0.325	pg/g	0.053	1.93
39227-28-6	1,2,3,4,7,8-HxCDD	J	0.581	pg/g	0.105	1.93
57653-85-7	1,2,3,6,7,8-HxCDD		2.51	pg/g	0.103	1.93
19408-74-3	1,2,3,7,8,9-HxCDD	J	1.46	pg/g	0.109	1.93
35822-46-9	1,2,3,4,6,7,8-HpCDD		63.6	pg/g	0.282	1.93
3268-87-9	1,2,3,4,6,7,8,9-OCDD		473	pg/g	0.632	3.85
51207-31-9	2,3,7,8-TCDF	JK	0.216	pg/g	0.112	0.385
57117-41-6	1,2,3,7,8-PeCDF	JK	0.376	pg/g	0.0914	1.93
57117-31-4	2,3,4,7,8-PeCDF	J	0.693	pg/g	0.0809	1.93
70648-26-9	1,2,3,4,7,8-HxCDF	J	1.14	pg/g	0.0911	1.93
57117-44-9	1,2,3,6,7,8-HxCDF	J	0.613	pg/g	0.0944	1.93
60851-34-5	2,3,4,6,7,8-HxCDF	J	0.832	pg/g	0.0988	1.93
72918-21-9	1,2,3,7,8,9-HxCDF	J	0.379	pg/g	0.137	1.93
67562-39-4	1,2,3,4,6,7,8-HpCDF		8.88	pg/g	0.0927	1.93
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	0.533	pg/g	0.132	1.93
39001-02-0	1,2,3,4,6,7,8,9-OCDF		12.3	pg/g	0.200	3.85
41903-57-5	Total TeCDD	K	1.13	pg/g	0.0592	0.770
36088-22-9	Total PeCDD	JK	2.98	pg/g	0.053	3.85
34465-46-8	Total HxCDD	K	17.0	pg/g	0.103	3.85
37871-00-4	Total HpCDD		111	pg/g	0.282	3.85
30402-14-3	Total TeCDF	K	2.31	pg/g	0.112	0.770
30402-15-4	Total PeCDF	K	8.47	pg/g	0.0273	3.85
55684-94-1	Total HxCDF	K	16.9	pg/g	0.0911	3.85
38998-75-3	Total HpCDF		24.5	pg/g	0.0927	3.85
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		2.30	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		2.30	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		134	154	pg/g	87.0	(25%-164%)
13C-1,2,3,7,8-PeCDD		134	154	pg/g	86.9	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		134	154	pg/g	86.9	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		129	154	pg/g	83.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		138	154	pg/g	89.3	(23%-140%)
13C-OCDD		289	308	pg/g	93.7	(17%-157%)
13C-2,3,7,8-TCDF		118	154	pg/g	76.3	(24%-169%)
13C-1,2,3,7,8-PeCDF		130	154	pg/g	84.4	(24%-185%)
13C-2,3,4,7,8-PeCDF		134	154	pg/g	86.8	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		122	154	pg/g	79.1	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		116	154	pg/g	75.1	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		122	154	pg/g	78.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		129	154	pg/g	83.6	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10575016	<b>Date Collected:</b> 03/09/2017 10:50	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 3.3
<b>Client ID:</b> ISM-AOI067-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 06:09	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b_2-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 13.42 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			125	154	pg/g	81.0 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			128	154	pg/g	82.9 (26%-138%)
37Cl-2,3,7,8-TCDD			12.6	15.4	pg/g	81.7 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration

# **Quality Control Summary**

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A7C0432

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12018334	LCS for batch 34311	13C-2,3,7,8-TCDD		76.4	(20%-175%)
		13C-1,2,3,7,8-PeCDD		71.7	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		86.5	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		88.8	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		79.6	(22%-166%)
		13C-OCDD		71.7	(13%-199%)
		13C-2,3,7,8-TCDF		67.5	(22%-152%)
		13C-1,2,3,7,8-PeCDF		70.3	(21%-192%)
		13C-2,3,4,7,8-PeCDF		73.2	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		79.0	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		78.5	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		82.8	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		82.0	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		77.3	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		72.1	(20%-186%)
		37Cl-2,3,7,8-TCDD		68.5	(31%-191%)
12018335	LCSD for batch 34311	13C-2,3,7,8-TCDD		85.7	(20%-175%)
		13C-1,2,3,7,8-PeCDD		79.0	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		79.8	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		85.0	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		72.9	(22%-166%)
		13C-OCDD		64.5	(13%-199%)
		13C-2,3,7,8-TCDF		75.6	(22%-152%)
		13C-1,2,3,7,8-PeCDF		75.7	(21%-192%)
		13C-2,3,4,7,8-PeCDF		79.3	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		71.1	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		74.4	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		76.4	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		76.2	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		71.4	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		67.7	(20%-186%)
		37Cl-2,3,7,8-TCDD		77.7	(31%-191%)
12018333	MB for batch 34311	13C-2,3,7,8-TCDD		85.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		78.7	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		80.2	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		86.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		73.6	(23%-140%)
		13C-OCDD		67.5	(17%-157%)
		13C-2,3,7,8-TCDF		75.8	(24%-169%)
		13C-1,2,3,7,8-PeCDF		78.1	(24%-185%)
		13C-2,3,4,7,8-PeCDF		81.9	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		70.0	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		76.1	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		79.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		78.6	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		71.1	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		66.9	(26%-138%)
		37Cl-2,3,7,8-TCDD		77.0	(35%-197%)
10575001	ISM-AOI056-0.5 - After Processing	13C-2,3,7,8-TCDD		88.6	(25%-164%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7C0432

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
10575001	ISM-AOI056-0.5 - After Processing	13C-1,2,3,7,8-PeCDD		80.1	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		75.2	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		88.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		82.4	(23%-140%)
		13C-OCDD		93.4	(17%-157%)
		13C-2,3,7,8-TCDF		77.1	(24%-169%)
		13C-1,2,3,7,8-PeCDF		82.5	(24%-185%)
		13C-2,3,4,7,8-PeCDF		83.5	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		70.6	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		76.4	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		73.7	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		78.8	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		73.6	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		67.5	(26%-138%)
		37Cl-2,3,7,8-TCDD		79.8	(35%-197%)
		10575002	ISM-AOI061-0.5 - After Processing	13C-2,3,7,8-TCDD	
13C-1,2,3,7,8-PeCDD				78.1	(25%-181%)
13C-1,2,3,4,7,8-HxCDD				71.8	(32%-141%)
13C-1,2,3,6,7,8-HxCDD				85.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD				71.9	(23%-140%)
13C-OCDD				87.5	(17%-157%)
13C-2,3,7,8-TCDF				65.0	(24%-169%)
13C-1,2,3,7,8-PeCDF				74.9	(24%-185%)
13C-2,3,4,7,8-PeCDF				81.4	(21%-178%)
13C-1,2,3,4,7,8-HxCDF				65.7	(26%-152%)
13C-1,2,3,6,7,8-HxCDF				71.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF				71.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF				70.8	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF				69.9	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF				62.2	(26%-138%)
37Cl-2,3,7,8-TCDD				67.2	(35%-197%)
12018336	ISM-AOI061-0.5 - After Processing(105750)	13C-2,3,7,8-TCDD		72.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		74.3	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		70.0	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		88.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		74.6	(23%-140%)
		13C-OCDD		91.2	(17%-157%)
		13C-2,3,7,8-TCDF		63.5	(24%-169%)
		13C-1,2,3,7,8-PeCDF		74.6	(24%-185%)
		13C-2,3,4,7,8-PeCDF		78.7	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		64.3	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		72.5	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		73.7	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		72.8	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		70.8	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		64.1	(26%-138%)
		37Cl-2,3,7,8-TCDD		66.0	(35%-197%)
12018337	ISM-AOI061-0.5 - After Processing(105750)	13C-2,3,7,8-TCDD		88.6	(25%-164%)
		13C-1,2,3,7,8-PeCDD		82.7	(25%-181%)



**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7C0432

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12018337	ISM-AOI061-0.5 - After Processing(105750)	13C-1,2,3,4,7,8-HxCDD		73.5	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		82.5	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		78.8	(23%-140%)
		13C-OCDD		94.6	(17%-157%)
		13C-2,3,7,8-TCDF		77.3	(24%-169%)
		13C-1,2,3,7,8-PeCDF		83.1	(24%-185%)
		13C-2,3,4,7,8-PeCDF		81.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		66.4	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		68.6	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		70.3	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		76.9	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		69.0	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		67.5	(26%-138%)
		37Cl-2,3,7,8-TCDD		80.0	(35%-197%)
		10575003	ISM-AOI043-0.5 - After Processing	13C-2,3,7,8-TCDD	
13C-1,2,3,7,8-PeCDD				82.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD				74.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD				81.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD				78.0	(23%-140%)
13C-OCDD				83.9	(17%-157%)
13C-2,3,7,8-TCDF				75.2	(24%-169%)
13C-1,2,3,7,8-PeCDF				79.0	(24%-185%)
13C-2,3,4,7,8-PeCDF				83.3	(21%-178%)
13C-1,2,3,4,7,8-HxCDF				67.9	(26%-152%)
13C-1,2,3,6,7,8-HxCDF				70.8	(26%-123%)
13C-2,3,4,6,7,8-HxCDF				72.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF				75.8	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF				69.9	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF				67.8	(26%-138%)
37Cl-2,3,7,8-TCDD		77.9	(35%-197%)		
10575004	ISM-AOI049-0.5 - After Processing	13C-2,3,7,8-TCDD		83.1	(25%-164%)
		13C-1,2,3,7,8-PeCDD		80.0	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		73.4	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		77.9	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		71.7	(23%-140%)
		13C-OCDD		75.2	(17%-157%)
		13C-2,3,7,8-TCDF		71.7	(24%-169%)
		13C-1,2,3,7,8-PeCDF		77.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		81.1	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		64.4	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		69.7	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		72.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		78.5	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		68.1	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		65.1	(26%-138%)
37Cl-2,3,7,8-TCDD		78.7	(35%-197%)		
10575005	ISM-AOI064-0.5 - After Processing	13C-2,3,7,8-TCDD		88.4	(25%-164%)
		13C-1,2,3,7,8-PeCDD		83.2	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		75.1	(32%-141%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7C0432

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
10575005	ISM-AOI064-0.5 - After Processing	13C-1,2,3,6,7,8-HxCDD		84.7	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		79.6	(23%-140%)
		13C-OCDD		83.5	(17%-157%)
		13C-2,3,7,8-TCDF		77.1	(24%-169%)
		13C-1,2,3,7,8-PeCDF		79.6	(24%-185%)
		13C-2,3,4,7,8-PeCDF		81.7	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		68.9	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		70.7	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		72.9	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		78.0	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		69.9	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		69.5	(26%-138%)
		37Cl-2,3,7,8-TCDD		81.4	(35%-197%)
		10575006	ISM-AOI054-0.5 - After Processing	13C-2,3,7,8-TCDD	
13C-1,2,3,7,8-PeCDD				80.7	(25%-181%)
13C-1,2,3,4,7,8-HxCDD				73.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD				85.3	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD				74.9	(23%-140%)
13C-OCDD				70.8	(17%-157%)
13C-2,3,7,8-TCDF				71.0	(24%-169%)
13C-1,2,3,7,8-PeCDF				78.0	(24%-185%)
13C-2,3,4,7,8-PeCDF				83.3	(21%-178%)
13C-1,2,3,4,7,8-HxCDF				68.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF				72.1	(26%-123%)
13C-2,3,4,6,7,8-HxCDF				73.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF				76.9	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF				68.7	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		69.3	(26%-138%)		
37Cl-2,3,7,8-TCDD		74.0	(35%-197%)		
10575007	ISM-AOI044-0.5 - After Processing	13C-2,3,7,8-TCDD		85.3	(25%-164%)
		13C-1,2,3,7,8-PeCDD		79.8	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		79.0	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		83.6	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		78.2	(23%-140%)
		13C-OCDD		79.8	(17%-157%)
		13C-2,3,7,8-TCDF		76.4	(24%-169%)
		13C-1,2,3,7,8-PeCDF		79.5	(24%-185%)
		13C-2,3,4,7,8-PeCDF		82.2	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		71.1	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		75.1	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		77.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		76.8	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		72.2	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		70.1	(26%-138%)		
37Cl-2,3,7,8-TCDD		79.6	(35%-197%)		
10575008	ISM-AOI051-0.5 - After Processing	13C-2,3,7,8-TCDD		78.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		83.2	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		71.4	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		86.3	(28%-130%)

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A7C0432

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
10575008	ISM-AOI051-0.5 - After Processing	13C-1,2,3,4,6,7,8-HpCDD		76.3	(23%-140%)
		13C-OCDD		77.4	(17%-157%)
		13C-2,3,7,8-TCDF		68.8	(24%-169%)
		13C-1,2,3,7,8-PeCDF		78.7	(24%-185%)
		13C-2,3,4,7,8-PeCDF		83.7	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		66.5	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		71.9	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		72.2	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		77.5	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		71.7	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		68.4	(26%-138%)
		37Cl-2,3,7,8-TCDD		71.7	(35%-197%)
		10575009	ISM-AOI077-0.5 - After Processing	13C-2,3,7,8-TCDD	
13C-1,2,3,7,8-PeCDD				70.9	(25%-181%)
13C-1,2,3,4,7,8-HxCDD				65.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD				74.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD				70.3	(23%-140%)
13C-OCDD				77.1	(17%-157%)
13C-2,3,7,8-TCDF				64.2	(24%-169%)
13C-1,2,3,7,8-PeCDF				71.6	(24%-185%)
13C-2,3,4,7,8-PeCDF				72.4	(21%-178%)
13C-1,2,3,4,7,8-HxCDF				60.5	(26%-152%)
13C-1,2,3,6,7,8-HxCDF				62.3	(26%-123%)
13C-2,3,4,6,7,8-HxCDF				64.5	(28%-136%)
13C-1,2,3,7,8,9-HxCDF				69.7	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF				62.8	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF				63.1	(26%-138%)
37Cl-2,3,7,8-TCDD		66.5	(35%-197%)		
10575010	ISM-AOI072-0.5 - After Processing	13C-2,3,7,8-TCDD		92.3	(25%-164%)
		13C-1,2,3,7,8-PeCDD		85.4	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		84.9	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		91.4	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		92.9	(23%-140%)
		13C-OCDD		101	(17%-157%)
		13C-2,3,7,8-TCDF		80.5	(24%-169%)
		13C-1,2,3,7,8-PeCDF		85.1	(24%-185%)
		13C-2,3,4,7,8-PeCDF		85.7	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		79.3	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		80.4	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		84.1	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		88.3	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		81.7	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		81.3	(26%-138%)
37Cl-2,3,7,8-TCDD		84.8	(35%-197%)		
10575011	ISM-AOI066-0.5-1 - After Processing	13C-2,3,7,8-TCDD		91.7	(25%-164%)
		13C-1,2,3,7,8-PeCDD		84.0	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		76.9	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		83.0	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		83.4	(23%-140%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7C0432

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
10575011	ISM-AOI066-0.5-1 - After Processing	13C-OCDD		92.4	(17%-157%)
		13C-2,3,7,8-TCDF		79.1	(24%-169%)
		13C-1,2,3,7,8-PeCDF		82.8	(24%-185%)
		13C-2,3,4,7,8-PeCDF		85.7	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		72.0	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		70.5	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		73.6	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		79.2	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		71.7	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		73.9	(26%-138%)
		37Cl-2,3,7,8-TCDD		83.8	(35%-197%)
10575012	ISM-AOI066-0.5-2 - After Processing	13C-2,3,7,8-TCDD		91.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		85.3	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		85.6	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		84.0	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		92.2	(23%-140%)
		13C-OCDD		109	(17%-157%)
		13C-2,3,7,8-TCDF		79.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		83.4	(24%-185%)
		13C-2,3,4,7,8-PeCDF		87.0	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		75.8	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		74.9	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		78.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		83.2	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		77.8	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		81.4	(26%-138%)		
37Cl-2,3,7,8-TCDD		86.2	(35%-197%)		
10575013	ISM-AOI066-0.5-3 - After Processing	13C-2,3,7,8-TCDD		89.4	(25%-164%)
		13C-1,2,3,7,8-PeCDD		86.8	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		77.7	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		84.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		85.5	(23%-140%)
		13C-OCDD		93.6	(17%-157%)
		13C-2,3,7,8-TCDF		77.7	(24%-169%)
		13C-1,2,3,7,8-PeCDF		84.1	(24%-185%)
		13C-2,3,4,7,8-PeCDF		87.5	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		73.1	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		73.0	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		76.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		79.2	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		73.3	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		75.6	(26%-138%)		
37Cl-2,3,7,8-TCDD		83.0	(35%-197%)		
10575014	ISM-AOI076-0.5 - After Processing	13C-2,3,7,8-TCDD		82.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		86.5	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		77.2	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		80.1	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		80.0	(23%-140%)
		13C-OCDD		84.1	(17%-157%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7C0432

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
10575014	ISM-AOI076-0.5 - After Processing	13C-2,3,7,8-TCDF		71.5	(24%-169%)
		13C-1,2,3,7,8-PeCDF		83.5	(24%-185%)
		13C-2,3,4,7,8-PeCDF		89.2	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		70.7	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		68.7	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		72.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		78.4	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		72.9	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		73.1	(26%-138%)
		37Cl-2,3,7,8-TCDD		77.5	(35%-197%)
10575015	ISM-AOI052-0.5 - After Processing	13C-2,3,7,8-TCDD		82.6	(25%-164%)
		13C-1,2,3,7,8-PeCDD		85.5	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		81.9	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		82.0	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		85.2	(23%-140%)
		13C-OCDD		88.4	(17%-157%)
		13C-2,3,7,8-TCDF		71.7	(24%-169%)
		13C-1,2,3,7,8-PeCDF		84.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		87.2	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		73.4	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		73.9	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		77.1	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		80.2	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		75.5	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		78.4	(26%-138%)
37Cl-2,3,7,8-TCDD		79.3	(35%-197%)		
10575016	ISM-AOI067-0.5 - After Processing	13C-2,3,7,8-TCDD		87.0	(25%-164%)
		13C-1,2,3,7,8-PeCDD		86.9	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		86.9	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		83.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		89.3	(23%-140%)
		13C-OCDD		93.7	(17%-157%)
		13C-2,3,7,8-TCDF		76.3	(24%-169%)
		13C-1,2,3,7,8-PeCDF		84.4	(24%-185%)
		13C-2,3,4,7,8-PeCDF		86.8	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		79.1	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		75.1	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		78.9	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		83.6	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		81.0	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		82.9	(26%-138%)
37Cl-2,3,7,8-TCDD		81.7	(35%-197%)		

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A7C0432

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 34311

Matrix: SOIL

Lab Sample ID: 12018334

Instrument: HRP763

Analysis Date: 04/10/2017 12:16

Dilution: 1

Analyst: CLP

Prep Batch ID:34311

Batch ID: 34313

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	20.0	18.1	90.7	67-158
40321-76-4	LCS 1,2,3,7,8-PeCDD	100	102	102	70-142
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	100	95.3	95.3	70-164
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	100	102	102	76-134
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	100	103	103	64-162
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	100	98.0	98	70-140
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	200	193	96.7	78-144
51207-31-9	LCS 2,3,7,8-TCDF	20.0	20.0	99.9	75-158
57117-41-6	LCS 1,2,3,7,8-PeCDF	100	97.3	97.3	80-134
57117-31-4	LCS 2,3,4,7,8-PeCDF	100	97.8	97.8	68-160
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	100	100	100	72-134
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	100	104	104	84-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	100	102	102	70-156
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	100	100	100	78-130
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	100	105	105	82-122
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	100	103	103	78-138
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	200	198	99.1	63-170



**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A7C0432

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 34311

Matrix: SOIL

Lab Sample ID: 12018335

Instrument: HRP763

Analysis Date: 04/10/2017 13:04

Dilution: 1

Analyst: CLP

Prep Batch ID: 34311

Batch ID: 34313

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	20.0	17.2	85.8	67-158	5.54	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	100	98.7	98.7	70-142	3.34	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	100	92.7	92.7	70-164	2.72	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	100	94.9	94.9	76-134	7.25	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	100	100	100	64-162	3.08	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	100	98.4	98.4	70-140	0.410	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	200	194	97	78-144	0.293	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	20.0	19.2	95.8	75-158	4.26	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	100	94.0	94	80-134	3.42	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	100	94.2	94.2	68-160	3.75	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	100	99.7	99.7	72-134	0.759	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	100	98.1	98.1	84-130	5.46	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	100	98.0	98	70-156	3.87	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	100	97.6	97.6	78-130	2.95	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	100	101	101	82-122	3.80	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	100	102	102	78-138	1.60	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	200	198	98.9	63-170	0.216	0-20

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

**SDG Number:** A7C0432  
**Client ID:** ISM-AOI061-0.5 - After  
 Processing(105750)  
**Lab Sample ID:** 12018336  
**Instrument:** HRP763  
**Analyst:** CLP

**Sample Type:** Matrix Spike  
**Matrix:** SOIL  
**%Moisture:** 2.5

**Analysis Date:** 04/10/2017 16:18  
**Prep Batch ID:** 34311  
**Batch ID:** 34313  
**Dilution:** 1

CAS No.	Parmname	Amount Added		Spike	Recovery %	Acceptance Limits	
		pg/g		Conc. pg/g			
1746-01-6	MS	2,3,7,8-TCDD	17.5	U	16.5	94.3	70-130
40321-76-4	MS	1,2,3,7,8-PeCDD	87.5	J	88.7	99	70-130
39227-28-6	MS	1,2,3,4,7,8-HxCDD	87.5		84.2	91.6	70-130
57653-85-7	MS	1,2,3,6,7,8-HxCDD	87.5		102	91.3	70-130
19408-74-3	MS	1,2,3,7,8,9-HxCDD	87.5		93.2	97.1	70-130
35822-46-9	MS	1,2,3,4,6,7,8-HpCDD	87.5		916	92.8	70-130
3268-87-9	MS	1,2,3,4,6,7,8,9-OCDD	175	E	10900	148 *	70-130
51207-31-9	MS	2,3,7,8-TCDF	17.5	K	17.9	95.4	70-130
57117-41-6	MS	1,2,3,7,8-PeCDF	87.5	J	83.2	93.1	70-130
57117-31-4	MS	2,3,4,7,8-PeCDF	87.5		84.0	91.8	70-130
70648-26-9	MS	1,2,3,4,7,8-HxCDF	87.5		94.0	96.3	70-130
57117-44-9	MS	1,2,3,6,7,8-HxCDF	87.5		88.4	95.5	70-130
60851-34-5	MS	2,3,4,6,7,8-HxCDF	87.5		90.5	96.6	70-130
72918-21-9	MS	1,2,3,7,8,9-HxCDF	87.5		83.9	91.8	70-130
67562-39-4	MS	1,2,3,4,6,7,8-HpCDF	87.5		199	109	70-130
55673-89-7	MS	1,2,3,4,7,8,9-HpCDF	87.5		95.4	101	70-130
39001-02-0	MS	1,2,3,4,6,7,8,9-OCDF	175		545	95.7	70-130

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

**SDG Number:** A7C0432  
**Client ID:** ISM-AOI061-0.5 - After  
 Processing(105750)  
**Lab Sample ID:** 12018337  
**Instrument:** HRP763  
**Analyst:** CLP

**Sample Type:** Matrix Spike Duplicate  
**Matrix:** SOIL  
**%Moisture:** 2.5  
**Analysis Date:** 04/10/2017 17:06  
**Prep Batch ID:** 34311  
**Batch ID:** 34313

**Dilution:** 1

CAS No.	Parmname	Amount Added		Spike Conc.	Recovery %	Acceptance Limits	RPD %	Acceptance Limits	
		pg/g							
1746-01-6	MSD	2,3,7,8-TCDD	17.6	U	15.9	90.2	70-130	3.70	0-20
40321-76-4	MSD	1,2,3,7,8-PeCDD	88.2	J	87.8	97.3	70-130	0.952	0-20
39227-28-6	MSD	1,2,3,4,7,8-HxCDD	88.2		85.7	92.6	70-130	1.79	0-20
57653-85-7	MSD	1,2,3,6,7,8-HxCDD	88.2		104	93.2	70-130	2.21	0-20
19408-74-3	MSD	1,2,3,7,8,9-HxCDD	88.2		96.5	100	70-130	3.48	0-20
35822-46-9	MSD	1,2,3,4,6,7,8-HpCDD	88.2		864	33.4 *	70-130	5.81	0-20
3268-87-9	MSD	1,2,3,4,6,7,8,9-OCDD	176	E	10500	-76.1 *	70-130	3.66	0-20
51207-31-9	MSD	2,3,7,8-TCDF	17.6	K	17.4	92.3	70-130	2.35	0-20
57117-41-6	MSD	1,2,3,7,8-PeCDF	88.2	J	83.4	92.5	70-130	0.176	0-20
57117-31-4	MSD	2,3,4,7,8-PeCDF	88.2		86.5	93.8	70-130	2.86	0-20
70648-26-9	MSD	1,2,3,4,7,8-HxCDF	88.2		94.5	96.1	70-130	0.577	0-20
57117-44-9	MSD	1,2,3,6,7,8-HxCDF	88.2		90.4	97.1	70-130	2.25	0-20
60851-34-5	MSD	2,3,4,6,7,8-HxCDF	88.2		89.3	94.6	70-130	1.30	0-20
72918-21-9	MSD	1,2,3,7,8,9-HxCDF	88.2		89.7	97.7	70-130	6.70	0-20
67562-39-4	MSD	1,2,3,4,6,7,8-HpCDF	88.2		202	112	70-130	1.35	0-20
55673-89-7	MSD	1,2,3,4,7,8,9-HpCDF	88.2		99.2	104	70-130	3.90	0-20
39001-02-0	MSD	1,2,3,4,6,7,8,9-OCDF	176		533	88	70-130	2.28	0-20

**Hi-Res Dioxins/Furans  
Quality Control Summary  
Spike Recovery Report**

**SDG Number:** A7C0432  
**Client ID:** ISM-AOI061-0.5 - After Processing(105750)  
**Lab Sample ID:** 12018336  
**Instrument:** HRP763  
**Analyst:** CLP

**Sample Type:** Matrix Spike  
**Matrix:** SOIL  
**%Moisture:** 2.5  
**Analysis Date:** 04/11/2017 16:46 **Dilution:** 1  
**Prep Batch ID:**34311  
**Batch ID:** 34313

CAS No.	Parmname	Amount Added		Spike Conc.	Recovery %	Acceptance Limits
		pg/g	K	pg/g	%	
51207-31-9	MS 2,3,7,8-TCDF	17.5	K	17.7	95	70-130

Hi-Res Dioxins/Furans  
Quality Control Summary  
Spike Recovery Report

<b>SDG Number:</b> A7C0432 <b>Client ID:</b> ISM-AOI061-0.5 - After Processing(105750) <b>Lab Sample ID:</b> 12018337 <b>Instrument:</b> HRP763 <b>Analyst:</b> CLP	<b>Sample Type:</b> Matrix Spike Duplicate <b>Matrix:</b> SOIL <b>%Moisture:</b> 2.5  <b>Analysis Date:</b> 04/11/2017 17:06 <b>Prep Batch ID:</b> 34311 <b>Batch ID:</b> 34313
	<b>Dilution:</b> 1

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
51207-31-9	MSD 2,3,7,8-TCDF	17.6 K	17.3	92.1	70-130	2.20	0-20

## Method Blank Summary

Page 1 of 1

SDG Number: A7C0432  
 Client ID: MB for batch 34311  
 Lab Sample ID: 12018333  
 Column:

Client: APEX001  
 Instrument ID: HRP763  
 Prep Date: 02-APR-17

Matrix: SOIL  
 Data File: b10apr17b-4  
 Analyzed: 04/10/17 13:53

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 34311	12018334	b10apr17b-2	04/10/17	1216
02 LCSD for batch 34311	12018335	b10apr17b-3	04/10/17	1304
03 ISM-AOI056-0.5 - After Processing	10575001	b10apr17b-5	04/10/17	1441
04 ISM-AOI061-0.5 - After Processing	10575002	b10apr17b-6	04/10/17	1530
05 ISM-AOI061-0.5 - After Processing(105750	12018336	b10apr17b-7	04/10/17	1618
06 ISM-AOI061-0.5 - After Processing(105750	12018337	b10apr17b-8	04/10/17	1706
07 ISM-AOI043-0.5 - After Processing	10575003	b10apr17b-9	04/10/17	1755
08 ISM-AOI049-0.5 - After Processing	10575004	b10apr17b-10	04/10/17	1843
09 ISM-AOI064-0.5 - After Processing	10575005	b10apr17b-11	04/10/17	1932
10 ISM-AOI054-0.5 - After Processing	10575006	b10apr17b-12	04/10/17	2020
11 ISM-AOI044-0.5 - After Processing	10575007	b10apr17b-13	04/10/17	2109
12 ISM-AOI051-0.5 - After Processing	10575008	b10apr17b-14	04/10/17	2157
13 ISM-AOI077-0.5 - After Processing	10575009	b10apr17b_2-2	04/11/17	0030
14 ISM-AOI072-0.5 - After Processing	10575010	b10apr17b_2-3	04/11/17	0118
15 ISM-AOI066-0.5-1 - After Processing	10575011	b10apr17b_2-4	04/11/17	0207
16 ISM-AOI066-0.5-2 - After Processing	10575012	b10apr17b_2-5	04/11/17	0255
17 ISM-AOI066-0.5-3 - After Processing	10575013	b10apr17b_2-6	04/11/17	0344
18 ISM-AOI076-0.5 - After Processing	10575014	b10apr17b_2-7	04/11/17	0432
19 ISM-AOI052-0.5 - After Processing	10575015	b10apr17b_2-8	04/11/17	0520
20 ISM-AOI067-0.5 - After Processing	10575016	b10apr17b_2-9	04/11/17	0609
21 ISM-AOI056-0.5 - After Processing	10575001	b11apr17a-9	04/11/17	1606
22 ISM-AOI061-0.5 - After Processing	10575002	b11apr17a-10	04/11/17	1626
23 ISM-AOI061-0.5 - After Processing(105750	12018336	b11apr17a-11	04/11/17	1646
24 ISM-AOI061-0.5 - After Processing(105750	12018337	b11apr17a-12	04/11/17	1706
25 ISM-AOI043-0.5 - After Processing	10575003	b11apr17a-13	04/11/17	1726
26 ISM-AOI077-0.5 - After Processing	10575009	b11apr17a-14	04/11/17	1746
27 ISM-AOI066-0.5-2 - After Processing	10575012	b11apr17a-16	04/11/17	1826
28 ISM-AOI076-0.5 - After Processing	10575014	b11apr17a-17	04/11/17	1846



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018333		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34311		
<b>Client ID:</b> MB for batch 34311		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 13:53	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.288	pg/g	0.288	0.500
40321-76-4	1,2,3,7,8-PeCDD	U	0.27	pg/g	0.270	2.50
39227-28-6	1,2,3,4,7,8-HxCDD	U	0.274	pg/g	0.274	2.50
57653-85-7	1,2,3,6,7,8-HxCDD	U	0.25	pg/g	0.250	2.50
19408-74-3	1,2,3,7,8,9-HxCDD	U	0.274	pg/g	0.274	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	0.5	pg/g	0.500	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD	U	0.572	pg/g	0.572	5.00
51207-31-9	2,3,7,8-TCDF	U	0.404	pg/g	0.404	0.500
57117-41-6	1,2,3,7,8-PeCDF	JK	0.194	pg/g	0.176	2.50
57117-31-4	2,3,4,7,8-PeCDF	U	0.144	pg/g	0.144	2.50
70648-26-9	1,2,3,4,7,8-HxCDF	U	0.244	pg/g	0.244	2.50
57117-44-9	1,2,3,6,7,8-HxCDF	U	0.242	pg/g	0.242	2.50
60851-34-5	2,3,4,6,7,8-HxCDF	U	0.238	pg/g	0.238	2.50
72918-21-9	1,2,3,7,8,9-HxCDF	U	0.348	pg/g	0.348	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF	J	0.292	pg/g	0.230	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	0.368	pg/g	0.368	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	0.856	pg/g	0.856	5.00
41903-57-5	Total TeCDD	U	0.288	pg/g	0.288	1.00
36088-22-9	Total PeCDD	U	0.27	pg/g	0.270	5.00
34465-46-8	Total HxCDD	U	0.25	pg/g	0.250	5.00
37871-00-4	Total HpCDD	U	0.5	pg/g	0.500	5.00
30402-14-3	Total TeCDF	U	0.404	pg/g	0.404	1.00
30402-15-4	Total PeCDF	JK	0.384	pg/g	0.144	5.00
55684-94-1	Total HxCDF	U	0.238	pg/g	0.238	5.00
38998-75-3	Total HpCDF	J	0.292	pg/g	0.230	5.00
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.00874	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		0.428	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		172	200	pg/g	85.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		157	200	pg/g	78.7	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		160	200	pg/g	80.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		174	200	pg/g	86.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		147	200	pg/g	73.6	(23%-140%)
13C-OCDD		270	400	pg/g	67.5	(17%-157%)
13C-2,3,7,8-TCDF		152	200	pg/g	75.8	(24%-169%)
13C-1,2,3,7,8-PeCDF		156	200	pg/g	78.1	(24%-185%)
13C-2,3,4,7,8-PeCDF		164	200	pg/g	81.9	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		140	200	pg/g	70.0	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		152	200	pg/g	76.1	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		158	200	pg/g	79.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		157	200	pg/g	78.6	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018333		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34311		
<b>Client ID:</b> MB for batch 34311		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 13:53	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%      Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			142	200	pg/g	71.1      (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			134	200	pg/g	66.9      (26%-138%)
37Cl-2,3,7,8-TCDD			15.4	20.0	pg/g	77.0      (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018334		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34311		
<b>Client ID:</b> LCS for batch 34311		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 12:16	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		18.1	pg/g	0.318	0.500
40321-76-4	1,2,3,7,8-PeCDD		102	pg/g	0.376	2.50
39227-28-6	1,2,3,4,7,8-HxCDD		95.3	pg/g	0.632	2.50
57653-85-7	1,2,3,6,7,8-HxCDD		102	pg/g	0.612	2.50
19408-74-3	1,2,3,7,8,9-HxCDD		103	pg/g	0.652	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD		98.0	pg/g	0.780	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD		193	pg/g	1.75	5.00
51207-31-9	2,3,7,8-TCDF		20.0	pg/g	0.424	0.500
57117-41-6	1,2,3,7,8-PeCDF		97.3	pg/g	0.484	2.50
57117-31-4	2,3,4,7,8-PeCDF		97.8	pg/g	0.424	2.50
70648-26-9	1,2,3,4,7,8-HxCDF		100	pg/g	0.912	2.50
57117-44-9	1,2,3,6,7,8-HxCDF		104	pg/g	0.890	2.50
60851-34-5	2,3,4,6,7,8-HxCDF		102	pg/g	0.898	2.50
72918-21-9	1,2,3,7,8,9-HxCDF		100	pg/g	1.30	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF		105	pg/g	0.554	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF		103	pg/g	0.906	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF		198	pg/g	1.67	5.00

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		153	200	pg/g	76.4	(20%-175%)
13C-1,2,3,7,8-PeCDD		143	200	pg/g	71.7	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		173	200	pg/g	86.5	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		178	200	pg/g	88.8	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		159	200	pg/g	79.6	(22%-166%)
13C-OCDD		287	400	pg/g	71.7	(13%-199%)
13C-2,3,7,8-TCDF		135	200	pg/g	67.5	(22%-152%)
13C-1,2,3,7,8-PeCDF		141	200	pg/g	70.3	(21%-192%)
13C-2,3,4,7,8-PeCDF		146	200	pg/g	73.2	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		158	200	pg/g	79.0	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		157	200	pg/g	78.5	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		166	200	pg/g	82.8	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		164	200	pg/g	82.0	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		155	200	pg/g	77.3	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		144	200	pg/g	72.1	(20%-186%)
37Cl-2,3,7,8-TCDD		13.7	20.0	pg/g	68.5	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018335		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34311		
<b>Client ID:</b> LCSD for batch 34311		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/10/2017 13:04	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b10apr17b-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		17.2	pg/g	0.328	0.500
40321-76-4	1,2,3,7,8-PeCDD		98.7	pg/g	0.412	2.50
39227-28-6	1,2,3,4,7,8-HxCDD		92.7	pg/g	0.620	2.50
57653-85-7	1,2,3,6,7,8-HxCDD		94.9	pg/g	0.534	2.50
19408-74-3	1,2,3,7,8,9-HxCDD		100	pg/g	0.600	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD		98.4	pg/g	0.856	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD		194	pg/g	1.89	5.00
51207-31-9	2,3,7,8-TCDF		19.2	pg/g	0.450	0.500
57117-41-6	1,2,3,7,8-PeCDF		94.0	pg/g	0.412	2.50
57117-31-4	2,3,4,7,8-PeCDF		94.2	pg/g	0.372	2.50
70648-26-9	1,2,3,4,7,8-HxCDF		99.7	pg/g	0.724	2.50
57117-44-9	1,2,3,6,7,8-HxCDF		98.1	pg/g	0.712	2.50
60851-34-5	2,3,4,6,7,8-HxCDF		98.0	pg/g	0.696	2.50
72918-21-9	1,2,3,7,8,9-HxCDF		97.6	pg/g	1.10	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF		101	pg/g	0.776	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF		102	pg/g	1.22	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF		198	pg/g	1.59	5.00

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		171	200	pg/g	85.7	(20%-175%)
13C-1,2,3,7,8-PeCDD		158	200	pg/g	79.0	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		160	200	pg/g	79.8	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		170	200	pg/g	85.0	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		146	200	pg/g	72.9	(22%-166%)
13C-OCDD		258	400	pg/g	64.5	(13%-199%)
13C-2,3,7,8-TCDF		151	200	pg/g	75.6	(22%-152%)
13C-1,2,3,7,8-PeCDF		151	200	pg/g	75.7	(21%-192%)
13C-2,3,4,7,8-PeCDF		159	200	pg/g	79.3	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		142	200	pg/g	71.1	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		149	200	pg/g	74.4	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		153	200	pg/g	76.4	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		152	200	pg/g	76.2	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		143	200	pg/g	71.4	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		135	200	pg/g	67.7	(20%-186%)
37Cl-2,3,7,8-TCDD		15.5	20.0	pg/g	77.7	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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SDG Number: A7C0432	Client: APEX001	Project: APEX00117
Lab Sample ID: 12018336	Date Collected: 03/08/2017 14:30	Matrix: SOIL
Client Sample: QC for batch 34311	Date Received: 03/23/2017 09:55	%Moisture: 2.5
Client ID: ISM-AOI061-0.5 - After Processing(1		Prep Basis: Dry Weight
Batch ID: 34313	Method: EPA Method 1613B	
Run Date: 04/10/2017 16:18	Analyst: CLP	Instrument: HRP763
Data File: b10apr17b-7		Dilution: 1
Prep Batch: 34311	Prep Method: SW846 3540C	
Prep Date: 02-APR-17	Prep Aliquot: 11.72 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		16.5	pg/g	0.464	0.437
40321-76-4	1,2,3,7,8-PeCDD		88.7	pg/g	0.709	2.19
39227-28-6	1,2,3,4,7,8-HxCDD		84.2	pg/g	1.19	2.19
57653-85-7	1,2,3,6,7,8-HxCDD		102	pg/g	1.05	2.19
19408-74-3	1,2,3,7,8,9-HxCDD		93.2	pg/g	1.16	2.19
35822-46-9	1,2,3,4,6,7,8-HpCDD		916	pg/g	3.11	2.19
3268-87-9	1,2,3,4,6,7,8,9-OCDD	E	10900	pg/g	4.60	4.37
51207-31-9	2,3,7,8-TCDF		17.9	pg/g	0.738	0.437
57117-41-6	1,2,3,7,8-PeCDF		83.2	pg/g	0.724	2.19
57117-31-4	2,3,4,7,8-PeCDF		84.0	pg/g	0.560	2.19
70648-26-9	1,2,3,4,7,8-HxCDF		94.0	pg/g	1.38	2.19
57117-44-9	1,2,3,6,7,8-HxCDF		88.4	pg/g	1.37	2.19
60851-34-5	2,3,4,6,7,8-HxCDF		90.5	pg/g	1.30	2.19
72918-21-9	1,2,3,7,8,9-HxCDF		83.9	pg/g	2.17	2.19
67562-39-4	1,2,3,4,6,7,8-HpCDF		199	pg/g	1.48	2.19
55673-89-7	1,2,3,4,7,8,9-HpCDF		95.4	pg/g	2.52	2.19
39001-02-0	1,2,3,4,6,7,8,9-OCDF		545	pg/g	1.34	4.37

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		127	175	pg/g	72.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		130	175	pg/g	74.3	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		123	175	pg/g	70.0	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		155	175	pg/g	88.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		130	175	pg/g	74.6	(23%-140%)
13C-OCDD		319	350	pg/g	91.2	(17%-157%)
13C-2,3,7,8-TCDF		111	175	pg/g	63.5	(24%-169%)
13C-1,2,3,7,8-PeCDF		130	175	pg/g	74.6	(24%-185%)
13C-2,3,4,7,8-PeCDF		138	175	pg/g	78.7	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		112	175	pg/g	64.3	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		127	175	pg/g	72.5	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		129	175	pg/g	73.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		127	175	pg/g	72.8	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF		124	175	pg/g	70.8	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		112	175	pg/g	64.1	(26%-138%)
37Cl-2,3,7,8-TCDD		11.5	17.5	pg/g	66.0	(35%-197%)

**Comments:****E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range**K** Estimated Maximum Possible Concentration**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018336	<b>Date Collected:</b> 03/08/2017 14:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34311	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.5
<b>Client ID:</b> ISM-AOI061-0.5 - After Processing(1)		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 16:46	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b11apr17a-11		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.72 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		17.7	pg/g	0.317	0.437

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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SDG Number: A7C0432	Client: APEX001	Project: APEX00117
Lab Sample ID: 12018337	Date Collected: 03/08/2017 14:30	Matrix: SOIL
Client Sample: QC for batch 34311	Date Received: 03/23/2017 09:55	%Moisture: 2.5
Client ID: ISM-AOI061-0.5 - After Processing(1		Prep Basis: Dry Weight
Batch ID: 34313	Method: EPA Method 1613B	
Run Date: 04/10/2017 17:06	Analyst: CLP	Instrument: HRP763
Data File: b10apr17b-8		Dilution: 1
Prep Batch: 34311	Prep Method: SW846 3540C	
Prep Date: 02-APR-17	Prep Aliquot: 11.63 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		15.9	pg/g	0.344	0.441
40321-76-4	1,2,3,7,8-PeCDD		87.8	pg/g	0.695	2.20
39227-28-6	1,2,3,4,7,8-HxCDD		85.7	pg/g	1.08	2.20
57653-85-7	1,2,3,6,7,8-HxCDD		104	pg/g	0.890	2.20
19408-74-3	1,2,3,7,8,9-HxCDD		96.5	pg/g	1.02	2.20
35822-46-9	1,2,3,4,6,7,8-HpCDD		864	pg/g	2.77	2.20
3268-87-9	1,2,3,4,6,7,8,9-OCDD	E	10500	pg/g	3.61	4.41
51207-31-9	2,3,7,8-TCDF		17.4	pg/g	0.485	0.441
57117-41-6	1,2,3,7,8-PeCDF		83.4	pg/g	0.402	2.20
57117-31-4	2,3,4,7,8-PeCDF		86.5	pg/g	0.361	2.20
70648-26-9	1,2,3,4,7,8-HxCDF		94.5	pg/g	1.08	2.20
57117-44-9	1,2,3,6,7,8-HxCDF		90.4	pg/g	1.07	2.20
60851-34-5	2,3,4,6,7,8-HxCDF		89.3	pg/g	1.03	2.20
72918-21-9	1,2,3,7,8,9-HxCDF		89.7	pg/g	1.50	2.20
67562-39-4	1,2,3,4,6,7,8-HpCDF		202	pg/g	0.945	2.20
55673-89-7	1,2,3,4,7,8,9-HpCDF		99.2	pg/g	1.55	2.20
39001-02-0	1,2,3,4,6,7,8,9-OCDF		533	pg/g	1.62	4.41

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		156	176	pg/g	88.6	(25%-164%)
13C-1,2,3,7,8-PeCDD		146	176	pg/g	82.7	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		130	176	pg/g	73.5	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		145	176	pg/g	82.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		139	176	pg/g	78.8	(23%-140%)
13C-OCDD		333	353	pg/g	94.6	(17%-157%)
13C-2,3,7,8-TCDF		136	176	pg/g	77.3	(24%-169%)
13C-1,2,3,7,8-PeCDF		147	176	pg/g	83.1	(24%-185%)
13C-2,3,4,7,8-PeCDF		144	176	pg/g	81.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		117	176	pg/g	66.4	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		121	176	pg/g	68.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		124	176	pg/g	70.3	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		136	176	pg/g	76.9	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF		122	176	pg/g	69.0	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		119	176	pg/g	67.5	(26%-138%)
37Cl-2,3,7,8-TCDD		14.1	17.6	pg/g	80.0	(35%-197%)

**Comments:****E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range**K** Estimated Maximum Possible Concentration**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7C0432	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018337	<b>Date Collected:</b> 03/08/2017 14:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34311	<b>Date Received:</b> 03/23/2017 09:55	<b>%Moisture:</b> 2.5
<b>Client ID:</b> ISM-AOI061-0.5 - After Processing(1)		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34313	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 04/11/2017 17:06	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b11apr17a-12		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34311	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 02-APR-17	<b>Prep Aliquot:</b> 11.63 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		17.3	pg/g	0.377	0.441

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.



June 16, 2017

Mr. Philip Nerenberg  
Apex Laboratories  
12232 S.W. Garden Place  
Portland, Oregon 97223

Re: POR DXN  
Work Order: 10849  
SDG: A7E0757

Dear Mr. Nerenberg:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 26, 2017. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,

Cynde Larkins  
Project Manager

Enclosures

SUBCONTRACT ORDER

Apex Laboratories  
A7E0757

LD  
5/25/17

SENDING LABORATORY:

Apex Laboratories  
12232 S.W. Garden Place  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 718-0333  
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Cape Fear Analytical, LLC  
3306 Kitty Hawk Rd Suite 120  
Wilmington, NC 28405  
Phone : (910) 795-0421  
Fax: -

CFA WO# 10849

Sample Name: RB Water Sampled: 05/23/17 10:50 (A7E0757-01)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	06/06/17 17:00	11/19/17 10:50	Low Level Standard Required
Containers Supplied:			
(A) 1 L Amber Glass - Non Preserved			
(B) 1 L Amber Glass - Non Preserved			

DH=7 1.7°C

After ISM Processing

Sample Name: ISM-AOI073-0.5 - After Processing Soil Sampled: 05/23/17 11:00 (A7E0757-03)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	06/06/17 17:00	11/19/17 11:00	Low Level Standard Required, Use Containers A, B, C, D, Use full volume
Containers Supplied:			
(A) 40 mL VOA - Non Preserved			
(B) 40 mL VOA - Non Preserved			
(C) 40 mL VOA - Non Preserved			
(D) 40 mL VOA - Non Preserved			

After ISM Processing

Sample Name: ISM-AOI075-0.5 - After Processing Soil Sampled: 05/23/17 11:20 (A7E0757-05)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	06/06/17 17:00	11/19/17 11:20	Low Level Standard Required, Use Containers A, B, C, D, Use full volume
Containers Supplied:			
(A) 40 mL VOA - Non Preserved			
(B) 40 mL VOA - Non Preserved			
(C) 40 mL VOA - Non Preserved			
(D) 40 mL VOA - Non Preserved			

Standard TAT

APK 5/25/17

FedEx  
UPS (Shipper)

Released By FedEx	Date 26 MAY 17 @	Received By Cathy J Spall @ CFA	Date 26 MAY 17 @ 1000
Released By UPS (Shipper)	Date 26 MAY 17 @	Received By	Date

SUBCONTRACT ORDER

Apex Laboratories

A7E0757

CFA NO #10849

Sample Name: ISM-AOI068-0.5 - After Processing      Soil      After ISM Processing      Sampled: 05/23/17 11:45      (A7E0757-07)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	06/06/17 17:00	11/19/17 11:45	Low Level Standard Required, Use Containers A, B, C, D, Use full volume

Containers Supplied:

- (A)40 mL VOA - Non Preserved
- (B)40 mL VOA - Non Preserved
- (C)40 mL VOA - Non Preserved
- (D)40 mL VOA - Non Preserved

Released By: *[Signature]* Date: 5/23/17      Received By: *[Signature]* Date: 26MAY17 @ 1000

Released By: UPS (Shipper) Date: 26MAY17 @      Received By: UPS (Shipper) Date: 26MAY17 @ 1000

# **High Resolution Dioxins and Furans Analysis**



# Case Narrative

**HDOX Case Narrative  
Apex Laboratories (APEX)  
SDG A7E0757  
Work Order 10849**

**Method/Analysis Information**

**Product:** Dioxins/Furans by EPA Method 1613B  
Analytical Method: EPA Method 1613B  
Extraction Method: SW846 3520C, 3540C  
Analytical Batch Number: 34696, 34719  
Clean Up Batch Number: 34693, 34718  
Extraction Batch Number: 34692, 34717

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in EPA Method 1613B:

<b>Sample ID</b>	<b>Client ID</b>
10849001	RB
10849002	ISM-AOI73-0.5-After Processing
10849003	ISM-AOI075-0.5-After Processing
10849004	ISM-AOI068-0.5-After Processing
12018682	Method Blank (MB)
12018683	Laboratory Control Sample (LCS)
12018684	Laboratory Control Sample Duplicate (LCSD)
12018703	Method Blank (MB)
12018704	Laboratory Control Sample (LCS)
12018705	Laboratory Control Sample Duplicate (LCSD)
12018706	10849002(ISM-AOI73-0.5-After Processing) Matrix Spike (MS)
12018707	10849002(ISM-AOI73-0.5-After Processing) Matrix Spike Duplicate (MSD)

Samples 10849 002, 003 and 004 in this SDG were analyzed on a "dry weight" basis. Sample 10849 001 in this SDG was analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 14.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

### **Calibration Information**

#### **Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

#### **Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

### **Quality Control (QC) Information**

#### **Certification Statement**

The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

#### **Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

#### **Surrogate Recoveries**

All surrogate recoveries were within the established acceptance criteria for this SDG.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

#### **Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits.

#### **LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

#### **QC Sample Designation**

Sample 10849002 (ISM-AOI73-0.5-After Processing)- Batch 34719 was selected for analysis as the matrix spike and matrix spike duplicate.

#### **Matrix Spike/Duplicate (MS/MSD) Recovery Statement**

The MS recoveries for this SDG were not within the acceptance limits. The failures confirm in the matrix spike duplicate and are attributed to matrix interference. 12018706 (ISM-AOI73-0.5-After Processing) and 12018707 (ISM-AOI73-0.5-After Processing)- Batch 34719.

#### **MS/MSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the MS and MSD met the acceptance limits.

### **Technical Information**

### **Holding Time Specifications**

CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

### **Sample Dilutions**

The samples in this SDG did not require dilutions.

### **Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

### **Miscellaneous Information**

#### **Nonconformance (NCR) Documentation**

The following NCR was generated for this SDG: 646482 12018706 (ISM-AOI73-0.5-After Processing) and 12018707 (ISM-AOI73-0.5-After Processing)- Batch 34719.

#### **Manual Integrations**

Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

#### **Sample preparation**

No difficulties were encountered during sample preparation.

#### **Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

# **Sample Data Summary**

## Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

### Qualifier Definition Report for

APEX001 Apex Laboratories

Client SDG: A7E0757 CFA Work Order: 10849

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- J Value is estimated
- K Estimated Maximum Possible Concentration
- U Analyte was analyzed for, but not detected above the specified detection limit.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

**Review/Validation**

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature: 

Name: Heather Patterson

Date: 16 JUN 2017

Title: Group Leader



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10849001	<b>Date Collected:</b> 05/23/2017 10:50	<b>Matrix:</b> WATER
<b>Client Sample:</b> 1613B Water	<b>Date Received:</b> 05/26/2017 10:00	
<b>Client ID:</b> RB		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34696	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/03/2017 08:52	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A02JUN17A_3-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34692	<b>Prep Method:</b> SW846 3520C	
<b>Prep Date:</b> 30-MAY-17	<b>Prep Aliquot:</b> 1018.4 mL	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	1.37	pg/L	1.37	4.91
40321-76-4	1,2,3,7,8-PeCDD	U	1.09	pg/L	1.09	24.5
39227-28-6	1,2,3,4,7,8-HxCDD	U	0.96	pg/L	0.960	24.5
57653-85-7	1,2,3,6,7,8-HxCDD	U	0.884	pg/L	0.884	24.5
19408-74-3	1,2,3,7,8,9-HxCDD	U	0.941	pg/L	0.941	24.5
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	1.55	pg/L	1.55	24.5
3268-87-9	1,2,3,4,6,7,8,9-OCDD	U	2.61	pg/L	2.61	49.1
51207-31-9	2,3,7,8-TCDF	U	1.53	pg/L	1.53	4.91
57117-41-6	1,2,3,7,8-PeCDF	U	0.731	pg/L	0.731	24.5
57117-31-4	2,3,4,7,8-PeCDF	U	0.609	pg/L	0.609	24.5
70648-26-9	1,2,3,4,7,8-HxCDF	U	0.52	pg/L	0.520	24.5
57117-44-9	1,2,3,6,7,8-HxCDF	U	0.473	pg/L	0.473	24.5
60851-34-5	2,3,4,6,7,8-HxCDF	U	0.471	pg/L	0.471	24.5
72918-21-9	1,2,3,7,8,9-HxCDF	U	0.687	pg/L	0.687	24.5
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	0.487	pg/L	0.487	24.5
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	0.758	pg/L	0.758	24.5
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	2.22	pg/L	2.22	49.1
41903-57-5	Total TeCDD	U	1.37	pg/L	1.37	4.91
36088-22-9	Total PeCDD	U	1.09	pg/L	1.09	24.5
34465-46-8	Total HxCDD	U	0.884	pg/L	0.884	24.5
37871-00-4	Total HpCDD	U	1.55	pg/L	1.55	24.5
30402-14-3	Total TeCDF	U	1.53	pg/L	1.53	4.91
30402-15-4	Total PeCDF	U	0.609	pg/L	0.609	24.5
55684-94-1	Total HxCDF	U	0.471	pg/L	0.471	24.5
38998-75-3	Total HpCDF	U	0.487	pg/L	0.487	24.5
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.00	pg/L		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		1.67	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1650	1960	pg/L	83.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		1790	1960	pg/L	91.1	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		1540	1960	pg/L	78.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		1740	1960	pg/L	88.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		1370	1960	pg/L	69.8	(23%-140%)
13C-OCDD		2290	3930	pg/L	58.4	(17%-157%)
13C-2,3,7,8-TCDF		1650	1960	pg/L	84.1	(24%-169%)
13C-1,2,3,7,8-PeCDF		1830	1960	pg/L	93.4	(24%-185%)
13C-2,3,4,7,8-PeCDF		1940	1960	pg/L	98.8	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		1480	1960	pg/L	75.2	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		1570	1960	pg/L	79.7	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		1590	1960	pg/L	80.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		1620	1960	pg/L	82.5	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10849001	<b>Date Collected:</b> 05/23/2017 10:50	<b>Matrix:</b> WATER
<b>Client Sample:</b> 1613B Water	<b>Date Received:</b> 05/26/2017 10:00	
<b>Client ID:</b> RB		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34696	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/03/2017 08:52	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A02JUN17A_3-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34692	<b>Prep Method:</b> SW846 3520C	
<b>Prep Date:</b> 30-MAY-17	<b>Prep Aliquot:</b> 1018.4 mL	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%      Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			1460	1960	pg/L	74.4      (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			1350	1960	pg/L	68.7      (26%-138%)
37Cl-2,3,7,8-TCDD			164	196	pg/L	83.7      (35%-197%)

**Comments:**  
 U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10849002	<b>Date Collected:</b> 05/23/2017 11:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 05/26/2017 10:00	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI73-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/06/2017 13:46	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A06JUN17A-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10.22 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		0.625	pg/g	0.298	0.504
40321-76-4	1,2,3,7,8-PeCDD	J	1.40	pg/g	0.264	2.52
39227-28-6	1,2,3,4,7,8-HxCDD		3.15	pg/g	0.552	2.52
57653-85-7	1,2,3,6,7,8-HxCDD		15.6	pg/g	0.522	2.52
19408-74-3	1,2,3,7,8,9-HxCDD		7.61	pg/g	0.550	2.52
35822-46-9	1,2,3,4,6,7,8-HpCDD		361	pg/g	1.76	2.52
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2240	pg/g	2.40	5.04
51207-31-9	2,3,7,8-TCDF		0.917	pg/g	0.377	0.504
57117-41-6	1,2,3,7,8-PeCDF	J	1.36	pg/g	0.262	2.52
57117-31-4	2,3,4,7,8-PeCDF		3.56	pg/g	0.220	2.52
70648-26-9	1,2,3,4,7,8-HxCDF		8.19	pg/g	0.413	2.52
57117-44-9	1,2,3,6,7,8-HxCDF		3.84	pg/g	0.403	2.52
60851-34-5	2,3,4,6,7,8-HxCDF		4.58	pg/g	0.423	2.52
72918-21-9	1,2,3,7,8,9-HxCDF	J	2.16	pg/g	0.554	2.52
67562-39-4	1,2,3,4,6,7,8-HpCDF		48.2	pg/g	0.490	2.52
55673-89-7	1,2,3,4,7,8,9-HpCDF		2.57	pg/g	0.721	2.52
39001-02-0	1,2,3,4,6,7,8,9-OCDF		49.8	pg/g	0.989	5.04
41903-57-5	Total TeCDD	K	8.03	pg/g	0.298	1.01
36088-22-9	Total PeCDD	K	13.1	pg/g	0.264	5.04
34465-46-8	Total HxCDD	K	77.7	pg/g	0.522	5.04
37871-00-4	Total HpCDD		616	pg/g	1.76	5.04
30402-14-3	Total TeCDF	K	8.53	pg/g	0.377	1.01
30402-15-4	Total PeCDF		36.2	pg/g	0.0602	5.04
55684-94-1	Total HxCDF		99.9	pg/g	0.403	5.04
38998-75-3	Total HpCDF		122	pg/g	0.490	5.04
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		12.5	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		12.5	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		165	201	pg/g	82.0	(25%-164%)
13C-1,2,3,7,8-PeCDD		192	201	pg/g	95.5	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		146	201	pg/g	72.7	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		163	201	pg/g	81.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		149	201	pg/g	74.1	(23%-140%)
13C-OCDD		284	403	pg/g	70.5	(17%-157%)
13C-2,3,7,8-TCDF		175	201	pg/g	86.9	(24%-169%)
13C-1,2,3,7,8-PeCDF		192	201	pg/g	95.1	(24%-185%)
13C-2,3,4,7,8-PeCDF		196	201	pg/g	97.0	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		140	201	pg/g	69.3	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		139	201	pg/g	68.7	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		145	201	pg/g	72.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		159	201	pg/g	78.9	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10849002	<b>Date Collected:</b> 05/23/2017 11:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 05/26/2017 10:00	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI73-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/06/2017 13:46	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A06JUN17A-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10.22 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			141	201	pg/g	69.9 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			140	201	pg/g	69.3 (26%-138%)
37Cl-2,3,7,8-TCDD			19.0	20.1	pg/g	94.1 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10849003	<b>Date Collected:</b> 05/23/2017 11:20	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 05/26/2017 10:00	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI075-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/06/2017 16:10	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A06JUN17A-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10.26 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	K	1.20	pg/g	0.221	0.502
40321-76-4	1,2,3,7,8-PeCDD	J	1.70	pg/g	0.185	2.51
39227-28-6	1,2,3,4,7,8-HxCDD	K	2.95	pg/g	0.679	2.51
57653-85-7	1,2,3,6,7,8-HxCDD		14.5	pg/g	0.630	2.51
19408-74-3	1,2,3,7,8,9-HxCDD		7.85	pg/g	0.671	2.51
35822-46-9	1,2,3,4,6,7,8-HpCDD		322	pg/g	1.54	2.51
3268-87-9	1,2,3,4,6,7,8,9-OCDD		1800	pg/g	2.19	5.02
51207-31-9	2,3,7,8-TCDF		1.07	pg/g	0.319	0.502
57117-41-6	1,2,3,7,8-PeCDF	JK	1.52	pg/g	0.335	2.51
57117-31-4	2,3,4,7,8-PeCDF		3.45	pg/g	0.283	2.51
70648-26-9	1,2,3,4,7,8-HxCDF		6.07	pg/g	0.404	2.51
57117-44-9	1,2,3,6,7,8-HxCDF		3.06	pg/g	0.396	2.51
60851-34-5	2,3,4,6,7,8-HxCDF		4.20	pg/g	0.442	2.51
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.82	pg/g	0.554	2.51
67562-39-4	1,2,3,4,6,7,8-HpCDF		44.2	pg/g	0.387	2.51
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	2.38	pg/g	0.538	2.51
39001-02-0	1,2,3,4,6,7,8,9-OCDF		47.4	pg/g	0.640	5.02
41903-57-5	Total TeCDD	K	9.02	pg/g	0.221	1.00
36088-22-9	Total PeCDD	K	13.3	pg/g	0.185	5.02
34465-46-8	Total HxCDD	K	75.2	pg/g	0.630	5.02
37871-00-4	Total HpCDD		537	pg/g	1.54	5.02
30402-14-3	Total TeCDF	K	14.3	pg/g	0.319	1.00
30402-15-4	Total PeCDF	K	36.8	pg/g	0.047	5.02
55684-94-1	Total HxCDF		83.5	pg/g	0.396	5.02
38998-75-3	Total HpCDF		113	pg/g	0.387	5.02
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		12.4	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		12.4	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		159	201	pg/g	79.4	(25%-164%)
13C-1,2,3,7,8-PeCDD		186	201	pg/g	92.7	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		154	201	pg/g	76.9	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		151	201	pg/g	75.3	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		146	201	pg/g	72.8	(23%-140%)
13C-OCDD		283	402	pg/g	70.5	(17%-157%)
13C-2,3,7,8-TCDF		165	201	pg/g	82.0	(24%-169%)
13C-1,2,3,7,8-PeCDF		185	201	pg/g	91.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		189	201	pg/g	94.2	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		138	201	pg/g	68.9	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		139	201	pg/g	69.3	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		145	201	pg/g	72.1	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		159	201	pg/g	79.3	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10849003	<b>Date Collected:</b> 05/23/2017 11:20	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 05/26/2017 10:00	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI075-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/06/2017 16:10	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A06JUN17A-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10.26 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			141	201	pg/g	70.3 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			141	201	pg/g	70.4 (26%-138%)
37Cl-2,3,7,8-TCDD			18.1	20.1	pg/g	90.4 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10849003	<b>Date Collected:</b> 05/23/2017 11:20	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 05/26/2017 10:00	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI075-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/15/2017 13:21	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A15JUN17B-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10.26 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		1.07	pg/g	0.144	0.502

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10849004	<b>Date Collected:</b> 05/23/2017 11:45	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 05/26/2017 10:00	<b>%Moisture:</b> 2.4
<b>Client ID:</b> ISM-AOI068-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/13/2017 06:25	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A12JUN17B_2-12		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10.21 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.255	pg/g	0.241	0.502
40321-76-4	1,2,3,7,8-PeCDD	J	1.34	pg/g	0.148	2.51
39227-28-6	1,2,3,4,7,8-HxCDD		2.53	pg/g	0.381	2.51
57653-85-7	1,2,3,6,7,8-HxCDD		11.3	pg/g	0.353	2.51
19408-74-3	1,2,3,7,8,9-HxCDD		6.39	pg/g	0.375	2.51
35822-46-9	1,2,3,4,6,7,8-HpCDD		277	pg/g	1.14	2.51
3268-87-9	1,2,3,4,6,7,8,9-OCDD		1750	pg/g	1.39	5.02
51207-31-9	2,3,7,8-TCDF	K	0.612	pg/g	0.369	0.502
57117-41-6	1,2,3,7,8-PeCDF	J	1.10	pg/g	0.191	2.51
57117-31-4	2,3,4,7,8-PeCDF	J	2.16	pg/g	0.167	2.51
70648-26-9	1,2,3,4,7,8-HxCDF		5.28	pg/g	0.233	2.51
57117-44-9	1,2,3,6,7,8-HxCDF		2.54	pg/g	0.217	2.51
60851-34-5	2,3,4,6,7,8-HxCDF		3.14	pg/g	0.223	2.51
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.39	pg/g	0.271	2.51
67562-39-4	1,2,3,4,6,7,8-HpCDF		38.2	pg/g	0.265	2.51
55673-89-7	1,2,3,4,7,8,9-HpCDF		3.05	pg/g	0.383	2.51
39001-02-0	1,2,3,4,6,7,8,9-OCDF		68.1	pg/g	0.373	5.02
41903-57-5	Total TeCDD	K	2.19	pg/g	0.241	1.00
36088-22-9	Total PeCDD	K	7.90	pg/g	0.148	5.02
34465-46-8	Total HxCDD		58.1	pg/g	0.353	5.02
37871-00-4	Total HpCDD		467	pg/g	1.14	5.02
30402-14-3	Total TeCDF	K	5.96	pg/g	0.369	1.00
30402-15-4	Total PeCDF		24.8	pg/g	0.0347	5.02
55684-94-1	Total HxCDF	K	63.6	pg/g	0.217	5.02
38998-75-3	Total HpCDF	K	107	pg/g	0.265	5.02
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		9.31	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		9.31	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		165	201	pg/g	82.0	(25%-164%)
13C-1,2,3,7,8-PeCDD		204	201	pg/g	101	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		155	201	pg/g	77.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		155	201	pg/g	77.0	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		140	201	pg/g	69.7	(23%-140%)
13C-OCDD		285	402	pg/g	71.1	(17%-157%)
13C-2,3,7,8-TCDF		149	201	pg/g	74.4	(24%-169%)
13C-1,2,3,7,8-PeCDF		180	201	pg/g	89.8	(24%-185%)
13C-2,3,4,7,8-PeCDF		194	201	pg/g	96.4	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		134	201	pg/g	67.0	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		126	201	pg/g	62.9	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		138	201	pg/g	68.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		150	201	pg/g	74.9	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10849004	<b>Date Collected:</b> 05/23/2017 11:45	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 05/26/2017 10:00	<b>%Moisture:</b> 2.4
<b>Client ID:</b> ISM-AOI068-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/13/2017 06:25	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A12JUN17B_2-12		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10.21 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			128	201	pg/g	63.5 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			127	201	pg/g	63.1 (26%-138%)
37Cl-2,3,7,8-TCDD			16.7	20.1	pg/g	83.3 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration

# **Quality Control Summary**

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A7E0757

Matrix Type: LIQUID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12018683	LCS for batch 34692	13C-2,3,7,8-TCDD		93.4	(20%-175%)
		13C-1,2,3,7,8-PeCDD		108	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		82.4	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		91.4	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		76.0	(22%-166%)
		13C-OCDD		60.4	(13%-199%)
		13C-2,3,7,8-TCDF		94.1	(22%-152%)
		13C-1,2,3,7,8-PeCDF		108	(21%-192%)
		13C-2,3,4,7,8-PeCDF		113	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		80.6	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		81.5	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		85.7	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		86.2	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		78.9	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		71.9	(20%-186%)
		37Cl-2,3,7,8-TCDD		96.6	(31%-191%)
12018684	LCSD for batch 34692	13C-2,3,7,8-TCDD		87.3	(20%-175%)
		13C-1,2,3,7,8-PeCDD		99.6	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		81.8	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		84.3	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		72.9	(22%-166%)
		13C-OCDD		60.2	(13%-199%)
		13C-2,3,7,8-TCDF		84.7	(22%-152%)
		13C-1,2,3,7,8-PeCDF		97.4	(21%-192%)
		13C-2,3,4,7,8-PeCDF		102	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		76.0	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		77.1	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		78.2	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		82.9	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		73.6	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		69.6	(20%-186%)
		37Cl-2,3,7,8-TCDD		90.3	(31%-191%)
12018682	MB for batch 34692	13C-2,3,7,8-TCDD		80.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		92.7	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		78.9	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		83.4	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		70.5	(23%-140%)
		13C-OCDD		58.2	(17%-157%)
		13C-2,3,7,8-TCDF		81.2	(24%-169%)
		13C-1,2,3,7,8-PeCDF		90.8	(24%-185%)
		13C-2,3,4,7,8-PeCDF		94.5	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		73.9	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		74.2	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		78.6	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		78.2	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		74.0	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		64.8	(26%-138%)
		37Cl-2,3,7,8-TCDD		81.1	(35%-197%)
10849001	RB	13C-2,3,7,8-TCDD		83.8	(25%-164%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7E0757

Matrix Type: LIQUID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
10849001	RB	13C-1,2,3,7,8-PeCDD		91.1	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		78.4	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		88.5	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		69.8	(23%-140%)
		13C-OCDD		58.4	(17%-157%)
		13C-2,3,7,8-TCDF		84.1	(24%-169%)
		13C-1,2,3,7,8-PeCDF		93.4	(24%-185%)
		13C-2,3,4,7,8-PeCDF		98.8	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		75.2	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		79.7	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		80.8	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		82.5	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		74.4	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		68.7	(26%-138%)
		37Cl-2,3,7,8-TCDD		83.7	(35%-197%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted



**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A7E0757

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12018704	LCS for batch 34717	13C-2,3,7,8-TCDD		83.6	(20%-175%)
		13C-1,2,3,7,8-PeCDD		97.0	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		76.0	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		83.0	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		70.7	(22%-166%)
		13C-OCDD		60.8	(13%-199%)
		13C-2,3,7,8-TCDF		87.5	(22%-152%)
		13C-1,2,3,7,8-PeCDF		96.0	(21%-192%)
		13C-2,3,4,7,8-PeCDF		98.3	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		69.7	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		73.6	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		77.8	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		81.6	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		68.1	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		68.7	(20%-186%)
		37Cl-2,3,7,8-TCDD		91.3	(31%-191%)
12018705	LCSD for batch 34717	13C-2,3,7,8-TCDD		81.9	(20%-175%)
		13C-1,2,3,7,8-PeCDD		95.3	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		72.3	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		76.9	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		65.8	(22%-166%)
		13C-OCDD		56.8	(13%-199%)
		13C-2,3,7,8-TCDF		85.0	(22%-152%)
		13C-1,2,3,7,8-PeCDF		92.8	(21%-192%)
		13C-2,3,4,7,8-PeCDF		95.7	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		66.1	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		69.3	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		71.9	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		77.5	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		64.5	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		62.6	(20%-186%)
		37Cl-2,3,7,8-TCDD		93.5	(31%-191%)
12018703	MB for batch 34717	13C-2,3,7,8-TCDD		77.9	(25%-164%)
		13C-1,2,3,7,8-PeCDD		89.8	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		77.2	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		75.5	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		71.7	(23%-140%)
		13C-OCDD		60.7	(17%-157%)
		13C-2,3,7,8-TCDF		79.7	(24%-169%)
		13C-1,2,3,7,8-PeCDF		91.0	(24%-185%)
		13C-2,3,4,7,8-PeCDF		92.8	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		69.8	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		72.5	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		75.2	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		82.5	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		70.4	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		69.0	(26%-138%)
		37Cl-2,3,7,8-TCDD		89.4	(35%-197%)
10849002	ISM-AOI73-0.5-After Processing	13C-2,3,7,8-TCDD		82.0	(25%-164%)

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A7E0757

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
10849002	ISM-AOI73-0.5-After Processing	13C-1,2,3,7,8-PeCDD		95.5	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		72.7	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		81.1	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		74.1	(23%-140%)
		13C-OCDD		70.5	(17%-157%)
		13C-2,3,7,8-TCDF		86.9	(24%-169%)
		13C-1,2,3,7,8-PeCDF		95.1	(24%-185%)
		13C-2,3,4,7,8-PeCDF		97.0	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		69.3	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		68.7	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		72.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		78.9	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		69.9	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		69.3	(26%-138%)
		37Cl-2,3,7,8-TCDD		94.1	(35%-197%)
12018706	ISM-AOI73-0.5-After Processing(10849002M)	13C-2,3,7,8-TCDD		68.5	(25%-164%)
		13C-1,2,3,7,8-PeCDD		87.2	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		64.7	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		72.0	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		64.3	(23%-140%)
		13C-OCDD		61.6	(17%-157%)
		13C-2,3,7,8-TCDF		72.8	(24%-169%)
		13C-1,2,3,7,8-PeCDF		86.2	(24%-185%)
		13C-2,3,4,7,8-PeCDF		89.5	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		61.6	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		61.2	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		63.8	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		71.3	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		60.8	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		60.7	(26%-138%)
37Cl-2,3,7,8-TCDD		75.6	(35%-197%)		
12018707	ISM-AOI73-0.5-After Processing(10849002M)	13C-2,3,7,8-TCDD		69.4	(25%-164%)
		13C-1,2,3,7,8-PeCDD		85.4	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		64.6	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		74.7	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		64.9	(23%-140%)
		13C-OCDD		64.1	(17%-157%)
		13C-2,3,7,8-TCDF		72.1	(24%-169%)
		13C-1,2,3,7,8-PeCDF		86.5	(24%-185%)
		13C-2,3,4,7,8-PeCDF		88.4	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		62.6	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		61.6	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		64.8	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		72.3	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		61.6	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		59.4	(26%-138%)
37Cl-2,3,7,8-TCDD		78.5	(35%-197%)		
10849003	ISM-AOI075-0.5-After Processing	13C-2,3,7,8-TCDD		79.4	(25%-164%)
		13C-1,2,3,7,8-PeCDD		92.7	(25%-181%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7E0757

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
10849003	ISM-AOI075-0.5-After Processing	13C-1,2,3,4,7,8-HxCDD		76.9	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		75.3	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		72.8	(23%-140%)
		13C-OCDD		70.5	(17%-157%)
		13C-2,3,7,8-TCDF		82.0	(24%-169%)
		13C-1,2,3,7,8-PeCDF		91.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		94.2	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		68.9	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		69.3	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		72.1	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		79.3	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		70.3	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		70.4	(26%-138%)
		37Cl-2,3,7,8-TCDD		90.4	(35%-197%)
		10849004	ISM-AOI068-0.5-After Processing	13C-2,3,7,8-TCDD	
13C-1,2,3,7,8-PeCDD				101	(25%-181%)
13C-1,2,3,4,7,8-HxCDD				77.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD				77.0	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD				69.7	(23%-140%)
13C-OCDD				71.1	(17%-157%)
13C-2,3,7,8-TCDF				74.4	(24%-169%)
13C-1,2,3,7,8-PeCDF				89.8	(24%-185%)
13C-2,3,4,7,8-PeCDF				96.4	(21%-178%)
13C-1,2,3,4,7,8-HxCDF				67.0	(26%-152%)
13C-1,2,3,6,7,8-HxCDF				62.9	(26%-123%)
13C-2,3,4,6,7,8-HxCDF				68.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF				74.9	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF				63.5	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF				63.1	(26%-138%)
37Cl-2,3,7,8-TCDD		83.3	(35%-197%)		

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A7E0757

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 34692

Matrix: WATER

Lab Sample ID: 12018683

Instrument: HRP750

Analysis Date: 06/02/2017 15:12

Dilution: 1

Analyst: CLP

Prep Batch ID: 34692

Batch ID: 34696

CAS No.	Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	200	211	105	67-158
40321-76-4	LCS 1,2,3,7,8-PeCDD	1000	1020	102	70-142
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	1000	1080	108	70-164
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	1000	1030	103	74-134
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	1000	1090	109	64-162
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	1000	1020	102	70-140
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	2000	2120	106	78-144
51207-31-9	LCS 2,3,7,8-TCDF	200	202	101	75-158
57117-41-6	LCS 1,2,3,7,8-PeCDF	1000	1010	101	80-134
57117-31-4	LCS 2,3,4,7,8-PeCDF	1000	1000	100	68-160
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	1000	1010	101	72-134
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	1000	1010	101	84-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	1000	987	98.7	70-156
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	1000	1010	101	78-130
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	1000	970	97	82-122
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	1000	980	98	78-138
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	2000	2090	105	63-170

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A7E0757

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 34692

Matrix: WATER

Lab Sample ID: 12018684

Instrument: HRP750

Analysis Date: 06/02/2017 15:59

Dilution: 1

Analyst: CLP

Prep Batch ID: 34692

Batch ID: 34696

CAS No.	Parmname	Amount Added pg/L	Spike Conc. pg/L	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	200	206	103	67-158	2.07	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	1000	1030	103	70-142	0.794	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	1000	1040	104	70-164	3.68	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	1000	1060	106	74-134	2.36	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	1000	1070	107	64-162	1.38	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	1000	1030	103	70-140	1.23	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	2000	2110	106	78-144	0.323	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	200	202	101	75-158	0.168	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	1000	1020	102	80-134	0.760	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	1000	998	99.8	68-160	0.557	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	1000	1030	103	72-134	2.09	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	1000	1020	102	84-130	0.804	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	1000	1040	104	70-156	5.59	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	1000	1040	104	78-130	2.33	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	1000	1010	101	82-122	4.50	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	1000	1020	102	78-138	4.39	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	2000	2090	104	63-170	0.308	0-20

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

**SDG Number:** A7E0757  
**Client ID:** LCS for batch 34717  
**Lab Sample ID:** 12018704  
**Instrument:** HRP750  
**Analyst:** CLP

**Sample Type:** Laboratory Control Sample  
**Matrix:** SOIL  
**Analysis Date:** 06/06/2017 11:24  
**Prep Batch ID:** 34717  
**Batch ID:** 34719  
**Dilution:** 1

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	
1746-01-6	LCS	2,3,7,8-TCDD	20.0	22.1	111	67-158
40321-76-4	LCS	1,2,3,7,8-PeCDD	100	102	102	70-142
39227-28-6	LCS	1,2,3,4,7,8-HxCDD	100	103	103	70-164
57653-85-7	LCS	1,2,3,6,7,8-HxCDD	100	101	101	76-134
19408-74-3	LCS	1,2,3,7,8,9-HxCDD	100	113	113	64-162
35822-46-9	LCS	1,2,3,4,6,7,8-HpCDD	100	104	104	70-140
3268-87-9	LCS	1,2,3,4,6,7,8,9-OCDD	200	206	103	78-144
51207-31-9	LCS	2,3,7,8-TCDF	20.0	20.3	102	75-158
57117-41-6	LCS	1,2,3,7,8-PeCDF	100	100	100	80-134
57117-31-4	LCS	2,3,4,7,8-PeCDF	100	98.8	98.8	68-160
70648-26-9	LCS	1,2,3,4,7,8-HxCDF	100	98.6	98.6	72-134
57117-44-9	LCS	1,2,3,6,7,8-HxCDF	100	99.2	99.2	84-130
60851-34-5	LCS	2,3,4,6,7,8-HxCDF	100	98.7	98.7	70-156
72918-21-9	LCS	1,2,3,7,8,9-HxCDF	100	97.4	97.4	78-130
67562-39-4	LCS	1,2,3,4,6,7,8-HpCDF	100	98.7	98.7	82-122
55673-89-7	LCS	1,2,3,4,7,8,9-HpCDF	100	96.1	96.1	78-138
39001-02-0	LCS	1,2,3,4,6,7,8,9-OCDF	200	205	102	63-170





Hi-Res Dioxins/Furans  
Quality Control Summary  
Spike Recovery Report

SDG Number: A7E0757  
Client ID: ISM-AOI73-0.5-After  
Processing(10849002M)  
Lab Sample ID: 12018706  
Instrument: HRP750  
Analyst: CLP

Sample Type: Matrix Spike  
Matrix: SOIL  
%Moisture: 2.9  
Analysis Date: 06/06/2017 14:34  
Prep Batch ID:34717  
Batch ID: 34719  
Dilution: 1

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits
1746-01-6	MS 2,3,7,8-TCDD	20.3	23.1	110	70-130
40321-76-4	MS 1,2,3,7,8-PeCDD	102 J	108	105	70-130
39227-28-6	MS 1,2,3,4,7,8-HxCDD	102	109	104	70-130
57653-85-7	MS 1,2,3,6,7,8-HxCDD	102	119	102	70-130
19408-74-3	MS 1,2,3,7,8,9-HxCDD	102	116	107	70-130
35822-46-9	MS 1,2,3,4,6,7,8-HpCDD	102	500	136 *	70-130
3268-87-9	MS 1,2,3,4,6,7,8,9-OCDD	203	2740	246 *	70-130
51207-31-9	MS 2,3,7,8-TCDF	20.3	22.0	104	70-130
57117-41-6	MS 1,2,3,7,8-PeCDF	102 J	104	101	70-130
57117-31-4	MS 2,3,4,7,8-PeCDF	102	104	98.9	70-130
70648-26-9	MS 1,2,3,4,7,8-HxCDF	102	109	99.2	70-130
57117-44-9	MS 1,2,3,6,7,8-HxCDF	102	104	98.4	70-130
60851-34-5	MS 2,3,4,6,7,8-HxCDF	102	108	101	70-130
72918-21-9	MS 1,2,3,7,8,9-HxCDF	102 J	102	98.4	70-130
67562-39-4	MS 1,2,3,4,6,7,8-HpCDF	102	157	107	70-130
55673-89-7	MS 1,2,3,4,7,8,9-HpCDF	102	102	97.8	70-130
39001-02-0	MS 1,2,3,4,6,7,8,9-OCDF	203	248	97.4	70-130

Hi-Res Dioxins/Furans  
Quality Control Summary  
Spike Recovery Report

SDG Number: A7E0757  
Client ID: ISM-AOI73-0.5-After  
Processing(10849002M)  
Lab Sample ID: 12018707  
Instrument: HRP750  
Analyst: CLP

Sample Type: Matrix Spike Duplicate  
Matrix: SOIL  
%Moisture: 2.9  
Analysis Date: 06/06/2017 15:22  
Prep Batch ID:34717  
Batch ID: 34719  
Dilution: 1

CAS No.	Parmname	Amount Added pg/g		Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	MSD 2,3,7,8-TCDD	20.3		23.6	113	70-130	2.21	0-20
40321-76-4	MSD 1,2,3,7,8-PeCDD	102	J	106	103	70-130	1.87	0-20
39227-28-6	MSD 1,2,3,4,7,8-HxCDD	102		112	107	70-130	2.83	0-20
57653-85-7	MSD 1,2,3,6,7,8-HxCDD	102		116	98.3	70-130	2.93	0-20
19408-74-3	MSD 1,2,3,7,8,9-HxCDD	102		120	111	70-130	3.52	0-20
35822-46-9	MSD 1,2,3,4,6,7,8-HpCDD	102		517	153 *	70-130	3.40	0-20
3268-87-9	MSD 1,2,3,4,6,7,8,9-OCDD	203		2670	212 *	70-130	2.59	0-20
51207-31-9	MSD 2,3,7,8-TCDF	20.3		22.1	104	70-130	0.701	0-20
57117-41-6	MSD 1,2,3,7,8-PeCDF	102	J	102	98.5	70-130	2.48	0-20
57117-31-4	MSD 2,3,4,7,8-PeCDF	102		102	96.6	70-130	2.27	0-20
70648-26-9	MSD 1,2,3,4,7,8-HxCDF	102		109	99.4	70-130	0.199	0-20
57117-44-9	MSD 1,2,3,6,7,8-HxCDF	102		105	99.4	70-130	0.958	0-20
60851-34-5	MSD 2,3,4,6,7,8-HxCDF	102		106	100	70-130	1.33	0-20
72918-21-9	MSD 1,2,3,7,8,9-HxCDF	102	J	98.9	95.1	70-130	3.35	0-20
67562-39-4	MSD 1,2,3,4,6,7,8-HpCDF	102		149	99.1	70-130	4.97	0-20
55673-89-7	MSD 1,2,3,4,7,8,9-HpCDF	102		103	99	70-130	1.22	0-20
39001-02-0	MSD 1,2,3,4,6,7,8,9-OCDF	203		237	92.1	70-130	4.43	0-20

## Method Blank Summary

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SDG Number: A7E0757  
Client ID: MB for batch 34692  
Lab Sample ID: 12018682  
Column:

Client: APEX001  
Instrument ID: HRP750  
Prep Date: 30-MAY-17

Matrix: WATER  
Data File: A02JUN17A\_2-3  
Analyzed: 06/02/17 16:47

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 34692	12018683	A02JUN17A_2-1	06/02/17	1512
02 LCSD for batch 34692	12018684	A02JUN17A_2-2	06/02/17	1559
03 RB	10849001	A02JUN17A_3-9	06/03/17	0852

## Method Blank Summary

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SDG Number: A7E0757  
Client ID: MB for batch 34717  
Lab Sample ID: 12018703  
Column:

Client: APEX001  
Instrument ID: HRP750  
Prep Date: 04-JUN-17

Matrix: SOIL  
Data File: A06JUN17A-4  
Analyzed: 06/06/17 12:58

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 34717	12018704	A06JUN17A-2	06/06/17	1124
02 LCSD for batch 34717	12018705	A06JUN17A-3	06/06/17	1211
03 ISM-AOI73-0.5-After Processing	10849002	A06JUN17A-5	06/06/17	1346
04 ISM-AOI73-0.5-After Processing(10849002M	12018706	A06JUN17A-6	06/06/17	1434
05 ISM-AOI73-0.5-After Processing(10849002M	12018707	A06JUN17A-7	06/06/17	1522
06 ISM-AOI075-0.5-After Processing	10849003	A06JUN17A-8	06/06/17	1610
07 ISM-AOI068-0.5-After Processing	10849004	A12JUN17B_2-12	06/13/17	0625
08 ISM-AOI075-0.5-After Processing	10849003	A15JUN17B-4	06/15/17	1321

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018682		<b>Matrix:</b> WATER
<b>Client Sample:</b> QC for batch 34692		
<b>Client ID:</b> MB for batch 34692		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34696	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/02/2017 16:47	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A02JUN17A_2-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34692	<b>Prep Method:</b> SW846 3520C	
<b>Prep Date:</b> 30-MAY-17	<b>Prep Aliquot:</b> 1000 mL	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	1.73	pg/L	1.73	5.00
40321-76-4	1,2,3,7,8-PeCDD	U	0.844	pg/L	0.844	25.0
39227-28-6	1,2,3,4,7,8-HxCDD	U	1.46	pg/L	1.46	25.0
57653-85-7	1,2,3,6,7,8-HxCDD	U	1.3	pg/L	1.30	25.0
19408-74-3	1,2,3,7,8,9-HxCDD	U	1.41	pg/L	1.41	25.0
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	1.69	pg/L	1.69	25.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD	JK	4.56	pg/L	2.48	50.0
51207-31-9	2,3,7,8-TCDF	U	1.71	pg/L	1.71	5.00
57117-41-6	1,2,3,7,8-PeCDF	U	0.806	pg/L	0.806	25.0
57117-31-4	2,3,4,7,8-PeCDF	U	0.658	pg/L	0.658	25.0
70648-26-9	1,2,3,4,7,8-HxCDF	U	0.812	pg/L	0.812	25.0
57117-44-9	1,2,3,6,7,8-HxCDF	U	0.816	pg/L	0.816	25.0
60851-34-5	2,3,4,6,7,8-HxCDF	U	0.756	pg/L	0.756	25.0
72918-21-9	1,2,3,7,8,9-HxCDF	JK	1.88	pg/L	1.08	25.0
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	0.902	pg/L	0.902	25.0
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	1.46	pg/L	1.46	25.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	3.1	pg/L	3.10	50.0
41903-57-5	Total TeCDD	U	1.73	pg/L	1.73	5.00
36088-22-9	Total PeCDD	U	0.844	pg/L	0.844	25.0
34465-46-8	Total HxCDD	U	1.3	pg/L	1.30	25.0
37871-00-4	Total HpCDD	JK	2.12	pg/L	1.69	25.0
30402-14-3	Total TeCDF	U	1.71	pg/L	1.71	5.00
30402-15-4	Total PeCDF	U	0.658	pg/L	0.658	25.0
55684-94-1	Total HxCDF	JK	1.88	pg/L	0.756	25.0
38998-75-3	Total HpCDF	U	0.902	pg/L	0.902	25.0
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.189	pg/L		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		2.02	pg/L		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1620	2000	pg/L	80.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		1850	2000	pg/L	92.7	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		1580	2000	pg/L	78.9	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		1670	2000	pg/L	83.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		1410	2000	pg/L	70.5	(23%-140%)
13C-OCDD		2330	4000	pg/L	58.2	(17%-157%)
13C-2,3,7,8-TCDF		1620	2000	pg/L	81.2	(24%-169%)
13C-1,2,3,7,8-PeCDF		1820	2000	pg/L	90.8	(24%-185%)
13C-2,3,4,7,8-PeCDF		1890	2000	pg/L	94.5	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		1480	2000	pg/L	73.9	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		1480	2000	pg/L	74.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		1570	2000	pg/L	78.6	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		1560	2000	pg/L	78.2	(29%-147%)



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018682		<b>Matrix:</b> WATER
<b>Client Sample:</b> QC for batch 34692		
<b>Client ID:</b> MB for batch 34692		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34696	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/02/2017 16:47	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A02JUN17A_2-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34692	<b>Prep Method:</b> SW846 3520C	
<b>Prep Date:</b> 30-MAY-17	<b>Prep Aliquot:</b> 1000 mL	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%      Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			1480	2000	pg/L	74.0      (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			1300	2000	pg/L	64.8      (26%-138%)
37Cl-2,3,7,8-TCDD			162	200	pg/L	81.1      (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018683		<b>Matrix:</b> WATER
<b>Client Sample:</b> QC for batch 34692		
<b>Client ID:</b> LCS for batch 34692		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34696	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/02/2017 15:12	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A02JUN17A_2-1		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34692	<b>Prep Method:</b> SW846 3520C	
<b>Prep Date:</b> 30-MAY-17	<b>Prep Aliquot:</b> 1000 mL	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		211	pg/L	2.26	5.00
40321-76-4	1,2,3,7,8-PeCDD		1020	pg/L	2.10	25.0
39227-28-6	1,2,3,4,7,8-HxCDD		1080	pg/L	5.36	25.0
57653-85-7	1,2,3,6,7,8-HxCDD		1030	pg/L	4.84	25.0
19408-74-3	1,2,3,7,8,9-HxCDD		1090	pg/L	5.20	25.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		1020	pg/L	5.78	25.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2120	pg/L	11.8	50.0
51207-31-9	2,3,7,8-TCDF		202	pg/L	2.20	5.00
57117-41-6	1,2,3,7,8-PeCDF		1010	pg/L	3.56	25.0
57117-31-4	2,3,4,7,8-PeCDF		1000	pg/L	2.98	25.0
70648-26-9	1,2,3,4,7,8-HxCDF		1010	pg/L	6.96	25.0
57117-44-9	1,2,3,6,7,8-HxCDF		1010	pg/L	6.44	25.0
60851-34-5	2,3,4,6,7,8-HxCDF		987	pg/L	6.60	25.0
72918-21-9	1,2,3,7,8,9-HxCDF		1010	pg/L	9.48	25.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		970	pg/L	5.30	25.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		980	pg/L	9.06	25.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2090	pg/L	12.9	50.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1870	2000	pg/L	93.4	(20%-175%)
13C-1,2,3,7,8-PeCDD		2160	2000	pg/L	108	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		1650	2000	pg/L	82.4	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		1830	2000	pg/L	91.4	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		1520	2000	pg/L	76.0	(22%-166%)
13C-OCDD		2410	4000	pg/L	60.4	(13%-199%)
13C-2,3,7,8-TCDF		1880	2000	pg/L	94.1	(22%-152%)
13C-1,2,3,7,8-PeCDF		2150	2000	pg/L	108	(21%-192%)
13C-2,3,4,7,8-PeCDF		2260	2000	pg/L	113	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		1610	2000	pg/L	80.6	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		1630	2000	pg/L	81.5	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		1710	2000	pg/L	85.7	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		1720	2000	pg/L	86.2	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		1580	2000	pg/L	78.9	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		1440	2000	pg/L	71.9	(20%-186%)
37Cl-2,3,7,8-TCDD		193	200	pg/L	96.6	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018684		<b>Matrix:</b> WATER
<b>Client Sample:</b> QC for batch 34692		
<b>Client ID:</b> LCSD for batch 34692		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34696	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/02/2017 15:59	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A02JUN17A_2-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34692	<b>Prep Method:</b> SW846 3520C	
<b>Prep Date:</b> 30-MAY-17	<b>Prep Aliquot:</b> 1000 mL	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		206	pg/L	1.71	5.00
40321-76-4	1,2,3,7,8-PeCDD		1030	pg/L	1.82	25.0
39227-28-6	1,2,3,4,7,8-HxCDD		1040	pg/L	5.94	25.0
57653-85-7	1,2,3,6,7,8-HxCDD		1060	pg/L	5.36	25.0
19408-74-3	1,2,3,7,8,9-HxCDD		1070	pg/L	5.76	25.0
35822-46-9	1,2,3,4,6,7,8-HpCDD		1030	pg/L	5.70	25.0
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2110	pg/L	14.1	50.0
51207-31-9	2,3,7,8-TCDF		202	pg/L	2.16	5.00
57117-41-6	1,2,3,7,8-PeCDF		1020	pg/L	3.78	25.0
57117-31-4	2,3,4,7,8-PeCDF		998	pg/L	3.00	25.0
70648-26-9	1,2,3,4,7,8-HxCDF		1030	pg/L	5.62	25.0
57117-44-9	1,2,3,6,7,8-HxCDF		1020	pg/L	5.46	25.0
60851-34-5	2,3,4,6,7,8-HxCDF		1040	pg/L	5.58	25.0
72918-21-9	1,2,3,7,8,9-HxCDF		1040	pg/L	7.38	25.0
67562-39-4	1,2,3,4,6,7,8-HpCDF		1010	pg/L	5.12	25.0
55673-89-7	1,2,3,4,7,8,9-HpCDF		1020	pg/L	7.56	25.0
39001-02-0	1,2,3,4,6,7,8,9-OCDF		2090	pg/L	13.4	50.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		1750	2000	pg/L	87.3	(20%-175%)
13C-1,2,3,7,8-PeCDD		1990	2000	pg/L	99.6	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		1640	2000	pg/L	81.8	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		1690	2000	pg/L	84.3	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		1460	2000	pg/L	72.9	(22%-166%)
13C-OCDD		2410	4000	pg/L	60.2	(13%-199%)
13C-2,3,7,8-TCDF		1690	2000	pg/L	84.7	(22%-152%)
13C-1,2,3,7,8-PeCDF		1950	2000	pg/L	97.4	(21%-192%)
13C-2,3,4,7,8-PeCDF		2040	2000	pg/L	102	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		1520	2000	pg/L	76.0	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		1540	2000	pg/L	77.1	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		1560	2000	pg/L	78.2	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		1660	2000	pg/L	82.9	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		1470	2000	pg/L	73.6	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		1390	2000	pg/L	69.6	(20%-186%)
37Cl-2,3,7,8-TCDD		181	200	pg/L	90.3	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018703		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34717		
<b>Client ID:</b> MB for batch 34717		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/06/2017 12:58	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A06JUN17A-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.15	pg/g	0.150	0.500
40321-76-4	1,2,3,7,8-PeCDD	U	0.0782	pg/g	0.0782	2.50
39227-28-6	1,2,3,4,7,8-HxCDD	U	0.113	pg/g	0.113	2.50
57653-85-7	1,2,3,6,7,8-HxCDD	U	0.106	pg/g	0.106	2.50
19408-74-3	1,2,3,7,8,9-HxCDD	U	0.112	pg/g	0.112	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	0.142	pg/g	0.142	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD	U	0.212	pg/g	0.212	5.00
51207-31-9	2,3,7,8-TCDF	U	0.118	pg/g	0.118	0.500
57117-41-6	1,2,3,7,8-PeCDF	U	0.0852	pg/g	0.0852	2.50
57117-31-4	2,3,4,7,8-PeCDF	U	0.075	pg/g	0.075	2.50
70648-26-9	1,2,3,4,7,8-HxCDF	U	0.0878	pg/g	0.0878	2.50
57117-44-9	1,2,3,6,7,8-HxCDF	U	0.0816	pg/g	0.0816	2.50
60851-34-5	2,3,4,6,7,8-HxCDF	U	0.0896	pg/g	0.0896	2.50
72918-21-9	1,2,3,7,8,9-HxCDF	U	0.115	pg/g	0.115	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	0.057	pg/g	0.057	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	0.0854	pg/g	0.0854	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	0.268	pg/g	0.268	5.00
41903-57-5	Total TeCDD	U	0.15	pg/g	0.150	1.00
36088-22-9	Total PeCDD	U	0.0782	pg/g	0.0782	5.00
34465-46-8	Total HxCDD	U	0.106	pg/g	0.106	5.00
37871-00-4	Total HpCDD	U	0.142	pg/g	0.142	5.00
30402-14-3	Total TeCDF	U	0.118	pg/g	0.118	1.00
30402-15-4	Total PeCDF	U	0.0434	pg/g	0.0434	5.00
55684-94-1	Total HxCDF	U	0.0816	pg/g	0.0816	5.00
38998-75-3	Total HpCDF	U	0.057	pg/g	0.057	5.00
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.00	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		0.169	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		156	200	pg/g	77.9	(25%-164%)
13C-1,2,3,7,8-PeCDD		180	200	pg/g	89.8	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		154	200	pg/g	77.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		151	200	pg/g	75.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		143	200	pg/g	71.7	(23%-140%)
13C-OCDD		243	400	pg/g	60.7	(17%-157%)
13C-2,3,7,8-TCDF		159	200	pg/g	79.7	(24%-169%)
13C-1,2,3,7,8-PeCDF		182	200	pg/g	91.0	(24%-185%)
13C-2,3,4,7,8-PeCDF		186	200	pg/g	92.8	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		140	200	pg/g	69.8	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		145	200	pg/g	72.5	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		150	200	pg/g	75.2	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		165	200	pg/g	82.5	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018703		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34717		
<b>Client ID:</b> MB for batch 34717		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/06/2017 12:58	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A06JUN17A-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%      Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			141	200	pg/g	70.4      (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			138	200	pg/g	69.0      (26%-138%)
37Cl-2,3,7,8-TCDD			17.9	20.0	pg/g	89.4      (35%-197%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018704		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34717		
<b>Client ID:</b> LCS for batch 34717		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/06/2017 11:24	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A06JUN17A-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		22.1	pg/g	0.230	0.500
40321-76-4	1,2,3,7,8-PeCDD		102	pg/g	0.264	2.50
39227-28-6	1,2,3,4,7,8-HxCDD		103	pg/g	0.450	2.50
57653-85-7	1,2,3,6,7,8-HxCDD		101	pg/g	0.390	2.50
19408-74-3	1,2,3,7,8,9-HxCDD		113	pg/g	0.428	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD		104	pg/g	0.746	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD		206	pg/g	1.87	5.00
51207-31-9	2,3,7,8-TCDF		20.3	pg/g	0.193	0.500
57117-41-6	1,2,3,7,8-PeCDF		100	pg/g	0.440	2.50
57117-31-4	2,3,4,7,8-PeCDF		98.8	pg/g	0.358	2.50
70648-26-9	1,2,3,4,7,8-HxCDF		98.6	pg/g	0.690	2.50
57117-44-9	1,2,3,6,7,8-HxCDF		99.2	pg/g	0.632	2.50
60851-34-5	2,3,4,6,7,8-HxCDF		98.7	pg/g	0.658	2.50
72918-21-9	1,2,3,7,8,9-HxCDF		97.4	pg/g	0.876	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF		98.7	pg/g	0.630	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF		96.1	pg/g	0.858	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF		205	pg/g	1.20	5.00

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		167	200	pg/g	83.6	(20%-175%)
13C-1,2,3,7,8-PeCDD		194	200	pg/g	97.0	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		152	200	pg/g	76.0	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		166	200	pg/g	83.0	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		141	200	pg/g	70.7	(22%-166%)
13C-OCDD		243	400	pg/g	60.8	(13%-199%)
13C-2,3,7,8-TCDF		175	200	pg/g	87.5	(22%-152%)
13C-1,2,3,7,8-PeCDF		192	200	pg/g	96.0	(21%-192%)
13C-2,3,4,7,8-PeCDF		197	200	pg/g	98.3	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		139	200	pg/g	69.7	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		147	200	pg/g	73.6	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		156	200	pg/g	77.8	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		163	200	pg/g	81.6	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		136	200	pg/g	68.1	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		137	200	pg/g	68.7	(20%-186%)
37Cl-2,3,7,8-TCDD		18.3	20.0	pg/g	91.3	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018705		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34717		
<b>Client ID:</b> LCSD for batch 34717		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/06/2017 12:11	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A06JUN17A-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		23.2	pg/g	0.254	0.500
40321-76-4	1,2,3,7,8-PeCDD		103	pg/g	0.202	2.50
39227-28-6	1,2,3,4,7,8-HxCDD		101	pg/g	0.684	2.50
57653-85-7	1,2,3,6,7,8-HxCDD		101	pg/g	0.610	2.50
19408-74-3	1,2,3,7,8,9-HxCDD		111	pg/g	0.660	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD		105	pg/g	0.836	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD		200	pg/g	1.06	5.00
51207-31-9	2,3,7,8-TCDF		20.5	pg/g	0.280	0.500
57117-41-6	1,2,3,7,8-PeCDF		101	pg/g	0.348	2.50
57117-31-4	2,3,4,7,8-PeCDF		98.8	pg/g	0.308	2.50
70648-26-9	1,2,3,4,7,8-HxCDF		98.9	pg/g	0.764	2.50
57117-44-9	1,2,3,6,7,8-HxCDF		99.5	pg/g	0.762	2.50
60851-34-5	2,3,4,6,7,8-HxCDF		96.3	pg/g	0.766	2.50
72918-21-9	1,2,3,7,8,9-HxCDF		101	pg/g	1.04	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF		97.0	pg/g	0.640	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF		96.3	pg/g	0.968	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF		197	pg/g	1.17	5.00

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		164	200	pg/g	81.9	(20%-175%)
13C-1,2,3,7,8-PeCDD		191	200	pg/g	95.3	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		145	200	pg/g	72.3	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		154	200	pg/g	76.9	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		132	200	pg/g	65.8	(22%-166%)
13C-OCDD		227	400	pg/g	56.8	(13%-199%)
13C-2,3,7,8-TCDF		170	200	pg/g	85.0	(22%-152%)
13C-1,2,3,7,8-PeCDF		186	200	pg/g	92.8	(21%-192%)
13C-2,3,4,7,8-PeCDF		191	200	pg/g	95.7	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		132	200	pg/g	66.1	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		139	200	pg/g	69.3	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		144	200	pg/g	71.9	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		155	200	pg/g	77.5	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		129	200	pg/g	64.5	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		125	200	pg/g	62.6	(20%-186%)
37Cl-2,3,7,8-TCDD		18.7	20.0	pg/g	93.5	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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SDG Number: A7E0757	Client: APEX001	Project: APEX00117
Lab Sample ID: 12018706	Date Collected: 05/23/2017 11:00	Matrix: SOIL
Client Sample: QC for batch 34717	Date Received: 05/26/2017 10:00	%Moisture: 2.9
Client ID: ISM-AOI73-0.5-After Processing(108)		Prep Basis: Dry Weight
Batch ID: 34719	Method: EPA Method 1613B	
Run Date: 06/06/2017 14:34	Analyst: CLP	Instrument: HRP750
Data File: A06JUN17A-6		Dilution: 1
Prep Batch: 34717	Prep Method: SW846 3540C	
Prep Date: 04-JUN-17	Prep Aliquot: 10.12 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		23.1	pg/g	0.338	0.509
40321-76-4	1,2,3,7,8-PeCDD		108	pg/g	0.283	2.54
39227-28-6	1,2,3,4,7,8-HxCDD		109	pg/g	1.01	2.54
57653-85-7	1,2,3,6,7,8-HxCDD		119	pg/g	0.977	2.54
19408-74-3	1,2,3,7,8,9-HxCDD		116	pg/g	1.02	2.54
35822-46-9	1,2,3,4,6,7,8-HpCDD		500	pg/g	2.16	2.54
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2740	pg/g	2.81	5.09
51207-31-9	2,3,7,8-TCDF		22.0	pg/g	0.381	0.509
57117-41-6	1,2,3,7,8-PeCDF		104	pg/g	0.446	2.54
57117-31-4	2,3,4,7,8-PeCDF		104	pg/g	0.393	2.54
70648-26-9	1,2,3,4,7,8-HxCDF		109	pg/g	1.04	2.54
57117-44-9	1,2,3,6,7,8-HxCDF		104	pg/g	1.01	2.54
60851-34-5	2,3,4,6,7,8-HxCDF		108	pg/g	1.05	2.54
72918-21-9	1,2,3,7,8,9-HxCDF		102	pg/g	1.40	2.54
67562-39-4	1,2,3,4,6,7,8-HpCDF		157	pg/g	0.958	2.54
55673-89-7	1,2,3,4,7,8,9-HpCDF		102	pg/g	1.45	2.54
39001-02-0	1,2,3,4,6,7,8,9-OCDF		248	pg/g	1.08	5.09

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		139	203	pg/g	68.5	(25%-164%)
13C-1,2,3,7,8-PeCDD		177	203	pg/g	87.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		132	203	pg/g	64.7	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		146	203	pg/g	72.0	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		131	203	pg/g	64.3	(23%-140%)
13C-OCDD		251	407	pg/g	61.6	(17%-157%)
13C-2,3,7,8-TCDF		148	203	pg/g	72.8	(24%-169%)
13C-1,2,3,7,8-PeCDF		175	203	pg/g	86.2	(24%-185%)
13C-2,3,4,7,8-PeCDF		182	203	pg/g	89.5	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		125	203	pg/g	61.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		125	203	pg/g	61.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		130	203	pg/g	63.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		145	203	pg/g	71.3	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF		124	203	pg/g	60.8	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		124	203	pg/g	60.7	(26%-138%)
37Cl-2,3,7,8-TCDD		15.4	20.3	pg/g	75.6	(35%-197%)

**Comments:****K Estimated Maximum Possible Concentration**

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7E0757	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018707	<b>Date Collected:</b> 05/23/2017 11:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34717	<b>Date Received:</b> 05/26/2017 10:00	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI73-0.5-After Processing(108)		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34719	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/06/2017 15:22	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP750
<b>Data File:</b> A06JUN17A-7		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34717	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 04-JUN-17	<b>Prep Aliquot:</b> 10.12 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		23.6	pg/g	0.240	0.509
40321-76-4	1,2,3,7,8-PeCDD		106	pg/g	0.315	2.54
39227-28-6	1,2,3,4,7,8-HxCDD		112	pg/g	0.889	2.54
57653-85-7	1,2,3,6,7,8-HxCDD		116	pg/g	0.771	2.54
19408-74-3	1,2,3,7,8,9-HxCDD		120	pg/g	0.842	2.54
35822-46-9	1,2,3,4,6,7,8-HpCDD		517	pg/g	2.26	2.54
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2670	pg/g	2.75	5.09
51207-31-9	2,3,7,8-TCDF		22.1	pg/g	0.374	0.509
57117-41-6	1,2,3,7,8-PeCDF		102	pg/g	0.413	2.54
57117-31-4	2,3,4,7,8-PeCDF		102	pg/g	0.348	2.54
70648-26-9	1,2,3,4,7,8-HxCDF		109	pg/g	0.853	2.54
57117-44-9	1,2,3,6,7,8-HxCDF		105	pg/g	0.867	2.54
60851-34-5	2,3,4,6,7,8-HxCDF		106	pg/g	0.869	2.54
72918-21-9	1,2,3,7,8,9-HxCDF		98.9	pg/g	1.19	2.54
67562-39-4	1,2,3,4,6,7,8-HpCDF		149	pg/g	0.794	2.54
55673-89-7	1,2,3,4,7,8,9-HpCDF		103	pg/g	1.18	2.54
39001-02-0	1,2,3,4,6,7,8,9-OCDF		237	pg/g	0.995	5.09

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		141	203	pg/g	69.4	(25%-164%)
13C-1,2,3,7,8-PeCDD		174	203	pg/g	85.4	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		131	203	pg/g	64.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		152	203	pg/g	74.7	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		132	203	pg/g	64.9	(23%-140%)
13C-OCDD		261	407	pg/g	64.1	(17%-157%)
13C-2,3,7,8-TCDF		147	203	pg/g	72.1	(24%-169%)
13C-1,2,3,7,8-PeCDF		176	203	pg/g	86.5	(24%-185%)
13C-2,3,4,7,8-PeCDF		180	203	pg/g	88.4	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		127	203	pg/g	62.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		125	203	pg/g	61.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		132	203	pg/g	64.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		147	203	pg/g	72.3	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF		125	203	pg/g	61.6	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		121	203	pg/g	59.4	(26%-138%)
37Cl-2,3,7,8-TCDD		16.0	20.3	pg/g	78.5	(35%-197%)

**Comments:****K Estimated Maximum Possible Concentration**



July 11, 2017

Mr. Philip Nerenberg  
Apex Laboratories  
12232 S.W. Garden Place  
Portland, Oregon 97223

Re: POR DXN  
Work Order: 10955  
SDG: A7F0429

Dear Mr. Nerenberg:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 20, 2017. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,

Cynde Larkins  
Project Manager

Enclosures

SUBCONTRACT ORDER

Apex Laboratories

A7F0429

CFA WO# 10955

77944098 B226

SENDING LABORATORY:

Apex Laboratories  
12232 S.W. Garden Place  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 718-0333  
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Cape Fear Analytical, LLC  
3306 Kitty Hawk Rd Suite 120  
Wilmington, NC 28405  
Phone : (910) 795-0421  
Fax: -

**Sample Name:** ISM-AOI062-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 06/14/17 09:55      (A7F0429-02)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	06/27/17 17:00	12/11/17 09:55	Low Level Standard Required, Use Containers A, B, C, D, Use full volume
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

**Sample Name:** ISM-AOI071-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 06/14/17 10:15      (A7F0429-04)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	06/27/17 17:00	12/11/17 10:15	Low Level Standard Required, Use Containers A, B, C, D, Use full volume
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

**Sample Name:** ISM-AOI046-0.5 - After Processing      **Soil**      **After ISM Processing**  
**Sampled:** 06/14/17 10:30      (A7F0429-06)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	06/27/17 17:00	12/11/17 10:30	Low Level Standard Required, Use Containers A, B, C, D, Use full volume
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

Standard TAT

FedEx

UPS (Shipper)

Released By: *[Signature]* Date: 20 JUN 17

Received By: \_\_\_\_\_ Date: \_\_\_\_\_

Released By: *[Signature]* Date: 20 JUN 17

Received By: *Cynde Perkins* Date: 20 JUN 17 1050

Released By: \_\_\_\_\_ Date: \_\_\_\_\_ Received By: \_\_\_\_\_ Date: \_\_\_\_\_

Temp. = 3.2°C

**SUBCONTRACT ORDER**

Apex Laboratories  
A7F0429

CFA WO#10955

**Sample Name:** ISM-AOI057-0.5 - After Processing      **Soil**      **Sampled:** 06/14/17 10:50      (A7F0429-08)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	06/27/17 17:00	12/11/17 10:50	Low Level Standard Required, Use Containers A, B, C, D, Use full volume
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

**Sample Name:** ISM-AOI063-0.5-1 - After Processing      **Soil**      **Sampled:** 06/14/17 11:15      (A7F0429-10)

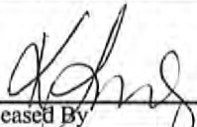

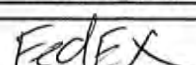
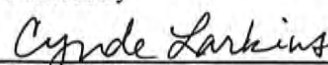
Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	06/27/17 17:00	12/11/17 11:15	Low Level Standard Required, Use Containers A, B, C, D, Use full volume
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

**Sample Name:** ISM-AOI063-0.5-2 - After Processing      **Soil**      **Sampled:** 06/14/17 11:25      (A7F0429-12)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	06/27/17 17:00	12/11/17 11:25	Low Level Standard Required, Use Containers A, B, C, D, Use full volume
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

**Sample Name:** ISM-AOI063-0.5-3 - After Processing      **Soil**      **Sampled:** 06/14/17 11:35      (A7F0429-14)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	06/27/17 17:00	12/11/17 11:35	Low Level Standard Required, Use Containers A, B, C, D, Use full volume
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

Released By 	Date 6/19/17	Received By 	Date
Released By 	Date 20 JUN 17	Received By 	Date 20 JUN 17 1050



**SAMPLE RECEIPT CHECKLIST**  
Cape Fear Analytical

Client: <b>APEX</b>	Work Order: <b>10955</b>
Shipping Company: <b>FedEx</b>	Date/Time Received: <b>20 JUN 17 1050</b>

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Samples < 2x background?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

\* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Air Witness: \_\_\_\_\_

#	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: seals broken   damaged container   leaking container   other (describe)
2	Chain of Custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Samples requiring cold preservation within 0-6°C?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method: ice bag   blue ice   dry ice   none   other (describe) <b>6.7° - 3.5° = 3.2°C</b>
4	Aqueous samples found to have visible solids?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample IDs, containers affected:
5	Samples requiring chemical preservation at proper pH?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample IDs, containers affected and pH observed: If preservative added, Lot#:
6	Samples requiring preservation have no residual chlorine?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample IDs, containers affected: If preservative added, Lot#:
7	Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample IDs, tests affected:
8	Sample IDs on COC match IDs on containers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample IDs, containers affected:
9	Date & time of COC match date & time on containers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample IDs, containers affected:
10	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	List type and number of containers / Sample IDs, containers affected: <b>4-40mL vials per sample</b>
11	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments:

Checklist performed by: Initials: CJ Date: 20 JUN 17

# **High Resolution Dioxins and Furans Analysis**

# Case Narrative

**HDOX Case Narrative  
Apex Laboratories (APEX)  
SDG A7F0429  
Work Order 10955**

**Method/Analysis Information**

**Product:** Dioxins/Furans by EPA Method 1613B in Solids  
Analytical Method: EPA Method 1613B  
Extraction Method: SW846 3540C  
Analytical Batch Number: 34950  
Clean Up Batch Number: 34947  
Extraction Batch Number: 34946

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in Method 1613B:

<b>Sample ID</b>	<b>Client ID</b>
10955001	ISM-AOI062-0.5-After Processing
10955002	ISM-AOI071-0.5-After Processing
10955003	ISM-AOI046-0.5-After Processing
10955004	ISM-AOI057-0.5-After Processing
10955005	ISM-AOI063-0.5-1-After Processing
10955006	ISM-AOI063-0.5-2-After Processing
10955007	ISM-AOI063-0.5-3-After Processing
12018889	Method Blank (MB)
12018890	Laboratory Control Sample (LCS)
12018891	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 14.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

**Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

**Quality Control (QC) Information****Certification Statement**

The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

**Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

**Surrogate Recoveries**

All surrogate recoveries were within the established acceptance criteria for this SDG.

**Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

**Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits.

**LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

**QC Sample Designation**

A matrix spike and matrix spike duplicate analysis was not required for this SDG.

**Technical Information****Holding Time Specifications**

CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

**Analytical Comments**

Diphenyl ether (DPE) interferences were detected in the samples. Where a total peak could be completely attributed to the DPE, the concentration was removed from the total homolog sum. If the concentration could not be completely attributed to the DPE, or where the DPE co-eluted with a 2378-substituted furan peak, by professional judgment the peak may be left in the report. In both cases, the concentration is flagged with a P and should be considered an estimate. 10955004 (ISM-AOI057-0.5-After Processing) and 10955006 (ISM-AOI063-0.5-2-After Processing)- Batch 34950.

**Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

**Miscellaneous Information****Nonconformance (NCR) Documentation**

A NCR was not required for this SDG.

**Manual Integrations**

Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

**Sample preparation**

No difficulties were encountered during sample preparation.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.



# Sample Data Summary

## Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

### Qualifier Definition Report for

APEX001 Apex Laboratories

Client SDG: A7F0429 CFA Work Order: 10955

#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- J Value is estimated
- K Estimated Maximum Possible Concentration
- P Diphenyl ether interference is present; value is estimated
- U Analyte was analyzed for, but not detected above the specified detection limit.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

#### Review/Validation

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature: 

Name: Heather Patterson

Date: 11 JUL 2017

Title: Group Leader

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955001	<b>Date Collected:</b> 06/14/2017 09:55	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.9
<b>Client ID:</b> ISM-AOI062-0.5-After Processing	<b>Method:</b> EPA Method 1613B	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Run Date:</b> 07/10/2017 12:52	<b>Prep Method:</b> SW846 3540C	<b>Dilution:</b> 1
<b>Data File:</b> A10JUL17A-5	<b>Prep Aliquot:</b> 10.76 g	
<b>Prep Batch:</b> 34946		
<b>Prep Date:</b> 27-JUN-17		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF	K	0.954	pg/g	0.207	0.484

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955001	<b>Date Collected:</b> 06/14/2017 09:55	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.9
<b>Client ID:</b> ISM-AOI062-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 07:11	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.76 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.267	pg/g	0.0451	0.484
40321-76-4	1,2,3,7,8-PeCDD	J	2.03	pg/g	0.0302	2.42
39227-28-6	1,2,3,4,7,8-HxCDD		3.89	pg/g	0.0875	2.42
57653-85-7	1,2,3,6,7,8-HxCDD		16.9	pg/g	0.0842	2.42
19408-74-3	1,2,3,7,8,9-HxCDD		8.92	pg/g	0.088	2.42
35822-46-9	1,2,3,4,6,7,8-HpCDD		366	pg/g	0.321	2.42
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2560	pg/g	0.441	4.84
51207-31-9	2,3,7,8-TCDF		0.830	pg/g	0.0681	0.484
57117-41-6	1,2,3,7,8-PeCDF	J	1.49	pg/g	0.0352	2.42
57117-31-4	2,3,4,7,8-PeCDF		4.31	pg/g	0.0325	2.42
70648-26-9	1,2,3,4,7,8-HxCDF		9.07	pg/g	0.070	2.42
57117-44-9	1,2,3,6,7,8-HxCDF		4.01	pg/g	0.070	2.42
60851-34-5	2,3,4,6,7,8-HxCDF		4.92	pg/g	0.0698	2.42
72918-21-9	1,2,3,7,8,9-HxCDF	J	2.11	pg/g	0.0846	2.42
67562-39-4	1,2,3,4,6,7,8-HpCDF		59.6	pg/g	0.101	2.42
55673-89-7	1,2,3,4,7,8,9-HpCDF		3.99	pg/g	0.149	2.42
39001-02-0	1,2,3,4,6,7,8,9-OCDF		135	pg/g	0.165	4.84
41903-57-5	Total TeCDD	K	3.17	pg/g	0.0451	0.967
36088-22-9	Total PeCDD	K	11.4	pg/g	0.0302	4.84
34465-46-8	Total HxCDD		84.6	pg/g	0.0842	4.84
37871-00-4	Total HpCDD		612	pg/g	0.321	4.84
30402-14-3	Total TeCDF	K	11.2	pg/g	0.0681	0.967
30402-15-4	Total PeCDF	K	43.3	pg/g	0.0149	4.84
55684-94-1	Total HxCDF	K	106	pg/g	0.0698	4.84
38998-75-3	Total HpCDF		174	pg/g	0.101	4.84
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		13.8	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		13.8	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		171	193	pg/g	88.6	(25%-164%)
13C-1,2,3,7,8-PeCDD		182	193	pg/g	93.8	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		153	193	pg/g	78.8	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		157	193	pg/g	81.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		162	193	pg/g	83.7	(23%-140%)
13C-OCDD		290	387	pg/g	75.0	(17%-157%)
13C-2,3,7,8-TCDF		154	193	pg/g	79.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		167	193	pg/g	86.1	(24%-185%)
13C-2,3,4,7,8-PeCDF		171	193	pg/g	88.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		147	193	pg/g	76.0	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		147	193	pg/g	75.8	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		150	193	pg/g	77.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		160	193	pg/g	82.8	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955001	<b>Date Collected:</b> 06/14/2017 09:55	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.9
<b>Client ID:</b> ISM-AOI062-0.5-After Processing	<b>Method:</b> EPA Method 1613B	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Run Date:</b> 07/06/2017 07:11	<b>Prep Method:</b> SW846 3540C	<b>Dilution:</b> 1
<b>Data File:</b> b05jul17a_3-3	<b>Prep Aliquot:</b> 10.76 g	
<b>Prep Batch:</b> 34946		
<b>Prep Date:</b> 27-JUN-17		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			146	193	pg/g	75.6 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			155	193	pg/g	80.2 (26%-138%)
37Cl-2,3,7,8-TCDD			17.9	19.3	pg/g	92.3 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955002	<b>Date Collected:</b> 06/14/2017 10:15	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.4
<b>Client ID:</b> ISM-AOI071-0.5-After Processing	<b>Method:</b> EPA Method 1613B	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Run Date:</b> 07/10/2017 13:12	<b>Prep Method:</b> SW846 3540C	<b>Dilution:</b> 1
<b>Data File:</b> A10JUL17A-6	<b>Prep Aliquot:</b> 10.4 g	
<b>Prep Batch:</b> 34946		
<b>Prep Date:</b> 27-JUN-17		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		0.854	pg/g	0.267	0.498

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955002	<b>Date Collected:</b> 06/14/2017 10:15	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.4
<b>Client ID:</b> ISM-AOI071-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 08:00	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.4 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.245	pg/g	0.0916	0.498
40321-76-4	1,2,3,7,8-PeCDD	J	1.29	pg/g	0.053	2.49
39227-28-6	1,2,3,4,7,8-HxCDD		2.78	pg/g	0.114	2.49
57653-85-7	1,2,3,6,7,8-HxCDD		15.1	pg/g	0.109	2.49
19408-74-3	1,2,3,7,8,9-HxCDD		6.55	pg/g	0.115	2.49
35822-46-9	1,2,3,4,6,7,8-HpCDD		320	pg/g	0.353	2.49
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2060	pg/g	0.582	4.98
51207-31-9	2,3,7,8-TCDF		0.727	pg/g	0.142	0.498
57117-41-6	1,2,3,7,8-PeCDF	J	1.43	pg/g	0.0627	2.49
57117-31-4	2,3,4,7,8-PeCDF		3.61	pg/g	0.0566	2.49
70648-26-9	1,2,3,4,7,8-HxCDF		8.31	pg/g	0.0797	2.49
57117-44-9	1,2,3,6,7,8-HxCDF		3.60	pg/g	0.0787	2.49
60851-34-5	2,3,4,6,7,8-HxCDF		4.61	pg/g	0.0815	2.49
72918-21-9	1,2,3,7,8,9-HxCDF	J	2.06	pg/g	0.101	2.49
67562-39-4	1,2,3,4,6,7,8-HpCDF		45.2	pg/g	0.111	2.49
55673-89-7	1,2,3,4,7,8,9-HpCDF		2.65	pg/g	0.156	2.49
39001-02-0	1,2,3,4,6,7,8,9-OCDF		47.1	pg/g	0.247	4.98
41903-57-5	Total TeCDD	K	2.28	pg/g	0.0916	0.996
36088-22-9	Total PeCDD	K	7.06	pg/g	0.053	4.98
34465-46-8	Total HxCDD	K	66.4	pg/g	0.109	4.98
37871-00-4	Total HpCDD		532	pg/g	0.353	4.98
30402-14-3	Total TeCDF	K	8.80	pg/g	0.142	0.996
30402-15-4	Total PeCDF	K	37.3	pg/g	0.0472	4.98
55684-94-1	Total HxCDF		100	pg/g	0.0787	4.98
38998-75-3	Total HpCDF		116	pg/g	0.111	4.98
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		11.3	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		11.3	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		184	199	pg/g	92.4	(25%-164%)
13C-1,2,3,7,8-PeCDD		199	199	pg/g	99.9	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		158	199	pg/g	79.3	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		161	199	pg/g	80.7	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		162	199	pg/g	81.5	(23%-140%)
13C-OCDD		272	398	pg/g	68.4	(17%-157%)
13C-2,3,7,8-TCDF		160	199	pg/g	80.2	(24%-169%)
13C-1,2,3,7,8-PeCDF		182	199	pg/g	91.6	(24%-185%)
13C-2,3,4,7,8-PeCDF		187	199	pg/g	94.1	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		147	199	pg/g	74.0	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		152	199	pg/g	76.1	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		153	199	pg/g	76.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		159	199	pg/g	80.0	(29%-147%)

**Hi-Res Dioxins/Furans  
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<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955002	<b>Date Collected:</b> 06/14/2017 10:15	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.4
<b>Client ID:</b> ISM-AOI071-0.5-After Processing	<b>Method:</b> EPA Method 1613B	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Run Date:</b> 07/06/2017 08:00	<b>Prep Method:</b> SW846 3540C	<b>Dilution:</b> 1
<b>Data File:</b> b05jul17a_3-4	<b>Prep Aliquot:</b> 10.4 g	
<b>Prep Batch:</b> 34946		
<b>Prep Date:</b> 27-JUN-17		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			146	199	pg/g	73.1 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			149	199	pg/g	75.0 (26%-138%)
37Cl-2,3,7,8-TCDD			18.9	19.9	pg/g	94.7 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955003	<b>Date Collected:</b> 06/14/2017 10:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.6
<b>Client ID:</b> ISM-AOI046-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/10/2017 13:32	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A10JUL17A-7		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.62 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		0.806	pg/g	0.215	0.488

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955003	<b>Date Collected:</b> 06/14/2017 10:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.6
<b>Client ID:</b> ISM-AOI046-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 08:48	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.62 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.326	pg/g	0.0562	0.488
40321-76-4	1,2,3,7,8-PeCDD	J	2.09	pg/g	0.057	2.44
39227-28-6	1,2,3,4,7,8-HxCDD		5.15	pg/g	0.117	2.44
57653-85-7	1,2,3,6,7,8-HxCDD		25.3	pg/g	0.116	2.44
19408-74-3	1,2,3,7,8,9-HxCDD		12.2	pg/g	0.120	2.44
35822-46-9	1,2,3,4,6,7,8-HpCDD		557	pg/g	0.357	2.44
3268-87-9	1,2,3,4,6,7,8,9-OCDD		3530	pg/g	0.459	4.88
51207-31-9	2,3,7,8-TCDF		0.861	pg/g	0.0762	0.488
57117-41-6	1,2,3,7,8-PeCDF	J	2.30	pg/g	0.0568	2.44
57117-31-4	2,3,4,7,8-PeCDF		7.16	pg/g	0.0516	2.44
70648-26-9	1,2,3,4,7,8-HxCDF		19.8	pg/g	0.0771	2.44
57117-44-9	1,2,3,6,7,8-HxCDF		7.15	pg/g	0.0789	2.44
60851-34-5	2,3,4,6,7,8-HxCDF		7.81	pg/g	0.0806	2.44
72918-21-9	1,2,3,7,8,9-HxCDF		4.59	pg/g	0.102	2.44
67562-39-4	1,2,3,4,6,7,8-HpCDF		82.6	pg/g	0.106	2.44
55673-89-7	1,2,3,4,7,8,9-HpCDF		5.33	pg/g	0.157	2.44
39001-02-0	1,2,3,4,6,7,8,9-OCDF		78.9	pg/g	0.197	4.88
41903-57-5	Total TeCDD	K	2.91	pg/g	0.0562	0.976
36088-22-9	Total PeCDD	K	11.8	pg/g	0.057	4.88
34465-46-8	Total HxCDD		119	pg/g	0.116	4.88
37871-00-4	Total HpCDD		943	pg/g	0.357	4.88
30402-14-3	Total TeCDF	K	9.50	pg/g	0.0762	0.976
30402-15-4	Total PeCDF	K	55.3	pg/g	0.0291	4.88
55684-94-1	Total HxCDF	K	183	pg/g	0.0771	4.88
38998-75-3	Total HpCDF	K	225	pg/g	0.106	4.88
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		20.4	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		20.4	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		180	195	pg/g	92.0	(25%-164%)
13C-1,2,3,7,8-PeCDD		183	195	pg/g	93.8	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		154	195	pg/g	79.1	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		164	195	pg/g	83.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		161	195	pg/g	82.6	(23%-140%)
13C-OCDD		287	391	pg/g	73.4	(17%-157%)
13C-2,3,7,8-TCDF		154	195	pg/g	79.0	(24%-169%)
13C-1,2,3,7,8-PeCDF		172	195	pg/g	87.8	(24%-185%)
13C-2,3,4,7,8-PeCDF		173	195	pg/g	88.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		150	195	pg/g	77.0	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		149	195	pg/g	76.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		153	195	pg/g	78.6	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		159	195	pg/g	81.6	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955003	<b>Date Collected:</b> 06/14/2017 10:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.6
<b>Client ID:</b> ISM-AOI046-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 08:48	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.62 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%      Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			144	195	pg/g	73.8      (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			147	195	pg/g	75.2      (26%-138%)
37Cl-2,3,7,8-TCDD			18.9	19.5	pg/g	96.6      (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955004	<b>Date Collected:</b> 06/14/2017 10:50	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.3
<b>Client ID:</b> ISM-AOI057-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/10/2017 13:52	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A10JUL17A-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.58 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		1.43	pg/g	0.217	0.489

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- P** Diphenyl ether interference is present; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
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<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955004	<b>Date Collected:</b> 06/14/2017 10:50	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.3
<b>Client ID:</b> ISM-AOI057-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 09:37	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-6		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.58 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		0.946	pg/g	0.0563	0.489
40321-76-4	1,2,3,7,8-PeCDD	J	2.25	pg/g	0.0579	2.44
39227-28-6	1,2,3,4,7,8-HxCDD		4.72	pg/g	0.158	2.44
57653-85-7	1,2,3,6,7,8-HxCDD		23.6	pg/g	0.153	2.44
19408-74-3	1,2,3,7,8,9-HxCDD		10.9	pg/g	0.159	2.44
35822-46-9	1,2,3,4,6,7,8-HpCDD		537	pg/g	0.387	2.44
3268-87-9	1,2,3,4,6,7,8,9-OCDD		3650	pg/g	0.530	4.89
51207-31-9	2,3,7,8-TCDF		1.44	pg/g	0.063	0.489
57117-41-6	1,2,3,7,8-PeCDF	J	2.32	pg/g	0.0598	2.44
57117-31-4	2,3,4,7,8-PeCDF		9.57	pg/g	0.0508	2.44
70648-26-9	1,2,3,4,7,8-HxCDF		13.4	pg/g	0.0954	2.44
57117-44-9	1,2,3,6,7,8-HxCDF		6.80	pg/g	0.0933	2.44
60851-34-5	2,3,4,6,7,8-HxCDF		9.01	pg/g	0.0935	2.44
72918-21-9	1,2,3,7,8,9-HxCDF		3.57	pg/g	0.126	2.44
67562-39-4	1,2,3,4,6,7,8-HpCDF		80.0	pg/g	0.117	2.44
55673-89-7	1,2,3,4,7,8,9-HpCDF		4.60	pg/g	0.172	2.44
39001-02-0	1,2,3,4,6,7,8,9-OCDF		101	pg/g	0.186	4.89
41903-57-5	Total TeCDD	K	6.66	pg/g	0.0563	0.978
36088-22-9	Total PeCDD		15.4	pg/g	0.0579	4.89
34465-46-8	Total HxCDD		115	pg/g	0.153	4.89
37871-00-4	Total HpCDD		919	pg/g	0.387	4.89
30402-14-3	Total TeCDF	P	36.0	pg/g	0.063	0.978
30402-15-4	Total PeCDF	P	107	pg/g	0.0254	4.89
55684-94-1	Total HxCDF	P	178	pg/g	0.0933	4.89
38998-75-3	Total HpCDF		208	pg/g	0.117	4.89
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		20.8	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		20.8	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		183	196	pg/g	93.3	(25%-164%)
13C-1,2,3,7,8-PeCDD		190	196	pg/g	97.0	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		149	196	pg/g	76.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		165	196	pg/g	84.6	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		163	196	pg/g	83.5	(23%-140%)
13C-OCDD		274	391	pg/g	69.9	(17%-157%)
13C-2,3,7,8-TCDF		159	196	pg/g	81.5	(24%-169%)
13C-1,2,3,7,8-PeCDF		179	196	pg/g	91.5	(24%-185%)
13C-2,3,4,7,8-PeCDF		179	196	pg/g	91.4	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		148	196	pg/g	75.5	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		153	196	pg/g	78.4	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		152	196	pg/g	78.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		159	196	pg/g	81.3	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955004	<b>Date Collected:</b> 06/14/2017 10:50	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.3
<b>Client ID:</b> ISM-AOI057-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 09:37	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-6		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.58 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			142	196	pg/g	72.5 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			148	196	pg/g	75.4 (26%-138%)
37Cl-2,3,7,8-TCDD			19.0	19.6	pg/g	96.9 (35%-197%)

- Comments:**
- J** Value is estimated
  - K** Estimated Maximum Possible Concentration
  - P** Diphenyl ether interference is present; value is estimated
  - U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955005	<b>Date Collected:</b> 06/14/2017 11:15	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI063-0.5-1-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/10/2017 14:12	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A10JUL17A-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.59 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		0.659	pg/g	0.220	0.486

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955005	<b>Date Collected:</b> 06/14/2017 11:15	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI063-0.5-1-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 10:25	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-7		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.59 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.362	pg/g	0.0811	0.486
40321-76-4	1,2,3,7,8-PeCDD	J	0.554	pg/g	0.0712	2.43
39227-28-6	1,2,3,4,7,8-HxCDD	J	1.07	pg/g	0.107	2.43
57653-85-7	1,2,3,6,7,8-HxCDD		4.52	pg/g	0.102	2.43
19408-74-3	1,2,3,7,8,9-HxCDD	J	2.32	pg/g	0.108	2.43
35822-46-9	1,2,3,4,6,7,8-HpCDD		103	pg/g	0.292	2.43
3268-87-9	1,2,3,4,6,7,8,9-OCDD		712	pg/g	0.753	4.86
51207-31-9	2,3,7,8-TCDF		0.626	pg/g	0.119	0.486
57117-41-6	1,2,3,7,8-PeCDF	J	0.449	pg/g	0.0823	2.43
57117-31-4	2,3,4,7,8-PeCDF	J	2.03	pg/g	0.0706	2.43
70648-26-9	1,2,3,4,7,8-HxCDF	J	2.39	pg/g	0.0844	2.43
57117-44-9	1,2,3,6,7,8-HxCDF	J	1.20	pg/g	0.0778	2.43
60851-34-5	2,3,4,6,7,8-HxCDF	J	1.74	pg/g	0.0863	2.43
72918-21-9	1,2,3,7,8,9-HxCDF	J	0.704	pg/g	0.109	2.43
67562-39-4	1,2,3,4,6,7,8-HpCDF		19.0	pg/g	0.117	2.43
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	1.14	pg/g	0.175	2.43
39001-02-0	1,2,3,4,6,7,8,9-OCDF		35.8	pg/g	0.315	4.86
41903-57-5	Total TeCDD		1.78	pg/g	0.0811	0.972
36088-22-9	Total PeCDD	K	4.90	pg/g	0.0712	4.86
34465-46-8	Total HxCDD	K	27.2	pg/g	0.102	4.86
37871-00-4	Total HpCDD		179	pg/g	0.292	4.86
30402-14-3	Total TeCDF	K	9.87	pg/g	0.119	0.972
30402-15-4	Total PeCDF	K	20.7	pg/g	0.0406	4.86
55684-94-1	Total HxCDF	K	35.7	pg/g	0.0778	4.86
38998-75-3	Total HpCDF		55.2	pg/g	0.117	4.86
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		4.45	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		4.45	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		185	194	pg/g	95.0	(25%-164%)
13C-1,2,3,7,8-PeCDD		198	194	pg/g	102	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		153	194	pg/g	78.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		162	194	pg/g	83.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		159	194	pg/g	81.8	(23%-140%)
13C-OCDD		253	389	pg/g	65.1	(17%-157%)
13C-2,3,7,8-TCDF		158	194	pg/g	81.3	(24%-169%)
13C-1,2,3,7,8-PeCDF		183	194	pg/g	94.3	(24%-185%)
13C-2,3,4,7,8-PeCDF		187	194	pg/g	96.2	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		146	194	pg/g	75.3	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		155	194	pg/g	79.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		153	194	pg/g	78.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		157	194	pg/g	80.6	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955005	<b>Date Collected:</b> 06/14/2017 11:15	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 2.9
<b>Client ID:</b> ISM-AOI063-0.5-1-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 10:25	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-7		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.59 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			141	194	pg/g	72.4 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			147	194	pg/g	75.4 (26%-138%)
37Cl-2,3,7,8-TCDD			19.1	19.4	pg/g	98.2 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955006	<b>Date Collected:</b> 06/14/2017 11:25	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3
<b>Client ID:</b> ISM-AOI063-0.5-2-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/10/2017 14:32	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A10JUL17A-10		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.48 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		0.726	pg/g	0.180	0.492

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- P** Diphenyl ether interference is present; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955006	<b>Date Collected:</b> 06/14/2017 11:25	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3
<b>Client ID:</b> ISM-AOI063-0.5-2-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 11:14	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.48 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.307	pg/g	0.0547	0.492
40321-76-4	1,2,3,7,8-PeCDD	J	1.24	pg/g	0.0496	2.46
39227-28-6	1,2,3,4,7,8-HxCDD		2.79	pg/g	0.110	2.46
57653-85-7	1,2,3,6,7,8-HxCDD		12.7	pg/g	0.107	2.46
19408-74-3	1,2,3,7,8,9-HxCDD		6.06	pg/g	0.111	2.46
35822-46-9	1,2,3,4,6,7,8-HpCDD		295	pg/g	0.366	2.46
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2210	pg/g	0.653	4.92
51207-31-9	2,3,7,8-TCDF		0.687	pg/g	0.0905	0.492
57117-41-6	1,2,3,7,8-PeCDF	J	1.04	pg/g	0.0614	2.46
57117-31-4	2,3,4,7,8-PeCDF		4.51	pg/g	0.0557	2.46
70648-26-9	1,2,3,4,7,8-HxCDF		7.40	pg/g	0.0823	2.46
57117-44-9	1,2,3,6,7,8-HxCDF		3.85	pg/g	0.083	2.46
60851-34-5	2,3,4,6,7,8-HxCDF		5.01	pg/g	0.0866	2.46
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.88	pg/g	0.107	2.46
67562-39-4	1,2,3,4,6,7,8-HpCDF		61.3	pg/g	0.134	2.46
55673-89-7	1,2,3,4,7,8,9-HpCDF		3.87	pg/g	0.193	2.46
39001-02-0	1,2,3,4,6,7,8,9-OCDF		137	pg/g	0.266	4.92
41903-57-5	Total TeCDD	K	2.89	pg/g	0.0547	0.984
36088-22-9	Total PeCDD	K	7.99	pg/g	0.0496	4.92
34465-46-8	Total HxCDD		61.6	pg/g	0.107	4.92
37871-00-4	Total HpCDD		487	pg/g	0.366	4.92
30402-14-3	Total TeCDF	KP	13.2	pg/g	0.0905	0.984
30402-15-4	Total PeCDF	KP	52.0	pg/g	0.0315	4.92
55684-94-1	Total HxCDF	KP	118	pg/g	0.0823	4.92
38998-75-3	Total HpCDF	K	209	pg/g	0.134	4.92
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		11.3	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		11.3	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		181	197	pg/g	91.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		191	197	pg/g	97.0	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		156	197	pg/g	79.1	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		167	197	pg/g	84.7	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		161	197	pg/g	82.0	(23%-140%)
13C-OCDD		261	394	pg/g	66.3	(17%-157%)
13C-2,3,7,8-TCDF		161	197	pg/g	81.7	(24%-169%)
13C-1,2,3,7,8-PeCDF		182	197	pg/g	92.6	(24%-185%)
13C-2,3,4,7,8-PeCDF		183	197	pg/g	93.1	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		152	197	pg/g	77.3	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		153	197	pg/g	77.7	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		157	197	pg/g	80.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		159	197	pg/g	80.9	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955006	<b>Date Collected:</b> 06/14/2017 11:25	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3
<b>Client ID:</b> ISM-AOI063-0.5-2-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 11:14	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.48 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			144	197	pg/g	73.2 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			149	197	pg/g	75.8 (26%-138%)
37Cl-2,3,7,8-TCDD			19.2	19.7	pg/g	97.3 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- P** Diphenyl ether interference is present; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955007	<b>Date Collected:</b> 06/14/2017 11:35	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.1
<b>Client ID:</b> ISM-AOI063-0.5-3-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/10/2017 14:52	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A10JUL17A-11		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.63 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		1.26	pg/g	0.221	0.485

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955007	<b>Date Collected:</b> 06/14/2017 11:35	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.1
<b>Client ID:</b> ISM-AOI063-0.5-3-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 12:02	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.63 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.282	pg/g	0.0767	0.485
40321-76-4	1,2,3,7,8-PeCDD	J	1.07	pg/g	0.059	2.43
39227-28-6	1,2,3,4,7,8-HxCDD	J	1.83	pg/g	0.115	2.43
57653-85-7	1,2,3,6,7,8-HxCDD		7.04	pg/g	0.108	2.43
19408-74-3	1,2,3,7,8,9-HxCDD		3.87	pg/g	0.114	2.43
35822-46-9	1,2,3,4,6,7,8-HpCDD		145	pg/g	0.322	2.43
3268-87-9	1,2,3,4,6,7,8,9-OCDD		944	pg/g	0.619	4.85
51207-31-9	2,3,7,8-TCDF		1.36	pg/g	0.112	0.485
57117-41-6	1,2,3,7,8-PeCDF	J	1.49	pg/g	0.0672	2.43
57117-31-4	2,3,4,7,8-PeCDF		4.78	pg/g	0.0577	2.43
70648-26-9	1,2,3,4,7,8-HxCDF		5.07	pg/g	0.123	2.43
57117-44-9	1,2,3,6,7,8-HxCDF		3.24	pg/g	0.117	2.43
60851-34-5	2,3,4,6,7,8-HxCDF		5.40	pg/g	0.124	2.43
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.54	pg/g	0.167	2.43
67562-39-4	1,2,3,4,6,7,8-HpCDF		32.8	pg/g	0.119	2.43
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	2.11	pg/g	0.174	2.43
39001-02-0	1,2,3,4,6,7,8,9-OCDF		48.8	pg/g	0.229	4.85
41903-57-5	Total TeCDD	K	7.16	pg/g	0.0767	0.971
36088-22-9	Total PeCDD	K	11.8	pg/g	0.059	4.85
34465-46-8	Total HxCDD		43.9	pg/g	0.108	4.85
37871-00-4	Total HpCDD		242	pg/g	0.322	4.85
30402-14-3	Total TeCDF	K	31.8	pg/g	0.112	0.971
30402-15-4	Total PeCDF	K	51.6	pg/g	0.033	4.85
55684-94-1	Total HxCDF		69.7	pg/g	0.117	4.85
38998-75-3	Total HpCDF		85.0	pg/g	0.119	4.85
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		7.85	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		7.85	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		169	194	pg/g	87.0	(25%-164%)
13C-1,2,3,7,8-PeCDD		187	194	pg/g	96.4	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		155	194	pg/g	79.9	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		167	194	pg/g	85.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		165	194	pg/g	85.1	(23%-140%)
13C-OCDD		276	388	pg/g	71.1	(17%-157%)
13C-2,3,7,8-TCDF		156	194	pg/g	80.4	(24%-169%)
13C-1,2,3,7,8-PeCDF		177	194	pg/g	90.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		178	194	pg/g	91.9	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		147	194	pg/g	75.5	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		158	194	pg/g	81.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		156	194	pg/g	80.5	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		156	194	pg/g	80.2	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 10955007	<b>Date Collected:</b> 06/14/2017 11:35	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613 Soil	<b>Date Received:</b> 06/20/2017 10:50	<b>%Moisture:</b> 3.1
<b>Client ID:</b> ISM-AOI063-0.5-3-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 07/06/2017 12:02	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b05jul17a_3-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10.63 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			146	194	pg/g	75.0 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			152	194	pg/g	78.4 (26%-138%)
37Cl-2,3,7,8-TCDD			17.3	19.4	pg/g	89.0 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

# **Quality Control Summary**



**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A7F0429

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12018890	LCS for batch 34946	13C-2,3,7,8-TCDD		80.8	(20%-175%)
		13C-1,2,3,7,8-PeCDD		85.1	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		73.8	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		75.6	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		80.4	(22%-166%)
		13C-OCDD		70.5	(13%-199%)
		13C-2,3,7,8-TCDF		80.3	(22%-152%)
		13C-1,2,3,7,8-PeCDF		84.7	(21%-192%)
		13C-2,3,4,7,8-PeCDF		85.5	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		75.3	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		75.0	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		76.3	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		77.8	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		74.8	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		83.2	(20%-186%)
		37Cl-2,3,7,8-TCDD		92.4	(31%-191%)
12018891	LCSD for batch 34946	13C-2,3,7,8-TCDD		86.9	(20%-175%)
		13C-1,2,3,7,8-PeCDD		89.3	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		80.1	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		80.6	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		80.5	(22%-166%)
		13C-OCDD		70.4	(13%-199%)
		13C-2,3,7,8-TCDF		85.0	(22%-152%)
		13C-1,2,3,7,8-PeCDF		89.6	(21%-192%)
		13C-2,3,4,7,8-PeCDF		90.6	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		79.6	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		80.4	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		82.3	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		83.8	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		77.0	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		80.9	(20%-186%)
		37Cl-2,3,7,8-TCDD		95.1	(31%-191%)
12018889	MB for batch 34946	13C-2,3,7,8-TCDD		81.2	(25%-164%)
		13C-1,2,3,7,8-PeCDD		84.6	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		79.3	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		78.1	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		81.4	(23%-140%)
		13C-OCDD		74.6	(17%-157%)
		13C-2,3,7,8-TCDF		82.3	(24%-169%)
		13C-1,2,3,7,8-PeCDF		84.7	(24%-185%)
		13C-2,3,4,7,8-PeCDF		85.9	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		78.5	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		78.7	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		81.3	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		81.0	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		76.5	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		80.2	(26%-138%)
		37Cl-2,3,7,8-TCDD		90.2	(35%-197%)
10955001	ISM-AOI062-0.5-After Processing	13C-2,3,7,8-TCDD		88.6	(25%-164%)

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A7F0429

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
10955001	ISM-AOI062-0.5-After Processing	13C-1,2,3,7,8-PeCDD		93.8	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		78.8	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		81.4	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		83.7	(23%-140%)
		13C-OCDD		75.0	(17%-157%)
		13C-2,3,7,8-TCDF		79.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		86.1	(24%-185%)
		13C-2,3,4,7,8-PeCDF		88.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		76.0	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		75.8	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		77.8	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		82.8	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		75.6	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		80.2	(26%-138%)
		37Cl-2,3,7,8-TCDD		92.3	(35%-197%)
10955002	ISM-AOI071-0.5-After Processing	13C-2,3,7,8-TCDD		92.4	(25%-164%)
		13C-1,2,3,7,8-PeCDD		99.9	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		79.3	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		80.7	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		81.5	(23%-140%)
		13C-OCDD		68.4	(17%-157%)
		13C-2,3,7,8-TCDF		80.2	(24%-169%)
		13C-1,2,3,7,8-PeCDF		91.6	(24%-185%)
		13C-2,3,4,7,8-PeCDF		94.1	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		74.0	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		76.1	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		76.7	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		80.0	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		73.1	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		75.0	(26%-138%)
37Cl-2,3,7,8-TCDD		94.7	(35%-197%)		
10955003	ISM-AOI046-0.5-After Processing	13C-2,3,7,8-TCDD		92.0	(25%-164%)
		13C-1,2,3,7,8-PeCDD		93.8	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		79.1	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		83.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		82.6	(23%-140%)
		13C-OCDD		73.4	(17%-157%)
		13C-2,3,7,8-TCDF		79.0	(24%-169%)
		13C-1,2,3,7,8-PeCDF		87.8	(24%-185%)
		13C-2,3,4,7,8-PeCDF		88.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		77.0	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		76.2	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		78.6	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		81.6	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		73.8	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		75.2	(26%-138%)
37Cl-2,3,7,8-TCDD		96.6	(35%-197%)		
10955004	ISM-AOI057-0.5-After Processing	13C-2,3,7,8-TCDD		93.3	(25%-164%)
		13C-1,2,3,7,8-PeCDD		97.0	(25%-181%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7F0429

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
10955004	ISM-AOI057-0.5-After Processing	13C-1,2,3,4,7,8-HxCDD		76.2	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		84.6	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		83.5	(23%-140%)
		13C-OCDD		69.9	(17%-157%)
		13C-2,3,7,8-TCDF		81.5	(24%-169%)
		13C-1,2,3,7,8-PeCDF		91.5	(24%-185%)
		13C-2,3,4,7,8-PeCDF		91.4	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		75.5	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		78.4	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		78.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		81.3	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		72.5	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		75.4	(26%-138%)
		37Cl-2,3,7,8-TCDD		96.9	(35%-197%)
		10955005	ISM-AOI063-0.5-1-After Processing	13C-2,3,7,8-TCDD	
13C-1,2,3,7,8-PeCDD				102	(25%-181%)
13C-1,2,3,4,7,8-HxCDD				78.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD				83.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD				81.8	(23%-140%)
13C-OCDD				65.1	(17%-157%)
13C-2,3,7,8-TCDF				81.3	(24%-169%)
13C-1,2,3,7,8-PeCDF				94.3	(24%-185%)
13C-2,3,4,7,8-PeCDF				96.2	(21%-178%)
13C-1,2,3,4,7,8-HxCDF				75.3	(26%-152%)
13C-1,2,3,6,7,8-HxCDF				79.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF				78.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF				80.6	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF				72.4	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF				75.4	(26%-138%)
37Cl-2,3,7,8-TCDD		98.2	(35%-197%)		
10955006	ISM-AOI063-0.5-2-After Processing	13C-2,3,7,8-TCDD		91.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		97.0	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		79.1	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		84.7	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		82.0	(23%-140%)
		13C-OCDD		66.3	(17%-157%)
		13C-2,3,7,8-TCDF		81.7	(24%-169%)
		13C-1,2,3,7,8-PeCDF		92.6	(24%-185%)
		13C-2,3,4,7,8-PeCDF		93.1	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		77.3	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		77.7	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		80.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		80.9	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		73.2	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		75.8	(26%-138%)
37Cl-2,3,7,8-TCDD		97.3	(35%-197%)		
10955007	ISM-AOI063-0.5-3-After Processing	13C-2,3,7,8-TCDD		87.0	(25%-164%)
		13C-1,2,3,7,8-PeCDD		96.4	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		79.9	(32%-141%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7F0429

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
10955007	ISM-AOI063-0.5-3-After Processing	13C-1,2,3,6,7,8-HxCDD		85.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		85.1	(23%-140%)
		13C-OCDD		71.1	(17%-157%)
		13C-2,3,7,8-TCDF		80.4	(24%-169%)
		13C-1,2,3,7,8-PeCDF		90.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		91.9	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		75.5	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		81.6	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		80.5	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		80.2	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		75.0	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		78.4	(26%-138%)
		37Cl-2,3,7,8-TCDD		89.0	(35%-197%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

**SDG Number:** A7F0429  
**Client ID:** LCS for batch 34946  
**Lab Sample ID:** 12018890  
**Instrument:** HRP763  
**Analyst:** CLP

**Sample Type:** Laboratory Control Sample  
**Matrix:** SOIL  
**Analysis Date:** 06/29/2017 01:59  
**Prep Batch ID:** 34946  
**Batch ID:** 34950  
**Dilution:** 1

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	20.0	21.9	110	67-158
40321-76-4	LCS 1,2,3,7,8-PeCDD	100	102	102	70-142
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	100	103	103	70-164
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	100	99.8	99.8	76-134
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	100	104	104	64-162
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	100	105	105	70-140
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	200	205	102	78-144
51207-31-9	LCS 2,3,7,8-TCDF	20.0	20.6	103	75-158
57117-41-6	LCS 1,2,3,7,8-PeCDF	100	105	105	80-134
57117-31-4	LCS 2,3,4,7,8-PeCDF	100	105	105	68-160
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	100	102	102	72-134
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	100	103	103	84-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	100	103	103	70-156
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	100	103	103	78-130
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	100	101	101	82-122
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	100	102	102	78-138
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	200	207	104	63-170

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A7F0429

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 34946

Matrix: SOIL

Lab Sample ID: 12018891

Instrument: HRP763

Analysis Date: 06/29/2017 02:47

Dilution: 1

Analyst: CLP

Prep Batch ID: 34946

Batch ID: 34950

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	20.0	21.6	108	67-158	1.67	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	100	102	102	70-142	0.253	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	100	99.9	99.9	70-164	3.38	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	100	101	101	76-134	0.731	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	100	105	105	64-162	0.541	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	100	103	103	70-140	1.90	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	200	198	98.9	78-144	3.49	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	20.0	20.7	103	75-158	0.252	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	100	102	102	80-134	2.21	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	100	103	103	68-160	1.88	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	100	102	102	72-134	0.192	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	100	100	100	84-130	2.54	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	100	100	100	70-156	3.26	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	100	101	101	78-130	2.45	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	100	101	101	82-122	0.430	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	100	101	101	78-138	0.733	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	200	201	101	63-170	2.80	0-20



## Method Blank Summary

Page 1 of 1

SDG Number: A7F0429  
 Client ID: MB for batch 34946  
 Lab Sample ID: 12018889  
 Column:

Client: APEX001  
 Instrument ID: HRP763  
 Prep Date: 27-JUN-17

Matrix: SOIL  
 Data File: b27jun17a\_6-3  
 Analyzed: 06/29/17 03:36

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 34946	12018890	b27jun17a_6-1	06/29/17	0159
02 LCSD for batch 34946	12018891	b27jun17a_6-2	06/29/17	0247
03 ISM-AOI062-0.5-After Processing	10955001	b05jul17a_3-3	07/06/17	0711
04 ISM-AOI071-0.5-After Processing	10955002	b05jul17a_3-4	07/06/17	0800
05 ISM-AOI046-0.5-After Processing	10955003	b05jul17a_3-5	07/06/17	0848
06 ISM-AOI057-0.5-After Processing	10955004	b05jul17a_3-6	07/06/17	0937
07 ISM-AOI063-0.5-1-After Processing	10955005	b05jul17a_3-7	07/06/17	1025
08 ISM-AOI063-0.5-2-After Processing	10955006	b05jul17a_3-8	07/06/17	1114
09 ISM-AOI063-0.5-3-After Processing	10955007	b05jul17a_3-9	07/06/17	1202
10 ISM-AOI062-0.5-After Processing	10955001	A10JUL17A-5	07/10/17	1252
11 ISM-AOI071-0.5-After Processing	10955002	A10JUL17A-6	07/10/17	1312
12 ISM-AOI046-0.5-After Processing	10955003	A10JUL17A-7	07/10/17	1332
13 ISM-AOI057-0.5-After Processing	10955004	A10JUL17A-8	07/10/17	1352
14 ISM-AOI063-0.5-1-After Processing	10955005	A10JUL17A-9	07/10/17	1412
15 ISM-AOI063-0.5-2-After Processing	10955006	A10JUL17A-10	07/10/17	1432
16 ISM-AOI063-0.5-3-After Processing	10955007	A10JUL17A-11	07/10/17	1452

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018889		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34946		
<b>Client ID:</b> MB for batch 34946		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/29/2017 03:36	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b27jun17a_6-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.074	pg/g	0.0316	0.500
40321-76-4	1,2,3,7,8-PeCDD	J	0.064	pg/g	0.0312	2.50
39227-28-6	1,2,3,4,7,8-HxCDD	J	0.066	pg/g	0.038	2.50
57653-85-7	1,2,3,6,7,8-HxCDD	J	0.048	pg/g	0.0368	2.50
19408-74-3	1,2,3,7,8,9-HxCDD	J	0.060	pg/g	0.0384	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD	JK	0.136	pg/g	0.0502	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD	J	0.292	pg/g	0.0722	5.00
51207-31-9	2,3,7,8-TCDF	J	0.112	pg/g	0.0376	0.500
57117-41-6	1,2,3,7,8-PeCDF	J	0.108	pg/g	0.0266	2.50
57117-31-4	2,3,4,7,8-PeCDF	JK	0.080	pg/g	0.0246	2.50
70648-26-9	1,2,3,4,7,8-HxCDF	JK	0.108	pg/g	0.028	2.50
57117-44-9	1,2,3,6,7,8-HxCDF	J	0.070	pg/g	0.0282	2.50
60851-34-5	2,3,4,6,7,8-HxCDF	J	0.058	pg/g	0.029	2.50
72918-21-9	1,2,3,7,8,9-HxCDF	J	0.110	pg/g	0.0386	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF	J	0.206	pg/g	0.0304	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF	JK	0.060	pg/g	0.0428	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF	J	0.142	pg/g	0.0748	5.00
41903-57-5	Total TeCDD	JK	0.224	pg/g	0.0316	1.00
36088-22-9	Total PeCDD	JK	0.188	pg/g	0.0312	5.00
34465-46-8	Total HxCDD	JK	0.332	pg/g	0.0368	5.00
37871-00-4	Total HpCDD	JK	0.224	pg/g	0.0502	5.00
30402-14-3	Total TeCDF	JK	0.480	pg/g	0.0376	1.00
30402-15-4	Total PeCDF	JK	0.428	pg/g	0.0166	5.00
55684-94-1	Total HxCDF	JK	0.406	pg/g	0.028	5.00
38998-75-3	Total HpCDF	JK	0.266	pg/g	0.0304	5.00
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.233	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		0.233	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		162	200	pg/g	81.2	(25%-164%)
13C-1,2,3,7,8-PeCDD		169	200	pg/g	84.6	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		159	200	pg/g	79.3	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		156	200	pg/g	78.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		163	200	pg/g	81.4	(23%-140%)
13C-OCDD		299	400	pg/g	74.6	(17%-157%)
13C-2,3,7,8-TCDF		165	200	pg/g	82.3	(24%-169%)
13C-1,2,3,7,8-PeCDF		169	200	pg/g	84.7	(24%-185%)
13C-2,3,4,7,8-PeCDF		172	200	pg/g	85.9	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		157	200	pg/g	78.5	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		157	200	pg/g	78.7	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		163	200	pg/g	81.3	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		162	200	pg/g	81.0	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018889		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34946		
<b>Client ID:</b> MB for batch 34946		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/29/2017 03:36	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b27jun17a_6-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			153	200	pg/g	76.5 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			160	200	pg/g	80.2 (26%-138%)
37Cl-2,3,7,8-TCDD			18.0	20.0	pg/g	90.2 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A7F0429	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12018890		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 34946		
<b>Client ID:</b> LCS for batch 34946		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 34950	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 06/29/2017 01:59	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b27jun17a_6-1		<b>Dilution:</b> 1
<b>Prep Batch:</b> 34946	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 27-JUN-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		21.9	pg/g	0.034	0.500
40321-76-4	1,2,3,7,8-PeCDD		102	pg/g	0.0628	2.50
39227-28-6	1,2,3,4,7,8-HxCDD		103	pg/g	0.0798	2.50
57653-85-7	1,2,3,6,7,8-HxCDD		99.8	pg/g	0.0808	2.50
19408-74-3	1,2,3,7,8,9-HxCDD		104	pg/g	0.0826	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD		105	pg/g	0.143	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD		205	pg/g	0.170	5.00
51207-31-9	2,3,7,8-TCDF		20.6	pg/g	0.0372	0.500
57117-41-6	1,2,3,7,8-PeCDF		105	pg/g	0.0626	2.50
57117-31-4	2,3,4,7,8-PeCDF		105	pg/g	0.0552	2.50
70648-26-9	1,2,3,4,7,8-HxCDF		102	pg/g	0.0998	2.50
57117-44-9	1,2,3,6,7,8-HxCDF		103	pg/g	0.0976	2.50
60851-34-5	2,3,4,6,7,8-HxCDF		103	pg/g	0.0994	2.50
72918-21-9	1,2,3,7,8,9-HxCDF		103	pg/g	0.134	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF		101	pg/g	0.124	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF		102	pg/g	0.170	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF		207	pg/g	0.190	5.00

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		162	200	pg/g	80.8	(20%-175%)
13C-1,2,3,7,8-PeCDD		170	200	pg/g	85.1	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		148	200	pg/g	73.8	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		151	200	pg/g	75.6	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		161	200	pg/g	80.4	(22%-166%)
13C-OCDD		282	400	pg/g	70.5	(13%-199%)
13C-2,3,7,8-TCDF		161	200	pg/g	80.3	(22%-152%)
13C-1,2,3,7,8-PeCDF		169	200	pg/g	84.7	(21%-192%)
13C-2,3,4,7,8-PeCDF		171	200	pg/g	85.5	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		151	200	pg/g	75.3	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		150	200	pg/g	75.0	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		153	200	pg/g	76.3	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		156	200	pg/g	77.8	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		150	200	pg/g	74.8	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		166	200	pg/g	83.2	(20%-186%)
37Cl-2,3,7,8-TCDD		18.5	20.0	pg/g	92.4	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

SDG Number: A7F0429	Client: APEX001	Project: APEX00117
Lab Sample ID: 12018891		Matrix: SOIL
Client Sample: QC for batch 34946		
Client ID: LCSDD for batch 34946		Prep Basis: As Received
Batch ID: 34950	Method: EPA Method 1613B	
Run Date: 06/29/2017 02:47	Analyst: CLP	Instrument: HRP763
Data File: b27jun17a_6-2		Dilution: 1
Prep Batch: 34946	Prep Method: SW846 3540C	
Prep Date: 27-JUN-17	Prep Aliquot: 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		21.6	pg/g	0.0294	0.500
40321-76-4	1,2,3,7,8-PeCDD		102	pg/g	0.0576	2.50
39227-28-6	1,2,3,4,7,8-HxCDD		99.9	pg/g	0.0874	2.50
57653-85-7	1,2,3,6,7,8-HxCDD		101	pg/g	0.092	2.50
19408-74-3	1,2,3,7,8,9-HxCDD		105	pg/g	0.0922	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD		103	pg/g	0.139	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD		198	pg/g	0.258	5.00
51207-31-9	2,3,7,8-TCDF		20.7	pg/g	0.0456	0.500
57117-41-6	1,2,3,7,8-PeCDF		102	pg/g	0.069	2.50
57117-31-4	2,3,4,7,8-PeCDF		103	pg/g	0.0662	2.50
70648-26-9	1,2,3,4,7,8-HxCDF		102	pg/g	0.137	2.50
57117-44-9	1,2,3,6,7,8-HxCDF		100	pg/g	0.136	2.50
60851-34-5	2,3,4,6,7,8-HxCDF		100	pg/g	0.134	2.50
72918-21-9	1,2,3,7,8,9-HxCDF		101	pg/g	0.175	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF		101	pg/g	0.130	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF		101	pg/g	0.182	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF		201	pg/g	0.256	5.00

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		174	200	pg/g	86.9	(20%-175%)
13C-1,2,3,7,8-PeCDD		179	200	pg/g	89.3	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		160	200	pg/g	80.1	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		161	200	pg/g	80.6	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		161	200	pg/g	80.5	(22%-166%)
13C-OCDD		282	400	pg/g	70.4	(13%-199%)
13C-2,3,7,8-TCDF		170	200	pg/g	85.0	(22%-152%)
13C-1,2,3,7,8-PeCDF		179	200	pg/g	89.6	(21%-192%)
13C-2,3,4,7,8-PeCDF		181	200	pg/g	90.6	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		159	200	pg/g	79.6	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		161	200	pg/g	80.4	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		165	200	pg/g	82.3	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		168	200	pg/g	83.8	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		154	200	pg/g	77.0	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		162	200	pg/g	80.9	(20%-186%)
37Cl-2,3,7,8-TCDD		19.0	20.0	pg/g	95.1	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.



September 07, 2017

Mr. Philip Nerenberg  
Apex Laboratories  
12232 S.W. Garden Place  
Portland, Oregon 97223

Re: POR DXN  
Work Order: 11203  
SDG: A7H0225

Dear Mr. Nerenberg:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 11, 2017. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,

Cynde Larkins  
Project Manager

Enclosures



A7H0225

CFA WO# 11203

**SENDING LABORATORY:**

**RECEIVING LABORATORY:**

Apex Laboratories  
12232 S.W. Garden Place  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 718-0333  
Project Manager: Philip Nerenberg

Cape Fear Analytical, LLC  
3306 Kitty Hawk Rd Suite 120  
Wilmington, NC 28405  
Phone : (910) 795-0421  
Fax: -

Sample Name: ISM-AOI045-0.5 - After Processing	Soil	After ISM Processing Sampled: 08/07/17 10:30	(A7H0225-02)
Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	08/21/17 17:00	02/03/18 10:30	Low Level Standard Required, Use Containers A,B,C, D, Use full volume
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

Sample Name: ISM-AOI048-0.5 - After Processing	Soil	After ISM Processing Sampled: 08/07/17 11:00	(A7H0225-04)
Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	08/21/17 17:00	02/03/18 11:00	Low Level Standard Required, Use Containers A,B,C, D, Use full volume
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

Sample Name: ISM-AOI059-0.5 - After Processing	Soil	After ISM Processing. Same Id on CoC as 2nd Sampled: 08/07/17 13:15	(A7H0225-06)
Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	08/21/17 17:00	02/03/18 13:15	Low Level Standard Required, Use Containers A,B,C, D, Use full volume
<i>Containers Supplied:</i>			
(A)40 mL VOA - Non Preserved			
(B)40 mL VOA - Non Preserved			
(C)40 mL VOA - Non Preserved			
(D)40 mL VOA - Non Preserved			

Standard TAT

8/10/17

Fed Ex (Shipper)

*[Signature]*  
Released By

Fed Ex (Shipper)

*Cynde Larkins*  
Received By

11 AUG 17 0954  
Date

Temp = 3.8°C

**SAMPLE RECEIPT CHECKLIST**  
Cape Fear Analytical

Client: <b>APEX</b>	Work Order: <b>11203</b>
Shipping Company: <b>FedEx</b>	Date/Time Received: <b>11 AUG 17 0954</b>

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?			✓
Samples identified as Foreign Soil?			✓

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?		✓	
Samples < 2x background?		✓	

\* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?			✓

Air Witness: \_\_\_\_\_

#	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: seals broken    damaged container    leaking container    other(describe)
2	Chain of Custody documents included with shipment?	✓			
3	Samples requiring cold preservation within 0-6°C?	✓			Preservation Method: ice bags    blue ice    dry ice    none    other (describe) <b>7.3° - 3.5° = 3.8°C</b>
4	Aqueous samples found to have visible solids?		✓		Sample IDs, containers affected:
5	Samples requiring chemical preservation at proper pH?		✓		Sample IDs, containers affected and pH observed: If preservative added, Lot#:
6	Samples requiring preservation have no residual chlorine?		✓		Sample IDs, containers affected: If preservative added, Lot#:
7	Samples received within holding time?	✓			Sample IDs, tests affected:
8	Sample IDs on COC match IDs on containers?	✓			Sample IDs, containers affected:
9	Date & time of COC match date & time on containers?	✓			Sample IDs, containers affected:
10	Number of containers received match number indicated on COC?	✓			List type and number of containers / Sample IDs, containers affected: <b>4 - 40ml vials per sample</b>
11	COC form is properly signed in relinquished/received sections?	✓			

Comments:

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Checklist performed by: Initials: **CJ**      Date: **11 AUG 17**

# **High Resolution Dioxins and Furans Analysis**

# Case Narrative

**HDOX Case Narrative  
Apex Laboratories (APEX)  
SDG A7H0225  
Work Order 11203**

**Method/Analysis Information**

**Product:** Dioxins/Furans by EPA Method 1613B in Solids  
Analytical Method: EPA Method 1613B  
Extraction Method: SW846 3540C  
Analytical Batch Number: 35403  
Clean Up Batch Number: 35401  
Extraction Batch Number: 35400

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in Method 1613B:

<b>Sample ID</b>	<b>Client ID</b>
11203001	ISM-AOI045-0.5-After Processing
11203002	ISM-AOI048-0.5-After Processing
11203003	ISM-AOI059-0.5-After Processing
12019315	Method Blank (MB)
12019316	Laboratory Control Sample (LCS)
12019317	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 14.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

### **Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

### **Quality Control (QC) Information**

#### **Certification Statement**

The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

#### **Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

#### **Surrogate Recoveries**

All surrogate recoveries were within the established acceptance criteria for this SDG.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

#### **Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits.

#### **LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

#### **QC Sample Designation**

A matrix spike and matrix spike duplicate analysis was not required for this SDG.

### **Technical Information**

#### **Holding Time Specifications**

CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

#### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

#### **Sample Dilutions**

The samples in this SDG did not require dilutions.

#### **Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

### **Miscellaneous Information**



**Nonconformance (NCR) Documentation**

A NCR was not required for this SDG.

**Manual Integrations**

Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

**Sample preparation**

No difficulties were encountered during sample preparation.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

# **Sample Data Summary**

## Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

### Qualifier Definition Report for

APEX001 Apex Laboratories

Client SDG: A7H0225 CFA Work Order: 11203

#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- E Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- J Value is estimated
- K Estimated Maximum Possible Concentration
- U Analyte was analyzed for, but not detected above the specified detection limit.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

#### Review/Validation

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature: 

Name: Heather Patterson

Date: 07 SEP 2017

Title: Group Leader

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7H0225	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 11203001	<b>Date Collected:</b> 08/07/2017 10:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/11/2017 09:54	<b>%Moisture:</b> 2.6
<b>Client ID:</b> ISM-AOI045-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 35403	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/01/2017 18:20	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A01SEP17A-13		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35400	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 17-AUG-17	<b>Prep Aliquot:</b> 9.99 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.483	pg/g	0.483	0.514
40321-76-4	1,2,3,7,8-PeCDD	JK	0.849	pg/g	0.174	2.57
39227-28-6	1,2,3,4,7,8-HxCDD	J	1.57	pg/g	0.317	2.57
57653-85-7	1,2,3,6,7,8-HxCDD		6.24	pg/g	0.308	2.57
19408-74-3	1,2,3,7,8,9-HxCDD		3.06	pg/g	0.321	2.57
35822-46-9	1,2,3,4,6,7,8-HpCDD		139	pg/g	1.08	2.57
3268-87-9	1,2,3,4,6,7,8,9-OCDD		962	pg/g	3.12	5.14
51207-31-9	2,3,7,8-TCDF		0.756	pg/g	0.693	0.514
57117-41-6	1,2,3,7,8-PeCDF	JK	0.668	pg/g	0.269	2.57
57117-31-4	2,3,4,7,8-PeCDF	J	1.82	pg/g	0.243	2.57
70648-26-9	1,2,3,4,7,8-HxCDF		3.18	pg/g	0.253	2.57
57117-44-9	1,2,3,6,7,8-HxCDF	J	1.46	pg/g	0.253	2.57
60851-34-5	2,3,4,6,7,8-HxCDF	J	2.05	pg/g	0.251	2.57
72918-21-9	1,2,3,7,8,9-HxCDF	J	0.816	pg/g	0.368	2.57
67562-39-4	1,2,3,4,6,7,8-HpCDF		20.9	pg/g	0.288	2.57
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	1.16	pg/g	0.469	2.57
39001-02-0	1,2,3,4,6,7,8,9-OCDF		27.0	pg/g	0.658	5.14
41903-57-5	Total TeCDD		3.49	pg/g	0.483	1.03
36088-22-9	Total PeCDD	K	8.72	pg/g	0.174	5.14
34465-46-8	Total HxCDD	K	37.6	pg/g	0.308	5.14
37871-00-4	Total HpCDD		243	pg/g	1.08	5.14
30402-14-3	Total TeCDF	K	5.36	pg/g	0.693	1.03
30402-15-4	Total PeCDF	K	18.1	pg/g	0.045	5.14
55684-94-1	Total HxCDF	K	40.3	pg/g	0.251	5.14
38998-75-3	Total HpCDF	K	54.8	pg/g	0.288	5.14
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		5.23	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		5.47	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		130	206	pg/g	63.4	(25%-164%)
13C-1,2,3,7,8-PeCDD		168	206	pg/g	81.7	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		144	206	pg/g	70.0	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		159	206	pg/g	77.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		155	206	pg/g	75.5	(23%-140%)
13C-OCDD		279	411	pg/g	67.8	(17%-157%)
13C-2,3,7,8-TCDF		118	206	pg/g	57.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		158	206	pg/g	76.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		166	206	pg/g	80.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		135	206	pg/g	65.9	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		145	206	pg/g	70.4	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		142	206	pg/g	69.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		149	206	pg/g	72.7	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 2 of 2

<b>SDG Number:</b> A7H0225	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 11203001	<b>Date Collected:</b> 08/07/2017 10:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/11/2017 09:54	<b>%Moisture:</b> 2.6
<b>Client ID:</b> ISM-AOI045-0.5-After Processing	<b>Method:</b> EPA Method 1613B	<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 35403	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Run Date:</b> 09/01/2017 18:20	<b>Prep Method:</b> SW846 3540C	<b>Dilution:</b> 1
<b>Data File:</b> A01SEP17A-13	<b>Prep Aliquot:</b> 9.99 g	
<b>Prep Batch:</b> 35400		
<b>Prep Date:</b> 17-AUG-17		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
	13C-1,2,3,4,6,7,8-HpCDF		141	206	pg/g	68.7 (28%-143%)
	13C-1,2,3,4,7,8,9-HpCDF		136	206	pg/g	66.3 (26%-138%)
	37Cl-2,3,7,8-TCDD		13.5	20.6	pg/g	65.5 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7H0225	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 11203002	<b>Date Collected:</b> 08/07/2017 11:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/11/2017 09:54	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI048-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 35403	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/01/2017 19:08	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A01SEP17A-14		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35400	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 17-AUG-17	<b>Prep Aliquot:</b> 10.08 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.453	pg/g	0.339	0.510
40321-76-4	1,2,3,7,8-PeCDD	J	1.36	pg/g	0.325	2.55
39227-28-6	1,2,3,4,7,8-HxCDD	J	2.09	pg/g	0.369	2.55
57653-85-7	1,2,3,6,7,8-HxCDD		9.32	pg/g	0.345	2.55
19408-74-3	1,2,3,7,8,9-HxCDD		4.29	pg/g	0.365	2.55
35822-46-9	1,2,3,4,6,7,8-HpCDD		277	pg/g	1.26	2.55
3268-87-9	1,2,3,4,6,7,8,9-OCDD		1910	pg/g	3.80	5.10
51207-31-9	2,3,7,8-TCDF		0.816	pg/g	0.486	0.510
57117-41-6	1,2,3,7,8-PeCDF	J	0.945	pg/g	0.189	2.55
57117-31-4	2,3,4,7,8-PeCDF		2.57	pg/g	0.161	2.55
70648-26-9	1,2,3,4,7,8-HxCDF		5.66	pg/g	0.535	2.55
57117-44-9	1,2,3,6,7,8-HxCDF	J	2.38	pg/g	0.518	2.55
60851-34-5	2,3,4,6,7,8-HxCDF		3.53	pg/g	0.572	2.55
72918-21-9	1,2,3,7,8,9-HxCDF	JK	1.37	pg/g	0.776	2.55
67562-39-4	1,2,3,4,6,7,8-HpCDF		56.9	pg/g	0.506	2.55
55673-89-7	1,2,3,4,7,8,9-HpCDF		3.35	pg/g	0.831	2.55
39001-02-0	1,2,3,4,6,7,8,9-OCDF		133	pg/g	1.15	5.10
41903-57-5	Total TeCDD	K	3.48	pg/g	0.339	1.02
36088-22-9	Total PeCDD		8.84	pg/g	0.325	5.10
34465-46-8	Total HxCDD	K	55.1	pg/g	0.345	5.10
37871-00-4	Total HpCDD		480	pg/g	1.26	5.10
30402-14-3	Total TeCDF	K	7.79	pg/g	0.486	1.02
30402-15-4	Total PeCDF	K	29.0	pg/g	0.0555	5.10
55684-94-1	Total HxCDF	K	84.4	pg/g	0.518	5.10
38998-75-3	Total HpCDF		194	pg/g	0.506	5.10
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		9.54	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		9.54	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		149	204	pg/g	73.0	(25%-164%)
13C-1,2,3,7,8-PeCDD		177	204	pg/g	86.6	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		146	204	pg/g	71.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		171	204	pg/g	83.6	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		160	204	pg/g	78.6	(23%-140%)
13C-OCDD		310	408	pg/g	75.8	(17%-157%)
13C-2,3,7,8-TCDF		131	204	pg/g	64.3	(24%-169%)
13C-1,2,3,7,8-PeCDF		168	204	pg/g	82.3	(24%-185%)
13C-2,3,4,7,8-PeCDF		174	204	pg/g	85.5	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		142	204	pg/g	69.7	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		155	204	pg/g	76.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		153	204	pg/g	74.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		158	204	pg/g	77.3	(29%-147%)



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7H0225	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 11203002	<b>Date Collected:</b> 08/07/2017 11:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/11/2017 09:54	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI048-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 35403	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/01/2017 19:08	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A01SEP17A-14		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35400	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 17-AUG-17	<b>Prep Aliquot:</b> 10.08 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
	13C-1,2,3,4,6,7,8-HpCDF		149	204	pg/g	73.1 (28%-143%)
	13C-1,2,3,4,7,8,9-HpCDF		142	204	pg/g	69.5 (26%-138%)
	37Cl-2,3,7,8-TCDD		14.9	20.4	pg/g	73.0 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7H0225	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 11203003	<b>Date Collected:</b> 08/07/2017 13:15	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/11/2017 09:54	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI059-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 35403	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/02/2017 00:06	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A01SEP17A_2-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35400	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 17-AUG-17	<b>Prep Aliquot:</b> 10.02 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	K	0.532	pg/g	0.384	0.513
40321-76-4	1,2,3,7,8-PeCDD		5.27	pg/g	0.199	2.57
39227-28-6	1,2,3,4,7,8-HxCDD		11.0	pg/g	1.05	2.57
57653-85-7	1,2,3,6,7,8-HxCDD		67.8	pg/g	0.986	2.57
19408-74-3	1,2,3,7,8,9-HxCDD		24.1	pg/g	1.04	2.57
35822-46-9	1,2,3,4,6,7,8-HpCDD		1750	pg/g	2.87	2.57
3268-87-9	1,2,3,4,6,7,8,9-OCDD	E	11400	pg/g	4.89	5.13
51207-31-9	2,3,7,8-TCDF		0.823	pg/g	0.548	0.513
57117-41-6	1,2,3,7,8-PeCDF		2.60	pg/g	0.361	2.57
57117-31-4	2,3,4,7,8-PeCDF		5.52	pg/g	0.302	2.57
70648-26-9	1,2,3,4,7,8-HxCDF		19.7	pg/g	0.602	2.57
57117-44-9	1,2,3,6,7,8-HxCDF		11.5	pg/g	0.595	2.57
60851-34-5	2,3,4,6,7,8-HxCDF		13.8	pg/g	0.634	2.57
72918-21-9	1,2,3,7,8,9-HxCDF		5.74	pg/g	0.864	2.57
67562-39-4	1,2,3,4,6,7,8-HpCDF		244	pg/g	0.881	2.57
55673-89-7	1,2,3,4,7,8,9-HpCDF		14.2	pg/g	1.38	2.57
39001-02-0	1,2,3,4,6,7,8,9-OCDF		400	pg/g	1.35	5.13
41903-57-5	Total TeCDD	K	4.89	pg/g	0.384	1.03
36088-22-9	Total PeCDD	K	23.8	pg/g	0.199	5.13
34465-46-8	Total HxCDD		278	pg/g	0.986	5.13
37871-00-4	Total HpCDD	E	2750	pg/g	2.87	5.13
30402-14-3	Total TeCDF	K	7.53	pg/g	0.548	1.03
30402-15-4	Total PeCDF	K	78.9	pg/g	0.0614	5.13
55684-94-1	Total HxCDF	K	387	pg/g	0.595	5.13
38998-75-3	Total HpCDF	K	704	pg/g	0.881	5.13
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		46.6	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		46.6	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		155	205	pg/g	75.3	(25%-164%)
13C-1,2,3,7,8-PeCDD		181	205	pg/g	88.3	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		155	205	pg/g	75.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		171	205	pg/g	83.3	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		179	205	pg/g	87.3	(23%-140%)
13C-OCDD		382	411	pg/g	93.0	(17%-157%)
13C-2,3,7,8-TCDF		134	205	pg/g	65.5	(24%-169%)
13C-1,2,3,7,8-PeCDF		166	205	pg/g	80.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		172	205	pg/g	83.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		148	205	pg/g	71.9	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		161	205	pg/g	78.3	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		157	205	pg/g	76.4	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		158	205	pg/g	77.2	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7H0225	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 11203003	<b>Date Collected:</b> 08/07/2017 13:15	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/11/2017 09:54	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI059-0.5-After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 35403	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/02/2017 00:06	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A01SEP17A_2-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35400	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 17-AUG-17	<b>Prep Aliquot:</b> 10.02 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			151	205	pg/g	73.6 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			150	205	pg/g	72.9 (26%-138%)
37Cl-2,3,7,8-TCDD			14.9	20.5	pg/g	72.7 (35%-197%)

**Comments:**  
**E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range  
**K** Estimated Maximum Possible Concentration

# **Quality Control Summary**

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A7H0225

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12019316	LCS for batch 35400	13C-2,3,7,8-TCDD		74.8	(20%-175%)
		13C-1,2,3,7,8-PeCDD		83.4	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		70.8	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		80.0	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		73.3	(22%-166%)
		13C-OCDD		64.5	(13%-199%)
		13C-2,3,7,8-TCDF		67.4	(22%-152%)
		13C-1,2,3,7,8-PeCDF		80.4	(21%-192%)
		13C-2,3,4,7,8-PeCDF		83.0	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		67.3	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		72.0	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		72.2	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		74.2	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		70.1	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		68.0	(20%-186%)
		37Cl-2,3,7,8-TCDD		76.9	(31%-191%)
12019317	LCSD for batch 35400	13C-2,3,7,8-TCDD		70.7	(20%-175%)
		13C-1,2,3,7,8-PeCDD		86.0	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		72.7	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		76.5	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		73.7	(22%-166%)
		13C-OCDD		63.6	(13%-199%)
		13C-2,3,7,8-TCDF		63.3	(22%-152%)
		13C-1,2,3,7,8-PeCDF		80.6	(21%-192%)
		13C-2,3,4,7,8-PeCDF		81.4	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		67.3	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		69.5	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		70.9	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		72.6	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		66.1	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		67.8	(20%-186%)
		37Cl-2,3,7,8-TCDD		74.7	(31%-191%)
12019315	MB for batch 35400	13C-2,3,7,8-TCDD		76.5	(25%-164%)
		13C-1,2,3,7,8-PeCDD		92.8	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		75.8	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		79.3	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		76.1	(23%-140%)
		13C-OCDD		68.1	(17%-157%)
		13C-2,3,7,8-TCDF		66.2	(24%-169%)
		13C-1,2,3,7,8-PeCDF		87.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		88.3	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		71.3	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		70.6	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		74.8	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		77.1	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		71.2	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		70.0	(26%-138%)
		37Cl-2,3,7,8-TCDD		79.0	(35%-197%)
11203001	ISM-AOI045-0.5-After Processing	13C-2,3,7,8-TCDD		63.4	(25%-164%)

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A7H0225

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
11203001	ISM-AOI045-0.5-After Processing	13C-1,2,3,7,8-PeCDD		81.7	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		70.0	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		77.4	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		75.5	(23%-140%)
		13C-OCDD		67.8	(17%-157%)
		13C-2,3,7,8-TCDF		57.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		76.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		80.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		65.9	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		70.4	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		69.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		72.7	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		68.7	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		66.3	(26%-138%)
		37Cl-2,3,7,8-TCDD		65.5	(35%-197%)
11203002	ISM-AOI048-0.5-After Processing	13C-2,3,7,8-TCDD		73.0	(25%-164%)
		13C-1,2,3,7,8-PeCDD		86.6	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		71.4	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		83.6	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		78.6	(23%-140%)
		13C-OCDD		75.8	(17%-157%)
		13C-2,3,7,8-TCDF		64.3	(24%-169%)
		13C-1,2,3,7,8-PeCDF		82.3	(24%-185%)
		13C-2,3,4,7,8-PeCDF		85.5	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		69.7	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		76.2	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		74.9	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		77.3	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		73.1	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		69.5	(26%-138%)
37Cl-2,3,7,8-TCDD		73.0	(35%-197%)		
11203003	ISM-AOI059-0.5-After Processing	13C-2,3,7,8-TCDD		75.3	(25%-164%)
		13C-1,2,3,7,8-PeCDD		88.3	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		75.4	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		83.3	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		87.3	(23%-140%)
		13C-OCDD		93.0	(17%-157%)
		13C-2,3,7,8-TCDF		65.5	(24%-169%)
		13C-1,2,3,7,8-PeCDF		80.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		83.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		71.9	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		78.3	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		76.4	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		77.2	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		73.6	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		72.9	(26%-138%)
37Cl-2,3,7,8-TCDD		72.7	(35%-197%)		

\* Recovery outside Acceptance Limits



**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7H0225

Matrix Type: SOLID

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Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
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\* Recovery outside Acceptance Limits  
# Column to be used to flag recovery values  
D Sample Diluted

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A7H0225

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 35400

Matrix: SOIL

Lab Sample ID: 12019316

Instrument: HRP750

Analysis Date: 09/01/2017 09:28

Dilution: 1

Analyst: MJC

Prep Batch ID: 35400

Batch ID: 35403

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	20.0	20.0	99.9	67-158
40321-76-4	LCS 1,2,3,7,8-PeCDD	100	99.2	99.2	70-142
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	100	102	102	70-164
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	100	102	102	76-134
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	100	105	105	64-162
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	100	100	100	70-140
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	200	201	101	78-144
51207-31-9	LCS 2,3,7,8-TCDF	20.0	18.4	92.2	75-158
57117-41-6	LCS 1,2,3,7,8-PeCDF	100	96.4	96.4	80-134
57117-31-4	LCS 2,3,4,7,8-PeCDF	100	97.1	97.1	68-160
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	100	105	105	72-134
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	100	105	105	84-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	100	103	103	70-156
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	100	99.9	99.9	78-130
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	100	101	101	82-122
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	100	101	101	78-138
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	200	196	97.8	63-170

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A7H0225

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 35400

Matrix: SOIL

Lab Sample ID: 12019317

Instrument: HRP750

Analysis Date: 09/01/2017 10:16

Dilution: 1

Analyst: MJC

Prep Batch ID: 35400

Batch ID: 35403

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	20.0	20.3	102	67-158	1.77	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	100	97.9	97.9	70-142	1.34	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	100	98.5	98.5	70-164	3.40	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	100	98.6	98.6	76-134	3.77	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	100	106	106	64-162	0.446	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	100	97.8	97.8	70-140	2.43	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	200	201	100	78-144	0.187	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	20.0	18.8	94.2	75-158	2.15	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	100	95.9	95.9	80-134	0.497	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	100	97.3	97.3	68-160	0.187	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	100	101	101	72-134	3.60	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	100	103	103	84-130	2.26	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	100	104	104	70-156	1.01	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	100	97.3	97.3	78-130	2.59	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	100	102	102	82-122	0.947	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	100	98.4	98.4	78-138	3.03	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	200	189	94.6	63-170	3.40	0-20

## Method Blank Summary

Page 1 of 1

SDG Number: A7H0225  
Client ID: MB for batch 35400  
Lab Sample ID: 12019315  
Column:

Client: APEX001  
Instrument ID: HRP750  
Prep Date: 17-AUG-17

Matrix: SOIL  
Data File: A01SEP17A-4  
Analyzed: 09/01/17 11:04

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 35400	12019316	A01SEP17A-2	09/01/17	0928
02 LCSD for batch 35400	12019317	A01SEP17A-3	09/01/17	1016
03 ISM-AOI045-0.5-After Processing	11203001	A01SEP17A-13	09/01/17	1820
04 ISM-AOI048-0.5-After Processing	11203002	A01SEP17A-14	09/01/17	1908
05 ISM-AOI059-0.5-After Processing	11203003	A01SEP17A_2-5	09/02/17	0006

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

**SDG Number:** A7H0225  
**Lab Sample ID:** 12019315  
**Client Sample:** QC for batch 35400  
**Client ID:** MB for batch 35400  
**Batch ID:** 35403  
**Run Date:** 09/01/2017 11:04  
**Data File:** A01SEP17A-4  
**Prep Batch:** 35400  
**Prep Date:** 17-AUG-17

**Client:** APEX001  
**Method:** EPA Method 1613B  
**Analyst:** MJC  
**Prep Method:** SW846 3540C  
**Prep Aliquot:** 10 g

**Project:** APEX00117  
**Matrix:** SOIL  
**Prep Basis:** As Received  
**Instrument:** HRP750  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.174	pg/g	0.174	0.500
40321-76-4	1,2,3,7,8-PeCDD	U	0.0922	pg/g	0.0922	2.50
39227-28-6	1,2,3,4,7,8-HxCDD	U	0.105	pg/g	0.105	2.50
57653-85-7	1,2,3,6,7,8-HxCDD	U	0.102	pg/g	0.102	2.50
19408-74-3	1,2,3,7,8,9-HxCDD	U	0.106	pg/g	0.106	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	0.116	pg/g	0.116	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD	JK	0.252	pg/g	0.246	5.00
51207-31-9	2,3,7,8-TCDF	U	0.193	pg/g	0.193	0.500
57117-41-6	1,2,3,7,8-PeCDF	U	0.0608	pg/g	0.0608	2.50
57117-31-4	2,3,4,7,8-PeCDF	U	0.0522	pg/g	0.0522	2.50
70648-26-9	1,2,3,4,7,8-HxCDF	U	0.09	pg/g	0.090	2.50
57117-44-9	1,2,3,6,7,8-HxCDF	U	0.0922	pg/g	0.0922	2.50
60851-34-5	2,3,4,6,7,8-HxCDF	U	0.0926	pg/g	0.0926	2.50
72918-21-9	1,2,3,7,8,9-HxCDF	U	0.136	pg/g	0.136	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	0.0622	pg/g	0.0622	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	0.104	pg/g	0.104	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	0.22	pg/g	0.220	5.00
41903-57-5	Total TeCDD	U	0.174	pg/g	0.174	1.00
36088-22-9	Total PeCDD	U	0.0922	pg/g	0.0922	5.00
34465-46-8	Total HxCDD	U	0.102	pg/g	0.102	5.00
37871-00-4	Total HpCDD	U	0.116	pg/g	0.116	5.00
30402-14-3	Total TeCDF	U	0.193	pg/g	0.193	1.00
30402-15-4	Total PeCDF	U	0.0522	pg/g	0.0522	5.00
55684-94-1	Total HxCDF	U	0.09	pg/g	0.090	5.00
38998-75-3	Total HpCDF	U	0.0622	pg/g	0.0622	5.00
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.0000756	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		0.189	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		153	200	pg/g	76.5	(25%-164%)
13C-1,2,3,7,8-PeCDD		186	200	pg/g	92.8	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		152	200	pg/g	75.8	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		159	200	pg/g	79.3	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		152	200	pg/g	76.1	(23%-140%)
13C-OCDD		273	400	pg/g	68.1	(17%-157%)
13C-2,3,7,8-TCDF		132	200	pg/g	66.2	(24%-169%)
13C-1,2,3,7,8-PeCDF		176	200	pg/g	87.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		177	200	pg/g	88.3	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		143	200	pg/g	71.3	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		141	200	pg/g	70.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		150	200	pg/g	74.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		154	200	pg/g	77.1	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 2 of 2

SDG Number: A7H0225	Client: APEX001	Project: APEX00117
Lab Sample ID: 12019315		Matrix: SOIL
Client Sample: QC for batch 35400		
Client ID: MB for batch 35400		Prep Basis: As Received
Batch ID: 35403	Method: EPA Method 1613B	
Run Date: 09/01/2017 11:04	Analyst: MJC	Instrument: HRP750
Data File: A01SEP17A-4		Dilution: 1
Prep Batch: 35400	Prep Method: SW846 3540C	
Prep Date: 17-AUG-17	Prep Aliquot: 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
	13C-1,2,3,4,6,7,8-HpCDF		142	200	pg/g	71.2 (28%-143%)
	13C-1,2,3,4,7,8,9-HpCDF		140	200	pg/g	70.0 (26%-138%)
	37Cl-2,3,7,8-TCDD		15.8	20.0	pg/g	79.0 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A7H0225	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12019316		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 35400		
<b>Client ID:</b> LCS for batch 35400		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 35403	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/01/2017 09:28	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A01SEP17A-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35400	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 17-AUG-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		20.0	pg/g	0.191	0.500
40321-76-4	1,2,3,7,8-PeCDD		99.2	pg/g	0.234	2.50
39227-28-6	1,2,3,4,7,8-HxCDD		102	pg/g	0.606	2.50
57653-85-7	1,2,3,6,7,8-HxCDD		102	pg/g	0.608	2.50
19408-74-3	1,2,3,7,8,9-HxCDD		105	pg/g	0.624	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD		100	pg/g	0.688	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD		201	pg/g	2.08	5.00
51207-31-9	2,3,7,8-TCDF		18.4	pg/g	0.272	0.500
57117-41-6	1,2,3,7,8-PeCDF		96.4	pg/g	0.250	2.50
57117-31-4	2,3,4,7,8-PeCDF		97.1	pg/g	0.214	2.50
70648-26-9	1,2,3,4,7,8-HxCDF		105	pg/g	0.666	2.50
57117-44-9	1,2,3,6,7,8-HxCDF		105	pg/g	0.648	2.50
60851-34-5	2,3,4,6,7,8-HxCDF		103	pg/g	0.712	2.50
72918-21-9	1,2,3,7,8,9-HxCDF		99.9	pg/g	0.972	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF		101	pg/g	0.558	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF		101	pg/g	0.904	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF		196	pg/g	1.87	5.00

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		150	200	pg/g	74.8	(20%-175%)
13C-1,2,3,7,8-PeCDD		167	200	pg/g	83.4	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		142	200	pg/g	70.8	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		160	200	pg/g	80.0	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		147	200	pg/g	73.3	(22%-166%)
13C-OCDD		258	400	pg/g	64.5	(13%-199%)
13C-2,3,7,8-TCDF		135	200	pg/g	67.4	(22%-152%)
13C-1,2,3,7,8-PeCDF		161	200	pg/g	80.4	(21%-192%)
13C-2,3,4,7,8-PeCDF		166	200	pg/g	83.0	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		135	200	pg/g	67.3	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		144	200	pg/g	72.0	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		144	200	pg/g	72.2	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		148	200	pg/g	74.2	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		140	200	pg/g	70.1	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		136	200	pg/g	68.0	(20%-186%)
37Cl-2,3,7,8-TCDD		15.4	20.0	pg/g	76.9	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A7H0225	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12019317		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 35400		
<b>Client ID:</b> LCSD for batch 35400		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 35403	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/01/2017 10:16	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A01SEP17A-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35400	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 17-AUG-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		20.3	pg/g	0.248	0.500
40321-76-4	1,2,3,7,8-PeCDD		97.9	pg/g	0.184	2.50
39227-28-6	1,2,3,4,7,8-HxCDD		98.5	pg/g	0.406	2.50
57653-85-7	1,2,3,6,7,8-HxCDD		98.6	pg/g	0.390	2.50
19408-74-3	1,2,3,7,8,9-HxCDD		106	pg/g	0.408	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD		97.8	pg/g	0.724	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD		201	pg/g	1.39	5.00
51207-31-9	2,3,7,8-TCDF		18.8	pg/g	0.210	0.500
57117-41-6	1,2,3,7,8-PeCDF		95.9	pg/g	0.232	2.50
57117-31-4	2,3,4,7,8-PeCDF		97.3	pg/g	0.197	2.50
70648-26-9	1,2,3,4,7,8-HxCDF		101	pg/g	0.538	2.50
57117-44-9	1,2,3,6,7,8-HxCDF		103	pg/g	0.516	2.50
60851-34-5	2,3,4,6,7,8-HxCDF		104	pg/g	0.540	2.50
72918-21-9	1,2,3,7,8,9-HxCDF		97.3	pg/g	0.750	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF		102	pg/g	0.602	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF		98.4	pg/g	0.888	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF		189	pg/g	1.46	5.00

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		141	200	pg/g	70.7	(20%-175%)
13C-1,2,3,7,8-PeCDD		172	200	pg/g	86.0	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		145	200	pg/g	72.7	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		153	200	pg/g	76.5	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		147	200	pg/g	73.7	(22%-166%)
13C-OCDD		255	400	pg/g	63.6	(13%-199%)
13C-2,3,7,8-TCDF		127	200	pg/g	63.3	(22%-152%)
13C-1,2,3,7,8-PeCDF		161	200	pg/g	80.6	(21%-192%)
13C-2,3,4,7,8-PeCDF		163	200	pg/g	81.4	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		135	200	pg/g	67.3	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		139	200	pg/g	69.5	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		142	200	pg/g	70.9	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		145	200	pg/g	72.6	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		132	200	pg/g	66.1	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		136	200	pg/g	67.8	(20%-186%)
37Cl-2,3,7,8-TCDD		14.9	20.0	pg/g	74.7	(31%-191%)

**Comments:**

**U** Analyte was analyzed for, but not detected above the specified detection limit.



September 22, 2017

Mr. Philip Nerenberg  
Apex Laboratories  
12232 S.W. Garden Place  
Portland, Oregon 97223

Re: POR DXN  
Work Order: 11257  
SDG: A7H0584

Dear Mr. Nerenberg:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 24, 2017. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,

Cynde Larkins  
Project Manager

Enclosures

SUBCONTRACT ORDER

Apex Laboratories

A7H0584

CFA WO #11257

SENDING LABORATORY:

Apex Laboratories  
12232 S.W. Garden Place  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 718-0333  
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Cape Fear Analytical, LLC  
3306 Kitty Hawk Rd Suite 120  
Wilmington, NC 28405  
Phone : (910) 795-0421  
Fax: -

Sample Name: ISM-AOI078-0.5 - After Processing      Soil      After ISM Processing  
Sampled: 08/18/17 10:54      (A7H0584-02)


Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	08/31/17 17:00	02/14/18 10:54	Low Level Standard Required, Use Containers A, B, C, D, Use full volume

*Containers Supplied:*

- (A)40 mL VOA - Non Preserved
- (B)40 mL VOA - Non Preserved
- (C)40 mL VOA - Non Preserved
- (D)40 mL VOA - Non Preserved

Standard TAT

Temp. = 0.4°C

Released By:  Date: 8/23/17  
 Fed Ex (Shipper)

Fed Ex (Shipper)

Received By      Date

Cynde Larkins 24 AUG 17 @ 1003

Released By      Date      Received By      Date

**SAMPLE RECEIPT CHECKLIST**  
Cape Fear Analytical

Client: <b>APEX</b>	Work Order: <b>11257</b>
Shipping Company: <b>FedEx</b>	Date/Time Received: <b>24 AUG 17 1003</b>

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?		<input checked="" type="checkbox"/>	
Samples < 2x background?		<input checked="" type="checkbox"/>	

\* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?			<input checked="" type="checkbox"/>

Air Witness: \_\_\_\_\_

#	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other(describe)
2	Chain of Custody documents included with shipment?	<input checked="" type="checkbox"/>			
3	Samples requiring cold preservation within 0-6°C?	<input checked="" type="checkbox"/>			Preservation Method: ice bags    blue ice    dry ice    none    other (describe) <b>4.4° - 3.5 = 0.4°C</b>
4	Aqueous samples found to have visible solids?		<input checked="" type="checkbox"/>		Sample IDs, containers affected:
5	Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample IDs, containers affected and pH observed: If preservative added, Lot#:
6	Samples requiring preservation have no residual chlorine?		<input checked="" type="checkbox"/>		Sample IDs, containers affected: If preservative added, Lot#:
7	Samples received within holding time?	<input checked="" type="checkbox"/>			Sample IDs, tests affected:
8	Sample IDs on COC match IDs on containers?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:
9	Date & time of COC match date & time on containers?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:
10	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			List type and number of containers / Sample IDs, containers affected: <b>4 - 40oz vials</b>
11	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

Checklist performed by: Initials: CF Date: 24 AUG 17

# **High Resolution Dioxins and Furans Analysis**



# Case Narrative

**HDOX Case Narrative  
Apex Laboratories (APEX)  
SDG A7H0584  
Work Order 11257**

**Method/Analysis Information**

**Product:** Dioxins/Furans by EPA Method 1613B in Solids  
Analytical Method: EPA Method 1613B  
Extraction Method: SW846 3540C  
Analytical Batch Number: 35558  
Clean Up Batch Number: 35556  
Extraction Batch Number: 35555

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in :

<b>Sample ID</b>	<b>Client ID</b>
11257001	ISM-AOI078-0.5 - After Processing
12019443	Method Blank (MB)
12019444	Laboratory Control Sample (LCS)
12019445	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 14.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

**Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

## **Quality Control (QC) Information**

### **Certification Statement**

The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

### **Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

### **Surrogate Recoveries**

All surrogate recoveries were within the established acceptance criteria for this SDG.

### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

### **Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits.

### **LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

### **QC Sample Designation**

A matrix spike and matrix spike duplicate analysis was not required for this SDG.

## **Technical Information**

### **Holding Time Specifications**

CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

### **Sample Dilutions**

The samples in this SDG did not require dilutions.

### **Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

## **Miscellaneous Information**

### **Nonconformance (NCR) Documentation**

A NCR was not required for this SDG.

### **Manual Integrations**

Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

### **Sample Preparation**

No difficulties were encountered during sample preparation.

### **System Configuration**

This analysis was performed on the following instrument configuration:

HRP750_2	Waters Autospec Premier high-resolution GC/MS system	Waters Autospec Prem	DB-5MS	60m x 0.25mm, 0.25um
HRP763_2	Waters Autospec Premier high-resolution GC/MS system	Waters Autospec Prem	DB-225	30m x 0.25mm, 0.25um

### **Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

# **Sample Data Summary**

## Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

### Qualifier Definition Report for

APEX001 Apex Laboratories

Client SDG: A7H0584 CFA Work Order: 11257


**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- J Value is estimated
- K Estimated Maximum Possible Concentration
- U Analyte was analyzed for, but not detected above the specified detection limit.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

**Review/Validation**

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature: 

Name: Erin Suhrie

Date: 22 SEP 2017

Title: Data Validator



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7H0584	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 11257001	<b>Date Collected:</b> 08/18/2017 10:54	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/24/2017 10:03	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI078-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 35558	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/09/2017 05:54	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A08SEP17A_3-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35555	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 01-SEP-17	<b>Prep Aliquot:</b> 10.04 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.768	pg/g	0.768	0.512
40321-76-4	1,2,3,7,8-PeCDD		4.08	pg/g	0.381	2.56
39227-28-6	1,2,3,4,7,8-HxCDD		7.02	pg/g	0.754	2.56
57653-85-7	1,2,3,6,7,8-HxCDD		29.5	pg/g	0.766	2.56
19408-74-3	1,2,3,7,8,9-HxCDD		17.7	pg/g	0.779	2.56
35822-46-9	1,2,3,4,6,7,8-HpCDD		552	pg/g	1.72	2.56
3268-87-9	1,2,3,4,6,7,8,9-OCDD		3140	pg/g	2.70	5.12
51207-31-9	2,3,7,8-TCDF		2.10	pg/g	0.389	0.512
57117-41-6	1,2,3,7,8-PeCDF	J	2.46	pg/g	0.291	2.56
57117-31-4	2,3,4,7,8-PeCDF		4.51	pg/g	0.258	2.56
70648-26-9	1,2,3,4,7,8-HxCDF		8.27	pg/g	0.483	2.56
57117-44-9	1,2,3,6,7,8-HxCDF		5.65	pg/g	0.488	2.56
60851-34-5	2,3,4,6,7,8-HxCDF		6.73	pg/g	0.500	2.56
72918-21-9	1,2,3,7,8,9-HxCDF		2.60	pg/g	0.686	2.56
67562-39-4	1,2,3,4,6,7,8-HpCDF		73.9	pg/g	0.567	2.56
55673-89-7	1,2,3,4,7,8,9-HpCDF		3.91	pg/g	0.801	2.56
39001-02-0	1,2,3,4,6,7,8,9-OCDF		88.2	pg/g	0.957	5.12
41903-57-5	Total TeCDD		8.73	pg/g	0.768	1.02
36088-22-9	Total PeCDD	K	26.5	pg/g	0.381	5.12
34465-46-8	Total HxCDD		152	pg/g	0.754	5.12
37871-00-4	Total HpCDD		921	pg/g	1.72	5.12
30402-14-3	Total TeCDF	K	40.5	pg/g	0.389	1.02
30402-15-4	Total PeCDF		57.6	pg/g	0.0834	5.12
55684-94-1	Total HxCDF		131	pg/g	0.483	5.12
38998-75-3	Total HpCDF		184	pg/g	0.567	5.12
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		20.7	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		21.1	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		177	205	pg/g	86.3	(25%-164%)
13C-1,2,3,7,8-PeCDD		210	205	pg/g	102	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		171	205	pg/g	83.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		170	205	pg/g	82.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		193	205	pg/g	94.2	(23%-140%)
13C-OCDD		409	410	pg/g	99.8	(17%-157%)
13C-2,3,7,8-TCDF		172	205	pg/g	83.9	(24%-169%)
13C-1,2,3,7,8-PeCDF		212	205	pg/g	104	(24%-185%)
13C-2,3,4,7,8-PeCDF		208	205	pg/g	101	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		161	205	pg/g	78.7	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		160	205	pg/g	78.0	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		168	205	pg/g	81.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		180	205	pg/g	88.0	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A7H0584	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 11257001	<b>Date Collected:</b> 08/18/2017 10:54	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/24/2017 10:03	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI078-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 35558	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/09/2017 05:54	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A08SEP17A_3-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35555	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 01-SEP-17	<b>Prep Aliquot:</b> 10.04 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
	13C-1,2,3,4,6,7,8-HpCDF		169	205	pg/g	82.6 (28%-143%)
	13C-1,2,3,4,7,8,9-HpCDF		181	205	pg/g	88.6 (26%-138%)
	37Cl-2,3,7,8-TCDD		18.8	20.5	pg/g	91.6 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7H0584	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 11257001	<b>Date Collected:</b> 08/18/2017 10:54	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/24/2017 10:03	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-AOI078-0.5 - After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 35558	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2017 11:19	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b20sep17a-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35555	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 01-SEP-17	<b>Prep Aliquot:</b> 10.04 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF	K	2.94	pg/g	0.760	0.512

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

# **Quality Control Summary**

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A7H0584

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12019444	LCS for batch 35555	13C-2,3,7,8-TCDD		74.3	(20%-175%)
		13C-1,2,3,7,8-PeCDD		89.2	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		74.8	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		77.6	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		79.1	(22%-166%)
		13C-OCDD		73.0	(13%-199%)
		13C-2,3,7,8-TCDF		76.8	(22%-152%)
		13C-1,2,3,7,8-PeCDF		91.7	(21%-192%)
		13C-2,3,4,7,8-PeCDF		93.9	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		76.1	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		77.6	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		79.0	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		81.2	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		75.5	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		79.5	(20%-186%)
		37Cl-2,3,7,8-TCDD		84.4	(31%-191%)
12019445	LCSD for batch 35555	13C-2,3,7,8-TCDD		78.6	(20%-175%)
		13C-1,2,3,7,8-PeCDD		88.9	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		82.3	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		82.4	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		81.8	(22%-166%)
		13C-OCDD		72.8	(13%-199%)
		13C-2,3,7,8-TCDF		80.2	(22%-152%)
		13C-1,2,3,7,8-PeCDF		94.5	(21%-192%)
		13C-2,3,4,7,8-PeCDF		94.8	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		82.1	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		82.7	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		83.7	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		84.7	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		80.7	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		82.5	(20%-186%)
		37Cl-2,3,7,8-TCDD		85.0	(31%-191%)
12019443	MB for batch 35555	13C-2,3,7,8-TCDD		71.9	(25%-164%)
		13C-1,2,3,7,8-PeCDD		87.7	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		80.7	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		77.9	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		81.4	(23%-140%)
		13C-OCDD		72.5	(17%-157%)
		13C-2,3,7,8-TCDF		72.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		91.5	(24%-185%)
		13C-2,3,4,7,8-PeCDF		91.9	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		77.4	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		80.6	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		80.9	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		84.1	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		79.8	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		81.7	(26%-138%)
		37Cl-2,3,7,8-TCDD		83.1	(35%-197%)
11257001	ISM-AOI078-0.5 - After Processing	13C-2,3,7,8-TCDD		86.3	(25%-164%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7H0584

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
11257001	ISM-AOI078-0.5 - After Processing	13C-1,2,3,7,8-PeCDD		102	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		83.6	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		82.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		94.2	(23%-140%)
		13C-OCDD		99.8	(17%-157%)
		13C-2,3,7,8-TCDF		83.9	(24%-169%)
		13C-1,2,3,7,8-PeCDF		104	(24%-185%)
		13C-2,3,4,7,8-PeCDF		101	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		78.7	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		78.0	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		81.8	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		88.0	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		82.6	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		88.6	(26%-138%)
		37Cl-2,3,7,8-TCDD		91.6	(35%-197%)

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted



**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A7H0584

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 35555

Matrix: SOIL

Lab Sample ID: 12019444

Instrument: HRP750

Analysis Date: 09/09/2017 03:30

Dilution: 1

Analyst: MJC

Prep Batch ID: 35555

Batch ID: 35558

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	20.0	22.0	110	67-158
40321-76-4	LCS 1,2,3,7,8-PeCDD	100	111	111	70-142
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	100	108	108	70-164
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	100	110	110	76-134
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	100	113	113	64-162
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	100	110	110	70-140
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	200	214	107	78-144
51207-31-9	LCS 2,3,7,8-TCDF	20.0	20.8	104	75-158
57117-41-6	LCS 1,2,3,7,8-PeCDF	100	110	110	80-134
57117-31-4	LCS 2,3,4,7,8-PeCDF	100	108	108	68-160
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	100	110	110	72-134
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	100	113	113	84-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	100	111	111	70-156
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	100	108	108	78-130
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	100	110	110	82-122
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	100	110	110	78-138
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	200	210	105	63-170

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A7H0584

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 35555

Matrix: SOIL

Lab Sample ID: 12019445

Instrument: HRP750

Analysis Date: 09/09/2017 04:18

Dilution: 1

Analyst: MJC

Prep Batch ID: 35555

Batch ID: 35558

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	20.0	21.5	108	67-158	2.37	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	100	110	110	70-142	1.11	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	100	104	104	70-164	4.36	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	100	105	105	76-134	4.61	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	100	107	107	64-162	5.02	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	100	105	105	70-140	4.08	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	200	209	105	78-144	2.29	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	20.0	19.9	99.7	75-158	4.28	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	100	104	104	80-134	5.00	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	100	103	103	68-160	4.62	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	100	104	104	72-134	5.27	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	100	107	107	84-130	4.92	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	100	107	107	70-156	3.64	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	100	104	104	78-130	3.31	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	100	108	108	82-122	2.34	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	100	105	105	78-138	4.48	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	200	213	106	63-170	1.46	0-20

## Method Blank Summary

Page 1 of 1

SDG Number: A7H0584  
Client ID: MB for batch 35555  
Lab Sample ID: 12019443  
Column:

Client: APEX001  
Instrument ID: HRP750  
Prep Date: 01-SEP-17

Matrix: SOIL  
Data File: A08SEP17A\_3-3  
Analyzed: 09/09/17 05:06

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 35555	12019444	A08SEP17A_3-1	09/09/17	0330
02 LCSD for batch 35555	12019445	A08SEP17A_3-2	09/09/17	0418
03 ISM-AOI078-0.5 - After Processing	11257001	A08SEP17A_3-4	09/09/17	0554
04 ISM-AOI078-0.5 - After Processing	11257001	b20sep17a-4	09/20/17	1119

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7H0584	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12019443		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 35555		
<b>Client ID:</b> MB for batch 35555		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 35558	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/09/2017 05:06	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A08SEP17A_3-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35555	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 01-SEP-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.236	pg/g	0.236	0.500
40321-76-4	1,2,3,7,8-PeCDD	U	0.127	pg/g	0.127	2.50
39227-28-6	1,2,3,4,7,8-HxCDD	U	0.136	pg/g	0.136	2.50
57653-85-7	1,2,3,6,7,8-HxCDD	U	0.136	pg/g	0.136	2.50
19408-74-3	1,2,3,7,8,9-HxCDD	U	0.139	pg/g	0.139	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	0.159	pg/g	0.159	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD	J	0.452	pg/g	0.240	5.00
51207-31-9	2,3,7,8-TCDF	U	0.204	pg/g	0.204	0.500
57117-41-6	1,2,3,7,8-PeCDF	JK	0.090	pg/g	0.0854	2.50
57117-31-4	2,3,4,7,8-PeCDF	J	0.088	pg/g	0.0766	2.50
70648-26-9	1,2,3,4,7,8-HxCDF	JK	0.152	pg/g	0.0952	2.50
57117-44-9	1,2,3,6,7,8-HxCDF	U	0.0876	pg/g	0.0876	2.50
60851-34-5	2,3,4,6,7,8-HxCDF	U	0.0922	pg/g	0.0922	2.50
72918-21-9	1,2,3,7,8,9-HxCDF	U	0.129	pg/g	0.129	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF	JK	0.216	pg/g	0.0692	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	0.104	pg/g	0.104	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	0.169	pg/g	0.169	5.00
41903-57-5	Total TeCDD	U	0.236	pg/g	0.236	1.00
36088-22-9	Total PeCDD	U	0.127	pg/g	0.127	5.00
34465-46-8	Total HxCDD	U	0.136	pg/g	0.136	5.00
37871-00-4	Total HpCDD	U	0.159	pg/g	0.159	5.00
30402-14-3	Total TeCDF	U	0.204	pg/g	0.204	1.00
30402-15-4	Total PeCDF	JK	0.308	pg/g	0.045	5.00
55684-94-1	Total HxCDF	JK	0.152	pg/g	0.0876	5.00
38998-75-3	Total HpCDF	JK	0.216	pg/g	0.0692	5.00
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.0466	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		0.276	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		144	200	pg/g	71.9	(25%-164%)
13C-1,2,3,7,8-PeCDD		175	200	pg/g	87.7	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		161	200	pg/g	80.7	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		156	200	pg/g	77.9	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		163	200	pg/g	81.4	(23%-140%)
13C-OCDD		290	400	pg/g	72.5	(17%-157%)
13C-2,3,7,8-TCDF		145	200	pg/g	72.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		183	200	pg/g	91.5	(24%-185%)
13C-2,3,4,7,8-PeCDF		184	200	pg/g	91.9	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		155	200	pg/g	77.4	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		161	200	pg/g	80.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		162	200	pg/g	80.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		168	200	pg/g	84.1	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7H0584	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12019443		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 35555		
<b>Client ID:</b> MB for batch 35555		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 35558	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/09/2017 05:06	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A08SEP17A_3-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35555	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 01-SEP-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			160	200	pg/g	79.8 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			163	200	pg/g	81.7 (26%-138%)
37Cl-2,3,7,8-TCDD			16.6	20.0	pg/g	83.1 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A7H0584	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12019444		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 35555		
<b>Client ID:</b> LCS for batch 35555		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 35558	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/09/2017 03:30	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A08SEP17A_3-1		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35555	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 01-SEP-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		22.0	pg/g	0.232	0.500
40321-76-4	1,2,3,7,8-PeCDD		111	pg/g	0.262	2.50
39227-28-6	1,2,3,4,7,8-HxCDD		108	pg/g	0.394	2.50
57653-85-7	1,2,3,6,7,8-HxCDD		110	pg/g	0.384	2.50
19408-74-3	1,2,3,7,8,9-HxCDD		113	pg/g	0.398	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD		110	pg/g	0.526	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD		214	pg/g	0.770	5.00
51207-31-9	2,3,7,8-TCDF		20.8	pg/g	0.332	0.500
57117-41-6	1,2,3,7,8-PeCDF		110	pg/g	0.322	2.50
57117-31-4	2,3,4,7,8-PeCDF		108	pg/g	0.288	2.50
70648-26-9	1,2,3,4,7,8-HxCDF		110	pg/g	0.510	2.50
57117-44-9	1,2,3,6,7,8-HxCDF		113	pg/g	0.490	2.50
60851-34-5	2,3,4,6,7,8-HxCDF		111	pg/g	0.514	2.50
72918-21-9	1,2,3,7,8,9-HxCDF		108	pg/g	0.688	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF		110	pg/g	0.484	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF		110	pg/g	0.722	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF		210	pg/g	0.916	5.00

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		149	200	pg/g	74.3	(20%-175%)
13C-1,2,3,7,8-PeCDD		178	200	pg/g	89.2	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		150	200	pg/g	74.8	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		155	200	pg/g	77.6	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		158	200	pg/g	79.1	(22%-166%)
13C-OCDD		292	400	pg/g	73.0	(13%-199%)
13C-2,3,7,8-TCDF		154	200	pg/g	76.8	(22%-152%)
13C-1,2,3,7,8-PeCDF		183	200	pg/g	91.7	(21%-192%)
13C-2,3,4,7,8-PeCDF		188	200	pg/g	93.9	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		152	200	pg/g	76.1	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		155	200	pg/g	77.6	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		158	200	pg/g	79.0	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		162	200	pg/g	81.2	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		151	200	pg/g	75.5	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		159	200	pg/g	79.5	(20%-186%)
37Cl-2,3,7,8-TCDD		16.9	20.0	pg/g	84.4	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A7H0584	<b>Client:</b> APEX001	<b>Project:</b> APEX00117
<b>Lab Sample ID:</b> 12019445		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 35555		
<b>Client ID:</b> LCSD for batch 35555		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 35558	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/09/2017 04:18	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A08SEP17A_3-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 35555	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 01-SEP-17	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		21.5	pg/g	0.310	0.500
40321-76-4	1,2,3,7,8-PeCDD		110	pg/g	0.248	2.50
39227-28-6	1,2,3,4,7,8-HxCDD		104	pg/g	0.354	2.50
57653-85-7	1,2,3,6,7,8-HxCDD		105	pg/g	0.352	2.50
19408-74-3	1,2,3,7,8,9-HxCDD		107	pg/g	0.362	2.50
35822-46-9	1,2,3,4,6,7,8-HpCDD		105	pg/g	0.510	2.50
3268-87-9	1,2,3,4,6,7,8,9-OCDD		209	pg/g	1.29	5.00
51207-31-9	2,3,7,8-TCDF		19.9	pg/g	0.258	0.500
57117-41-6	1,2,3,7,8-PeCDF		104	pg/g	0.310	2.50
57117-31-4	2,3,4,7,8-PeCDF		103	pg/g	0.288	2.50
70648-26-9	1,2,3,4,7,8-HxCDF		104	pg/g	0.528	2.50
57117-44-9	1,2,3,6,7,8-HxCDF		107	pg/g	0.510	2.50
60851-34-5	2,3,4,6,7,8-HxCDF		107	pg/g	0.536	2.50
72918-21-9	1,2,3,7,8,9-HxCDF		104	pg/g	0.764	2.50
67562-39-4	1,2,3,4,6,7,8-HpCDF		108	pg/g	0.490	2.50
55673-89-7	1,2,3,4,7,8,9-HpCDF		105	pg/g	0.798	2.50
39001-02-0	1,2,3,4,6,7,8,9-OCDF		213	pg/g	0.852	5.00

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		157	200	pg/g	78.6	(20%-175%)
13C-1,2,3,7,8-PeCDD		178	200	pg/g	88.9	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		165	200	pg/g	82.3	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		165	200	pg/g	82.4	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		164	200	pg/g	81.8	(22%-166%)
13C-OCDD		291	400	pg/g	72.8	(13%-199%)
13C-2,3,7,8-TCDF		160	200	pg/g	80.2	(22%-152%)
13C-1,2,3,7,8-PeCDF		189	200	pg/g	94.5	(21%-192%)
13C-2,3,4,7,8-PeCDF		190	200	pg/g	94.8	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		164	200	pg/g	82.1	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		165	200	pg/g	82.7	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		167	200	pg/g	83.7	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		169	200	pg/g	84.7	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		161	200	pg/g	80.7	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		165	200	pg/g	82.5	(20%-186%)
37Cl-2,3,7,8-TCDD		17.0	20.0	pg/g	85.0	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.



Tuesday, January 30, 2018

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: Port of Ridgefield / 9003.01.39-04

Enclosed are the results of analyses for work order A7K0850, which was received by the laboratory on 11/22/2017 at 2:37:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

---

Apex Laboratories



Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher


**Reported:**  
01/30/18 17:14

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ROW-078N	A7K0850-01	Soil	11/22/17 12:00	11/22/17 14:37
ROW-078NE	A7K0850-02	Soil	11/22/17 12:30	11/22/17 14:37
ROW-078NW	A7K0850-03	Soil	11/22/17 13:00	11/22/17 14:37

Apex Laboratories



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Philip Nerenberg, Lab Director

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

**Reported:**  
01/30/18 17:14

## ANALYTICAL CASE NARRATIVE

**Work Order: A7K0850**

Amended Report Revision 1:

This report supersedes all previous reports.

Analysis of TOC on samples ROW078NE and ROW78NW were added after the previous report version had been completed.

Philip Nerenberg  
Lab Director  
1/30/18



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

**Reported:**  
 01/30/18 17:14

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
<b>ROW-078N (A7K0850-01)</b>			<b>Matrix: Soil</b>					
Batch: 7120369								
<b>Total Organic Carbon</b>	<b>29000</b>	---	200	mg/kg	1	12/05/17 15:30	PSEP/SM 5310B MOD	
<b>ROW-078NE (A7K0850-02)</b>			<b>Matrix: Soil</b>					
Batch: 8010456								
<b>Total Organic Carbon</b>	<b>29000</b>	---	200	mg/kg	1	01/10/18 14:51	PSEP/SM 5310B MOD	H-05
<b>ROW-078NW (A7K0850-03)</b>			<b>Matrix: Soil</b>					
Batch: 8010456								
<b>Total Organic Carbon</b>	<b>30000</b>	---	200	mg/kg	1	01/10/18 14:51	PSEP/SM 5310B MOD	H-05

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

**Reported:**  
01/30/18 17:14

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 7120369 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (7120369-BLK1)</b>						Prepared: 12/04/17 12:57 Analyzed: 12/05/17 15:30						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (7120369-BS1)</b>						Prepared: 12/04/17 12:57 Analyzed: 12/05/17 15:30						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	9800	---		mg/kg	1	10000	---	98	85-115	---	---	
<b>Duplicate (7120369-DUP1)</b>						Prepared: 12/04/17 12:57 Analyzed: 12/05/17 15:30						
<b>QC Source Sample: ROW-078N (A7K0850-01)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	28000	---	200	mg/kg	1	---	29000	---	---	2	20%	
<b>Batch 8010456 - PSEP TOC</b>						<b>Soil</b>						
<b>Blank (8010456-BLK1)</b>						Prepared: 01/08/18 12:19 Analyzed: 01/10/18 14:51						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	---
<b>LCS (8010456-BS1)</b>						Prepared: 01/08/18 12:19 Analyzed: 01/10/18 14:51						
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	10000	---		mg/kg	1	10000	---	100	85-115	---	---	
<b>Duplicate (8010456-DUP1)</b>						Prepared: 01/08/18 12:25 Analyzed: 01/10/18 14:51						
<b>QC Source Sample: ROW-078NE (A7K0850-02)</b>												
<b>PSEP/SM 5310B MOD</b>												
Total Organic Carbon	32000	---	200	mg/kg	1	---	29000	---	---	9	20%	

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield**  
 Project Number: 9003.01.39-04  
 Project Manager: Phil Wiescher

**Reported:**  
 01/30/18 17:14

### SAMPLE PREPARATION INFORMATION

#### Conventional Chemistry Parameters

**Prep: PSEP TOC**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 7120369</b>							
A7K0850-01	Soil	PSEP/SM 5310B MOD	11/22/17 12:00	12/04/17 12:57	5g/5g	5g/5g	NA
<b>Batch: 8010456</b>							
A7K0850-02	Soil	PSEP/SM 5310B MOD	11/22/17 12:30	01/08/18 12:25	5g/5g	5g/5g	NA
A7K0850-03	Soil	PSEP/SM 5310B MOD	11/22/17 13:00	01/08/18 12:25	5g/5g	5g/5g	NA

Apex Laboratories



Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

Reported:  
01/30/18 17:14

## Notes and Definitions

### Qualifiers:

H-05 Sample received without adequate lead time to perform analysis within hold time.

### Notes and Conventions:

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.  
RPD Relative Percent Difference  
MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.  
WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.  
Batch QC In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.

Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.

For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

--- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

\*\*\* Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).





**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

Reported:  
01/30/18 17:14

Lab # **A1K0850** COC 1 of 1

**CHAIN OF CUSTODY**

**APEX LABS**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: **MFA** Project Mgr: **Phil Wiescher** Project Name: **RIDGEFIELD Boundary 607 ACS** Project # **9003.01.39-04** PO#

Address: **201 NW 19th Ave Suite 200, Portland, OR 97209** Phone: **503-407-1030** Fax: **503-407-1030** Email: **Phil.Wiescher@maul-foster.com**

Sampled by: **LBP**

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS		ANALYSIS REQUEST
				YES	NO	
1	1/22/18	12:00	SO	2		1200-Z 1200-COLS TOTAL DISS TCLP SG, AS, NA, TL, V, ZB HG, MG, MN, MO, NI, PB, CR, CO, CU, FE, PP, AL, SP, SS, BA, BE, CD TCLP Metals (8) RCRA Metals (8) 600 TTO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX VOCs 8260 HVOCS 8260 RBDM VOCs 8260 VOCs Full List NWTPH-GX NWTPH-DX NWTPH-HCID
2	1/22/18	10:30	SO	2		✓ 1613B Dichloro ✓ TOL by KSE/SM S-HOB
3	1/22/18	1:00	SO	2		* * * *
4						
5						
6						
7						
8						
9						
10						

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 3 Day

RECEIVED BY: **Michael Heubrich** Signature: *[Signature]* Date: **11-27-17**

Signature: *[Signature]* Date: **11-27-17**

Printed Name: **BLAIRE PERULY** Time: **14:57** Printed Name: **Michael Heubrich** Time: **14:57**

Company: **MFA** Company: **Apex Labs**

SPECIAL INSTRUCTIONS:  
\* Please archive samples Row-078NE and Row-078NW for potential future analysis.

RECEIVED BY: \_\_\_\_\_ Date: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_  
Company: \_\_\_\_\_

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield**  
Project Number: 9003.01.39-04  
Project Manager: Phil Wiescher

Reported:  
01/30/18 17:14

**APEX LABS COOLER RECEIPT FORM**

Client: MFA Element WO#: A7 K0850

Project/Project #: Ridgefield Boundary Soil Ass. / 9003.01.39-04

**Delivery info:**

Date/Time Received: 11-22-17 @ 1437 By: MK

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: MK : 11-22-17 @ 1510

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	<u>Cooler #1</u>	<u>Cooler #2</u>	<u>Cooler #3</u>	<u>Cooler #4</u>	<u>Cooler #5</u>	<u>Cooler #6</u>	<u>Cooler #7</u>
Temperature (deg. C)	_____	_____	_____	_____	_____	_____	_____
Received on Ice? <input checked="" type="checkbox"/> <u>N</u>	_____	_____	_____	_____	_____	_____	_____
Temp. Blanks? <input checked="" type="checkbox"/> <u>N</u> <u>3,3</u>	_____	_____	_____	_____	_____	_____	_____
Ice Type: <input checked="" type="checkbox"/> <u>Gel</u> / Real / Other	_____	_____	_____	_____	_____	_____	_____
Condition: <u>good</u>	_____	_____	_____	_____	_____	_____	_____
Cooler out of temp? <input checked="" type="checkbox"/> <u>N</u> Possible reason why: _____	_____	_____	_____	_____	_____	_____	_____
If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA <input checked="" type="checkbox"/> <u>N</u>	_____	_____	_____	_____	_____	_____	_____

**Samples Inspection:** Inspected by: MK : 11-22-17 @ 1525

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: NO TID on cool

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

Labeled by: \_\_\_\_\_ Witness: \_\_\_\_\_ Cooler Inspected by: MK See Project Contact Form: Y

MK JS

*Philip Nerenberg*

January 30, 2018

Mr. Darwin Thomas  
Apex Laboratories  
12232 S.W. Garden Place  
Portland, Oregon 97223

Re: Dioxin & PCB's subcontract  
Work Order: 11857  
SDG: A7K0850\_2

Dear Mr. Thomas:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on January 09, 2018. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,



Cynde Larkins  
Project Manager

Enclosures

SUBCONTRACT ORDER

Apex Laboratories

A7K0850

CFA WO#11857

OK  
AJ

**SENDING LABORATORY:**

Apex Laboratories  
12232 S.W. Garden Place  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 718-0333  
Project Manager: Philip Nerenberg

**RECEIVING LABORATORY:**

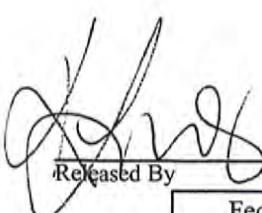
Cape Fear Analytical, LLC  
3306 Kitty Hawk Rd Suite 120  
Wilmington, NC 28405  
Phone : (910) 795-0421  
Fax: -

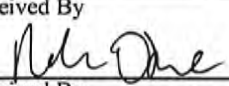
Sample Name:	Soil	Sampled:	No T/D on cont.
ROW-078N		11/22/17 12:00	(A7K0850-01)
Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/07/17 17:00	05/21/18 12:00	007 1/18/18
<i>Containers Supplied:</i> (A)8 oz Glass Jar			
<i>Already Sent</i>			

Sample Name:	Soil	Sampled:	No T/D on cont.
ROW-078NE		11/22/17 12:30	(A7K0850-02)
Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	01/19/18 17:00	05/21/18 12:30	
<i>Containers Supplied:</i> (B)8 oz Glass Jar			

Sample Name:	Soil	Sampled:	No T/D on cont.
ROW-078NW		11/22/17 13:00	(A7K0850-03)
Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	01/19/18 17:00	05/21/18 13:00	
<i>Containers Supplied:</i> (B)8 oz Glass Jar			

Standard TAT

Released By:  Date: 1/8/18

Received By:  Date: 1/4/18 @ 10:30

Released By: Fed Ex (Shipper) Date: \_\_\_\_\_

Received By: Fed Ex (Shipper) Date: \_\_\_\_\_

**SAMPLE RECEIPT CHECKLIST**  
Cape Fear Analytical

Client: <u>Apex</u>	Work Order: <u>11857</u>
Shipping Company: <u>FedEx</u>	Date/Time Received: <u>1/9/10 10:30</u>

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?			
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?		<input checked="" type="checkbox"/>	
Samples < 2x background?		<input checked="" type="checkbox"/>	

\* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?			<input checked="" type="checkbox"/>

Air Witness: \_\_\_\_\_

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other(describe)
2 Chain of Custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within 0-6°C?	<input checked="" type="checkbox"/>			Preservation Method: <u>ice bags</u> blue ice    dry ice    none    other (describe) <u>7.3-2.2=5.1</u>
4 Aqueous samples found to have visible solids?		<input checked="" type="checkbox"/>		Sample IDs, containers affected:
5 Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample IDs, containers affected and pH observed:  If preservative added, Lot#:
6 Samples requiring preservation have no residual chlorine?		<input checked="" type="checkbox"/>		Sample IDs, containers affected:  If preservative added, Lot#:
7 Samples received within holding time?	<input checked="" type="checkbox"/>			Sample IDs, tests affected:
8 Sample IDs on COC match IDs on containers?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:
9 Date & time of COC match date & time on containers?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:
10 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			List type and number of containers / Sample IDs, containers affected: <u>2 8oz clear glass</u>
11 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

Temp Blank included

Checklist performed by: Initials: RLG      Date: 1/9/10

CF-UD-F-7

# **High Resolution Dioxins and Furans Analysis**

# Case Narrative



**HDOX Case Narrative  
Apex Laboratories (APEX)  
SDG A7K0850\_2  
Work Order 11857**

**Method/Analysis Information**

**Product:** Dioxins/Furans by EPA Method 1613B in Solids  
Analytical Method: EPA Method 1613B  
Extraction Method: SW846 3540C  
Analytical Batch Number: 36711  
Clean Up Batch Number: 36709  
Extraction Batch Number: 36708

**Sample Analysis**

The following samples were analyzed using the analytical protocol as established in Method 1613B:

<b>Sample ID</b>	<b>Client ID</b>
11857001	ROW-078NE
11857002	ROW-078NW
12020487	Method Blank (MB)
12020488	Laboratory Control Sample (LCS)
12020489	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 15.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

**Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

## **Quality Control (QC) Information**

### **Certification Statement**

The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

### **Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

### **Surrogate Recoveries**

All surrogate recoveries were within the established acceptance criteria for this SDG.

### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

### **Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits.

### **LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

### **QC Sample Designation**

A matrix spike and matrix spike duplicate analysis was not required for this SDG.

## **Technical Information**

### **Holding Time Specifications**

CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

### **Sample Dilutions**

The samples in this SDG did not require dilutions.

### **Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

## **Miscellaneous Information**

### **Nonconformance (NCR) Documentation**

A NCR was not required for this SDG.

**Manual Integrations**

Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

**Sample preparation**

No difficulties were encountered during sample preparation.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

# **Sample Data Summary**

## Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

### Qualifier Definition Report for

APEX001 Apex Laboratories

Client SDG: A7K0850\_2 CFA Work Order: 11857

#### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- J Value is estimated
- K Estimated Maximum Possible Concentration
- Q Quantitative Interference; value is estimated
- U Analyte was analyzed for, but not detected above the specified detection limit.
  
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

#### Review/Validation

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature: 

Name: Heather Patterson

Date: 30 JAN 2018

Title: Group Leader

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A7K0850_2	<b>Client:</b> APEX001	<b>Project:</b> APEX00111
<b>Lab Sample ID:</b> 11857001	<b>Date Collected:</b> 11/22/2017 12:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 01/09/2018 10:30	<b>%Moisture:</b> 27.3
<b>Client ID:</b> ROW-078NE		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 36711	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 01/25/2018 14:45	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b24jan18a_3-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 36708	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 19-JAN-18	<b>Prep Aliquot:</b> 13.88 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.369	pg/g	0.041	0.991
40321-76-4	1,2,3,7,8-PeCDD	J	2.98	pg/g	0.0703	4.95
39227-28-6	1,2,3,4,7,8-HxCDD	J	4.76	pg/g	0.102	4.95
57653-85-7	1,2,3,6,7,8-HxCDD		16.6	pg/g	0.103	4.95
19408-74-3	1,2,3,7,8,9-HxCDD		8.46	pg/g	0.106	4.95
35822-46-9	1,2,3,4,6,7,8-HpCDD		271	pg/g	0.295	4.95
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2280	pg/g	0.464	9.91
51207-31-9	2,3,7,8-TCDF		1.67	pg/g	0.0781	0.991
57117-41-6	1,2,3,7,8-PeCDF	J	1.52	pg/g	0.0428	4.95
57117-31-4	2,3,4,7,8-PeCDF		5.18	pg/g	0.0394	4.95
70648-26-9	1,2,3,4,7,8-HxCDF		10.9	pg/g	0.0618	4.95
57117-44-9	1,2,3,6,7,8-HxCDF	J	3.78	pg/g	0.0604	4.95
60851-34-5	2,3,4,6,7,8-HxCDF	J	4.82	pg/g	0.0618	4.95
72918-21-9	1,2,3,7,8,9-HxCDF	J	2.25	pg/g	0.0842	4.95
67562-39-4	1,2,3,4,6,7,8-HpCDF		43.3	pg/g	0.0872	4.95
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	3.28	pg/g	0.138	4.95
39001-02-0	1,2,3,4,6,7,8,9-OCDF		69.1	pg/g	0.144	9.91
41903-57-5	Total TeCDD	K	7.91	pg/g	0.041	0.991
36088-22-9	Total PeCDD	KQ	18.7	pg/g	0.0703	4.95
34465-46-8	Total HxCDD	Q	91.0	pg/g	0.102	4.95
37871-00-4	Total HpCDD		487	pg/g	0.295	4.95
30402-14-3	Total TeCDF	K	26.9	pg/g	0.0781	0.991
30402-15-4	Total PeCDF	KQ	55.3	pg/g	0.0254	4.95
55684-94-1	Total HxCDF	Q	106	pg/g	0.0604	4.95
38998-75-3	Total HpCDF		123	pg/g	0.0872	4.95
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		14.2	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		14.2	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		164	198	pg/g	82.6	(25%-164%)
13C-1,2,3,7,8-PeCDD		141	198	pg/g	71.1	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		166	198	pg/g	83.5	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		162	198	pg/g	81.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		180	198	pg/g	90.9	(23%-140%)
13C-OCDD		318	396	pg/g	80.3	(17%-157%)
13C-2,3,7,8-TCDF		176	198	pg/g	88.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		158	198	pg/g	79.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		158	198	pg/g	79.9	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		161	198	pg/g	81.0	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		158	198	pg/g	80.0	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		172	198	pg/g	86.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		164	198	pg/g	82.8	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 2 of 2

<b>SDG Number:</b> A7K0850_2	<b>Client:</b> APEX001	<b>Project:</b> APEX00111
<b>Lab Sample ID:</b> 11857001	<b>Date Collected:</b> 11/22/2017 12:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 01/09/2018 10:30	<b>%Moisture:</b> 27.3
<b>Client ID:</b> ROW-078NE		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 36711	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 01/25/2018 14:45	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b24jan18a_3-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 36708	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 19-JAN-18	<b>Prep Aliquot:</b> 13.88 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
	13C-1,2,3,4,6,7,8-HpCDF		173	198	pg/g	87.2 (28%-143%)
	13C-1,2,3,4,7,8,9-HpCDF		164	198	pg/g	82.7 (26%-138%)
	37Cl-2,3,7,8-TCDD		15.1	19.8	pg/g	76.3 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- Q** Quantitative Interference; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7K0850_2	<b>Client:</b> APEX001	<b>Project:</b> APEX00111
<b>Lab Sample ID:</b> 11857001	<b>Date Collected:</b> 11/22/2017 12:30	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 01/09/2018 10:30	<b>%Moisture:</b> 27.3
<b>Client ID:</b> ROW-078NE		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 36711	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 01/29/2018 16:26	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b29jan18b-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 36708	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 19-JAN-18	<b>Prep Aliquot:</b> 13.88 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		1.65	pg/g	0.109	0.991

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
---------------------------	------	--------	---------	-------	-----------	-------------------

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- Q** Quantitative Interference; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

**SDG Number:** A7K0850\_2  
**Lab Sample ID:** 11857002  
**Client Sample:** 1613B Soil  
**Client ID:** ROW-078NW  
**Batch ID:** 36711  
**Run Date:** 01/25/2018 15:33  
**Data File:** b24jan18a\_3-9  
**Prep Batch:** 36708  
**Prep Date:** 19-JAN-18

**Client:** APEX001  
**Date Collected:** 11/22/2017 13:00  
**Date Received:** 01/09/2018 10:30  
**Method:** EPA Method 1613B  
**Analyst:** CLP  
**Prep Method:** SW846 3540C  
**Prep Aliquot:** 13.71 g

**Project:** APEX00111  
**Matrix:** SOIL  
**%Moisture:** 28.8  
**Prep Basis:** Dry Weight  
**Instrument:** HRP763  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		1.87	pg/g	0.0805	1.02
40321-76-4	1,2,3,7,8-PeCDD	J	4.75	pg/g	0.122	5.12
39227-28-6	1,2,3,4,7,8-HxCDD		7.98	pg/g	0.204	5.12
57653-85-7	1,2,3,6,7,8-HxCDD		29.8	pg/g	0.203	5.12
19408-74-3	1,2,3,7,8,9-HxCDD		16.6	pg/g	0.209	5.12
35822-46-9	1,2,3,4,6,7,8-HpCDD		445	pg/g	0.606	5.12
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2800	pg/g	0.950	10.2
51207-31-9	2,3,7,8-TCDF		1.10	pg/g	0.104	1.02
57117-41-6	1,2,3,7,8-PeCDF	J	1.66	pg/g	0.0958	5.12
57117-31-4	2,3,4,7,8-PeCDF	J	3.81	pg/g	0.0893	5.12
70648-26-9	1,2,3,4,7,8-HxCDF		7.41	pg/g	0.156	5.12
57117-44-9	1,2,3,6,7,8-HxCDF	J	4.18	pg/g	0.154	5.12
60851-34-5	2,3,4,6,7,8-HxCDF		5.68	pg/g	0.167	5.12
72918-21-9	1,2,3,7,8,9-HxCDF	J	2.21	pg/g	0.238	5.12
67562-39-4	1,2,3,4,6,7,8-HpCDF		58.3	pg/g	0.174	5.12
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	3.35	pg/g	0.291	5.12
39001-02-0	1,2,3,4,6,7,8,9-OCDF		67.0	pg/g	0.348	10.2
41903-57-5	Total TeCDD	K	13.5	pg/g	0.0805	1.02
36088-22-9	Total PeCDD	KQ	34.0	pg/g	0.122	5.12
34465-46-8	Total HxCDD		174	pg/g	0.203	5.12
37871-00-4	Total HpCDD		797	pg/g	0.606	5.12
30402-14-3	Total TeCDF		16.8	pg/g	0.104	1.02
30402-15-4	Total PeCDF	KQ	48.9	pg/g	0.0412	5.12
55684-94-1	Total HxCDF	K	128	pg/g	0.154	5.12
38998-75-3	Total HpCDF		152	pg/g	0.174	5.12
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		21.2	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		21.2	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		160	205	pg/g	77.9	(25%-164%)
13C-1,2,3,7,8-PeCDD		144	205	pg/g	70.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		165	205	pg/g	80.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		170	205	pg/g	82.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		175	205	pg/g	85.4	(23%-140%)
13C-OCDD		303	410	pg/g	74.1	(17%-157%)
13C-2,3,7,8-TCDF		174	205	pg/g	85.1	(24%-169%)
13C-1,2,3,7,8-PeCDF		166	205	pg/g	81.1	(24%-185%)
13C-2,3,4,7,8-PeCDF		163	205	pg/g	79.8	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		179	205	pg/g	87.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		178	205	pg/g	86.9	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		176	205	pg/g	86.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		169	205	pg/g	82.7	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 2 of 2

<b>SDG Number:</b> A7K0850_2	<b>Client:</b> APEX001	<b>Project:</b> APEX00111
<b>Lab Sample ID:</b> 11857002	<b>Date Collected:</b> 11/22/2017 13:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 01/09/2018 10:30	<b>%Moisture:</b> 28.8
<b>Client ID:</b> ROW-078NW		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 36711	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 01/25/2018 15:33	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b24jan18a_3-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 36708	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 19-JAN-18	<b>Prep Aliquot:</b> 13.71 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
	13C-1,2,3,4,6,7,8-HpCDF		173	205	pg/g	84.5 (28%-143%)
	13C-1,2,3,4,7,8,9-HpCDF		158	205	pg/g	77.4 (26%-138%)
	37Cl-2,3,7,8-TCDD		14.9	20.5	pg/g	72.5 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- Q** Quantitative Interference; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A7K0850_2	<b>Client:</b> APEX001	<b>Project:</b> APEX00111
<b>Lab Sample ID:</b> 11857002	<b>Date Collected:</b> 11/22/2017 13:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 01/09/2018 10:30	<b>%Moisture:</b> 28.8
<b>Client ID:</b> ROW-078NW		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 36711	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 01/29/2018 16:46	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b29jan18b-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 36708	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 19-JAN-18	<b>Prep Aliquot:</b> 13.71 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		1.17	pg/g	0.0852	1.02

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- Q** Quantitative Interference; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.

# **Quality Control Summary**

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7K0850\_2

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12020488	LCS for batch 36708	13C-2,3,7,8-TCDD		82.5	(20%-175%)
		13C-1,2,3,7,8-PeCDD		73.2	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		77.1	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		86.9	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		81.0	(22%-166%)
		13C-OCDD		64.0	(13%-199%)
		13C-2,3,7,8-TCDF		87.6	(22%-152%)
		13C-1,2,3,7,8-PeCDF		83.7	(21%-192%)
		13C-2,3,4,7,8-PeCDF		82.9	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		80.5	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		85.3	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		83.6	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		77.8	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		81.8	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		73.1	(20%-186%)
		37Cl-2,3,7,8-TCDD		77.0	(31%-191%)
12020489	LCSD for batch 36708	13C-2,3,7,8-TCDD		72.8	(20%-175%)
		13C-1,2,3,7,8-PeCDD		68.1	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		70.9	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		82.0	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		79.0	(22%-166%)
		13C-OCDD		64.6	(13%-199%)
		13C-2,3,7,8-TCDF		80.3	(22%-152%)
		13C-1,2,3,7,8-PeCDF		80.3	(21%-192%)
		13C-2,3,4,7,8-PeCDF		78.5	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		77.4	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		82.4	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		78.7	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		75.7	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		76.3	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		71.3	(20%-186%)
		37Cl-2,3,7,8-TCDD		68.4	(31%-191%)
12020487	MB for batch 36708	13C-2,3,7,8-TCDD		72.9	(25%-164%)
		13C-1,2,3,7,8-PeCDD		67.6	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		69.9	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		80.3	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		82.8	(23%-140%)
		13C-OCDD		67.4	(17%-157%)
		13C-2,3,7,8-TCDF		79.0	(24%-169%)
		13C-1,2,3,7,8-PeCDF		79.2	(24%-185%)
		13C-2,3,4,7,8-PeCDF		77.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		77.6	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		84.2	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		81.1	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		78.4	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		81.0	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		76.2	(26%-138%)
		37Cl-2,3,7,8-TCDD		67.1	(35%-197%)
11857001	ROW-078NE	13C-2,3,7,8-TCDD		82.6	(25%-164%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A7K0850\_2

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
11857001	ROW-078NE	13C-1,2,3,7,8-PeCDD		71.1	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		83.5	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		81.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		90.9	(23%-140%)
		13C-OCDD		80.3	(17%-157%)
		13C-2,3,7,8-TCDF		88.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		79.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		79.9	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		81.0	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		80.0	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		86.7	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		82.8	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		87.2	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		82.7	(26%-138%)
		37Cl-2,3,7,8-TCDD		76.3	(35%-197%)
11857002	ROW-078NW	13C-2,3,7,8-TCDD		77.9	(25%-164%)
		13C-1,2,3,7,8-PeCDD		70.2	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		80.4	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		82.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		85.4	(23%-140%)
		13C-OCDD		74.1	(17%-157%)
		13C-2,3,7,8-TCDF		85.1	(24%-169%)
		13C-1,2,3,7,8-PeCDF		81.1	(24%-185%)
		13C-2,3,4,7,8-PeCDF		79.8	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		87.6	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		86.9	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		86.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		82.7	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		84.5	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		77.4	(26%-138%)
37Cl-2,3,7,8-TCDD		72.5	(35%-197%)		

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted



**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A7K0850\_2

Sample Type: Laboratory Control Sample

Client ID: LCS for batch 36708

Matrix: SOIL

Lab Sample ID: 12020488

Instrument: HRP763

Analysis Date: 01/25/2018 09:06

Dilution: 1

Analyst: CLP

Prep Batch ID:36708

Batch ID: 36711

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	20.0	21.2	106	67-158
40321-76-4	LCS 1,2,3,7,8-PeCDD	100	125	125	70-142
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	100	117	117	70-164
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	100	116	116	76-134
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	100	116	116	64-162
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	100	99.1	99.1	70-140
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	200	219	110	78-144
51207-31-9	LCS 2,3,7,8-TCDF	20.0	20.6	103	75-158
57117-41-6	LCS 1,2,3,7,8-PeCDF	100	105	105	80-134
57117-31-4	LCS 2,3,4,7,8-PeCDF	100	104	104	68-160
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	100	116	116	72-134
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	100	117	117	84-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	100	113	113	70-156
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	100	113	113	78-130
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	100	108	108	82-122
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	100	112	112	78-138
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	200	222	111	63-170

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A7K0850\_2

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 36708

Matrix: SOIL

Lab Sample ID: 12020489

Instrument: HRP763

Analysis Date: 01/25/2018 09:53

Dilution: 1

Analyst: CLP

Prep Batch ID: 36708

Batch ID: 36711

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	20.0	21.9	109	67-158	3.26	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	100	125	125	70-142	0.466	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	100	116	116	70-164	0.637	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	100	119	119	76-134	2.28	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	100	120	120	64-162	2.81	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	100	98.4	98.4	70-140	0.692	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	200	222	111	78-144	1.26	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	20.0	20.2	101	75-158	1.85	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	100	103	103	80-134	1.76	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	100	105	105	68-160	0.0727	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	100	114	114	72-134	1.09	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	100	118	118	84-130	1.01	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	100	112	112	70-156	1.01	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	100	109	109	78-130	2.96	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	100	113	113	82-122	4.54	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	100	111	111	78-138	1.63	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	200	220	110	63-170	0.974	0-20

## Method Blank Summary

Page 1 of 1

SDG Number: A7K0850\_2  
Client ID: MB for batch 36708  
Lab Sample ID: 12020487  
Column:

Client: APEX001  
Instrument ID: HRP763  
Prep Date: 19-JAN-18

Matrix: SOIL  
Data File: b24jan18a\_3-3  
Analyzed: 01/25/18 10:42

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 36708	12020488	b24jan18a_3-1	01/25/18	0906
02 LCSD for batch 36708	12020489	b24jan18a_3-2	01/25/18	0953
03 ROW-078NE	11857001	b24jan18a_3-8	01/25/18	1445
04 ROW-078NW	11857002	b24jan18a_3-9	01/25/18	1533
05 ROW-078NE	11857001	b29jan18b-4	01/29/18	1626
06 ROW-078NW	11857002	b29jan18b-5	01/29/18	1646

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

**SDG Number:** A7K0850\_2  
**Lab Sample ID:** 12020487  
**Client Sample:** QC for batch 36708  
**Client ID:** MB for batch 36708  
**Batch ID:** 36711  
**Run Date:** 01/25/2018 10:42  
**Data File:** b24jan18a\_3-3  
**Prep Batch:** 36708  
**Prep Date:** 19-JAN-18

**Client:** APEX001  
**Method:** EPA Method 1613B  
**Analyst:** CLP  
**Prep Method:** SW846 3540C  
**Prep Aliquot:** 10 g

**Project:** APEX00111  
**Matrix:** SOIL  
**Prep Basis:** As Received  
**Instrument:** HRP763  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.0882	pg/g	0.0882	1.00
40321-76-4	1,2,3,7,8-PeCDD	J	0.152	pg/g	0.0818	5.00
39227-28-6	1,2,3,4,7,8-HxCDD	JK	0.150	pg/g	0.103	5.00
57653-85-7	1,2,3,6,7,8-HxCDD	JK	0.108	pg/g	0.0978	5.00
19408-74-3	1,2,3,7,8,9-HxCDD	J	0.154	pg/g	0.103	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD	JK	0.198	pg/g	0.141	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD	J	0.352	pg/g	0.220	10.0
51207-31-9	2,3,7,8-TCDF	J	0.124	pg/g	0.108	1.00
57117-41-6	1,2,3,7,8-PeCDF	JK	0.134	pg/g	0.072	5.00
57117-31-4	2,3,4,7,8-PeCDF	J	0.108	pg/g	0.0662	5.00
70648-26-9	1,2,3,4,7,8-HxCDF	JK	0.108	pg/g	0.0696	5.00
57117-44-9	1,2,3,6,7,8-HxCDF	JK	0.082	pg/g	0.0676	5.00
60851-34-5	2,3,4,6,7,8-HxCDF	JK	0.100	pg/g	0.074	5.00
72918-21-9	1,2,3,7,8,9-HxCDF	JK	0.126	pg/g	0.116	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF	JK	0.182	pg/g	0.067	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	0.122	pg/g	0.114	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	0.302	pg/g	0.302	10.0
41903-57-5	Total TeCDD	U	0.0882	pg/g	0.0882	1.00
36088-22-9	Total PeCDD	J	0.152	pg/g	0.0818	5.00
34465-46-8	Total HxCDD	JK	0.412	pg/g	0.0978	5.00
37871-00-4	Total HpCDD	JK	0.198	pg/g	0.141	5.00
30402-14-3	Total TeCDF	J	0.124	pg/g	0.108	1.00
30402-15-4	Total PeCDF	JK	0.242	pg/g	0.0522	5.00
55684-94-1	Total HxCDF	JK	0.416	pg/g	0.0676	5.00
38998-75-3	Total HpCDF	JK	0.304	pg/g	0.067	5.00
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.289	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		0.333	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		146	200	pg/g	72.9	(25%-164%)
13C-1,2,3,7,8-PeCDD		135	200	pg/g	67.6	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		140	200	pg/g	69.9	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		161	200	pg/g	80.3	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		166	200	pg/g	82.8	(23%-140%)
13C-OCDD		270	400	pg/g	67.4	(17%-157%)
13C-2,3,7,8-TCDF		158	200	pg/g	79.0	(24%-169%)
13C-1,2,3,7,8-PeCDF		158	200	pg/g	79.2	(24%-185%)
13C-2,3,4,7,8-PeCDF		155	200	pg/g	77.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		155	200	pg/g	77.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		168	200	pg/g	84.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		162	200	pg/g	81.1	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		157	200	pg/g	78.4	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 2 of 2

SDG Number: A7K0850_2	Client: APEX001	Project: APEX00111
Lab Sample ID: 12020487		Matrix: SOIL
Client Sample: QC for batch 36708		
Client ID: MB for batch 36708		Prep Basis: As Received
Batch ID: 36711	Method: EPA Method 1613B	
Run Date: 01/25/2018 10:42	Analyst: CLP	Instrument: HRP763
Data File: b24jan18a_3-3		Dilution: 1
Prep Batch: 36708	Prep Method: SW846 3540C	
Prep Date: 19-JAN-18	Prep Aliquot: 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			162	200	pg/g	81.0
13C-1,2,3,4,7,8,9-HpCDF			152	200	pg/g	76.2
37Cl-2,3,7,8-TCDD			13.4	20.0	pg/g	67.1

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

SDG Number: A7K0850_2	Client: APEX001	Project: APEX00111
Lab Sample ID: 12020488		Matrix: SOIL
Client Sample: QC for batch 36708		
Client ID: LCS for batch 36708		Prep Basis: As Received
Batch ID: 36711	Method: EPA Method 1613B	
Run Date: 01/25/2018 09:06	Analyst: CLP	Instrument: HRP763
Data File: b24jan18a_3-1		Dilution: 1
Prep Batch: 36708	Prep Method: SW846 3540C	
Prep Date: 19-JAN-18	Prep Aliquot: 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		21.2	pg/g	0.114	1.00
40321-76-4	1,2,3,7,8-PeCDD		125	pg/g	0.220	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		117	pg/g	0.240	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		116	pg/g	0.224	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		116	pg/g	0.238	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		99.1	pg/g	0.354	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		219	pg/g	0.748	10.0
51207-31-9	2,3,7,8-TCDF		20.6	pg/g	0.140	1.00
57117-41-6	1,2,3,7,8-PeCDF		105	pg/g	0.159	5.00
57117-31-4	2,3,4,7,8-PeCDF		104	pg/g	0.145	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		116	pg/g	0.338	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		117	pg/g	0.320	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		113	pg/g	0.356	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		113	pg/g	0.562	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		108	pg/g	0.268	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		112	pg/g	0.490	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		222	pg/g	0.792	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		165	200	pg/g	82.5	(20%-175%)
13C-1,2,3,7,8-PeCDD		146	200	pg/g	73.2	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		154	200	pg/g	77.1	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		174	200	pg/g	86.9	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		162	200	pg/g	81.0	(22%-166%)
13C-OCDD		256	400	pg/g	64.0	(13%-199%)
13C-2,3,7,8-TCDF		175	200	pg/g	87.6	(22%-152%)
13C-1,2,3,7,8-PeCDF		167	200	pg/g	83.7	(21%-192%)
13C-2,3,4,7,8-PeCDF		166	200	pg/g	82.9	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		161	200	pg/g	80.5	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		171	200	pg/g	85.3	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		167	200	pg/g	83.6	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		156	200	pg/g	77.8	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		164	200	pg/g	81.8	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		146	200	pg/g	73.1	(20%-186%)
37Cl-2,3,7,8-TCDD		15.4	20.0	pg/g	77.0	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A7K0850_2	<b>Client:</b> APEX001	<b>Project:</b> APEX00111
<b>Lab Sample ID:</b> 12020489		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 36708		
<b>Client ID:</b> LCSDD for batch 36708		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 36711	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 01/25/2018 09:53	<b>Analyst:</b> CLP	<b>Instrument:</b> HRP763
<b>Data File:</b> b24jan18a_3-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 36708	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 19-JAN-18	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		21.9	pg/g	0.130	1.00
40321-76-4	1,2,3,7,8-PeCDD		125	pg/g	0.264	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		116	pg/g	0.288	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		119	pg/g	0.270	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		120	pg/g	0.286	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		98.4	pg/g	0.364	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		222	pg/g	0.804	10.0
51207-31-9	2,3,7,8-TCDF		20.2	pg/g	0.126	1.00
57117-41-6	1,2,3,7,8-PeCDF		103	pg/g	0.214	5.00
57117-31-4	2,3,4,7,8-PeCDF		105	pg/g	0.185	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		114	pg/g	0.290	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		118	pg/g	0.284	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		112	pg/g	0.314	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		109	pg/g	0.490	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		113	pg/g	0.310	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		111	pg/g	0.540	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		220	pg/g	0.950	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		146	200	pg/g	72.8	(20%-175%)
13C-1,2,3,7,8-PeCDD		136	200	pg/g	68.1	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		142	200	pg/g	70.9	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		164	200	pg/g	82.0	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		158	200	pg/g	79.0	(22%-166%)
13C-OCDD		258	400	pg/g	64.6	(13%-199%)
13C-2,3,7,8-TCDF		161	200	pg/g	80.3	(22%-152%)
13C-1,2,3,7,8-PeCDF		161	200	pg/g	80.3	(21%-192%)
13C-2,3,4,7,8-PeCDF		157	200	pg/g	78.5	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		155	200	pg/g	77.4	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		165	200	pg/g	82.4	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		157	200	pg/g	78.7	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		151	200	pg/g	75.7	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		153	200	pg/g	76.3	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		143	200	pg/g	71.3	(20%-186%)
37Cl-2,3,7,8-TCDD		13.7	20.0	pg/g	68.4	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.



# DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9003.01.39 | OCTOBER 2, 2019 | PORT OF RIDGEFIELD—  
REMEDIAL INVESTIGATION PHASE III

Maul Foster & Alongi, Inc., conducted an independent review of the quality of analytical results for soil samples collected on August 13, 2019, at the Port of Ridgefield site in Ridgefield, Washington.

Apex Laboratories, LLC (Apex) and Cape Fear Analytical, LLC (CFA) performed the analyses. Apex report number A9H0592 and CFA report number WO15439 were reviewed. Samples submitted to Apex were subcontracted to CFA for dioxin/furan analysis and are reported in WO15439. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Total Organic Carbon	SM 5310
Dioxins and Furans	USEPA 1613B
NOTES: SM = Standard Methods for the Examination of Water and Wastewater. USEPA = U.S. Environmental Protection Agency.	

Samples Analyzed		
Report A9H0592/WO15439		
ISM-A01081-0.5	ISM-A01079-0.5	ISM-A01085-0.5
ISM-A01082-0.5	ISM-A01080-0.5	ISM-A01084-0.5
ISM-A01083-0.5	ISM-A01086-0.5	--

## DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (USEPA) procedures (USEPA, 2014, 2016, 2017) and appropriate laboratory and method-specific guidelines (Apex, 2018; CFA, 2018; USEPA, 1986).

Data validation procedures were modified, as appropriate, to accommodate quality-control requirements for methods not specifically addressed by the USEPA procedures (e.g., SM 5310B Mod).

In report WO15439, CFA flagged 1,2,3,4,6,7,8,9-OCDD as estimated because the result concentration exceeded the instrument calibration range. The result has been qualified by the reviewer with a “J,” as estimated, in the table below.

Report	Sample	Component	Original Result (pg/g)	Qualified Result (pg/g)
WO15439	ISM-A0I079-0.5	1,2,3,4,6,7,8,9-OCDD	4,700	4,700 J
NOTES: J = Result is estimated. pg/g = picograms per gram.				

USEPA Method 1613B laboratory-qualified estimated maximum potential concentrations (EMPCs) congener results were qualified by the reviewer as estimated, not detected, at the reported concentration, consistent with USEPA Region 10 guidance for data validation of polychlorinated dibenzodioxins and polychlorinated dibenzofurans (USEPA, 2014) and USEPA national functional guidelines for high-resolution Superfund methods data review (USEPA, 2016).

USEPA Method 1613B results with laboratory EMPC flags are qualified by the reviewer in the following table. Results flagged by CFA with “Q,” based on quantitative interferences, as well as CFA “P”-flagged results, based on diphenyl ether interferences, were also detected below the method reporting limit (MRL); additional qualification was not required as results below the MRL are already flagged as estimated.

Report	Sample	Component	Original Result (pg/g)	Qualified Result (pg/g)
WO15439	ISM-A0I081-0.5	Total TeCDD	4.14 JK	4.14 UJ
		Total PeCDD	17.6 JK	17.6 UJ
		Total TeCDF	11.8 JK	11.8 UJ
		Total PeCDF	52.0 JK	52.0 UJ
	ISM-A0I082-0.5	Total TeCDD	11.5 JK	11.5 UJ
		Total TeCDF	55.7 JK	55.7 UJ
		Total PeCDF	111 JK	111 UJ
	ISM-A0I083-0.5	Total TeCDD	7.27 JK	7.27 UJ
		Total TeCDF	36.7 JKP	36.7 UJ
		Total PeCDF	104 JK PQ	104 UJ
		Total HxCDF	170 JK	170 UJ
	ISM-A0I079-0.5	Total TeCDD	15.6 JK	15.6 UJ
		Total PeCDF	465 JK PQ	465 UJ
	ISM-A0I080-0.5	Total TeCDD	18.2 JK	18.2 UJ
		Total TeCDF	62.3 JK	62.3 UJ
		Total PeCDF	162 JK Q	162 UJ
ISM-A0I086-0.5	Total TeCDD	4.60 JK	4.60 UJ	
	Total TeCDF	11.2 JK	11.2 UJ	
	Total PeCDF	40.2 JK	40.2 UJ	
	Total HxCDF	72.3 JK	72.3 UJ	

Report	Sample	Component	Original Result (pg/g)	Qualified Result (pg/g)
	ISM-A01085-0.5	2,3,7,8-TCDD	0.125 JK	0.125 UJ
		Total TeCDD	2.51 JK	2.51 UJ
		Total PeCDD	6.48 JK	6.48 UJ
		Total TeCDF	7.59 JK	7.59 UJ
		Total PeCDF	19.2 JK	19.2 UJ
		Total HxCDF	34.7 JK	34.7 UJ
	ISM-A01084-0.5	2,3,7,8-TCDD	0.144 JK	0.144 UJ
		Total TeCDD	1.67 JK	1.67 UJ
		Total PeCDD	5.86 JK	5.86 UJ
		Total TeCDF	5.52 BJK	5.52 UJ
		Total PeCDF	22.5 JK	22.5 UJ
		Total HxCDF	43.4 JK	43.4 UJ

NOTES:  
 BJK = Result is detected in the associated method blank, is an estimated value, and is an EMPC.  
 EMPC = estimated maximum potential concentration.  
 JK = Result is an estimated value (detected below the MRL) and an EMPC.  
 JKP = Result is an estimated value (detected below the MRL), is an EMPC, and is estimated because of diphenyl ether interference.  
 JKPO = Result is an estimated value (detected below the MRL), is an EMPC, is estimated because of diphenyl ether interference as well as quantitative interference.  
 JKQ = Result is an estimated value (detected below the MRL), is an EMPC, and is estimated because of quantitative interference.  
 MRL = method reporting limit.  
 pg/g = picograms per gram.  
 UJ = Result is not detected and is an estimated value.

Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B analytical columns; therefore, any detections are confirmed and quantified using a secondary analytical column. All 2,3,7,8-TCDF results detected above the MRL were confirmed by secondary column analysis and are considered the results of record.

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

## HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

### Holding Times

Extractions and analyses were performed within the recommended holding time criteria.

### Preservation and Sample Storage

The samples were preserved and stored appropriately.

## BLANKS

### Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. Where an analyte was detected in a sample and in the associated method blank, the sample result was qualified if the concentration was less than five times the method blank concentration. MRLs or estimated detection limits (EDLs) were elevated to the concentration detected in the samples, and results were qualified as not detected, "U," at the elevated MRL.

According to report WO15439, the USEPA 1613B batch 41691 laboratory method blank had several detections between the EDL and the MRL. Some detections were also flagged by CFA as EMPCs. Associated sample results less than five times the method blank concentration have been qualified by the reviewer with "U" as non-detect at the reported sample value.

Report	Sample	Component	Method Blank Result (pg/g)	Analysis	Result (pg/g)	Qualified Result (pg/g)
WO15439	ISM-A01081-0.5	2,3,7,8-TCDF	0.286 J	Primary	1.02	1.02 U
				Confirmation	1.11	1.11 U
	ISM-A01084-0.5			Primary	0.640 J	0.640 UJ
	ISM-A01085-0.5			Primary	0.659 J	0.659 UJ
	ISM-A01086-0.5			Primary	0.999	0.999 U
				Confirmation	1.14	1.14 U
NOTES: J = Result is estimated. pg/g = picograms per gram. U = Result is non-detect. UJ = Result is non-detect and estimated.						

All remaining laboratory method blanks were non-detect.

### Trip Blanks

Trip blanks were not required for this sampling event.

### Equipment Rinsate Blanks

Equipment rinsate blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

## SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. All surrogate recoveries were within acceptance limits.

## MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. The MS/MSD samples were extracted and analyzed at the required frequency. All MS/MSD results were within acceptance limits for percent recovery and relative percent difference (RPD).

## LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

An LCS/LCSD is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency. All LCS/LCSD results were within acceptance limits for percent recovery and RPD.

## FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. No field duplicates were submitted with this report.

## REPORTING LIMITS

Apex and CFA used routine reporting limits for non-detect results, except for samples requiring dilutions because of high analyte concentrations and/or matrix interferences. Results between the EDL and the reporting limit were qualified by CFA with J, as estimated.

## DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

In report WO15439, the subcontracted lab noted in the sample receipt checklist that the samples had been labeled with “M” instead of “ISM.” Although it is best practice to have the sample ID match the chain of custody form, no data qualifications were necessary.

No additional errors were found.

## REFERENCES

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Apex. 2018. Quality systems manual. Rev. 6. Apex Laboratories, LLC, Tigard, Oregon. July 2.

CFA. 2018. Quality assurance plan. Rev. 15. Cape Fear Analytical, LLC, Wilmington, North Carolina.

USEPA. 1986. Test methods for evaluating solid waste, physical/chemical methods. EPA publication SW-846. 3d ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), and VI phase II (2018).

USEPA. 2014. R10 data validation and review guidelines for polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran data (PCDD/PCDF) using Method 1613B and SW846 Method 8290A. EPA-910-R-14-003. U.S. Environmental Protection Agency, Office of Environmental Assessment. May.

USEPA. 2016. USEPA contract laboratory program, national functional guidelines for high resolution Superfund methods data review. EPA 542-B-16-001. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. April.

USEPA. 2017. USEPA contract laboratory program, national functional guidelines for Superfund organic methods data review. EPA 540-R-2017-002. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.

# DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9003.01.39 | MARCH 9, 2020 | PORT OF RIDGEFIELD—  
REMEDIAL INVESTIGATION PHASE III

Maul Foster & Alongi, Inc., conducted an independent review of the quality of analytical results for incremental sampling methodology (ISM) samples collected for use in the Port of Ridgefield Off-Property Portion Remedial Action. The samples were collected in January and March, 2020.

Apex Laboratories, LLC (Apex), and Cape Fear Analytical, LLC (CFA) performed the analyses. Apex report numbers A0A0974 and A0B0466 were reviewed, with original CFA reports appended to the Apex reports. CFA report WO16260 associated with Apex report A0B0466 was revised to correct the sample name and is reported separately as “WO126260 Rev1.” Samples were subcontracted from Apex to CFA for dioxin/furan analysis. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Dioxin and Furans	USEPA 1613B
Total Organic Carbon	PSEP/SM 5310B Modified
NOTES: PSEP = Puget Sound Estuary Protocols. SM = Standard Method. USEPA = U.S. Environmental Protection Agency.	

Samples Analyzed	
Report A0A0974	Report A0B0466/WO126260 Rev1
ISM-AOI87-0.5	ISM-AOI88-0.5
ISM-AOI89-0.5	-

## DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (USEPA) procedures (USEPA, 2017) and appropriate laboratory and method-specific guidelines (Apex, 2019; CFA, 2018; USEPA, 1986).

Data validation procedures were modified, as appropriate, to accommodate quality-control requirements for methods not specifically addressed by the USEPA procedures (e.g., PSEP/SM 5310B).

USEPA Method 1613B results qualified by the laboratory as estimated maximum potential concentrations (EMPCs) were qualified by the reviewer with “U,” as non-detect at the reported sample concentration. Total homolog results flagged as EMPCs by the laboratory were qualified by the reviewer with “UJ,” as estimated, not detected, at the reported concentration when all associated congeners were reported by the laboratory as either EMPCs



or not detected. Total homolog results already reported as estimated because of detection below the reporting limit were not additionally qualified. The following results were qualified:

Report	Sample	Component	Original Sample Result (pg/g)	Qualified Sample Result (pg/g)
A0A0974	ISM-AOI87-0.5	2,3,7,8-TCDF	0.885 JK	0.885 UJ
		1,2,3,7,8-PeCDF	1.22 JK	1.22 UJ
		1,2,3,7,8,9-HxCDF	1.53 JK	1.53 UJ
		Total PeCDD	16.6 JK	16.6 J
		Total HxCDD	91.1 JK	91.1 J
		Total TeCDF	26.5 JK	26.5 UJ
		Total PeCDF	99.6 JK	99.6 J
		Total HxCDF	110 JK	110 J
	ISM-AOI89-0.5	Total TeCDD	9.20 JK	9.20 J
		Total PeCDD	26.0 JK	26.0 J
		Total HxCDD	130 JK	130 J
		Total TeCDF	21.9 JK	21.9 J
		Total PeCDF	60.6 JK	60.6 J
A0B0466	ISM-A0I88	2,3,7,8-TCDD	0.321 JK	0.321 UJ
		1,2,3,4,7,8-HxCDD	2.94 JK	2.94 UJ
		1,2,3,7,8,9-HxCDD	4.26 JK	4.26 UJ
		2,3,7,8-TCDF	0.467 JK	0.467 UJ
		Total TeCDD	1.43 JK	1.43 UJ
		Total PeCDD	6.65 JK	6.65 J
		Total HxCDD	50.9 JK	50.9 J
		Total TeCDF	4.70 JK	4.70 UJ
		Total PeCDF	31.8 JK	31.8 J
		Total HpCDF	206 JK	206 J

NOTES:  
 EMPC = estimated maximum potential concentration.  
 J = Result is estimated.  
 JK = Result is estimated and an EMPC.  
 pg/g = picograms per gram.  
 UJ = Result is estimated and non-detect.

Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B columns; therefore, any detections above the reporting limit are confirmed and quantified using a secondary column or method.

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

## HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

### Holding Times

Extractions and analyses were performed within the recommended holding time criteria.

### Preservation and Sample Storage

The samples were preserved appropriately.

According to report A0B0466, CFA received sample ISM-A0I88-0.5 at 20.2°C. The reviewer confirmed that the samples had been packed with an appropriate amount of ice and then shipped to CFA via overnight FedEx on February 20, 2020. However, because of a shipping delay, CFA did not receive the samples until February 26, 2020. Analysis by USEPA Method 1613B proceeded with the approval of the MFA project manager. All associated sample results have been qualified by the reviewer as estimated, with final detected results reported as “J” (estimated) and final non-detect results reported as UJ. Results already qualified as estimated because of detection below the quantitation limit or because of qualification based on EMPCs were not additionally qualified.

Report	Sample	Component	Original Sample Result (pg/g)	Qualified Sample Result (pg/g)
A0B0466	ISM-A0I88-0.5	1,2,3,6,7,8-HxCDD	8.91	8.91 J
		1,2,3,4,6,7,8-HpCDD	204	204 J
		1,2,3,4,6,7,8,9-OCDD	2,320	2,320 J
		1,2,3,7,8-PeCDF	0.592 U	0.592 UJ
		1,2,3,4,7,8-HxCDF	18.3	18.3 J
		2,3,4,6,7,8-HxCDF	5.11	5.11 J
		1,2,3,4,6,7,8-HpCDF	59.0	59.0 J
		1,2,3,4,7,8,9-HpCDF	7.63	7.63 J
		1,2,3,4,6,7,8,9-OCDF	69.7	69.7 J
		Total HpCDD	368	368 J
NOTES: J = Result is estimated. pg/g = picograms per gram. U = Result is non-detect. UJ = Result is estimated and non-detect.				

The remaining samples were stored appropriately.

## BLANKS

### Method Blanks

Method blank results are used to demonstrate a lack of contamination from laboratory processes. Laboratory method blank analyses were performed at the required frequencies. For

purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch.

For USEPA Method 1613B method blank evaluation, where an analyte was detected in the sample and the associated method blank, the sample result was qualified if the concentration was less than five times the method blank concentration. Sample results were also qualified when the associated method blank result was an EMPC. Sample results between the estimated detection limit (EDL) and the method reporting limit (MRL), with concentrations less than five times the method blank concentration, were qualified with U as non-detect at the sample result value.

According to report A0A0974, the USEPA Method 1613B method blank had detections of OCDD; 1,2,3,4,7,8-HxCDF; 1,2,3,4,6,7,8-HpCDF; total HxCDF; and total HpCDF below quantitation limits. The method blank detections were also flagged by CFA as EMPCs. The associated sample results were detected at concentrations greater than five times the method blank concentrations; thus, no results were qualified.

According to report A0B0466, the USEPA Method 1613B batch 43396 method blank had detections of OCDD, 1,2,3,7,8-PeCDF, and total PeCDF below quantitation limits. Associated sample results either were non-detect or were detected at concentrations greater than five times the method blank results; thus, qualification was not required.

The remaining laboratory method blanks were non-detect.

#### Trip Blanks

Trip blanks were not required for this sampling event.

#### Equipment Rinsate Blanks

Equipment rinsate blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

### SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. The laboratory appropriately documented and qualified surrogate outliers. Associated batch quality assurance/quality control for samples with surrogate outliers were within acceptance limits. All surrogate recoveries were within acceptance limits.

### MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. MS/MSD samples were extracted and analyzed at the required frequency, with exceptions noted below. When MS/MSD percent recoveries and relative percent differences (RPDs) were outside acceptance limits because of high concentrations of analyte in the sample, and MS/MSD exceedances were flagged by the laboratory because of high concentrations of analyte, no qualifications were made by the reviewer.

In report A0A0974, laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs) were used to evaluate precision and accuracy.

According to report A0B0466, the USEPA Method 1613B MS/MSD results for OCDD exceeded the upper percent recovery acceptance limit of 130 percent at 181 percent and 441 percent, respectively. CFA indicated that the recoveries were likely attributable to matrix interference. The sample used to prepare the MS/MSD had a significant concentration of OCDD; thus, qualification based on OCDD recovery was not required. The MSD also exceeded the upper percent recovery acceptance limit of 130 percent for 1,2,3,4,6,7,8-HpCDD at 146 percent. CFA also indicated that these recoveries were likely attributable to matrix interference. The MS result for 1,2,3,4,6,7,8-HpCDD was within percent recovery acceptance limits at 111 percent, and the MS/MSD RPD was within the 20 percent control limit; thus, qualification based on 1,2,3,4,6,7,8-HpCDD was not required.

## LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency. Laboratory duplicate results within five times the MRL were not evaluated for precision.

All laboratory duplicate RPDs were within acceptance limits.

## LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

An LCS/LCSD is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

All LCS/LCSD results were within acceptance limits for percent recovery and RPD.

## FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. Field duplicate samples were not submitted for analysis.

## INITIAL/CONTINUING CALIBRATION VERIFICATION RESULTS

Initial calibration verification (ICV) and continuing calibration verification (CCV) results are used to demonstrate instrument precision and accuracy following instrument calibration and through the end of the sample batch. Apex did not report CCV results. CFA noted in the case narrative that ICV and CCV results met acceptance criteria. Batch quality control results that were flagged because of CCV exceedances were not qualified when the quality control results were within acceptance limits.

## REPORTING LIMITS

Apex reported results to the MRL. CFA reported results to EDLs. Apex raised some reporting limits because of matrix interference and qualified them appropriately. Results between the EDL and the reporting limit were qualified by CFA with J as estimated.

## DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

All ISM sample names reported by Apex were appended with “---After Processing” to indicate sample processing, or with “---As Received” to indicate the unprocessed aliquot analyzed for percent moisture. For brevity, samples are referenced in this validation memorandum by the original sample name.

According to report A0B0466, the chain of custody for sample ISM-A0I88-0.5 was recorded with sample name “ISM-AOI88-0.5” and was transcribed and reported by Apex as “ISM-A0I88-0.5.

According to report A0B0466, analysis of sample ROW-090E-1 was canceled by the MFA project manager after samples were received by the laboratory.

No additional issues were found.

## REFERENCES

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Apex. 2019. Quality systems manual. Rev. 75. Apex Laboratories, LLC, Tigard, Oregon. February 11.

CFA. 2018. Quality assurance plan. Rev. 15. Cape Fear Analytical, LLC, Wilmington, North Carolina. December 15.

USEPA. 1986. Test methods for evaluating solid waste, physical/chemical methods. EPA publication SW-846. 3d ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), and VI phase III (2019).

USEPA. 2016. USEPA contract laboratory program, national functional guidelines for high resolution Superfund methods data review. EPA 542-B-16-001. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. April.

USEPA. 2017. USEPA contract laboratory program, national functional guidelines for Superfund organic methods data review. EPA 540-R-2017-002. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.

# DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 9003.01.39 | MAY 26, 2020 | PORT OF RIDGEFIELD-REMEDIAL INVESTIGATION PHASE III

Maul Foster & Alongi, Inc., conducted an independent review of the quality of analytical results for soil samples collected for the Port of Ridgefield off-property remedial investigation. The samples were collected on November 22, 2017.

Apex Laboratories (Apex) and Cape Fear Analytical (CFA) performed the analyses. Apex report number A7K0850 and CFA report numbers WO11688 and WO11857 were reviewed. Samples were subcontracted by Apex to CFA for dibenzo-p-dioxins and dibenzofurans (dioxins/furans) analysis. The analyses performed and samples analyzed are listed below. Samples ROW-078NE and ROW-078NW were originally submitted to Apex on hold, and their dioxin/furan results are reported in WO11857.

Analysis	Reference
Dioxins/Furans	USEPA Method 1613B modified
Total Organic Carbon	PSEP/SM 5310B modified

**NOTES:**

PSEP = Puget Sound Estuary Protocols.

SM = Standard Methods for the Examination of Water and Wastewater.

USEPA = U.S. Environmental Protection Agency.

Samples Analyzed
<b>Reports A7K0850/WO11688/WO11857</b>
ROW-078N
ROW-078NE
ROW-078NW

## DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (USEPA) procedures (USEPA, 2016, 2017) and appropriate laboratory and method-specific guidelines (Apex, 2016; CFA, 2016; USEPA, 1986).

USEPA Method 1613B and 8290A detections between the method reporting limit (MRL) and the estimated detection limit (EDL) were qualified as estimates (J) by the laboratory.

In report A7K0850, the USEPA Method 1613B result for 1,2,3,4,6,7,8,9-OCDD (OCDD) was flagged by CFA due to results that exceeded the instrument calibration range. The reviewer confirmed with CFA that OCDD calibration range exceedances do not require dilution, per USEPA guidance (USEPA, 2016), and that the OCDD result is considered estimated. Results were qualified by the reviewer with “J” as estimated.



Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
WO11688	ROW-078N	OCDD	6720 E	6720 J

Notes:

E = result exceeds instrument calibration.

ID = identification.

J = result is an estimated value.

pg/g = picograms per gram.

The laboratory identified some USEPA Method 1613B results as estimated maximum potential concentrations (EMPCs). EMPC results were qualified by the reviewer as not detected (U) at the reported value in the following table. USEPA Method 1613B total homolog results reported by CFA as EMPCs were qualified by the reviewer as estimated, not detected, at the reported concentration when all associated congeners were reported by CFA as EMPCs or non-detected results. However, when one or more congeners associated with an EMPC-homolog was reported as a detection with no EMPC qualifier, the total homolog result was qualified by the reviewer with “J” as estimated. Some EMPC results were also flagged by CFA with “Q” due to qualitative interference; results were qualified based on the EMPC detection.

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
WO11688	ROW-078N	Total TCDD	14.0 K	14.0 J
		Total PeCDF	248 K	248 J
		Total HxCDF	338 K	338 J
WO11857	ROW-078NE	2,3,7,8-TCDD	0.369 JK	0.369 UJ
		Total TCDD	7.91 K	7.91 U
		Total PeCDD	18.7 QK	18.7 J
		Total TCDF	26.9 K	26.9 J
		Total PeCDF	55.3 KQ	55.3 J
	ROW-078NW	Total TCDD	13.5 K	13.5 J
		Total PeCDD	34.0 KQ	34.0 J
		Total PeCDF	48.9 KQ	48.9 J
		Total HxCDF	128 K	128 J

Notes:

HxCDF = hexachlorodibenzofuran.

ID = identification.

J = result is an estimated value.

K = result is an estimated maximum potential concentration.

PeCDD = pentachlorodibenzo-p-dioxin.

PeCDF = pentachlorodibenzofuran.

pg/g = picograms per gram.

Q = result is estimated due to qualitative interference.

TCDD = tetrachlorodibenzo-p-dioxin.

TCDF = tetrachlorodibenzofuran.

U = result is not detected.

Positive identification of 2,3,7,8-TCDF cannot be achieved using typical USEPA Method 1613B columns; therefore, all detections above the reporting limit were confirmed and

quantified using a secondary column. The confirmation TCDF result is considered the result of record.

Report	Sample ID	Analyte	Original Result (pg/g)	Confirmation Result (pg/g)
WO11688	ROW-078N	2,3,7,8-TCDF	2.24	2.41
WO11857	ROW-078NE	2,3,7,8-TCDF	1.67	1.65
	ROW-078NW	2,3,7,8-TCDF	1.87	1.17

NOTES:  
 ID = identification.  
 pg/g = picograms per gram.  
 TCDF = tetrachlorodibenzofuran.

The laboratory identified some USEPA Method 1613B results as estimated due to qualitative interference. The results have been qualified by the reviewer with “J” as estimated.

Report	Sample ID	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
WO11857	ROW-078NE	Total HxCDD	91.0 Q	91.0 J
		Total HxCDF	106 Q	106 J

Notes:  
 HxCDD = hexachlorodibenzo-p-dioxin.  
 HxCDF = hexachlorodibenzofuran.  
 J = result is an estimated value.  
 pg/g = picograms per gram.  
 Q = result is estimated due to qualitative interference.

Data validation procedures were modified, as appropriate, to accommodate quality-control requirements for methods not specifically addressed by the USEPA procedures (e.g., PSEP/SM5310B).

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

## HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

### Holding Times

Extractions and analyses were performed within the recommended holding time criteria. Archived samples were frozen at -18 degrees Celsius to extend holding times.

In report A7K0850, samples ROW-078NE and ROW-078NW were removed from hold and analyzed for total organic carbons 16 days after the standard 28-day holding time. The reviewer confirmed that the samples had been archived at the time of receipt at -18 degrees Celsius, which extended the holding time from 28 days to 1 year. No qualification was required.

### Preservation and Sample Storage

The samples were preserved and stored appropriately.

## BLANKS

### Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. Where an analyte was detected in a sample and in the associated method blank, the sample result was qualified if the sample concentration was less than five times the method blank concentration. MRLs/EDLs were elevated to the concentration detected in the samples, qualified "U," and assigned as the sample result. Non-detect sample results associated with method blank detections (including EMPCs) were not qualified.

In reports WO11688 and WO11857, the USEPA Method 1613B method blanks had several detections between the EDL and MRL, with some method blank detections also reported as EMPCs. All sample results were greater than five times the associated method blank concentrations; thus, no results were qualified.

### Equipment Rinsate Blanks

Equipment rinsate blanks were not submitted for this sampling event.

### Trip Blanks

Trip blanks were not required for this sampling event.

## LABELED ANALOG STANDARD RECOVERY RESULTS

All USEPA Method 1613B and 8290A samples were spiked with C13 labeled analog standards to evaluate and document data quality. All labeled analog recoveries were within acceptance limits.

## MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. All MS/MSD samples were extracted and analyzed at the required frequency. The laboratory noted some MS/MSD results that exceeded acceptance criteria due to matrix effects or high analyte concentration. MS/MSD results that exceeded acceptance criteria due to high analyte concentration did not require qualification.

In report WO11688, the USEPA Method 1613B MS/MSD exceeded upper and lower percent recovery acceptance limits as well as the relative percent difference (RPD) control limit for 1,2,3,4,6,7,8-HpCDD and OCDD. Both analytes were present at high concentrations in the sample used to prepare the MS/MSD; thus, no results were qualified.

All remaining MS/MSD results were within acceptance limits for percent recovery and RPD.

## LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency. Laboratory duplicate results within five times the MRL were not evaluated for precision. All laboratory duplicate RPDs were within acceptance limits.

## LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency. All LCS/LCSD results were within acceptance limits for percent recovery and RPD.

## FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. Field duplicate samples were not submitted for analysis.

## REPORTING LIMITS

Apex and CFA used routine MRLs and EDLs for non-detect results. MRLs and EDLs were adjusted for samples requiring dilutions because of high analyte concentrations, matrix interferences, or EMPC qualification.

## DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

In report A7K0850, Apex indicated on the cooler receipt form that the sample collection date and time were not recorded on the sample container label for ROW-078N. The reviewer informed the sampler. No additional action was required.

No additional issues were found.

## REFERENCES

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Apex. 2016. Quality systems manual. Revision 5. Apex Laboratories, LLC, Tigard, Oregon. April 1.

CFA. 2016. Quality assurance plan. Cape Fear Analytical, LLC, Wilmington, North Carolina. April 5.

USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846. Update V. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 1, July 2014).

USEPA. 2016. USEPA contract laboratory program, national functional guidelines for high resolution Superfund methods data review. EPA 542-B-16-001. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. April.

USEPA. 2017. USEPA contract laboratory program, national functional guidelines for inorganic Superfund methods data review. EPA 540-R-2017-001. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.



Friday, February 28, 2020  
Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: A0A0974 - Port of Ridgefield ISM - 9003.01.39

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0A0974, which was received by the laboratory on 1/29/2020 at 12:13:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

---

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1            0.1 degC

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.  
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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2001 NW 19th Ave, STE 200  
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Project: **Port of Ridgefield ISM**

Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A0A0974 - 02 28 20 1520**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-A0I87-0.5(As Received)	A0A0974-01	Soil	01/29/20 10:00	01/29/20 12:13
ISM-A0I87-0.5(After Processing)	A0A0974-02	Soil	01/29/20 10:00	01/29/20 12:13
ISM-A0I89-0.5(As Received)	A0A0974-03	Soil	01/29/20 09:35	01/29/20 12:13
ISM-A0I89-0.5(After Processing)	A0A0974-04	Soil	01/29/20 09:35	01/29/20 12:13

Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director





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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A0A0974 - 02 28 20 1520**

**ANALYTICAL SAMPLE RESULTS**

**Demand Parameters**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>ISM-A0187-0.5(After Processing) (A0A0974-02)</b>				<b>Matrix: Soil</b>				
Batch: 0011021								
<b>Total Organic Carbon</b>	<b>21000</b>	---	200	mg/kg	1	02/04/20 21:32	PSEP/SM 5310B MOD	
<b>ISM-A0189-0.5(After Processing) (A0A0974-04)</b>				<b>Matrix: Soil</b>				
Batch: 0011021								
<b>Total Organic Carbon</b>	<b>27000</b>	---	200	mg/kg	1	02/04/20 22:26	PSEP/SM 5310B MOD	

Apex Laboratories

Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



<b>Maul Foster &amp; Alongi, INC.</b> 2001 NW 19th Ave, STE 200 Portland, OR 97209	Project: <b>Port of Ridgefield ISM</b> Project Number: <b>9003.01.39</b> Project Manager: <b>Phil Wiescher</b>	<b>Report ID:</b> <b>A0A0974 - 02 28 20 1520</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Demand Parameters**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0011021 - PSEP-5310B TOC</b>						<b>Soil</b>						
<b>Blank (0011021-BLK1)</b>			Prepared: 01/31/20 16:32 Analyzed: 02/04/20 20:59									
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>Blank (0011021-BLK2)</b>			Prepared: 01/31/20 16:32 Analyzed: 02/04/20 21:10									
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	A-01
<b>LCS (0011021-BS1)</b>			Prepared: 01/31/20 16:32 Analyzed: 02/04/20 21:21									
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	10000	---		mg/kg	1	10000	---	100	90-110%	---	---	
<b>Duplicate (0011021-DUP1)</b>			Prepared: 01/31/20 16:32 Analyzed: 02/04/20 22:04									
<u>QC Source Sample: ISM-A0187-0.5(After Processing) (A0A0974-02)</u>												
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	20000	---	200	mg/kg	1	---	21000	---	---	5	20%	
<b>Duplicate (0011021-DUP2)</b>			Prepared: 01/31/20 16:32 Analyzed: 02/04/20 22:15									
<u>QC Source Sample: ISM-A0187-0.5(After Processing) (A0A0974-02)</u>												
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	21000	---	200	mg/kg	1	---	21000	---	---	2	20%	



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Maul Foster & Alongi, INC.**

2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A0A0974 - 02 28 20 1520**

**SAMPLE PREPARATION INFORMATION**

**Demand Parameters**

Prep: PSEP-5310B TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0011021</u>							
A0A0974-02	Soil	PSEP/SM 5310B MOD	01/29/20 10:00	01/31/20 16:32			NA
A0A0974-04	Soil	PSEP/SM 5310B MOD	01/29/20 09:35	01/31/20 16:32			NA

Apex Laboratories

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Philip Nerenberg, Lab Director



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A0A0974 - 02 28 20 1520

**QUALIFIER DEFINITIONS**

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

A-01 Puck mill grind blank.

Apex Laboratories

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.
- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.



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Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A0A0974 - 02 28 20 1520**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.



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Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A0A0974 - 02 28 20 1520**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Philip Nerenberg, Lab Director





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 Project Manager: **Phil Wiescher**

**Report ID:**  
 A0A0974 - 02 28 20 1520

**CHAIN OF CUSTODY**

Lab # A0A0974 COC 1 of 1

**APEX LABS**  
 6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Company: **MFA** Project Mgr: **Phil Wiescher** Project Name: **Port of Ridgefield** Project #: **9003.01.39**

Address: **109 E 13th Street Vancouver, WA 98660** Phone: **3606492641** Email: **phil.wiescher@maulalongi.com** PO #

Sampled by: **E. Cuchis, M. Pollock**

Site Location: **OR WA CA**

AK ID \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWPH-HCID	NWPH-DX	NWPH-CX	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCA Metals (8)	Priority Metals (13)	AL, Sb, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Hg, Mn, Ni, K, Se, Ag, Na, TL, V, Zn	TOTAL DISS. TCLP	TCLP Metals (8)	1613B Dioxins	TOC by PSEP/SHW	5210B	Archive	
ISM-ADIST-0.5		1-25-10	1000	SO	1																					
ISM-AOI 89-0.5		1-09-05	0935	SO	1																					

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle):  
 1 Day    2 Day    3 Day  
 4 DAY    5 DAY    Other: DOCVOL

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Signature: <i>Meaghan Tolouch</i> Printed Name: <b>Meaghan Tolouch</b> Company: <b>MFA</b>	RECEIVED BY: Signature: <i>Charles Heikking</i> Printed Name: <b>Charles Heikking</b> Company: <b>Apex Labs</b>	Date: <b>1-29-2020</b>	Date: <b>1/29/20</b>
Time: <b>12:13</b>	Time: <b>12:13</b>		

SPECIAL INSTRUCTIONS:  
 please also email: [jmcaulster@maulalongi.com](mailto:jmcaulster@maulalongi.com)  
[mberanger@maulalongi.com](mailto:mberanger@maulalongi.com)

Apex Laboratories

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*Philip Nerenberg*

Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: **9003.01.39**  
Project Manager: **Phil Wiescher**

**Report ID:**  
A0A0974 - 02 28 20 1520

**APEX LABS COOLER RECEIPT FORM**

Client: Maul Foster Alongi Element WO#: A0 A0974

Project/Project #: Port of Ridgefield 9003.01.39

**Delivery Info:**

Date/time received: 1/29/20 @ 1213 By: CFH

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Date/time inspected: 1/29/20 @ 1356 By: CFH

Chain of Custody included? Yes  No  Custody seals? Yes  No

Signed/dated by client? Yes  No

Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>0.1</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>Y</u>						
Ice type: (Gel/Real/Other)	<u>Real</u>						
Condition:	<u>Good</u>						

Cooler out of temp? (Y/N) Y Possible reason why: \_\_\_\_\_  
If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA NA

Out of temperature samples form initiated? Yes/No/NA NA

**Samples Inspection:** Date/time inspected: 1/29/20 @ 1440 By: [Signature]

All samples intact? Yes  No  Comments: \_\_\_\_\_

Bottle labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

COC/container discrepancies form initiated? Yes  No  NA

Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA vials have visible headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA

Comments: \_\_\_\_\_

**Additional information:**  
\_\_\_\_\_  
\_\_\_\_\_

Labeled by: [Signature] Witness: [Signature] Cooler Inspected by: [Signature] See Project Contact Form: Y

*Philip Nerenberg*

February 28, 2020

Mr. Philip Nerenberg  
Apex Laboratories  
6700 SW Sandburg Street  
Portland, Oregon 97223

Re: DXN & PCB Subcontract  
Work Order: 16139  
SDG: A0A0974

Dear Mr. Nerenberg:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 04, 2020. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,



Cynde Larkins  
Project Manager

Enclosures

SUBCONTRACT ORDER

Apex Laboratories

A0A0974

PO 2/3/20

WAP 1/31/2020

SENDING LABORATORY:

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Cape Fear Analytical, LLC  
3306 Kitty Hawk Rd Suite 120  
Wilmington, NC 28405  
Phone : (910) 795-0421  
Fax: -

CFA WO #16139

**Sample Name:** ISM-A0I87-0.5(After Processing)      **Soil**      **Sampled:** 01/29/20 10:00      (A0A0974-02)

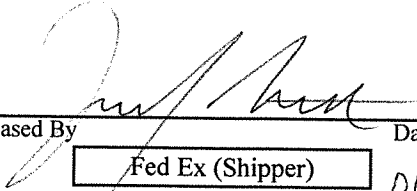
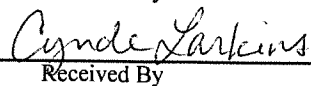
Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) Containers Supplied: (B)4 oz Glass Jar	02/11/20 17:00 2/17/2020	07/27/20 10:00	

**Sample Name:** ISM-A0I89-0.5(After Processing)      **Soil**      **Sampled:** 01/29/20 09:35      (A0A0974-04)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) Containers Supplied: (B)4 oz Glass Jar	02/11/20 17:00 2/17/2020	07/27/20 09:35	

Standard TAT

temp. = 4.0°C

Released By:  Date: 2/3/20  
 Received By:  Date: 04 Feb 20 @ 0934

Released By: Fed Ex (Shipper) Date: 04 Feb 20  
 Received By: Fed Ex (Shipper) Date: 04 Feb 20 @ 0934

**SAMPLE RECEIPT CHECKLIST**  
Cape Fear Analytical

Client: <u>APEX</u>	Work Order: <u>16139</u>
Shipping Company: <u>FedEx</u>	Date/Time Received: <u>04Feb20 0934</u>

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Samples < 2x background?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

\* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Air Witness: \_\_\_\_\_

#	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: seals broken    damaged container    leaking container    other(describe)
2	Custody seal/s present on cooler?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Seal intact?    Yes    No
3	Chain of Custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Samples requiring cold preservation within 0-6°C?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Preservation Method:    Temperature Blank present:    Yes <input checked="" type="checkbox"/> No (ice bags) blue ice    dry ice    none    other (describe) <u>3.8° + 0.2 = 4.0° C</u>
5	Aqueous samples found to have visible solids?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample IDs, containers affected:
5	Samples requiring chemical preservation at proper pH?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample IDs, containers affected and pH observed: If preservative added, Lot#:
7	Samples requiring preservation have no residual chlorine?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample IDs, containers affected: If preservative added, Lot#:
8	Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample IDs, tests affected:
9	Sample IDs on COC match IDs on containers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample IDs, containers affected:
10	Date & time of COC match date & time on containers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample IDs, containers affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	List type and number of containers / Sample IDs, containers affected: <u>1- 4oz clear glass soil jar per sample.</u> <u>2 total</u>
12	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments:

Checklist performed by: Initials: CJ      Date: 04Feb20

# **High Resolution Dioxins and Furans Analysis**

# Case Narrative



**HDOX Case Narrative  
Apex Laboratories (APEX)  
SDG A0A0974  
Work Order 16139**

**Method/Analysis Information**

**Product:** Dioxins/Furans by EPA Method 1613B in Solids  
**Analytical Method:** EPA Method 1613B  
**Extraction Method:** SW846 3540C  
**Analytical Batch Number:** 43139  
**Clean Up Batch Number:** 43137  
**Extraction Batch Number:** 43136

**Sample Analysis**

Samples were received at 4.0°C (16139001, 16139002). The following samples were analyzed using the analytical protocol as established in Method 1613B:

<b>Sample ID</b>	<b>Client ID</b>
12026019	Method Blank (MB)
12026020	Laboratory Control Sample (LCS)
12026021	Laboratory Control Sample Duplicate (LCSD)
16139001	ISM-A0I87-0.5 (After Processing)
16139002	ISM-A0I89-0.5 (After Processing)

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 15.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

**Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

## **Quality Control (QC) Information**

### **Certification Statement**

The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

### **Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

### **Surrogate Recoveries**

All surrogate recoveries were within the established acceptance criteria for this SDG.

### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

### **Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits.

### **LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

### **QC Sample Designation**

A matrix spike and matrix spike duplicate analysis was not required for this SDG.

## **Technical Information**

### **Holding Time Specifications**

CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

### **Sample Dilutions**

The samples in this SDG did not require dilutions.

### **Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

## **Miscellaneous Information**

### **Nonconformance (NCR) Documentation**

A NCR was not required for this SDG.

**Manual Integrations**

Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

**Sample preparation**

No difficulties were encountered during sample preparation.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

# Sample Data Summary

# Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

## Qualifier Definition Report for

APEX001 Apex Laboratories

Client SDG: A0A0974 CFA Work Order: 16139

### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- J Value is estimated
- K Estimated Maximum Possible Concentration
- U Analyte was analyzed for, but not detected above the specified detection limit.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

### Review/Validation

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature: 

Name: Heather Patterson

Date: 28 FEB 2020

Title: Group Leader

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

**SDG Number:** A0A0974  
**Lab Sample ID:** 16139001  
**Client Sample:** 1613B Soil  
**Client ID:** ISM-A0I87-0.5 (After Processing)  
**Batch ID:** 43139  
**Run Date:** 02/19/2020 20:07  
**Data File:** A19FEB20B-6  
**Prep Batch:** 43136  
**Prep Date:** 18-FEB-20

**Client:** APEX001  
**Date Collected:** 01/29/2020 10:00  
**Date Received:** 02/04/2020 09:34  
**Method:** EPA Method 1613B  
**Analyst:** MLL  
**Prep Method:** SW846 3540C  
**Prep Aliquot:** 10.8 g

**Project:** APEX00319  
**Matrix:** SOIL  
**%Moisture:** 2.8  
**Prep Basis:** Dry Weight  
**Instrument:** HRP750  
**Dilution:** 1

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.400	pg/g	0.385	0.952
40321-76-4	1,2,3,7,8-PeCDD	J	2.71	pg/g	0.387	4.76
39227-28-6	1,2,3,4,7,8-HxCDD	J	4.48	pg/g	0.514	4.76
57653-85-7	1,2,3,6,7,8-HxCDD		15.9	pg/g	0.507	4.76
19408-74-3	1,2,3,7,8,9-HxCDD		9.36	pg/g	0.518	4.76
35822-46-9	1,2,3,4,6,7,8-HpCDD		311	pg/g	1.29	4.76
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2000	pg/g	2.08	9.52
51207-31-9	2,3,7,8-TCDF	JK	0.885	pg/g	0.453	0.952
57117-41-6	1,2,3,7,8-PeCDF	JK	1.22	pg/g	0.242	4.76
57117-31-4	2,3,4,7,8-PeCDF		7.29	pg/g	0.236	4.76
70648-26-9	1,2,3,4,7,8-HxCDF		5.02	pg/g	0.295	4.76
57117-44-9	1,2,3,6,7,8-HxCDF	J	3.67	pg/g	0.314	4.76
60851-34-5	2,3,4,6,7,8-HxCDF		5.59	pg/g	0.322	4.76
72918-21-9	1,2,3,7,8,9-HxCDF	JK	1.53	pg/g	0.368	4.76
67562-39-4	1,2,3,4,6,7,8-HpCDF		50.8	pg/g	0.360	4.76
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	2.53	pg/g	0.465	4.76
39001-02-0	1,2,3,4,6,7,8,9-OCDF		60.7	pg/g	0.512	9.52
41903-57-5	Total TeCDD	J	5.22	pg/g	0.385	0.952
36088-22-9	Total PeCDD	JK	16.6	pg/g	0.387	4.76
34465-46-8	Total HxCDD	JK	91.1	pg/g	0.507	4.76
37871-00-4	Total HpCDD		564	pg/g	1.29	4.76
30402-14-3	Total TeCDF	JK	26.5	pg/g	0.453	0.952
30402-15-4	Total PeCDF	JK	99.6	pg/g	0.0802	4.76
55684-94-1	Total HxCDF	JK	110	pg/g	0.295	4.76
38998-75-3	Total HpCDF	J	131	pg/g	0.360	4.76
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		14.2	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		14.2	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		156	190	pg/g	81.7	(25%-164%)
13C-1,2,3,7,8-PeCDD		168	190	pg/g	88.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		150	190	pg/g	78.5	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		156	190	pg/g	81.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		179	190	pg/g	94.0	(23%-140%)
13C-OCDD		325	381	pg/g	85.2	(17%-157%)
13C-2,3,7,8-TCDF		171	190	pg/g	90.1	(24%-169%)
13C-1,2,3,7,8-PeCDF		185	190	pg/g	97.0	(24%-185%)
13C-2,3,4,7,8-PeCDF		168	190	pg/g	88.1	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		147	190	pg/g	77.1	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		146	190	pg/g	76.7	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		153	190	pg/g	80.2	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		164	190	pg/g	86.3	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A0A0974	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 16139001	<b>Date Collected:</b> 01/29/2020 10:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 02/04/2020 09:34	<b>%Moisture:</b> 2.8
<b>Client ID:</b> ISM-A0I87-0.5 (After Processing)		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43139	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 02/19/2020 20:07	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A19FEB20B-6		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43136	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 18-FEB-20	<b>Prep Aliquot:</b> 10.8 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			146	190	pg/g	76.8 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			161	190	pg/g	84.6 (26%-138%)
37Cl-2,3,7,8-TCDD			16.3	19.0	pg/g	85.8 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A0A0974	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 16139002	<b>Date Collected:</b> 01/29/2020 09:35	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 02/04/2020 09:34	<b>%Moisture:</b> 3.4
<b>Client ID:</b> ISM-A0I89-0.5 (After Processing)		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43139	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 02/19/2020 20:54	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A19FEB20B-7		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43136	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 18-FEB-20	<b>Prep Aliquot:</b> 11.35 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		1.18	pg/g	0.423	0.912
40321-76-4	1,2,3,7,8-PeCDD	J	3.77	pg/g	0.221	4.56
39227-28-6	1,2,3,4,7,8-HxCDD		6.90	pg/g	0.567	4.56
57653-85-7	1,2,3,6,7,8-HxCDD		23.9	pg/g	0.573	4.56
19408-74-3	1,2,3,7,8,9-HxCDD		13.6	pg/g	0.580	4.56
35822-46-9	1,2,3,4,6,7,8-HpCDD		428	pg/g	1.40	4.56
3268-87-9	1,2,3,4,6,7,8,9-OCDD		3110	pg/g	1.88	9.12
51207-31-9	2,3,7,8-TCDF		1.35	pg/g	0.432	0.912
57117-41-6	1,2,3,7,8-PeCDF	J	1.94	pg/g	0.228	4.56
57117-31-4	2,3,4,7,8-PeCDF		5.67	pg/g	0.224	4.56
70648-26-9	1,2,3,4,7,8-HxCDF		14.2	pg/g	0.255	4.56
57117-44-9	1,2,3,6,7,8-HxCDF		4.97	pg/g	0.250	4.56
60851-34-5	2,3,4,6,7,8-HxCDF		6.73	pg/g	0.253	4.56
72918-21-9	1,2,3,7,8,9-HxCDF	J	3.39	pg/g	0.297	4.56
67562-39-4	1,2,3,4,6,7,8-HpCDF		86.3	pg/g	0.503	4.56
55673-89-7	1,2,3,4,7,8,9-HpCDF		6.63	pg/g	0.697	4.56
39001-02-0	1,2,3,4,6,7,8,9-OCDF		133	pg/g	0.642	9.12
41903-57-5	Total TeCDD	JK	9.20	pg/g	0.423	0.912
36088-22-9	Total PeCDD	JK	26.0	pg/g	0.221	4.56
34465-46-8	Total HxCDD	JK	130	pg/g	0.567	4.56
37871-00-4	Total HpCDD		755	pg/g	1.40	4.56
30402-14-3	Total TeCDF	JK	21.9	pg/g	0.432	0.912
30402-15-4	Total PeCDF	JK	60.6	pg/g	0.0664	4.56
55684-94-1	Total HxCDF	J	159	pg/g	0.250	4.56
38998-75-3	Total HpCDF	J	268	pg/g	0.503	4.56
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		20.4	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		20.4	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		151	182	pg/g	82.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		168	182	pg/g	92.1	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		153	182	pg/g	84.1	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		147	182	pg/g	80.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		172	182	pg/g	94.4	(23%-140%)
13C-OCDD		325	365	pg/g	89.2	(17%-157%)
13C-2,3,7,8-TCDF		163	182	pg/g	89.5	(24%-169%)
13C-1,2,3,7,8-PeCDF		181	182	pg/g	99.1	(24%-185%)
13C-2,3,4,7,8-PeCDF		168	182	pg/g	92.1	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		145	182	pg/g	79.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		143	182	pg/g	78.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		151	182	pg/g	82.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		155	182	pg/g	85.1	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A0A0974	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 16139002	<b>Date Collected:</b> 01/29/2020 09:35	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 02/04/2020 09:34	<b>%Moisture:</b> 3.4
<b>Client ID:</b> ISM-A0I89-0.5 (After Processing)		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43139	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 02/19/2020 20:54	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A19FEB20B-7		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43136	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 18-FEB-20	<b>Prep Aliquot:</b> 11.35 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			143	182	pg/g	78.6 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			155	182	pg/g	85.1 (26%-138%)
37Cl-2,3,7,8-TCDD			15.7	18.2	pg/g	86.2 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A0A0974	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 16139002	<b>Date Collected:</b> 01/29/2020 09:35	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 02/04/2020 09:34	<b>%Moisture:</b> 3.4
<b>Client ID:</b> ISM-A0I89-0.5 (After Processing)		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43139	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 02/20/2020 13:04	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP757
<b>Data File:</b> e20feb20a_2-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43136	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 18-FEB-20	<b>Prep Aliquot:</b> 11.35 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		1.58	pg/g	0.190	0.912

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

# Quality Control Summary

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A0A0974

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12026020	LCS for batch 43136	13C-2,3,7,8-TCDD		80.4	(20%-175%)
		13C-1,2,3,7,8-PeCDD		84.8	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		80.9	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		81.1	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		87.0	(22%-166%)
		13C-OCDD		73.3	(13%-199%)
		13C-2,3,7,8-TCDF		88.2	(22%-152%)
		13C-1,2,3,7,8-PeCDF		90.6	(21%-192%)
		13C-2,3,4,7,8-PeCDF		84.5	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		77.0	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		77.7	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		82.2	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		84.0	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		75.9	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		80.9	(20%-186%)
		37Cl-2,3,7,8-TCDD		86.2	(31%-191%)
12026021	LCSD for batch 43136	13C-2,3,7,8-TCDD		78.3	(20%-175%)
		13C-1,2,3,7,8-PeCDD		89.9	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		79.0	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		79.0	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		79.3	(22%-166%)
		13C-OCDD		64.4	(13%-199%)
		13C-2,3,7,8-TCDF		88.8	(22%-152%)
		13C-1,2,3,7,8-PeCDF		95.7	(21%-192%)
		13C-2,3,4,7,8-PeCDF		88.9	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		77.4	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		76.7	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		79.4	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		82.2	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		70.0	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		72.6	(20%-186%)
		37Cl-2,3,7,8-TCDD		86.3	(31%-191%)
12026019	MB for batch 43136	13C-2,3,7,8-TCDD		70.7	(25%-164%)
		13C-1,2,3,7,8-PeCDD		77.1	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		71.8	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		70.9	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		75.9	(23%-140%)
		13C-OCDD		60.3	(17%-157%)
		13C-2,3,7,8-TCDF		78.1	(24%-169%)
		13C-1,2,3,7,8-PeCDF		80.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		73.9	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		69.1	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		69.4	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		72.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		73.1	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		64.6	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		68.6	(26%-138%)
		37Cl-2,3,7,8-TCDD		80.2	(35%-197%)
16139001	ISM-A0187-0.5 (After Processing)	13C-2,3,7,8-TCDD		81.7	(25%-164%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A0A0974

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
16139001	ISM-A0I87-0.5 (After Processing)	13C-1,2,3,7,8-PeCDD		88.2	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		78.5	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		81.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		94.0	(23%-140%)
		13C-OCDD		85.2	(17%-157%)
		13C-2,3,7,8-TCDF		90.1	(24%-169%)
		13C-1,2,3,7,8-PeCDF		97.0	(24%-185%)
		13C-2,3,4,7,8-PeCDF		88.1	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		77.1	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		76.7	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		80.2	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		86.3	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		76.8	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		84.6	(26%-138%)
		37Cl-2,3,7,8-TCDD		85.8	(35%-197%)
16139002	ISM-A0I89-0.5 (After Processing)	13C-2,3,7,8-TCDD		82.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		92.1	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		84.1	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		80.5	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		94.4	(23%-140%)
		13C-OCDD		89.2	(17%-157%)
		13C-2,3,7,8-TCDF		89.5	(24%-169%)
		13C-1,2,3,7,8-PeCDF		99.1	(24%-185%)
		13C-2,3,4,7,8-PeCDF		92.1	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		79.6	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		78.2	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		82.7	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		85.1	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		78.6	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		85.1	(26%-138%)
37Cl-2,3,7,8-TCDD		86.2	(35%-197%)		

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

**SDG Number:** A0A0974  
**Client ID:** LCS for batch 43136  
**Lab Sample ID:** 12026020  
**Instrument:** HRP750  
**Analyst:** MLL

**Sample Type:** Laboratory Control Sample  
**Matrix:** SOIL  
**Analysis Date:** 02/19/2020 16:57  
**Prep Batch ID:** 43136  
**Batch ID:** 43139  
**Dilution:** 1

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	20.0	20.3	101	67-158
40321-76-4	LCS 1,2,3,7,8-PeCDD	100	111	111	70-142
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	100	104	104	70-164
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	100	103	103	76-134
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	100	110	110	64-162
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	100	92.9	92.9	70-140
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	200	205	103	78-144
51207-31-9	LCS 2,3,7,8-TCDF	20.0	17.3	86.7	75-158
57117-41-6	LCS 1,2,3,7,8-PeCDF	100	92.7	92.7	80-134
57117-31-4	LCS 2,3,4,7,8-PeCDF	100	103	103	68-160
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	100	102	102	72-134
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	100	98.5	98.5	84-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	100	95.4	95.4	70-156
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	100	95.9	95.9	78-130
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	100	104	104	82-122
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	100	96.1	96.1	78-138
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	200	193	96.3	63-170



**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A0A0974

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 43136

Matrix: SOIL

Lab Sample ID: 12026021

Instrument: HRP750

Analysis Date: 02/19/2020 17:44

Dilution: 1

Analyst: MLL

Prep Batch ID: 43136

Batch ID: 43139

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	20.0	20.9	105	67-158	3.28	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	100	112	112	70-142	0.318	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	100	105	105	70-164	0.941	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	100	104	104	76-134	1.20	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	100	108	108	64-162	1.95	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	100	95.2	95.2	70-140	2.50	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	200	206	103	78-144	0.337	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	20.0	17.7	88.7	75-158	2.28	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	100	93.2	93.2	80-134	0.555	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	100	104	104	68-160	0.888	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	100	98.5	98.5	72-134	3.05	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	100	100	100	84-130	1.61	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	100	98.8	98.8	70-156	3.45	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	100	98.8	98.8	78-130	3.06	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	100	103	103	82-122	0.985	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	100	98.2	98.2	78-138	2.21	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	200	199	99.4	63-170	3.12	0-20

## Method Blank Summary

Page 1 of 1

SDG Number: A0A0974  
Client ID: MB for batch 43136  
Lab Sample ID: 12026019  
Column:

Client: APEX001  
Instrument ID: HRP750  
Prep Date: 18-FEB-20

Matrix: SOIL  
Data File: A19FEB20B-4  
Analyzed: 02/19/20 18:32

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 43136	12026020	A19FEB20B-2	02/19/20	1657
02 LCSD for batch 43136	12026021	A19FEB20B-3	02/19/20	1744
03 ISM-A0I87-0.5 (After Processing)	16139001	A19FEB20B-6	02/19/20	2007
04 ISM-A0I89-0.5 (After Processing)	16139002	A19FEB20B-7	02/19/20	2054
05 ISM-A0I89-0.5 (After Processing)	16139002	e20feb20a_2-4	02/20/20	1304

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A0A0974	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 12026019		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43136		
<b>Client ID:</b> MB for batch 43136		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43139	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 02/19/2020 18:32	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A19FEB20B-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43136	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 18-FEB-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.3	pg/g	0.300	1.00
40321-76-4	1,2,3,7,8-PeCDD	U	0.137	pg/g	0.137	5.00
39227-28-6	1,2,3,4,7,8-HxCDD	U	0.202	pg/g	0.202	5.00
57653-85-7	1,2,3,6,7,8-HxCDD	U	0.197	pg/g	0.197	5.00
19408-74-3	1,2,3,7,8,9-HxCDD	U	0.202	pg/g	0.202	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	0.21	pg/g	0.210	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD	J	0.588	pg/g	0.296	10.0
51207-31-9	2,3,7,8-TCDF	U	0.2	pg/g	0.200	1.00
57117-41-6	1,2,3,7,8-PeCDF	U	0.135	pg/g	0.135	5.00
57117-31-4	2,3,4,7,8-PeCDF	U	0.139	pg/g	0.139	5.00
70648-26-9	1,2,3,4,7,8-HxCDF	JK	0.148	pg/g	0.123	5.00
57117-44-9	1,2,3,6,7,8-HxCDF	U	0.123	pg/g	0.123	5.00
60851-34-5	2,3,4,6,7,8-HxCDF	U	0.124	pg/g	0.124	5.00
72918-21-9	1,2,3,7,8,9-HxCDF	U	0.163	pg/g	0.163	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF	JK	0.200	pg/g	0.105	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	0.143	pg/g	0.143	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	0.378	pg/g	0.378	10.0
41903-57-5	Total TeCDD	U	0.3	pg/g	0.300	1.00
36088-22-9	Total PeCDD	U	0.137	pg/g	0.137	5.00
34465-46-8	Total HxCDD	U	0.197	pg/g	0.197	5.00
37871-00-4	Total HpCDD	U	0.21	pg/g	0.210	5.00
30402-14-3	Total TeCDF	U	0.2	pg/g	0.200	1.00
30402-15-4	Total PeCDF	U	0.0918	pg/g	0.0918	5.00
55684-94-1	Total HxCDF	JK	0.148	pg/g	0.123	5.00
38998-75-3	Total HpCDF	JK	0.200	pg/g	0.105	5.00
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.017	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		0.321	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		141	200	pg/g	70.7	(25%-164%)
13C-1,2,3,7,8-PeCDD		154	200	pg/g	77.1	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		144	200	pg/g	71.8	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		142	200	pg/g	70.9	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		152	200	pg/g	75.9	(23%-140%)
13C-OCDD		241	400	pg/g	60.3	(17%-157%)
13C-2,3,7,8-TCDF		156	200	pg/g	78.1	(24%-169%)
13C-1,2,3,7,8-PeCDF		162	200	pg/g	80.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		148	200	pg/g	73.9	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		138	200	pg/g	69.1	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		139	200	pg/g	69.4	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		144	200	pg/g	72.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		146	200	pg/g	73.1	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A0A0974	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 12026019		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43136		
<b>Client ID:</b> MB for batch 43136		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43139	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 02/19/2020 18:32	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A19FEB20B-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43136	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 18-FEB-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			129	200	pg/g	64.6 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			137	200	pg/g	68.6 (26%-138%)
37Cl-2,3,7,8-TCDD			16.0	20.0	pg/g	80.2 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A0A0974	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 12026020		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43136		
<b>Client ID:</b> LCS for batch 43136		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43139	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 02/19/2020 16:57	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A19FEB20B-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43136	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 18-FEB-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		20.3	pg/g	0.310	1.00
40321-76-4	1,2,3,7,8-PeCDD		111	pg/g	0.252	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		104	pg/g	0.412	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		103	pg/g	0.392	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		110	pg/g	0.406	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		92.9	pg/g	0.564	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		205	pg/g	0.748	10.0
51207-31-9	2,3,7,8-TCDF		17.3	pg/g	0.178	1.00
57117-41-6	1,2,3,7,8-PeCDF		92.7	pg/g	0.366	5.00
57117-31-4	2,3,4,7,8-PeCDF		103	pg/g	0.370	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		102	pg/g	0.584	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		98.5	pg/g	0.552	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		95.4	pg/g	0.562	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		95.9	pg/g	0.736	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		104	pg/g	0.454	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		96.1	pg/g	0.650	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		193	pg/g	0.670	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		161	200	pg/g	80.4	(20%-175%)
13C-1,2,3,7,8-PeCDD		170	200	pg/g	84.8	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		162	200	pg/g	80.9	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		162	200	pg/g	81.1	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		174	200	pg/g	87.0	(22%-166%)
13C-OCDD		293	400	pg/g	73.3	(13%-199%)
13C-2,3,7,8-TCDF		176	200	pg/g	88.2	(22%-152%)
13C-1,2,3,7,8-PeCDF		181	200	pg/g	90.6	(21%-192%)
13C-2,3,4,7,8-PeCDF		169	200	pg/g	84.5	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		154	200	pg/g	77.0	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		155	200	pg/g	77.7	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		164	200	pg/g	82.2	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		168	200	pg/g	84.0	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		152	200	pg/g	75.9	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		162	200	pg/g	80.9	(20%-186%)
37Cl-2,3,7,8-TCDD		17.2	20.0	pg/g	86.2	(31%-191%)

**Comments:**

**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A0A0974	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 12026021		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43136		
<b>Client ID:</b> LCSD for batch 43136		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43139	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 02/19/2020 17:44	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A19FEB20B-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43136	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 18-FEB-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		20.9	pg/g	0.352	1.00
40321-76-4	1,2,3,7,8-PeCDD		112	pg/g	0.328	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		105	pg/g	0.462	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		104	pg/g	0.434	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		108	pg/g	0.454	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		95.2	pg/g	0.492	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		206	pg/g	1.10	10.0
51207-31-9	2,3,7,8-TCDF		17.7	pg/g	0.222	1.00
57117-41-6	1,2,3,7,8-PeCDF		93.2	pg/g	0.262	5.00
57117-31-4	2,3,4,7,8-PeCDF		104	pg/g	0.268	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		98.5	pg/g	0.526	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		100	pg/g	0.518	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		98.8	pg/g	0.526	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		98.8	pg/g	0.710	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		103	pg/g	0.470	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		98.2	pg/g	0.664	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		199	pg/g	0.852	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		157	200	pg/g	78.3	(20%-175%)
13C-1,2,3,7,8-PeCDD		180	200	pg/g	89.9	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		158	200	pg/g	79.0	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		158	200	pg/g	79.0	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		159	200	pg/g	79.3	(22%-166%)
13C-OCDD		258	400	pg/g	64.4	(13%-199%)
13C-2,3,7,8-TCDF		178	200	pg/g	88.8	(22%-152%)
13C-1,2,3,7,8-PeCDF		191	200	pg/g	95.7	(21%-192%)
13C-2,3,4,7,8-PeCDF		178	200	pg/g	88.9	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		155	200	pg/g	77.4	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		153	200	pg/g	76.7	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		159	200	pg/g	79.4	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		164	200	pg/g	82.2	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		140	200	pg/g	70.0	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		145	200	pg/g	72.6	(20%-186%)
37Cl-2,3,7,8-TCDD		17.3	20.0	pg/g	86.3	(31%-191%)

**Comments:**

**U** Analyte was analyzed for, but not detected above the specified detection limit.



**Apex Laboratories, LLC**

**6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039**

Wednesday, September 25, 2019

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: A9H0592 - Port of Ridgefield ISM - 9003.01.39

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A9H0592, which was received by the laboratory on 8/14/2019 at 12:22:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	5.7 degC	Cooler #2	5.1 degC
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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

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Philip Nerenberg, Lab Director





**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Maul Foster & Alongi, INC.**

2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A9H0592 - 09 25 19 1708**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-A0I081-0.5(After Processing)	A9H0592-02	Soil	08/13/19 08:56	08/14/19 12:22
ISM-A0I082-0.5(After Processing)	A9H0592-04	Soil	08/13/19 09:25	08/14/19 12:22
ISM-A0I083-0.5(After Processing)	A9H0592-06	Soil	08/13/19 10:00	08/14/19 12:22
ISM-A0I079-0.5(After Processing)	A9H0592-08	Soil	08/13/19 10:32	08/14/19 12:22
ISM-A0I080-0.5(After Processing)	A9H0592-10	Soil	08/13/19 10:50	08/14/19 12:22
ISM-A0I086-0.5(After Processing)	A9H0592-12	Soil	08/13/19 13:51	08/14/19 12:22
ISM-A0I085-0.5(After Processing)	A9H0592-14	Soil	08/13/19 14:11	08/14/19 12:22
ISM-A0I084-0.5(After Processing)	A9H0592-16	Soil	08/13/19 14:34	08/14/19 12:22

Apex Laboratories

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Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: **9003.01.39**  
 Project Manager: **Phil Wiescher**

**Report ID:**  
**A9H0592 - 09 25 19 1708**

**ANALYTICAL SAMPLE RESULTS**

**Demand Parameters**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>ISM-A01081-0.5(After Processing) (A9H0592-02)</b>				<b>Matrix: Soil</b>				
Batch: 9081273								
<b>Total Organic Carbon</b>	<b>30000</b>	---	200	mg/kg	1	08/23/19 17:30	PSEP/SM 5310B MOD	
<b>ISM-A01082-0.5(After Processing) (A9H0592-04)</b>				<b>Matrix: Soil</b>				
Batch: 9081273								
<b>Total Organic Carbon</b>	<b>27000</b>	---	200	mg/kg	1	08/23/19 17:30	PSEP/SM 5310B MOD	
<b>ISM-A01083-0.5(After Processing) (A9H0592-06)</b>				<b>Matrix: Soil</b>				
Batch: 9081273								
<b>Total Organic Carbon</b>	<b>35000</b>	---	200	mg/kg	1	08/23/19 17:30	PSEP/SM 5310B MOD	
<b>ISM-A01079-0.5(After Processing) (A9H0592-08)</b>				<b>Matrix: Soil</b>				
Batch: 9081273								
<b>Total Organic Carbon</b>	<b>28000</b>	---	200	mg/kg	1	08/23/19 17:30	PSEP/SM 5310B MOD	
<b>ISM-A01080-0.5(After Processing) (A9H0592-10)</b>				<b>Matrix: Soil</b>				
Batch: 9081273								
<b>Total Organic Carbon</b>	<b>30000</b>	---	200	mg/kg	1	08/23/19 17:30	PSEP/SM 5310B MOD	
<b>ISM-A01086-0.5(After Processing) (A9H0592-12)</b>				<b>Matrix: Soil</b>				
Batch: 9081273								
<b>Total Organic Carbon</b>	<b>25000</b>	---	200	mg/kg	1	08/23/19 17:30	PSEP/SM 5310B MOD	
<b>ISM-A01085-0.5(After Processing) (A9H0592-14)</b>				<b>Matrix: Soil</b>				
Batch: 9081273								
<b>Total Organic Carbon</b>	<b>25000</b>	---	200	mg/kg	1	08/23/19 17:30	PSEP/SM 5310B MOD	
<b>ISM-A01084-0.5(After Processing) (A9H0592-16)</b>				<b>Matrix: Soil</b>				
Batch: 9081273								
<b>Total Organic Carbon</b>	<b>16000</b>	---	200	mg/kg	1	08/23/19 17:30	PSEP/SM 5310B MOD	

Apex Laboratories

Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: **9003.01.39**  
 Project Manager: **Phil Wiescher**

**Report ID:**  
**A9H0592 - 09 25 19 1708**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Demand Parameters**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 9081273 - PSEP TOC</b>						<b>Sediment</b>						
<b>Blank (9081273-BLK1)</b>			Prepared: 08/22/19 16:52 Analyzed: 08/23/19 17:30									
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>Blank (9081273-BLK2)</b>			Prepared: 08/22/19 16:52 Analyzed: 08/23/19 17:30									
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	A-01
<b>LCS (9081273-BS1)</b>			Prepared: 08/22/19 16:52 Analyzed: 08/23/19 17:30									
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	10000	---		mg/kg	1	10000	---	100	90-110%	---	---	
<b>Duplicate (9081273-DUP1)</b>			Prepared: 08/22/19 16:52 Analyzed: 08/23/19 17:30									
<u>QC Source Sample: ISM-A01081-0.5(After Processing) (A9H0592-02)</u>												
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	<b>27000</b>	---	200	mg/kg	1	---	30000	---	---	12	20%	



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
 Tigard, OR 97223  
 503-718-2323  
 EPA ID: OR01039

**Maul Foster & Alongi, INC.**  
 2001 NW 19th Ave, STE 200  
 Portland, OR 97209

Project: **Port of Ridgefield ISM**  
 Project Number: **9003.01.39**  
 Project Manager: **Phil Wiescher**

**Report ID:**  
**A9H0592 - 09 25 19 1708**

**SAMPLE PREPARATION INFORMATION**

**Demand Parameters**

Prep: PSEP TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 9081273</u>							
A9H0592-02	Soil	PSEP/SM 5310B MOD	08/13/19 08:56	08/22/19 16:52	5g/5g	5g/5g	NA
A9H0592-04	Soil	PSEP/SM 5310B MOD	08/13/19 09:25	08/22/19 16:52	5g/5g	5g/5g	NA
A9H0592-06	Soil	PSEP/SM 5310B MOD	08/13/19 10:00	08/22/19 16:52	5g/5g	5g/5g	NA
A9H0592-08	Soil	PSEP/SM 5310B MOD	08/13/19 10:32	08/22/19 16:52	5g/5g	5g/5g	NA
A9H0592-10	Soil	PSEP/SM 5310B MOD	08/13/19 10:50	08/22/19 16:52	5g/5g	5g/5g	NA
A9H0592-12	Soil	PSEP/SM 5310B MOD	08/13/19 13:51	08/22/19 16:52	5g/5g	5g/5g	NA
A9H0592-14	Soil	PSEP/SM 5310B MOD	08/13/19 14:11	08/22/19 16:52	5g/5g	5g/5g	NA
A9H0592-16	Soil	PSEP/SM 5310B MOD	08/13/19 14:34	08/22/19 16:52	5g/5g	5g/5g	NA

Apex Laboratories

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Philip Nerenberg, Lab Director



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2001 NW 19th Ave, STE 200  
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Project: Port of Ridgefield ISM

Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

Report ID:

**A9H0592 - 09 25 19 1708**

## QUALIFIER DEFINITIONS

### Client Sample and Quality Control (QC) Sample Qualifier Definitions:

#### Apex Laboratories

A-01 Puck mill grind blank

---

Apex Laboratories

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---

Philip Nerenberg, Lab Director



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2001 NW 19th Ave, STE 200  
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Project: **Port of Ridgefield ISM**  
Project Number: **9003.01.39**  
Project Manager: **Phil Wiescher**

**Report ID:**  
**A9H0592 - 09 25 19 1708**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.



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**Report ID:**  
**A9H0592 - 09 25 19 1708**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.





**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
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503-718-2323  
**EPA ID: OR01039**

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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A9H0592 - 09 25 19 1708**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: **9003.01.39**  
Project Manager: **Phil Wiescher**

**Report ID:**  
A9H0592 - 09 25 19 1708

**CHAIN OF CUSTODY**

Lab # **A9H0592** of **1** COC

**APEX LABS**  
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Company: **Maul Foster & Alongi, Inc.** Project Mgr: **Phil Wiescher**  
Address: **101 E 15th Street Vancouver, WA 98668** Phone: **503 507 1036** Email: **pwiescher@maulalongi.com** PO # **9003.01.39**

Sampled by: **B. Hauman, M. Pollock**

Site Location: **OR WA CA**  
AK ID \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Cu, Fe, Pb, Hg, Mn, Ni, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn	TOTAL DISS. TCLP	TCLP Metals (8)	1613b Dioxins TCDFs PCDFs SMP	Archive	
ISM-AOI081-0.5		8/14/19	0556	Soil	1																			
ISM-AOI082-0.5			0705																					
ISM-AOI083-0.5			1006																					
ISM-AOI079-0.5			1032																					
ISM-AOI080-0.5			1050																					
ISM-AOI086-0.5			1351																					
ISM-AOI085-0.5			1411																					
ISM-AOI084-0.5			1434																					

Normal Turn Around Time (TAT) 10 Business Days

TAT Requested (circle): **1 Day** 2 Day 3 Day  
4 DAY 5 DAY Other: None

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Signature: <i>Phil Wiescher</i> Date: <b>8/14/19</b>	RECEIVED BY: Signature: <i>Michael Namborg</i> Date: <b>8-14-19</b>
Printed Name: <b>PHIL WIESCHER</b>	Printed Name: <b>Michael Namborg</b>
Company: <b>MFA</b>	Company: <b>Apex Labs</b>

SPECIAL INSTRUCTIONS:

*Philip Namborg*



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: **9003.01.39**  
Project Manager: **Phil Wiescher**

**Report ID:**  
**A9H0592 - 09 25 19 1708**

**APEX LABS COOLER RECEIPT FORM**

Client: Maul Foster & Alongi Element WO#: A9 H0592

Project/Project #: Port of Ridgefield / 9003.01.39

**Delivery Info:**

Date/time received: 8-14-19 @ 1222 By: MM  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Date/time inspected: 8-14-19 @ 1300 By: MM

Chain of Custody included? Yes  No  Custody seals? Yes  No

Signed/dated by client? Yes  No

Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>5.7</u>	<u>5.1</u>					
Received on ice? (Y/N)	<u>Y</u>	<u>Y</u>					
Temp. blanks? (Y/N)	<u>N</u>	<u>N</u>					
Ice type: (Gel/Real/Other)	<u>Gel</u>	<u>Gel/Real</u>					
Condition:	<u>good</u>	<u>"</u>					

Cooler out of temp? (Y/N) Possible reason why:

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA

Out of temperature samples form initiated? Yes/No/NA

**Samples Inspection:** Date/time inspected: 8/14/19 @ 1245 By: AS

All samples intact? Yes  No  Comments:

Bottle labels/COCs agree? Yes  No  Comments:

COC/container discrepancies form initiated? Yes  No  NA

Containers/volumes received appropriate for analysis? Yes  No  Comments:

Do VOA vials have visible headspace? Yes  No  NA

Comments:

Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA

Comments:

**Additional information:**

Labeled by: AS Witness: AKK Cooler Inspected by: \_\_\_\_\_ See Project Contact Form: Y

*Philip Nerenberg*

September 24, 2019

Mr. Philip Nerenberg  
Apex Laboratories  
6700 SW Sandburg Street  
Portland, Oregon 97223

Re: DXN & PCB Subcontract  
Work Order: 15439  
SDG: A9H0592

Dear Mr. Nerenberg:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 27, 2019. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,



Cynde Larkins  
Project Manager

Enclosures

SUBCONTRACT ORDER

Apex Laboratories

A9H0592

CFA NO# 15437

WAD  
8/22/19

SENDING LABORATORY:

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Cape Fear Analytical, LLC  
3306 Kitty Hawk Rd Suite 120  
Wilmington, NC 28405  
Phone : (910) 795-0421  
Fax: -

**Sample Name:** ISM-A01081-0.5(After Processing)      **Soil**      **Sampled:** 08/13/19 08:56      (A9H0592-02)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	09/13/19 17:00	02/09/20 08:56	
<i>Containers Supplied:</i> (B)4 oz Glass Jar			

**Sample Name:** ISM-A01082-0.5(After Processing)      **Soil**      **Sampled:** 08/13/19 09:25      (A9H0592-04)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	09/13/19 17:00	02/09/20 09:25	
<i>Containers Supplied:</i> (B)4 oz Glass Jar			

**Sample Name:** ISM-A01083-0.5(After Processing)      **Soil**      **Sampled:** 08/13/19 10:00      (A9H0592-06)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	09/13/19 17:00	02/09/20 10:00	
<i>Containers Supplied:</i> (B)4 oz Glass Jar			

**Sample Name:** ISM-A01079-0.5(After Processing)      **Soil**      **Sampled:** 08/13/19 10:32      (A9H0592-08)

Analysis	Due	Expires	Comments
<b>1613B Dioxins and Furans (SUB)</b>	09/13/19 17:00	02/09/20 10:32	
<i>Containers Supplied:</i> (B)4 oz Glass Jar			

Standard

temp. = 3.5°C

*CB*

8/26/19 1320

Fed Ex (Shipper)

Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_

Fed Ex (Shipper)

*Mr. Su* 8/27/19 10:4

Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_



SUBCONTRACT ORDER

CFA WO #15439

Apex Laboratories

A9H0592

Sample Name: ISM-A0I080-0.5(After Processing) Soil Sampled: 08/13/19 10:50 (A9H0592-10)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	09/13/19 17:00	02/09/20 10:50	
<i>Containers Supplied:</i> (B)4 oz Glass Jar			

Sample Name: ISM-A0I086-0.5(After Processing) Soil Sampled: 08/13/19 13:51 (A9H0592-12)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	09/13/19 17:00	02/09/20 13:51	
<i>Containers Supplied:</i> (B)4 oz Glass Jar			

Sample Name: ISM-A0I085-0.5(After Processing) Soil Sampled: 08/13/19 14:11 (A9H0592-14)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	09/13/19 17:00	02/09/20 14:11	
<i>Containers Supplied:</i> (B)4 oz Glass Jar			

Sample Name: ISM-A0I084-0.5(After Processing) Soil Sampled: 08/13/19 14:34 (A9H0592-16)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	09/13/19 17:00	02/09/20 14:34	
<i>Containers Supplied:</i> (B)4 oz Glass Jar			

8/26/19 1320

Fed Ex (Shipper)

Released By	Date	Received By	Date
			8/27/19 10:44
Released By	Date	Received By	Date
Fed Ex (Shipper)			

**SAMPLE RECEIPT CHECKLIST**  
Cape Fear Analytical

Client: <u>Apex</u>	Work Order: <u>15439</u>
Shipping Company: <u>FedEx</u>	Date/Time Received: <u>3/27/19 10:11</u>

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?			<input checked="" type="checkbox"/>
Samples < 2x background?			<input checked="" type="checkbox"/>

\* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?			<input checked="" type="checkbox"/>

Air Witness: \_\_\_\_\_

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other(describe)
2 Custody seal/s present on cooler?			<input checked="" type="checkbox"/>	Seal intact?    Yes    No
3 Chain of Custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Samples requiring cold preservation within 0-6°C?	<input checked="" type="checkbox"/>			Preservation Method: <u>ice bags</u> blue ice    dry ice    none    other (describe)    Temperature Blank present: <input checked="" type="checkbox"/> Yes    No <u>3.500 = 3.5°</u>
5 Aqueous samples found to have visible solids?		<input checked="" type="checkbox"/>		Sample IDs, containers affected:
5 Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample IDs, containers affected and pH observed: If preservative added, Lot#:
7 Samples requiring preservation have no residual chlorine?		<input checked="" type="checkbox"/>		Sample IDs, containers affected: If preservative added, Lot#:
8 Samples received within holding time?	<input checked="" type="checkbox"/>			Sample IDs, tests affected:
9 Sample IDs on COC match IDs on containers?			<input checked="" type="checkbox"/>	Sample IDs, containers affected: <u>Samples labels - M - instead of ISM</u>
10 Date & time of COC match date & time on containers?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			List type and number of containers / Sample IDs, containers affected: <u>received 8 - 4 oz clear</u>
12 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

Checklist performed by: Initials: AP    Date: 3/27/19



# **High Resolution Dioxins and Furans Analysis**

# Case Narrative

**HDOX Case Narrative  
Apex Laboratories (APEX)  
SDG A9H0592  
Work Order 15439**

**Method/Analysis Information**

**Product:** Dioxins/Furans by EPA Method 1613B in Solids  
**Analytical Method:** EPA Method 1613B  
**Extraction Method:** SW846 3540C  
**Analytical Batch Number:** 41691  
**Clean Up Batch Number:** 41690  
**Extraction Batch Number:** 41689

**Sample Analysis**

Samples were received at 3.5°C (15439001, 15439002, 15439003, 15439004, 15439005, 15439006, 15439007, 15439008). The following samples were analyzed using the analytical protocol as established in EPA Method 1613B:

<b>Sample ID</b>	<b>Client ID</b>
12024731	Method Blank (MB)
12024732	Laboratory Control Sample (LCS)
12024733	Laboratory Control Sample Duplicate (LCSD)
15439001	ISM-A0I081-0.5 (After Processing)
15439002	ISM-A0I082-0.5 (After Processing)
15439003	ISM-A0I083-0.5 (After Processing)
15439004	ISM-A0I079-0.5 (After Processing)
15439005	ISM-A0I080-0.5 (After Processing)
15439006	ISM-A0I086-0.5 (After Processing)
15439007	ISM-A0I085-0.5 (After Processing)
15439008	ISM-A0I084-0.5 (After Processing)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 15.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

## **Calibration Information**

### **Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

### **Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

## **Quality Control (QC) Information**

### **Certification Statement**

The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

### **Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

### **Surrogate Recoveries**

All surrogate recoveries were within the established acceptance criteria for this SDG.

### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

### **Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits.

### **LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

### **QC Sample Designation**

A matrix spike and matrix spike duplicate analysis was not required for this SDG.

## **Technical Information**

### **Holding Time Specifications**

CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

### **Analytical Comments**

Diphenyl ether (DPE) interferences were detected in the samples. Where a totals peak could be completely attributed to the DPE, the concentration was removed from the total homolog sum. If the concentration could not be completely attributed to the DPE, or where the DPE co-eluted with a 2378-substituted furan peak, by professional judgment the peak may be left in the report. In both cases, the concentration is flagged with a P and should be considered an estimate.

15439003 (ISM-A0I083-0.5 (After Processing)) and 15439004 (ISM-A0I079-0.5 (After Processing)).

### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

### **Sample Dilutions**

The samples in this SDG did not require dilutions.

### **Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

### **Miscellaneous Information**

#### **Nonconformance (NCR) Documentation**

A NCR was not required for this SDG.

#### **Manual Integrations**

Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction.

Manual integrations were required for data files in this SDG.

#### **System Configuration**

This analysis was performed on the following instrument configuration:

<b>Instrument ID</b>	<b>Instrument</b>	<b>System Configuration</b>	<b>Column ID</b>	<b>Column Description</b>
HRP750_3	Confirmation Analysis	TCDF Confirmation	DB-225	30m x 0.25mm, 0.25um
HRP763_1	Primary Dioxin Analysis	Dioxin Analysis	DB-5MS	60m x 0.25mm, 0.25um

#### **Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

# Sample Data Summary

## Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

### Qualifier Definition Report for

APEX001 Apex Laboratories

Client SDG: A9H0592 CFA Work Order: 15439

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- B The target analyte was detected in the associated blank.
- E Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- J Value is estimated
- K Estimated Maximum Possible Concentration
- P Diphenyl ether interference is present; value is estimated
- Q Quantitative Interference; value is estimated
- U Analyte was analyzed for, but not detected above the specified detection limit.
  
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

**Review/Validation**

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature: 

Name: Heather Patterson

Date: 24 SEP 2019

Title: Group Leader



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439001	<b>Date Collected:</b> 08/13/2019 08:56	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I081-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/24/2019 02:02	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A23SEP19A_2-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.39 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF	B	1.11	pg/g	0.291	0.962

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- B** The target analyte was detected in the associated blank.
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439001	<b>Date Collected:</b> 08/13/2019 08:56	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I081-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 16:25	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.39 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.316	pg/g	0.082	0.962
40321-76-4	1,2,3,7,8-PeCDD	J	4.14	pg/g	0.120	4.81
39227-28-6	1,2,3,4,7,8-HxCDD		5.29	pg/g	0.296	4.81
57653-85-7	1,2,3,6,7,8-HxCDD		23.9	pg/g	0.287	4.81
19408-74-3	1,2,3,7,8,9-HxCDD		13.4	pg/g	0.298	4.81
35822-46-9	1,2,3,4,6,7,8-HpCDD		399	pg/g	0.756	4.81
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2150	pg/g	1.23	9.62
51207-31-9	2,3,7,8-TCDF	B	1.02	pg/g	0.151	0.962
57117-41-6	1,2,3,7,8-PeCDF	J	1.57	pg/g	0.117	4.81
57117-31-4	2,3,4,7,8-PeCDF	J	2.84	pg/g	0.109	4.81
70648-26-9	1,2,3,4,7,8-HxCDF		5.58	pg/g	0.126	4.81
57117-44-9	1,2,3,6,7,8-HxCDF	J	3.43	pg/g	0.137	4.81
60851-34-5	2,3,4,6,7,8-HxCDF		4.85	pg/g	0.136	4.81
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.81	pg/g	0.163	4.81
67562-39-4	1,2,3,4,6,7,8-HpCDF		49.8	pg/g	0.237	4.81
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	2.70	pg/g	0.358	4.81
39001-02-0	1,2,3,4,6,7,8,9-OCDF		63.2	pg/g	0.314	9.62
41903-57-5	Total TeCDD	JK	4.14	pg/g	0.082	0.962
36088-22-9	Total PeCDD	JK	17.6	pg/g	0.120	4.81
34465-46-8	Total HxCDD	J	119	pg/g	0.287	4.81
37871-00-4	Total HpCDD		718	pg/g	0.756	4.81
30402-14-3	Total TeCDF	JK	11.8	pg/g	0.151	0.962
30402-15-4	Total PeCDF	JK	52.0	pg/g	0.0554	4.81
55684-94-1	Total HxCDF	J	105	pg/g	0.126	4.81
38998-75-3	Total HpCDF	J	138	pg/g	0.237	4.81
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		16.5	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		16.5	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		150	192	pg/g	78.0	(25%-164%)
13C-1,2,3,7,8-PeCDD		142	192	pg/g	73.9	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		166	192	pg/g	86.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		145	192	pg/g	75.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		167	192	pg/g	86.6	(23%-140%)
13C-OCDD		321	385	pg/g	83.5	(17%-157%)
13C-2,3,7,8-TCDF		121	192	pg/g	62.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		112	192	pg/g	58.2	(24%-185%)
13C-2,3,4,7,8-PeCDF		115	192	pg/g	59.9	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		135	192	pg/g	70.2	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		119	192	pg/g	61.8	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		124	192	pg/g	64.5	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		138	192	pg/g	71.7	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 2 of 2

<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439001	<b>Date Collected:</b> 08/13/2019 08:56	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I081-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 16:25	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.39 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			129	192	pg/g	66.8 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			140	192	pg/g	72.8 (26%-138%)
37Cl-2,3,7,8-TCDD			17.1	19.2	pg/g	88.6 (35%-197%)

**Comments:**

- B** The target analyte was detected in the associated blank.
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439002	<b>Date Collected:</b> 08/13/2019 09:25	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I082-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/24/2019 03:10	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A23SEP19A_2-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.12 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF	B	2.79	pg/g	0.626	0.988

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- B** The target analyte was detected in the associated blank.
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439002	<b>Date Collected:</b> 08/13/2019 09:25	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I082-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 18:50	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-7		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.12 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.672	pg/g	0.0982	0.988
40321-76-4	1,2,3,7,8-PeCDD	J	2.81	pg/g	0.181	4.94
39227-28-6	1,2,3,4,7,8-HxCDD	J	3.82	pg/g	0.235	4.94
57653-85-7	1,2,3,6,7,8-HxCDD		15.5	pg/g	0.239	4.94
19408-74-3	1,2,3,7,8,9-HxCDD		8.43	pg/g	0.243	4.94
35822-46-9	1,2,3,4,6,7,8-HpCDD		329	pg/g	0.619	4.94
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2230	pg/g	1.29	9.88
51207-31-9	2,3,7,8-TCDF		3.11	pg/g	0.204	0.988
57117-41-6	1,2,3,7,8-PeCDF	J	2.91	pg/g	0.172	4.94
57117-31-4	2,3,4,7,8-PeCDF		7.80	pg/g	0.152	4.94
70648-26-9	1,2,3,4,7,8-HxCDF		8.09	pg/g	0.127	4.94
57117-44-9	1,2,3,6,7,8-HxCDF		5.28	pg/g	0.132	4.94
60851-34-5	2,3,4,6,7,8-HxCDF		7.22	pg/g	0.140	4.94
72918-21-9	1,2,3,7,8,9-HxCDF	J	2.71	pg/g	0.154	4.94
67562-39-4	1,2,3,4,6,7,8-HpCDF		53.5	pg/g	0.202	4.94
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	3.60	pg/g	0.300	4.94
39001-02-0	1,2,3,4,6,7,8,9-OCDF		90.1	pg/g	0.433	9.88
41903-57-5	Total TeCDD	JK	11.5	pg/g	0.0982	0.988
36088-22-9	Total PeCDD	J	23.0	pg/g	0.181	4.94
34465-46-8	Total HxCDD	J	96.0	pg/g	0.235	4.94
37871-00-4	Total HpCDD		649	pg/g	0.619	4.94
30402-14-3	Total TeCDF	JK	55.7	pg/g	0.204	0.988
30402-15-4	Total PeCDF	JK	111	pg/g	0.0958	4.94
55684-94-1	Total HxCDF	J	124	pg/g	0.127	4.94
38998-75-3	Total HpCDF	J	152	pg/g	0.202	4.94
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		15.9	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		15.9	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		165	198	pg/g	83.6	(25%-164%)
13C-1,2,3,7,8-PeCDD		159	198	pg/g	80.4	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		185	198	pg/g	93.8	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		154	198	pg/g	78.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		180	198	pg/g	91.0	(23%-140%)
13C-OCDD		339	395	pg/g	85.8	(17%-157%)
13C-2,3,7,8-TCDF		133	198	pg/g	67.5	(24%-169%)
13C-1,2,3,7,8-PeCDF		128	198	pg/g	64.8	(24%-185%)
13C-2,3,4,7,8-PeCDF		130	198	pg/g	65.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		152	198	pg/g	76.8	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		129	198	pg/g	65.1	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		134	198	pg/g	67.8	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		152	198	pg/g	76.7	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 2 of 2

SDG Number: A9H0592	Client: APEX001	Project: APEX00319
Lab Sample ID: 15439002	Date Collected: 08/13/2019 09:25	Matrix: SOIL
Client Sample: 1613B Soil	Date Received: 08/27/2019 10:11	
Client ID: ISM-A0I082-0.5 (After Processing)		Prep Basis: As Received
Batch ID: 41691	Method: EPA Method 1613B	
Run Date: 09/20/2019 18:50	Analyst: MLS	Instrument: HRP763
Data File: b19sep19a_4-7		Dilution: 1
Prep Batch: 41689	Prep Method: SW846 3540C	
Prep Date: 09-SEP-19	Prep Aliquot: 10.12 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL	
<b>Surrogate/Tracer recovery</b>							
		Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
	13C-1,2,3,4,6,7,8-HpCDF		139	198	pg/g	70.4	(28%-143%)
	13C-1,2,3,4,7,8,9-HpCDF		155	198	pg/g	78.4	(26%-138%)
	37Cl-2,3,7,8-TCDD		18.0	19.8	pg/g	91.3	(35%-197%)

**Comments:**

- B** The target analyte was detected in the associated blank.
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
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Sample Summary**

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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439003	<b>Date Collected:</b> 08/13/2019 10:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I083-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/24/2019 03:32	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A23SEP19A_2-6		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.16 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF	B	2.50	pg/g	0.774	0.984

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- B** The target analyte was detected in the associated blank.
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- P** Diphenyl ether interference is present; value is estimated
- Q** Quantitative Interference; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439003	<b>Date Collected:</b> 08/13/2019 10:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I083-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 19:39	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.16 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.398	pg/g	0.0984	0.984
40321-76-4	1,2,3,7,8-PeCDD	J	3.08	pg/g	0.171	4.92
39227-28-6	1,2,3,4,7,8-HxCDD	J	4.81	pg/g	0.272	4.92
57653-85-7	1,2,3,6,7,8-HxCDD		22.3	pg/g	0.272	4.92
19408-74-3	1,2,3,7,8,9-HxCDD		10.1	pg/g	0.278	4.92
35822-46-9	1,2,3,4,6,7,8-HpCDD		449	pg/g	0.797	4.92
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2860	pg/g	1.28	9.84
51207-31-9	2,3,7,8-TCDF	B	2.60	pg/g	0.315	0.984
57117-41-6	1,2,3,7,8-PeCDF	J	2.92	pg/g	0.234	4.92
57117-31-4	2,3,4,7,8-PeCDF		8.22	pg/g	0.211	4.92
70648-26-9	1,2,3,4,7,8-HxCDF		13.9	pg/g	0.209	4.92
57117-44-9	1,2,3,6,7,8-HxCDF		6.32	pg/g	0.220	4.92
60851-34-5	2,3,4,6,7,8-HxCDF		7.88	pg/g	0.220	4.92
72918-21-9	1,2,3,7,8,9-HxCDF	J	3.57	pg/g	0.219	4.92
67562-39-4	1,2,3,4,6,7,8-HpCDF		70.5	pg/g	0.341	4.92
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	4.35	pg/g	0.469	4.92
39001-02-0	1,2,3,4,6,7,8,9-OCDF		70.5	pg/g	0.348	9.84
41903-57-5	Total TeCDD	JK	7.27	pg/g	0.0984	0.984
36088-22-9	Total PeCDD	JQ	19.3	pg/g	0.171	4.92
34465-46-8	Total HxCDD	J	118	pg/g	0.272	4.92
37871-00-4	Total HpCDD		894	pg/g	0.797	4.92
30402-14-3	Total TeCDF	JKP	36.7	pg/g	0.315	0.984
30402-15-4	Total PeCDF	JKPQ	104	pg/g	0.211	4.92
55684-94-1	Total HxCDF	JK	170	pg/g	0.209	4.92
38998-75-3	Total HpCDF	J	188	pg/g	0.341	4.92
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		19.3	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		19.3	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		160	197	pg/g	81.5	(25%-164%)
13C-1,2,3,7,8-PeCDD		150	197	pg/g	76.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		180	197	pg/g	91.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		147	197	pg/g	74.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		177	197	pg/g	89.7	(23%-140%)
13C-OCDD		342	394	pg/g	87.0	(17%-157%)
13C-2,3,7,8-TCDF		132	197	pg/g	67.0	(24%-169%)
13C-1,2,3,7,8-PeCDF		121	197	pg/g	61.4	(24%-185%)
13C-2,3,4,7,8-PeCDF		124	197	pg/g	62.9	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		142	197	pg/g	72.4	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		125	197	pg/g	63.3	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		130	197	pg/g	66.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		139	197	pg/g	70.9	(29%-147%)

**Hi-Res Dioxins/Furans  
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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439003	<b>Date Collected:</b> 08/13/2019 10:00	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I083-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 19:39	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.16 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			137	197	pg/g	69.4 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			151	197	pg/g	76.6 (26%-138%)
37Cl-2,3,7,8-TCDD			17.7	19.7	pg/g	90.2 (35%-197%)

**Comments:**

- B** The target analyte was detected in the associated blank.
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- P** Diphenyl ether interference is present; value is estimated
- Q** Quantitative Interference; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439004	<b>Date Collected:</b> 08/13/2019 10:32	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I079-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/24/2019 03:55	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A23SEP19A_2-7		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.04 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		2.90	pg/g	0.807	0.996

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- B** The target analyte was detected in the associated blank.
- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- P** Diphenyl ether interference is present; value is estimated
- Q** Quantitative Interference; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439004	<b>Date Collected:</b> 08/13/2019 10:32	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A01079-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 20:27	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.04 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.918	pg/g	0.0962	0.996
40321-76-4	1,2,3,7,8-PeCDD		7.70	pg/g	0.203	4.98
39227-28-6	1,2,3,4,7,8-HxCDD		12.6	pg/g	0.287	4.98
57653-85-7	1,2,3,6,7,8-HxCDD		45.5	pg/g	0.289	4.98
19408-74-3	1,2,3,7,8,9-HxCDD		27.8	pg/g	0.295	4.98
35822-46-9	1,2,3,4,6,7,8-HpCDD		827	pg/g	1.07	4.98
3268-87-9	1,2,3,4,6,7,8,9-OCDD	E	4700	pg/g	1.78	9.96
51207-31-9	2,3,7,8-TCDF	B	2.84	pg/g	0.182	0.996
57117-41-6	1,2,3,7,8-PeCDF	J	3.35	pg/g	0.203	4.98
57117-31-4	2,3,4,7,8-PeCDF		24.8	pg/g	0.198	4.98
70648-26-9	1,2,3,4,7,8-HxCDF		13.6	pg/g	0.277	4.98
57117-44-9	1,2,3,6,7,8-HxCDF		10.8	pg/g	0.295	4.98
60851-34-5	2,3,4,6,7,8-HxCDF		19.0	pg/g	0.309	4.98
72918-21-9	1,2,3,7,8,9-HxCDF		5.08	pg/g	0.325	4.98
67562-39-4	1,2,3,4,6,7,8-HpCDF		111	pg/g	0.367	4.98
55673-89-7	1,2,3,4,7,8,9-HpCDF		6.40	pg/g	0.532	4.98
39001-02-0	1,2,3,4,6,7,8,9-OCDF		181	pg/g	0.540	9.96
41903-57-5	Total TeCDD	JK	15.6	pg/g	0.0962	0.996
36088-22-9	Total PeCDD	JQ	53.0	pg/g	0.203	4.98
34465-46-8	Total HxCDD	J	271	pg/g	0.287	4.98
37871-00-4	Total HpCDD		1570	pg/g	1.07	4.98
30402-14-3	Total TeCDF	JP	112	pg/g	0.182	0.996
30402-15-4	Total PeCDF	JKPQ	465	pg/g	0.0964	4.98
55684-94-1	Total HxCDF	J	319	pg/g	0.277	4.98
38998-75-3	Total HpCDF	J	307	pg/g	0.367	4.98
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		40.8	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		40.8	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		148	199	pg/g	74.1	(25%-164%)
13C-1,2,3,7,8-PeCDD		142	199	pg/g	71.0	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		172	199	pg/g	86.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		139	199	pg/g	69.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		165	199	pg/g	83.0	(23%-140%)
13C-OCDD		319	398	pg/g	80.1	(17%-157%)
13C-2,3,7,8-TCDF		121	199	pg/g	60.8	(24%-169%)
13C-1,2,3,7,8-PeCDF		114	199	pg/g	57.3	(24%-185%)
13C-2,3,4,7,8-PeCDF		116	199	pg/g	58.4	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		136	199	pg/g	68.2	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		117	199	pg/g	58.8	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		123	199	pg/g	61.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		135	199	pg/g	67.8	(29%-147%)

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SDG Number: A9H0592	Client: APEX001	Project: APEX00319
Lab Sample ID: 15439004	Date Collected: 08/13/2019 10:32	Matrix: SOIL
Client Sample: 1613B Soil	Date Received: 08/27/2019 10:11	
Client ID: ISM-A0I079-0.5 (After Processing)		Prep Basis: As Received
Batch ID: 41691	Method: EPA Method 1613B	
Run Date: 09/20/2019 20:27	Analyst: MLS	Instrument: HRP763
Data File: b19sep19a_4-9		Dilution: 1
Prep Batch: 41689	Prep Method: SW846 3540C	
Prep Date: 09-SEP-19	Prep Aliquot: 10.04 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
	13C-1,2,3,4,6,7,8-HpCDF		127	199	pg/g	63.8 (28%-143%)
	13C-1,2,3,4,7,8,9-HpCDF		142	199	pg/g	71.5 (26%-138%)
	37Cl-2,3,7,8-TCDD		17.0	19.9	pg/g	85.4 (35%-197%)

**Comments:**

- B** The target analyte was detected in the associated blank.
- E** Value is estimated - Concentration of the target analyte exceeds the instrument calibration range
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- P** Diphenyl ether interference is present; value is estimated
- Q** Quantitative Interference; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439005	<b>Date Collected:</b> 08/13/2019 10:50	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I080-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/24/2019 04:17	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A23SEP19A_2-8		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.05 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF		3.38	pg/g	0.500	0.995

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- Q** Quantitative Interference; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.

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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439005	<b>Date Collected:</b> 08/13/2019 10:50	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	<b>Prep Basis:</b> As Received
<b>Client ID:</b> ISM-A0I080-0.5 (After Processing)	<b>Method:</b> EPA Method 1613B	<b>Instrument:</b> HRP763
<b>Batch ID:</b> 41691	<b>Analyst:</b> MLS	<b>Dilution:</b> 1
<b>Run Date:</b> 09/20/2019 21:16	<b>Prep Method:</b> SW846 3540C	
<b>Data File:</b> b19sep19a_4-10	<b>Prep Aliquot:</b> 10.05 g	
<b>Prep Batch:</b> 41689		
<b>Prep Date:</b> 09-SEP-19		

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		1.57	pg/g	0.100	0.995
40321-76-4	1,2,3,7,8-PeCDD	J	4.78	pg/g	0.170	4.98
39227-28-6	1,2,3,4,7,8-HxCDD		7.85	pg/g	0.275	4.98
57653-85-7	1,2,3,6,7,8-HxCDD		27.5	pg/g	0.291	4.98
19408-74-3	1,2,3,7,8,9-HxCDD		15.4	pg/g	0.289	4.98
35822-46-9	1,2,3,4,6,7,8-HpCDD		538	pg/g	0.894	4.98
3268-87-9	1,2,3,4,6,7,8,9-OCDD		3690	pg/g	1.63	9.95
51207-31-9	2,3,7,8-TCDF		3.45	pg/g	0.253	0.995
57117-41-6	1,2,3,7,8-PeCDF	J	3.99	pg/g	0.121	4.98
57117-31-4	2,3,4,7,8-PeCDF		16.5	pg/g	0.110	4.98
70648-26-9	1,2,3,4,7,8-HxCDF		37.9	pg/g	0.235	4.98
57117-44-9	1,2,3,6,7,8-HxCDF		11.6	pg/g	0.257	4.98
60851-34-5	2,3,4,6,7,8-HxCDF		13.0	pg/g	0.257	4.98
72918-21-9	1,2,3,7,8,9-HxCDF		8.18	pg/g	0.263	4.98
67562-39-4	1,2,3,4,6,7,8-HpCDF		117	pg/g	0.312	4.98
55673-89-7	1,2,3,4,7,8,9-HpCDF		8.26	pg/g	0.450	4.98
39001-02-0	1,2,3,4,6,7,8,9-OCDF		104	pg/g	0.384	9.95
41903-57-5	Total TeCDD	JK	18.2	pg/g	0.100	0.995
36088-22-9	Total PeCDD	JQ	40.7	pg/g	0.170	4.98
34465-46-8	Total HxCDD	J	175	pg/g	0.275	4.98
37871-00-4	Total HpCDD		1060	pg/g	0.894	4.98
30402-14-3	Total TeCDF	JK	62.3	pg/g	0.253	0.995
30402-15-4	Total PeCDF	JKQ	162	pg/g	0.100	4.98
55684-94-1	Total HxCDF	J	277	pg/g	0.235	4.98
38998-75-3	Total HpCDF	J	309	pg/g	0.312	4.98
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		31.7	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		31.7	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		159	199	pg/g	79.9	(25%-164%)
13C-1,2,3,7,8-PeCDD		148	199	pg/g	74.4	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		173	199	pg/g	87.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		150	199	pg/g	75.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		176	199	pg/g	88.3	(23%-140%)
13C-OCDD		345	398	pg/g	86.6	(17%-157%)
13C-2,3,7,8-TCDF		126	199	pg/g	63.4	(24%-169%)
13C-1,2,3,7,8-PeCDF		120	199	pg/g	60.3	(24%-185%)
13C-2,3,4,7,8-PeCDF		122	199	pg/g	61.5	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		145	199	pg/g	72.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		120	199	pg/g	60.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		130	199	pg/g	65.4	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		143	199	pg/g	72.0	(29%-147%)



**Hi-Res Dioxins/Furans  
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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439005	<b>Date Collected:</b> 08/13/2019 10:50	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I080-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 21:16	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-10		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.05 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			134	199	pg/g	67.1 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			151	199	pg/g	75.9 (26%-138%)
37Cl-2,3,7,8-TCDD			17.4	19.9	pg/g	87.3 (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- Q** Quantitative Interference; value is estimated
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439006	<b>Date Collected:</b> 08/13/2019 13:51	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I086-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/24/2019 04:40	<b>Analyst:</b> MJC	<b>Instrument:</b> HRP750
<b>Data File:</b> A23SEP19A_2-9		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.21 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
51207-31-9	2,3,7,8-TCDF	B	1.14	pg/g	0.578	0.979

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
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**Comments:**

- B** The target analyte was detected in the associated blank.
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439006	<b>Date Collected:</b> 08/13/2019 13:51	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I086-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 22:04	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-11		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.21 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	J	0.255	pg/g	0.0652	0.979
40321-76-4	1,2,3,7,8-PeCDD	J	2.32	pg/g	0.0595	4.90
39227-28-6	1,2,3,4,7,8-HxCDD	J	3.25	pg/g	0.172	4.90
57653-85-7	1,2,3,6,7,8-HxCDD		16.3	pg/g	0.169	4.90
19408-74-3	1,2,3,7,8,9-HxCDD		7.85	pg/g	0.174	4.90
35822-46-9	1,2,3,4,6,7,8-HpCDD		301	pg/g	0.533	4.90
3268-87-9	1,2,3,4,6,7,8,9-OCDD		1780	pg/g	1.10	9.79
51207-31-9	2,3,7,8-TCDF	B	0.999	pg/g	0.153	0.979
57117-41-6	1,2,3,7,8-PeCDF	J	1.20	pg/g	0.126	4.90
57117-31-4	2,3,4,7,8-PeCDF	J	2.40	pg/g	0.111	4.90
70648-26-9	1,2,3,4,7,8-HxCDF	J	3.84	pg/g	0.111	4.90
57117-44-9	1,2,3,6,7,8-HxCDF	J	2.33	pg/g	0.113	4.90
60851-34-5	2,3,4,6,7,8-HxCDF	J	3.15	pg/g	0.123	4.90
72918-21-9	1,2,3,7,8,9-HxCDF	J	1.34	pg/g	0.143	4.90
67562-39-4	1,2,3,4,6,7,8-HpCDF		37.0	pg/g	0.198	4.90
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	2.16	pg/g	0.292	4.90
39001-02-0	1,2,3,4,6,7,8,9-OCDF		58.4	pg/g	0.251	9.79
41903-57-5	Total TeCDD	JK	4.60	pg/g	0.0652	0.979
36088-22-9	Total PeCDD	J	11.8	pg/g	0.0595	4.90
34465-46-8	Total HxCDD	J	77.1	pg/g	0.169	4.90
37871-00-4	Total HpCDD		543	pg/g	0.533	4.90
30402-14-3	Total TeCDF	JK	11.2	pg/g	0.153	0.979
30402-15-4	Total PeCDF	JK	40.2	pg/g	0.0574	4.90
55684-94-1	Total HxCDF	JK	72.3	pg/g	0.111	4.90
38998-75-3	Total HpCDF	J	104	pg/g	0.198	4.90
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		11.2	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		11.2	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		151	196	pg/g	77.1	(25%-164%)
13C-1,2,3,7,8-PeCDD		143	196	pg/g	72.8	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		168	196	pg/g	85.7	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		136	196	pg/g	69.2	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		159	196	pg/g	81.0	(23%-140%)
13C-OCDD		294	392	pg/g	75.2	(17%-157%)
13C-2,3,7,8-TCDF		122	196	pg/g	62.3	(24%-169%)
13C-1,2,3,7,8-PeCDF		114	196	pg/g	58.4	(24%-185%)
13C-2,3,4,7,8-PeCDF		116	196	pg/g	59.3	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		133	196	pg/g	67.7	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		117	196	pg/g	59.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		121	196	pg/g	61.5	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		136	196	pg/g	69.2	(29%-147%)

**Hi-Res Dioxins/Furans  
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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439006	<b>Date Collected:</b> 08/13/2019 13:51	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I086-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 22:04	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-11		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.21 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			122	196	pg/g	62.2 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			137	196	pg/g	69.9 (26%-138%)
37Cl-2,3,7,8-TCDD			17.2	19.6	pg/g	87.8 (35%-197%)

**Comments:**

- B** The target analyte was detected in the associated blank.
- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
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Sample Summary**

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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439007	<b>Date Collected:</b> 08/13/2019 14:11	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I085-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 22:53	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-12		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.05 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.125	pg/g	0.0404	0.995
40321-76-4	1,2,3,7,8-PeCDD	J	1.15	pg/g	0.084	4.98
39227-28-6	1,2,3,4,7,8-HxCDD	J	1.80	pg/g	0.189	4.98
57653-85-7	1,2,3,6,7,8-HxCDD		7.26	pg/g	0.189	4.98
19408-74-3	1,2,3,7,8,9-HxCDD	J	4.17	pg/g	0.193	4.98
35822-46-9	1,2,3,4,6,7,8-HpCDD		140	pg/g	0.358	4.98
3268-87-9	1,2,3,4,6,7,8,9-OCDD		856	pg/g	0.641	9.95
51207-31-9	2,3,7,8-TCDF	BJ	0.659	pg/g	0.143	0.995
57117-41-6	1,2,3,7,8-PeCDF	BJ	0.738	pg/g	0.120	4.98
57117-31-4	2,3,4,7,8-PeCDF	J	1.20	pg/g	0.105	4.98
70648-26-9	1,2,3,4,7,8-HxCDF	J	1.94	pg/g	0.0882	4.98
57117-44-9	1,2,3,6,7,8-HxCDF	J	1.16	pg/g	0.0971	4.98
60851-34-5	2,3,4,6,7,8-HxCDF	J	1.63	pg/g	0.0983	4.98
72918-21-9	1,2,3,7,8,9-HxCDF	BJ	0.653	pg/g	0.122	4.98
67562-39-4	1,2,3,4,6,7,8-HpCDF		18.8	pg/g	0.131	4.98
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	1.17	pg/g	0.191	4.98
39001-02-0	1,2,3,4,6,7,8,9-OCDF		34.6	pg/g	0.402	9.95
41903-57-5	Total TeCDD	JK	2.51	pg/g	0.0404	0.995
36088-22-9	Total PeCDD	JK	6.48	pg/g	0.084	4.98
34465-46-8	Total HxCDD	J	38.9	pg/g	0.189	4.98
37871-00-4	Total HpCDD		252	pg/g	0.358	4.98
30402-14-3	Total TeCDF	JK	7.59	pg/g	0.143	0.995
30402-15-4	Total PeCDF	JK	19.2	pg/g	0.0515	4.98
55684-94-1	Total HxCDF	JK	34.7	pg/g	0.0882	4.98
38998-75-3	Total HpCDF	J	54.6	pg/g	0.131	4.98
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		5.44	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		5.44	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		171	199	pg/g	86.2	(25%-164%)
13C-1,2,3,7,8-PeCDD		164	199	pg/g	82.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		180	199	pg/g	90.3	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		154	199	pg/g	77.3	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		179	199	pg/g	90.2	(23%-140%)
13C-OCDD		337	398	pg/g	84.7	(17%-157%)
13C-2,3,7,8-TCDF		134	199	pg/g	67.5	(24%-169%)
13C-1,2,3,7,8-PeCDF		132	199	pg/g	66.3	(24%-185%)
13C-2,3,4,7,8-PeCDF		130	199	pg/g	65.5	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		149	199	pg/g	75.0	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		128	199	pg/g	64.3	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		135	199	pg/g	67.9	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		149	199	pg/g	75.0	(29%-147%)

**Hi-Res Dioxins/Furans  
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Sample Summary**

<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439007	<b>Date Collected:</b> 08/13/2019 14:11	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I085-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 22:53	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-12		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.05 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			137	199	pg/g	68.9 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			153	199	pg/g	77.1 (26%-138%)
37Cl-2,3,7,8-TCDD			18.9	19.9	pg/g	95.0 (35%-197%)

**Comments:**  
**B** The target analyte was detected in the associated blank.  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration

**Hi-Res Dioxins/Furans  
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<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439008	<b>Date Collected:</b> 08/13/2019 14:34	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I084-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 23:41	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-13		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.13 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.144	pg/g	0.0492	0.987
40321-76-4	1,2,3,7,8-PeCDD	J	0.892	pg/g	0.125	4.94
39227-28-6	1,2,3,4,7,8-HxCDD	J	1.59	pg/g	0.170	4.94
57653-85-7	1,2,3,6,7,8-HxCDD		7.46	pg/g	0.173	4.94
19408-74-3	1,2,3,7,8,9-HxCDD	J	3.84	pg/g	0.176	4.94
35822-46-9	1,2,3,4,6,7,8-HpCDD		157	pg/g	0.391	4.94
3268-87-9	1,2,3,4,6,7,8,9-OCDD		951	pg/g	0.586	9.87
51207-31-9	2,3,7,8-TCDF	BJ	0.640	pg/g	0.137	0.987
57117-41-6	1,2,3,7,8-PeCDF	BJ	0.675	pg/g	0.0727	4.94
57117-31-4	2,3,4,7,8-PeCDF	J	1.15	pg/g	0.0665	4.94
70648-26-9	1,2,3,4,7,8-HxCDF	J	1.86	pg/g	0.0827	4.94
57117-44-9	1,2,3,6,7,8-HxCDF	J	1.27	pg/g	0.0869	4.94
60851-34-5	2,3,4,6,7,8-HxCDF	J	1.78	pg/g	0.0867	4.94
72918-21-9	1,2,3,7,8,9-HxCDF	BJ	0.667	pg/g	0.102	4.94
67562-39-4	1,2,3,4,6,7,8-HpCDF		24.8	pg/g	0.131	4.94
55673-89-7	1,2,3,4,7,8,9-HpCDF	J	1.24	pg/g	0.197	4.94
39001-02-0	1,2,3,4,6,7,8,9-OCDF		34.7	pg/g	0.292	9.87
41903-57-5	Total TeCDD	JK	1.67	pg/g	0.0492	0.987
36088-22-9	Total PeCDD	JK	5.86	pg/g	0.125	4.94
34465-46-8	Total HxCDD	J	39.6	pg/g	0.170	4.94
37871-00-4	Total HpCDD		291	pg/g	0.391	4.94
30402-14-3	Total TeCDF	BJK	5.52	pg/g	0.137	0.987
30402-15-4	Total PeCDF	JK	22.5	pg/g	0.0424	4.94
55684-94-1	Total HxCDF	JK	43.4	pg/g	0.0827	4.94
38998-75-3	Total HpCDF	J	65.1	pg/g	0.131	4.94
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		5.44	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		5.44	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		160	197	pg/g	81.3	(25%-164%)
13C-1,2,3,7,8-PeCDD		152	197	pg/g	76.8	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		170	197	pg/g	86.1	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		149	197	pg/g	75.7	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		171	197	pg/g	86.7	(23%-140%)
13C-OCDD		324	395	pg/g	82.1	(17%-157%)
13C-2,3,7,8-TCDF		127	197	pg/g	64.4	(24%-169%)
13C-1,2,3,7,8-PeCDF		127	197	pg/g	64.2	(24%-185%)
13C-2,3,4,7,8-PeCDF		125	197	pg/g	63.3	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		143	197	pg/g	72.4	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		123	197	pg/g	62.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		130	197	pg/g	66.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		146	197	pg/g	73.9	(29%-147%)



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 2 of 2

<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 15439008	<b>Date Collected:</b> 08/13/2019 14:34	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 08/27/2019 10:11	
<b>Client ID:</b> ISM-A0I084-0.5 (After Processing)		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 23:41	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-13		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10.13 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
	13C-1,2,3,4,6,7,8-HpCDF		135	197	pg/g	68.4 (28%-143%)
	13C-1,2,3,4,7,8,9-HpCDF		148	197	pg/g	74.8 (26%-138%)
	37Cl-2,3,7,8-TCDD		18.0	19.7	pg/g	91.1 (35%-197%)

**Comments:**

- B** The target analyte was detected in the associated blank.  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration

# **Quality Control Summary**

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A9H0592

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12024732	LCS for batch 41689	13C-2,3,7,8-TCDD		75.4	(20%-175%)
		13C-1,2,3,7,8-PeCDD		68.9	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		81.8	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		76.8	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		75.1	(22%-166%)
		13C-OCDD		61.1	(13%-199%)
		13C-2,3,7,8-TCDF		59.1	(22%-152%)
		13C-1,2,3,7,8-PeCDF		57.1	(21%-192%)
		13C-2,3,4,7,8-PeCDF		55.7	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		67.6	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		64.2	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		63.4	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		65.2	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		63.6	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		64.1	(20%-186%)
		37Cl-2,3,7,8-TCDD		84.8	(31%-191%)
12024733	LCSD for batch 41689	13C-2,3,7,8-TCDD		77.8	(20%-175%)
		13C-1,2,3,7,8-PeCDD		69.9	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		79.4	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		79.6	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		78.2	(22%-166%)
		13C-OCDD		66.1	(13%-199%)
		13C-2,3,7,8-TCDF		60.2	(22%-152%)
		13C-1,2,3,7,8-PeCDF		56.9	(21%-192%)
		13C-2,3,4,7,8-PeCDF		55.7	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		70.1	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		62.3	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		64.8	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		66.9	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		63.8	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		66.0	(20%-186%)
		37Cl-2,3,7,8-TCDD		89.6	(31%-191%)
12024731	MB for batch 41689	13C-2,3,7,8-TCDD		78.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		72.4	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		80.3	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		77.5	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		77.3	(23%-140%)
		13C-OCDD		67.4	(17%-157%)
		13C-2,3,7,8-TCDF		61.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		60.3	(24%-185%)
		13C-2,3,4,7,8-PeCDF		57.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		69.3	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		60.8	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		63.7	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		66.6	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		63.2	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		66.1	(26%-138%)
		37Cl-2,3,7,8-TCDD		92.7	(35%-197%)
15439001	ISM-A0I081-0.5 (After Processing)	13C-2,3,7,8-TCDD		78.0	(25%-164%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A9H0592

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
15439001	ISM-A0I081-0.5 (After Processing)	13C-1,2,3,7,8-PeCDD		73.9	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		86.2	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		75.1	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		86.6	(23%-140%)
		13C-OCDD		83.5	(17%-157%)
		13C-2,3,7,8-TCDF		62.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		58.2	(24%-185%)
		13C-2,3,4,7,8-PeCDF		59.9	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		70.2	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		61.8	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		64.5	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		71.7	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		66.8	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		72.8	(26%-138%)
		37Cl-2,3,7,8-TCDD		88.6	(35%-197%)
15439002	ISM-A0I082-0.5 (After Processing)	13C-2,3,7,8-TCDD		83.6	(25%-164%)
		13C-1,2,3,7,8-PeCDD		80.4	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		93.8	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		78.1	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		91.0	(23%-140%)
		13C-OCDD		85.8	(17%-157%)
		13C-2,3,7,8-TCDF		67.5	(24%-169%)
		13C-1,2,3,7,8-PeCDF		64.8	(24%-185%)
		13C-2,3,4,7,8-PeCDF		65.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		76.8	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		65.1	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		67.8	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		76.7	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		70.4	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		78.4	(26%-138%)
37Cl-2,3,7,8-TCDD		91.3	(35%-197%)		
15439003	ISM-A0I083-0.5 (After Processing)	13C-2,3,7,8-TCDD		81.5	(25%-164%)
		13C-1,2,3,7,8-PeCDD		76.2	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		91.6	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		74.5	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		89.7	(23%-140%)
		13C-OCDD		87.0	(17%-157%)
		13C-2,3,7,8-TCDF		67.0	(24%-169%)
		13C-1,2,3,7,8-PeCDF		61.4	(24%-185%)
		13C-2,3,4,7,8-PeCDF		62.9	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		72.4	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		63.3	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		66.0	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		70.9	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		69.4	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		76.6	(26%-138%)
37Cl-2,3,7,8-TCDD		90.2	(35%-197%)		
15439004	ISM-A0I079-0.5 (After Processing)	13C-2,3,7,8-TCDD		74.1	(25%-164%)
		13C-1,2,3,7,8-PeCDD		71.0	(25%-181%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A9H0592

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
15439004	ISM-A0I079-0.5 (After Processing)	13C-1,2,3,4,7,8-HxCDD		86.2	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		69.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		83.0	(23%-140%)
		13C-OCDD		80.1	(17%-157%)
		13C-2,3,7,8-TCDF		60.8	(24%-169%)
		13C-1,2,3,7,8-PeCDF		57.3	(24%-185%)
		13C-2,3,4,7,8-PeCDF		58.4	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		68.2	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		58.8	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		61.7	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		67.8	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		63.8	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		71.5	(26%-138%)
		37Cl-2,3,7,8-TCDD		85.4	(35%-197%)
		15439005	ISM-A0I080-0.5 (After Processing)	13C-2,3,7,8-TCDD	
13C-1,2,3,7,8-PeCDD				74.4	(25%-181%)
13C-1,2,3,4,7,8-HxCDD				87.2	(32%-141%)
13C-1,2,3,6,7,8-HxCDD				75.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD				88.3	(23%-140%)
13C-OCDD				86.6	(17%-157%)
13C-2,3,7,8-TCDF				63.4	(24%-169%)
13C-1,2,3,7,8-PeCDF				60.3	(24%-185%)
13C-2,3,4,7,8-PeCDF				61.5	(21%-178%)
13C-1,2,3,4,7,8-HxCDF				72.6	(26%-152%)
13C-1,2,3,6,7,8-HxCDF				60.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF				65.4	(28%-136%)
13C-1,2,3,7,8,9-HxCDF				72.0	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF				67.1	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF				75.9	(26%-138%)
37Cl-2,3,7,8-TCDD		87.3	(35%-197%)		
15439006	ISM-A0I086-0.5 (After Processing)	13C-2,3,7,8-TCDD		77.1	(25%-164%)
		13C-1,2,3,7,8-PeCDD		72.8	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		85.7	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		69.2	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		81.0	(23%-140%)
		13C-OCDD		75.2	(17%-157%)
		13C-2,3,7,8-TCDF		62.3	(24%-169%)
		13C-1,2,3,7,8-PeCDF		58.4	(24%-185%)
		13C-2,3,4,7,8-PeCDF		59.3	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		67.7	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		59.6	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		61.5	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		69.2	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		62.2	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		69.9	(26%-138%)
37Cl-2,3,7,8-TCDD		87.8	(35%-197%)		
15439007	ISM-A0I085-0.5 (After Processing)	13C-2,3,7,8-TCDD		86.2	(25%-164%)
		13C-1,2,3,7,8-PeCDD		82.2	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		90.3	(32%-141%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A9H0592

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
15439007	ISM-A0I085-0.5 (After Processing)	13C-1,2,3,6,7,8-HxCDD		77.3	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		90.2	(23%-140%)
		13C-OCDD		84.7	(17%-157%)
		13C-2,3,7,8-TCDF		67.5	(24%-169%)
		13C-1,2,3,7,8-PeCDF		66.3	(24%-185%)
		13C-2,3,4,7,8-PeCDF		65.5	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		75.0	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		64.3	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		67.9	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		75.0	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		68.9	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		77.1	(26%-138%)
		37Cl-2,3,7,8-TCDD		95.0	(35%-197%)
		15439008	ISM-A0I084-0.5 (After Processing)	13C-2,3,7,8-TCDD	
13C-1,2,3,7,8-PeCDD				76.8	(25%-181%)
13C-1,2,3,4,7,8-HxCDD				86.1	(32%-141%)
13C-1,2,3,6,7,8-HxCDD				75.7	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD				86.7	(23%-140%)
13C-OCDD				82.1	(17%-157%)
13C-2,3,7,8-TCDF				64.4	(24%-169%)
13C-1,2,3,7,8-PeCDF				64.2	(24%-185%)
13C-2,3,4,7,8-PeCDF				63.3	(21%-178%)
13C-1,2,3,4,7,8-HxCDF				72.4	(26%-152%)
13C-1,2,3,6,7,8-HxCDF				62.2	(26%-123%)
13C-2,3,4,6,7,8-HxCDF				66.0	(28%-136%)
13C-1,2,3,7,8,9-HxCDF				73.9	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF				68.4	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		74.8	(26%-138%)		
37Cl-2,3,7,8-TCDD		91.1	(35%-197%)		

\* Recovery outside Acceptance Limits

# Column to be used to flag recovery values

D Sample Diluted

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

**SDG Number:** A9H0592  
**Client ID:** LCS for batch 41689  
**Lab Sample ID:** 12024732  
**Instrument:** HRP763  
**Analyst:** MLS

**Sample Type:** Laboratory Control Sample  
**Matrix:** SOIL  
**Analysis Date:** 09/20/2019 14:01 **Dilution:** 1  
**Prep Batch ID:** 41689  
**Batch ID:** 41691

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	20.0	15.7	78.7	67-158
40321-76-4	LCS 1,2,3,7,8-PeCDD	100	86.7	86.7	70-142
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	100	85.5	85.5	70-164
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	100	89.9	89.9	76-134
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	100	94.1	94.1	64-162
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	100	93.0	93	70-140
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	200	181	90.6	78-144
51207-31-9	LCS 2,3,7,8-TCDF	20.0	18.2	91.1	75-158
57117-41-6	LCS 1,2,3,7,8-PeCDF	100	92.4	92.4	80-134
57117-31-4	LCS 2,3,4,7,8-PeCDF	100	93.5	93.5	68-160
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	100	95.5	95.5	72-134
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	100	101	101	84-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	100	99.4	99.4	70-156
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	100	99.4	99.4	78-130
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	100	97.5	97.5	82-122
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	100	99.1	99.1	78-138
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	200	172	85.8	63-170



**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A9H0592

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 41689

Matrix: SOIL

Lab Sample ID: 12024733

Instrument: HRP763

Analysis Date: 09/20/2019 14:48

Dilution: 1

Analyst: MLS

Prep Batch ID: 41689

Batch ID: 41691

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	20.0	15.2	76.1	67-158	3.37	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	100	84.8	84.8	70-142	2.20	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	100	89.9	89.9	70-164	5.04	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	100	81.8	81.8	76-134	9.42	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	100	88.7	88.7	64-162	5.93	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	100	90.6	90.6	70-140	2.67	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	200	179	89.6	78-144	1.01	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	20.0	17.8	89.2	75-158	2.03	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	100	89.8	89.8	80-134	2.88	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	100	91.3	91.3	68-160	2.43	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	100	92.5	92.5	72-134	3.14	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	100	98.1	98.1	84-130	2.86	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HxCDF	100	94.8	94.8	70-156	4.75	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	100	94.8	94.8	78-130	4.71	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	100	97.4	97.4	82-122	0.0923	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	100	95.9	95.9	78-138	3.29	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	200	168	83.9	63-170	2.23	0-20

## Method Blank Summary

Page 1 of 1

SDG Number: A9H0592  
 Client ID: MB for batch 41689  
 Lab Sample ID: 12024731  
 Column:

Client: APEX001  
 Instrument ID: HRP763  
 Prep Date: 09-SEP-19

Matrix: SOIL  
 Data File: b19sep19a\_4-3  
 Analyzed: 09/20/19 15:37

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 41689	12024732	b19sep19a_4-1	09/20/19	1401
02 LCSD for batch 41689	12024733	b19sep19a_4-2	09/20/19	1448
03 ISM-A0I081-0.5 (After Processing)	15439001	b19sep19a_4-4	09/20/19	1625
04 ISM-A0I082-0.5 (After Processing)	15439002	b19sep19a_4-7	09/20/19	1850
05 ISM-A0I083-0.5 (After Processing)	15439003	b19sep19a_4-8	09/20/19	1939
06 ISM-A0I079-0.5 (After Processing)	15439004	b19sep19a_4-9	09/20/19	2027
07 ISM-A0I080-0.5 (After Processing)	15439005	b19sep19a_4-10	09/20/19	2116
08 ISM-A0I086-0.5 (After Processing)	15439006	b19sep19a_4-11	09/20/19	2204
09 ISM-A0I085-0.5 (After Processing)	15439007	b19sep19a_4-12	09/20/19	2253
10 ISM-A0I084-0.5 (After Processing)	15439008	b19sep19a_4-13	09/20/19	2341
11 ISM-A0I081-0.5 (After Processing)	15439001	A23SEP19A_2-2	09/24/19	0202
12 ISM-A0I082-0.5 (After Processing)	15439002	A23SEP19A_2-5	09/24/19	0310
13 ISM-A0I083-0.5 (After Processing)	15439003	A23SEP19A_2-6	09/24/19	0332
14 ISM-A0I079-0.5 (After Processing)	15439004	A23SEP19A_2-7	09/24/19	0355
15 ISM-A0I080-0.5 (After Processing)	15439005	A23SEP19A_2-8	09/24/19	0417
16 ISM-A0I086-0.5 (After Processing)	15439006	A23SEP19A_2-9	09/24/19	0440

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 12024731		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 41689		
<b>Client ID:</b> MB for batch 41689		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 15:37	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.048	pg/g	0.048	1.00
40321-76-4	1,2,3,7,8-PeCDD	J	0.088	pg/g	0.0568	5.00
39227-28-6	1,2,3,4,7,8-HxCDD	U	0.0778	pg/g	0.0778	5.00
57653-85-7	1,2,3,6,7,8-HxCDD	U	0.0778	pg/g	0.0778	5.00
19408-74-3	1,2,3,7,8,9-HxCDD	U	0.0796	pg/g	0.0796	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD	J	0.146	pg/g	0.102	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD	JK	0.366	pg/g	0.170	10.0
51207-31-9	2,3,7,8-TCDF	J	0.286	pg/g	0.087	1.00
57117-41-6	1,2,3,7,8-PeCDF	JK	0.114	pg/g	0.061	5.00
57117-31-4	2,3,4,7,8-PeCDF	J	0.078	pg/g	0.055	5.00
70648-26-9	1,2,3,4,7,8-HxCDF	J	0.158	pg/g	0.047	5.00
57117-44-9	1,2,3,6,7,8-HxCDF	JK	0.088	pg/g	0.0488	5.00
60851-34-5	2,3,4,6,7,8-HxCDF	JK	0.090	pg/g	0.052	5.00
72918-21-9	1,2,3,7,8,9-HxCDF	J	0.120	pg/g	0.0736	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF	J	0.220	pg/g	0.0588	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	0.0876	pg/g	0.0876	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF	J	0.196	pg/g	0.190	10.0
41903-57-5	Total TeCDD	J	0.096	pg/g	0.048	1.00
36088-22-9	Total PeCDD	JK	0.150	pg/g	0.0568	5.00
34465-46-8	Total HxCDD	JK	0.102	pg/g	0.0778	5.00
37871-00-4	Total HpCDD	J	0.146	pg/g	0.102	5.00
30402-14-3	Total TeCDF	JK	0.588	pg/g	0.087	1.00
30402-15-4	Total PeCDF	JK	0.520	pg/g	0.0504	5.00
55684-94-1	Total HxCDF	JK	0.572	pg/g	0.047	5.00
38998-75-3	Total HpCDF	J	0.220	pg/g	0.0588	5.00
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.193	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		0.229	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		158	200	pg/g	78.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		145	200	pg/g	72.4	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		161	200	pg/g	80.3	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		155	200	pg/g	77.5	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		155	200	pg/g	77.3	(23%-140%)
13C-OCDD		270	400	pg/g	67.4	(17%-157%)
13C-2,3,7,8-TCDF		123	200	pg/g	61.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		121	200	pg/g	60.3	(24%-185%)
13C-2,3,4,7,8-PeCDF		115	200	pg/g	57.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		139	200	pg/g	69.3	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		122	200	pg/g	60.8	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		127	200	pg/g	63.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		133	200	pg/g	66.6	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 2 of 2

SDG Number: A9H0592	Client: APEX001	Project: APEX00319
Lab Sample ID: 12024731		Matrix: SOIL
Client Sample: QC for batch 41689		
Client ID: MB for batch 41689		Prep Basis: As Received
Batch ID: 41691	Method: EPA Method 1613B	
Run Date: 09/20/2019 15:37	Analyst: MLS	Instrument: HRP763
Data File: b19sep19a_4-3		Dilution: 1
Prep Batch: 41689	Prep Method: SW846 3540C	
Prep Date: 09-SEP-19	Prep Aliquot: 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL	
<b>Surrogate/Tracer recovery</b>							
		Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
	13C-1,2,3,4,6,7,8-HpCDF		126	200	pg/g	63.2	(28%-143%)
	13C-1,2,3,4,7,8,9-HpCDF		132	200	pg/g	66.1	(26%-138%)
	37Cl-2,3,7,8-TCDD		18.5	20.0	pg/g	92.7	(35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 12024732		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 41689		
<b>Client ID:</b> LCS for batch 41689		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 14:01	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-1		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		15.7	pg/g	0.0638	1.00
40321-76-4	1,2,3,7,8-PeCDD		86.7	pg/g	0.100	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		85.5	pg/g	0.166	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		89.9	pg/g	0.161	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		94.1	pg/g	0.167	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		93.0	pg/g	0.292	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		181	pg/g	0.912	10.0
51207-31-9	2,3,7,8-TCDF		18.2	pg/g	0.116	1.00
57117-41-6	1,2,3,7,8-PeCDF		92.4	pg/g	0.137	5.00
57117-31-4	2,3,4,7,8-PeCDF		93.5	pg/g	0.130	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		95.5	pg/g	0.228	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		101	pg/g	0.246	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		99.4	pg/g	0.252	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		99.4	pg/g	0.386	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		97.5	pg/g	0.332	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		99.1	pg/g	0.550	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		172	pg/g	0.680	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		151	200	pg/g	75.4	(20%-175%)
13C-1,2,3,7,8-PeCDD		138	200	pg/g	68.9	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		164	200	pg/g	81.8	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		154	200	pg/g	76.8	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		150	200	pg/g	75.1	(22%-166%)
13C-OCDD		244	400	pg/g	61.1	(13%-199%)
13C-2,3,7,8-TCDF		118	200	pg/g	59.1	(22%-152%)
13C-1,2,3,7,8-PeCDF		114	200	pg/g	57.1	(21%-192%)
13C-2,3,4,7,8-PeCDF		111	200	pg/g	55.7	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		135	200	pg/g	67.6	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		128	200	pg/g	64.2	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		127	200	pg/g	63.4	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		130	200	pg/g	65.2	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		127	200	pg/g	63.6	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		128	200	pg/g	64.1	(20%-186%)
37Cl-2,3,7,8-TCDD		17.0	20.0	pg/g	84.8	(31%-191%)

**Comments:**

**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A9H0592	<b>Client:</b> APEX001	<b>Project:</b> APEX00319
<b>Lab Sample ID:</b> 12024733		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 41689		
<b>Client ID:</b> LCSD for batch 41689		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 41691	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 09/20/2019 14:48	<b>Analyst:</b> MLS	<b>Instrument:</b> HRP763
<b>Data File:</b> b19sep19a_4-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 41689	<b>Prep Method:</b> SW846 3540C	
<b>Prep Date:</b> 09-SEP-19	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		15.2	pg/g	0.0906	1.00
40321-76-4	1,2,3,7,8-PeCDD		84.8	pg/g	0.139	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		89.9	pg/g	0.250	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		81.8	pg/g	0.244	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		88.7	pg/g	0.252	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		90.6	pg/g	0.396	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		179	pg/g	0.922	10.0
51207-31-9	2,3,7,8-TCDF		17.8	pg/g	0.147	1.00
57117-41-6	1,2,3,7,8-PeCDF		89.8	pg/g	0.206	5.00
57117-31-4	2,3,4,7,8-PeCDF		91.3	pg/g	0.179	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		92.5	pg/g	0.298	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		98.1	pg/g	0.318	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		94.8	pg/g	0.332	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		94.8	pg/g	0.472	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		97.4	pg/g	0.424	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		95.9	pg/g	0.698	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		168	pg/g	0.744	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		156	200	pg/g	77.8	(20%-175%)
13C-1,2,3,7,8-PeCDD		140	200	pg/g	69.9	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		159	200	pg/g	79.4	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		159	200	pg/g	79.6	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		156	200	pg/g	78.2	(22%-166%)
13C-OCDD		265	400	pg/g	66.1	(13%-199%)
13C-2,3,7,8-TCDF		120	200	pg/g	60.2	(22%-152%)
13C-1,2,3,7,8-PeCDF		114	200	pg/g	56.9	(21%-192%)
13C-2,3,4,7,8-PeCDF		111	200	pg/g	55.7	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		140	200	pg/g	70.1	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		125	200	pg/g	62.3	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		130	200	pg/g	64.8	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		134	200	pg/g	66.9	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		128	200	pg/g	63.8	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		132	200	pg/g	66.0	(20%-186%)
37Cl-2,3,7,8-TCDD		17.9	20.0	pg/g	89.6	(31%-191%)

**Comments:**

**U** Analyte was analyzed for, but not detected above the specified detection limit.



Monday, April 6, 2020

Phil Wiescher  
Maul Foster & Alongi, INC.  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

RE: A0B0466 - Port of Ridgefield ISM - 9003.01.39

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0B0466, which was received by the laboratory on 2/18/2020 at 11:10:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

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Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1                      2.8 degC

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.  
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

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Philip Nerenberg, Lab Director





**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Maul Foster & Alongi, INC.**

2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A0B0466 - 04 06 20 1002**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ISM-A0I88-0.5---As Received	A0B0466-01	Soil	02/17/20 08:40	02/18/20 11:10
ISM-A0I88-0.5---After Processing	A0B0466-02	Soil	02/17/20 08:40	02/18/20 11:10

Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street

Tigard, OR 97223

503-718-2323

EPA ID: OR01039

**Maul Foster & Alongi, INC.**

2001 NW 19th Ave, STE 200

Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A0B0466 - 04 06 20 1002**

**ANALYTICAL SAMPLE RESULTS**

**Demand Parameters**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>ISM-A0188-0.5---After Processing (A0B0466-02)</b>				<b>Matrix: Soil</b>				
Batch: 0020644								
<b>Total Organic Carbon</b>	<b>25000</b>	---	200	mg/kg	1	02/21/20 17:27	PSEP/SM 5310B MOD	

Apex Laboratories

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Philip Nerenberg, Lab Director



<b>Maul Foster &amp; Alongi, INC.</b> 2001 NW 19th Ave, STE 200 Portland, OR 97209	Project: <b>Port of Ridgefield ISM</b> Project Number: <b>9003.01.39</b> Project Manager: <b>Phil Wiescher</b>	<b>Report ID:</b> <b>A0B0466 - 04 06 20 1002</b>
--	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Demand Parameters**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 0020644 - PSEP-5310B TOC</b>						<b>Soil</b>						
<b>Blank (0020644-BLK1)</b>			Prepared: 02/20/20 15:49 Analyzed: 02/21/20 16:55									
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	
<b>Blank (0020644-BLK2)</b>			Prepared: 02/20/20 15:49 Analyzed: 02/21/20 17:06									
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	ND	---	200	mg/kg	1	---	---	---	---	---	---	A-01, asRec
<b>LCS (0020644-BS1)</b>			Prepared: 02/20/20 15:49 Analyzed: 02/21/20 17:17									
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	9700	---		mg/kg	1	10000	---	97	90-110%	---	---	
<b>Duplicate (0020644-DUP1)</b>			Prepared: 02/20/20 15:49 Analyzed: 02/21/20 17:49									
<u>QC Source Sample: ROW-090E-1---After Processing (A0B0466-04)</u>												
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	<b>23000</b>	---	200	mg/kg	1	---	23000	---	---	0.04	20%	
<b>Duplicate (0020644-DUP2)</b>			Prepared: 02/20/20 15:49 Analyzed: 02/21/20 18:00									
<u>QC Source Sample: ROW-090E-1---After Processing (A0B0466-04)</u>												
<u>PSEP/SM 5310B MOD</u>												
Total Organic Carbon	<b>23000</b>	---	200	mg/kg	1	---	23000	---	---	0.2	20%	



**Apex Laboratories, LLC**

6700 S.W. Sandburg Street

Tigard, OR 97223

503-718-2323

EPA ID: OR01039

**Maul Foster & Alongi, INC.**

2001 NW 19th Ave, STE 200

Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A0B0466 - 04 06 20 1002**

**SAMPLE PREPARATION INFORMATION**

**Demand Parameters**

Prep: PSEP-5310B TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 0020644</u>							
A0B0466-02	Soil	PSEP/SM 5310B MOD	02/17/20 08:40	02/20/20 15:49			NA

Apex Laboratories

Philip Nerenberg, Lab Director

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**A0B0466 - 04 06 20 1002**

## QUALIFIER DEFINITIONS

### Client Sample and Quality Control (QC) Sample Qualifier Definitions:

#### Apex Laboratories

- A-01** Puck mill grind blank. Weight not recorded during sample preparation.
- asRec** Sample reported on an 'as received' basis, no dry weight analysis or correction performed due to matrix.

---

Apex Laboratories

Philip Nerenberg, Lab Director

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Project: **Port of Ridgefield ISM**  
Project Number: **9003.01.39**  
Project Manager: **Phil Wiescher**

**Report ID:**  
**A0B0466 - 04 06 20 1002**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.
- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.



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Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A0B0466 - 04 06 20 1002**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.





**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

**Maul Foster & Alongi, INC.**

2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**

Project Number: **9003.01.39**

Project Manager: **Phil Wiescher**

**Report ID:**

**A0B0466 - 04 06 20 1002**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Philip Nerenberg, Lab Director



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2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: **9003.01.39**  
Project Manager: **Phil Wiescher**

**Report ID:**  
A0B0466 - 04 06 20 1002

**CHAIN OF CUSTODY**

Lab # A0B0466 COC # of 1

**APEX LABS** 6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Company: MFA Project Mgr: Phil Wiescher Project Name: Port of Ridgefield Project #: 9003.01.39

Address: 109 E 13th Street Vancouver, WA Phone: 3606942691 Email: pwiescher@maulfooster.com PO #: 9003.01.39

Sampled by: M. Pollock, E. Clark's

Site Location: OR WA CA  
AK ID \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NVTPH-CID	NVTPH-DX	NVTPH-GX	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vol Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	AL, Sb, As, Ba, Be, Cd, Ca, Cr, Cu, Fe, Pb, Hg, Ni, Mn, Mo, Ni, K, Se, Ag, Na, TL, V, Zn	TOTAL DISS. TCLP	TCLP Metals (8)	1613 B Dioxins	TOC by PHE/SEM	Archive	
ISM-A0188-0.5		2-17-20	0940	SO	1																	X	X		
ROW-0901E-1		2-17-20	0945	SO	1																	X	X		
ROW-0901E-2		2-17-20	0955	SO	1																	X	X		

SPECIAL INSTRUCTIONS:  
Please also email: jmc-muster@maulfooster.com  
mberenberg@maulfooster.com

Normal Turn-Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: NOV metal

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Signature: <u>Meaghan Alford</u> Printed Name: <u>Meaghan Alford</u> Date: <u>2-18-2020</u> Time: <u>1110</u> Company: <u>MFA</u>	RECEIVED BY: Signature: <u>[Signature]</u> Printed Name: <u>Michael Moberg</u> Date: <u>2-18-2020</u> Time: <u>1110</u> Company: <u>Apex Labs</u>
---	--

Apex Laboratories

*Philip Nerenberg*

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Philip Nerenberg, Lab Director



**Maul Foster & Alongi, INC.**  
2001 NW 19th Ave, STE 200  
Portland, OR 97209

Project: **Port of Ridgefield ISM**  
Project Number: **9003.01.39**  
Project Manager: **Phil Wiescher**

**Report ID:**  
A0B0466 - 04 06 20 1002

APEX LABS COOLER RECEIPT FORM

Client: MFA Element WO#: A0 B0466

Project/Project #: Port of Ridgefield / 9003.01.39

**Delivery Info:**

Date/time received: 2-18-2020 @ 1110 By: MM

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Date/time inspected: 2-18-2020 @ 1235 By: MM

Chain of Custody included? Yes  No  Custody seals? Yes  No

Signed/dated by client? Yes  No

Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>2.8</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>Y</u>						
Ice type: (Gel/Real/Other)	<u>Real</u>						
Condition:	<u>good</u>						

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA NA

Out of temperature samples form initiated? Yes/No/NA NA

**Samples Inspection:** Date/time inspected: 2/18/20 @ 1246 By: SO

All samples intact? Yes  No  Comments: \_\_\_\_\_

Bottle labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

COC/container discrepancies form initiated? Yes  No  NA

Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA vials have visible headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA

Comments: \_\_\_\_\_

**Additional information:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Labeled by: (Signature) Witness: \_\_\_\_\_ Cooler Inspected by: (Signature) See Project Contact Form: Y

*Philip Nerenberg*

April 06, 2020

Mr. Philip Nerenberg  
Apex Laboratories  
6700 SW Sandburg Street  
Portland, Oregon 97223

Re: 2018 DXN & PCB IDIQ  
Work Order: 16260  
SDG: A0B0466

Dear Mr. Nerenberg:

Cape Fear Analytical LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 26, 2020. This original data report has been prepared and reviewed in accordance with CFA's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at 910-795-0421.

Sincerely,



Cynde Larkins  
Project Manager

Enclosures

SUBCONTRACT ORDER

Apex Laboratories

A0B0466

TAT  
HAD  
2/20/2020

SENDING LABORATORY:

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Cape Fear Analytical, LLC  
3306 Kitty Hawk Rd Suite 120  
Wilmington, NC 28405  
Phone :(910) 795-0421  
Fax: -

CFA WO#16260

Sample Name: ISM-A0188-0.5---After Processing      Soil      Sampled: 02/17/20 08:40      (A0B0466-02)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) Containers Supplied: (B)4 oz Glass Jar	03/13/20 17:00	08/15/20 08:40	

Sample Name: ROW-090E-1---After Processing      Soil      Sampled: 02/17/20 08:48      (A0B0466-04)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) Containers Supplied: (B)4 oz Glass Jar	03/13/20 17:00	08/15/20 08:48	

Cf 26Feb20

Canceled  
per client  
email 24Feb20

Standard  
TAT

temp. = 20.2°C

BOB 2/20/20 1400

Fed Ex (Shipper)

Released By      Date      Received By      Date

Fed Ex (Shipper)

Cyndee Larkins      20 Feb 20      0938

Released By      Date      Received By      Date





RE: also cancelled- this one we did send

**Subject:** RE: also cancelled- this one we did send  
**From:** Philip Nerenberg <pnerenberg@apex-labs.com>  
**Date:** 2/26/2020, 3:59 PM  
**To:** 'Cynde Larkins' <Cynde.larkins@cfanalytical.com>

Yes footnote however you wish and proceed.

---

**From:** Cynde Larkins [mailto:Cynde.larkins@cfanalytical.com]  
**Sent:** Wednesday, February 26, 2020 12:57 PM  
**To:** Philip Nerenberg  
**Subject:** Re: also cancelled- this one we did send

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

It was received out of temp at 20.2°C - are we still good to analyze?

On 2/26/2020 3:56 PM, Philip Nerenberg wrote:

Cancel sample AOB0466-04, run the other one AOB0466-02. Equis EDD, [REDACTED]

---

**From:** Cynde Larkins [mailto:Cynde.larkins@cfanalytical.com]  
**Sent:** Wednesday, February 26, 2020 10:47 AM  
**To:** Philip Nerenberg  
**Subject:** Re: also cancelled- this one we did send

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Verifying: cancel AoBo388 and AoBo466?

On 2/24/2020 4:15 PM, Philip Nerenberg wrote:

AOB0466-04

If you have already prepared it, charge us for that portion- just let me know.

P

---

**From:** Philip Nerenberg  
**Sent:** Monday, February 24, 2020 1:08 PM  
**To:** 'Cynde Larkins'; Lisa Domenighini  
**Subject:** RE: Rush request--EPA 1613

Sorry for the fire drill, this one has been cancelled.



# **High Resolution Dioxins and Furans Analysis**

# Case Narrative

**HDOX Case Narrative  
Apex Laboratories (APEX)  
SDG A0B0466  
Work Order 16260**

**Method/Analysis Information**

**Product:** Dioxins/Furans by EPA 1613B-3546 in Solids  
Analytical Method: EPA Method 1613B  
Extraction Method: EPA Method 1613B-3546  
Analytical Batch Number: 43398  
Clean Up Batch Number: 43397  
Extraction Batch Number: 43396

**Sample Analysis**

Samples were received at 20.2°C (16260001, 16260002). The following samples were analyzed using the analytical protocol as established in Method 1613B:

<b>Sample ID</b>	<b>Client ID</b>
12026272	Method Blank (MB)
12026273	Laboratory Control Sample (LCS)
12026274	Laboratory Control Sample Duplicate (LCSD)
12026275	16260001(ISM-A0I88-0.5---After Processing) Matrix Spike (MS)
12026276	16260001(ISM-A0I88-0.5---After Processing) Matrix Spike Duplicate (MSD)
16260001	ISM-A0I88-0.5---After Processing

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 15.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

### **Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

### **Quality Control (QC) Information**

#### **Certification Statement**

The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

#### **Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

#### **Surrogate Recoveries**

All surrogate recoveries were within the established acceptance criteria for this SDG.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

#### **Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits.

#### **LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

#### **QC Sample Designation**

Sample 16260001 (ISM-A0I88-0.5---After Processing)- Batch 43398 was selected for analysis as the matrix spike and matrix spike duplicate.

#### **Matrix Spike/Duplicate (MS/MSD) Recovery Statement**

The MS recoveries for this SDG were not within the acceptance limits. The failures confirm in the matrix spike duplicate and are attributed to matrix interference. 12026275 (ISM-A0I88-0.5---After Processing) and 12026276 (ISM-A0I88-0.5---After Processing)- Batch 43398.

#### **MS/MSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the MS and MSD met the acceptance limits.

### **Technical Information**

#### **Holding Time Specifications**

CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

#### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

**Miscellaneous Information****Nonconformance (NCR) Documentation**

The following NCR was generated for this SDG: 647796 12026276 (ISM-A0I88-0.5---After Processing)- Batch 43398.

**Manual Integrations**

Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

**Sample preparation**

No difficulties were encountered during sample preparation.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

# Sample Data Summary

## Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

### Qualifier Definition Report for

APEX001 Apex Laboratories

Client SDG: A0B0466 CFA Work Order: 16260

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- J Value is estimated
- K Estimated Maximum Possible Concentration
- U Analyte was analyzed for, but not detected above the specified detection limit.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

**Review/Validation**

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature: 

Name: Heather Patterson

Date: 06 APR 2020

Title: Group Leader



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 16260001	<b>Date Collected:</b> 02/17/2020 08:40	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 02/26/2020 09:38	<b>%Moisture:</b> 29.1
<b>Client ID:</b> ISM-A0I88-0.5---After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 20:13	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 14.87 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.321	pg/g	0.286	0.949
40321-76-4	1,2,3,7,8-PeCDD	J	1.03	pg/g	0.753	4.74
39227-28-6	1,2,3,4,7,8-HxCDD	JK	2.94	pg/g	1.51	4.74
57653-85-7	1,2,3,6,7,8-HxCDD		8.91	pg/g	1.43	4.74
19408-74-3	1,2,3,7,8,9-HxCDD	JK	4.26	pg/g	1.49	4.74
35822-46-9	1,2,3,4,6,7,8-HpCDD		204	pg/g	5.37	4.74
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2320	pg/g	10.4	9.49
51207-31-9	2,3,7,8-TCDF	JK	0.467	pg/g	0.419	0.949
57117-41-6	1,2,3,7,8-PeCDF	U	0.592	pg/g	0.592	4.74
57117-31-4	2,3,4,7,8-PeCDF	J	3.30	pg/g	0.615	4.74
70648-26-9	1,2,3,4,7,8-HxCDF		18.3	pg/g	1.02	4.74
57117-44-9	1,2,3,6,7,8-HxCDF	J	3.81	pg/g	1.02	4.74
72918-21-9	1,2,3,7,8,9-HxCDF	J	2.89	pg/g	1.60	4.74
60851-34-5	2,3,4,6,7,8-HxCDF		5.11	pg/g	1.04	4.74
67562-39-4	1,2,3,4,6,7,8-HpCDF		59.0	pg/g	1.33	4.74
55673-89-7	1,2,3,4,7,8,9-HpCDF		7.63	pg/g	2.20	4.74
39001-02-0	1,2,3,4,6,7,8,9-OCDF		69.7	pg/g	2.24	9.49
41903-57-5	Total TeCDD	JK	1.43	pg/g	0.286	0.949
36088-22-9	Total PeCDD	JK	6.65	pg/g	0.753	4.74
34465-46-8	Total HxCDD	JK	50.9	pg/g	1.43	4.74
37871-00-4	Total HpCDD		368	pg/g	5.37	4.74
30402-14-3	Total TeCDF	JK	4.70	pg/g	0.419	0.949
30402-15-4	Total PeCDF	JK	31.8	pg/g	0.132	4.74
55684-94-1	Total HxCDF	J	126	pg/g	1.02	4.74
38998-75-3	Total HpCDF	JK	206	pg/g	1.33	4.74
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		10.4	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		10.4	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		98.8	190	pg/g	52.1	(25%-164%)
13C-1,2,3,7,8-PeCDD		89.7	190	pg/g	47.3	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		80.9	190	pg/g	42.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		95.0	190	pg/g	50.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		85.3	190	pg/g	45.0	(23%-140%)
13C-OCDD		185	379	pg/g	48.7	(17%-157%)
13C-2,3,7,8-TCDF		100	190	pg/g	52.9	(24%-169%)
13C-1,2,3,7,8-PeCDF		114	190	pg/g	60.3	(24%-185%)
13C-2,3,4,7,8-PeCDF		97.0	190	pg/g	51.1	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		88.7	190	pg/g	46.8	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		97.7	190	pg/g	51.5	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		99.0	190	pg/g	52.2	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		96.4	190	pg/g	50.8	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 16260001	<b>Date Collected:</b> 02/17/2020 08:40	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 02/26/2020 09:38	<b>%Moisture:</b> 29.1
<b>Client ID:</b> ISM-A0I88-0.5---After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 20:13	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 14.87 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			88.3	190	pg/g	46.5 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			85.9	190	pg/g	45.3 (26%-138%)
37Cl-2,3,7,8-TCDD			18.2	19.0	pg/g	96.0 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

# Quality Control Summary

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A0B0466

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12026273	LCS for batch 43396	13C-2,3,7,8-TCDD		83.7	(20%-175%)
		13C-1,2,3,7,8-PeCDD		72.3	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		57.1	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		73.7	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		58.9	(22%-166%)
		13C-OCDD		56.9	(13%-199%)
		13C-2,3,7,8-TCDF		79.1	(22%-152%)
		13C-1,2,3,7,8-PeCDF		89.8	(21%-192%)
		13C-2,3,4,7,8-PeCDF		74.9	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		62.1	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		70.3	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		71.8	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		65.6	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		59.7	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		58.4	(20%-186%)
		37Cl-2,3,7,8-TCDD		110	(31%-191%)
12026274	LCSD for batch 43396	13C-2,3,7,8-TCDD		81.4	(20%-175%)
		13C-1,2,3,7,8-PeCDD		72.0	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		58.6	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		74.6	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		61.8	(22%-166%)
		13C-OCDD		61.6	(13%-199%)
		13C-2,3,7,8-TCDF		82.6	(22%-152%)
		13C-1,2,3,7,8-PeCDF		92.8	(21%-192%)
		13C-2,3,4,7,8-PeCDF		76.9	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		65.0	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		74.3	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		75.1	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		68.9	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		62.2	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		63.1	(20%-186%)
		37Cl-2,3,7,8-TCDD		96.6	(31%-191%)
12026272	MB for batch 43396	13C-2,3,7,8-TCDD		75.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		69.2	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		58.4	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		72.6	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		62.1	(23%-140%)
		13C-OCDD		62.9	(17%-157%)
		13C-2,3,7,8-TCDF		77.7	(24%-169%)
		13C-1,2,3,7,8-PeCDF		86.2	(24%-185%)
		13C-2,3,4,7,8-PeCDF		73.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		62.4	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		71.9	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		72.2	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		66.7	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		62.8	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		61.1	(26%-138%)
		37Cl-2,3,7,8-TCDD		90.5	(35%-197%)
16260001	ISM-A0I88-0.5---After Processing	13C-2,3,7,8-TCDD		52.1	(25%-164%)

**Hi-Res Dioxins/Furans**  
**Surrogate Recovery Report**

SDG Number: A0B0466

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
16260001	ISM-A0I88-0.5---After Processing	13C-1,2,3,7,8-PeCDD		47.3	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		42.6	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		50.1	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		45.0	(23%-140%)
		13C-OCDD		48.7	(17%-157%)
		13C-2,3,7,8-TCDF		52.9	(24%-169%)
		13C-1,2,3,7,8-PeCDF		60.3	(24%-185%)
		13C-2,3,4,7,8-PeCDF		51.1	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		46.8	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		51.5	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		52.2	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		50.8	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		46.5	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		45.3	(26%-138%)
		37Cl-2,3,7,8-TCDD		96.0	(35%-197%)
12026275	ISM-A0I88-0.5---After Processing(1626000)	13C-2,3,7,8-TCDD		58.3	(25%-164%)
		13C-1,2,3,7,8-PeCDD		48.7	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		42.6	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		48.4	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		45.5	(23%-140%)
		13C-OCDD		49.4	(17%-157%)
		13C-2,3,7,8-TCDF		54.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		63.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		53.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		46.9	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		49.6	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		51.7	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		48.3	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		44.9	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		44.6	(26%-138%)
37Cl-2,3,7,8-TCDD		104	(35%-197%)		
12026276	ISM-A0I88-0.5---After Processing(1626000)	13C-2,3,7,8-TCDD		59.3	(25%-164%)
		13C-1,2,3,7,8-PeCDD		58.0	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		47.3	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		56.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		48.8	(23%-140%)
		13C-OCDD		52.6	(17%-157%)
		13C-2,3,7,8-TCDF		60.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		71.4	(24%-185%)
		13C-2,3,4,7,8-PeCDF		61.3	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		51.2	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		57.1	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		57.4	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		60.7	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		49.1	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		47.2	(26%-138%)
37Cl-2,3,7,8-TCDD		91.9	(35%-197%)		

\* Recovery outside Acceptance Limits

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A0B0466

Matrix Type: SOLID

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Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
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\* Recovery outside Acceptance Limits  
# Column to be used to flag recovery values  
D Sample Diluted

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

**SDG Number:** A0B0466  
**Client ID:** LCS for batch 43396  
**Lab Sample ID:** 12026273  
**Instrument:** HRP750  
**Analyst:** MLL

**Sample Type:** Laboratory Control Sample  
**Matrix:** SOIL  
**Analysis Date:** 03/30/2020 17:45  
**Prep Batch ID:** 43396  
**Batch ID:** 43398

**Dilution:** 1

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	20.0	20.5	103	67-158
40321-76-4	LCS 1,2,3,7,8-PeCDD	100	98.2	98.2	70-142
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	100	99.8	99.8	70-164
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	100	98.5	98.5	76-134
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	100	101	101	64-162
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	100	93.1	93.1	70-140
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	200	175	87.3	78-144
51207-31-9	LCS 2,3,7,8-TCDF	20.0	17.2	85.9	75-158
57117-41-6	LCS 1,2,3,7,8-PeCDF	100	90.0	90	80-134
57117-31-4	LCS 2,3,4,7,8-PeCDF	100	103	103	68-160
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	100	98.7	98.7	72-134
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	100	103	103	84-130
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	100	98.4	98.4	78-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	100	93.6	93.6	70-156
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	100	102	102	82-122
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	100	94.7	94.7	78-138
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	200	200	99.8	63-170



**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A0B0466

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 43396

Matrix: SOIL

Lab Sample ID: 12026274

Instrument: HRP750

Analysis Date: 03/30/2020 18:34

Dilution: 1

Analyst: MLL

Prep Batch ID: 43396

Batch ID: 43398

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	20.0	21.2	106	67-158	3.40	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	100	107	107	70-142	8.94	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	100	99.4	99.4	70-164	0.383	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	100	101	101	76-134	2.53	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	100	101	101	64-162	0.377	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	100	92.9	92.9	70-140	0.209	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	200	178	88.9	78-144	1.82	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	20.0	17.5	87.5	75-158	1.79	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	100	92.1	92.1	80-134	2.32	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	100	105	105	68-160	1.56	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	100	100	100	72-134	1.76	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	100	99.6	99.6	84-130	3.14	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	100	96.2	96.2	78-130	2.31	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HpCDF	100	93.1	93.1	70-156	0.563	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	100	103	103	82-122	1.68	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	100	91.4	91.4	78-138	3.53	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	200	199	99.4	63-170	0.400	0-20

Hi-Res Dioxins/Furans  
Quality Control Summary  
Spike Recovery Report

SDG Number: A0B0466  
Client ID: ISM-A0I88-0.5---After  
Processing(1626000)

Sample Type: Matrix Spike  
Matrix: SOIL  
%Moisture: 29.1

Lab Sample ID: 12026275

Instrument: HRP750

Analysis Date: 03/30/2020 21:02

Dilution: 1

Analyst: MLL

Prep Batch ID:43396

Batch ID: 43398

CAS No.	Parmname	Amount Added		Spike Conc.	Recovery %	Acceptance Limits	
		pg/g					
1746-01-6	MS	2,3,7,8-TCDD	19.1	JK	19.4	99.9	70-130
40321-76-4	MS	1,2,3,7,8-PeCDD	95.3	J	101	105	70-130
39227-28-6	MS	1,2,3,4,7,8-HxCDD	95.3	JK	96.8	98.5	70-130
57653-85-7	MS	1,2,3,6,7,8-HxCDD	95.3		107	103	70-130
19408-74-3	MS	1,2,3,7,8,9-HxCDD	95.3	JK	98.0	98.4	70-130
35822-46-9	MS	1,2,3,4,6,7,8-HpCDD	95.3		309	111	70-130
3268-87-9	MS	1,2,3,4,6,7,8,9-OCDD	191		2670	181 *	70-130
51207-31-9	MS	2,3,7,8-TCDF	19.1	JK	17.6	89.9	70-130
57117-41-6	MS	1,2,3,7,8-PeCDF	95.3	U	87.1	91.4	70-130
57117-31-4	MS	2,3,4,7,8-PeCDF	95.3	J	100	102	70-130
70648-26-9	MS	1,2,3,4,7,8-HxCDF	95.3		112	97.9	70-130
57117-44-9	MS	1,2,3,6,7,8-HxCDF	95.3	J	98.0	98.8	70-130
72918-21-9	MS	1,2,3,7,8,9-HxCDF	95.3	J	105	107	70-130
60851-34-5	MS	2,3,4,6,7,8-HxCDF	95.3		95.5	94.8	70-130
67562-39-4	MS	1,2,3,4,6,7,8-HpCDF	95.3		167	113	70-130
55673-89-7	MS	1,2,3,4,7,8,9-HpCDF	95.3		95.7	92.4	70-130
39001-02-0	MS	1,2,3,4,6,7,8,9-OCDF	191		263	101	70-130

Hi-Res Dioxins/Furans  
Quality Control Summary  
Spike Recovery Report

SDG Number: A0B0466  
Client ID: ISM-A0I88-0.5---After  
Processing(1626000  
Lab Sample ID: 12026276  
Instrument: HRP750  
Analyst: MLL

Sample Type: Matrix Spike Duplicate  
Matrix: SOIL  
%Moisture: 29.1  
Analysis Date: 03/30/2020 21:51 Dilution: 1  
Prep Batch ID:43396  
Batch ID: 43398

CAS No.	Parmname	Amount Added		Spike Conc.	Recovery %	Acceptance Limits	RPD %	Acceptance Limits	
		pg/g							
1746-01-6	MSD	2,3,7,8-TCDD	19.0	JK	20.2	105	70-130	4.14	0-20
40321-76-4	MSD	1,2,3,7,8-PeCDD	95.0	J	98.9	103	70-130	2.01	0-20
39227-28-6	MSD	1,2,3,4,7,8-HxCDD	95.0	JK	100	103	70-130	3.76	0-20
57653-85-7	MSD	1,2,3,6,7,8-HxCDD	95.0		115	111	70-130	7.05	0-20
19408-74-3	MSD	1,2,3,7,8,9-HxCDD	95.0	JK	104	105	70-130	5.58	0-20
35822-46-9	MSD	1,2,3,4,6,7,8-HpCDD	95.0		342	146 *	70-130	10.1	0-20
3268-87-9	MSD	1,2,3,4,6,7,8,9-OCDD	190		3160	441 *	70-130	16.9	0-20
51207-31-9	MSD	2,3,7,8-TCDF	19.0	JK	17.7	90.5	70-130	0.299	0-20
57117-41-6	MSD	1,2,3,7,8-PeCDF	95.0	U	93.9	98.9	70-130	7.49	0-20
57117-31-4	MSD	2,3,4,7,8-PeCDF	95.0	J	104	106	70-130	3.57	0-20
70648-26-9	MSD	1,2,3,4,7,8-HxCDF	95.0		114	100	70-130	1.87	0-20
57117-44-9	MSD	1,2,3,6,7,8-HxCDF	95.0	J	103	104	70-130	4.77	0-20
72918-21-9	MSD	1,2,3,7,8,9-HxCDF	95.0	J	96.2	98.3	70-130	8.46	0-20
60851-34-5	MSD	2,3,4,6,7,8-HxCDF	95.0		102	102	70-130	6.79	0-20
67562-39-4	MSD	1,2,3,4,6,7,8-HpCDF	95.0		173	120	70-130	3.39	0-20
55673-89-7	MSD	1,2,3,4,7,8,9-HpCDF	95.0		104	102	70-130	8.41	0-20
39001-02-0	MSD	1,2,3,4,6,7,8,9-OCDF	190		275	108	70-130	4.35	0-20

## Method Blank Summary

Page 1 of 1

SDG Number: A0B0466  
 Client ID: MB for batch 43396  
 Lab Sample ID: 12026272  
 Column:

Client: APEX001  
 Instrument ID: HRP750  
 Prep Date: 26-MAR-20

Matrix: SOIL  
 Data File: A28MAR20B\_6-3  
 Analyzed: 03/30/20 19:23

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 43396	12026273	A28MAR20B_6-1	03/30/20	1745
02 LCSD for batch 43396	12026274	A28MAR20B_6-2	03/30/20	1834
03 ISM-A0I88-0.5---After Processing	16260001	A28MAR20B_6-4	03/30/20	2013
04 ISM-A0I88-0.5---After Processing(1626000	12026275	A28MAR20B_6-5	03/30/20	2102
05 ISM-A0I88-0.5---After Processing(1626000	12026276	A28MAR20B_6-6	03/30/20	2151

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026272		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396		
<b>Client ID:</b> MB for batch 43396		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 19:23	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.152	pg/g	0.152	1.00
40321-76-4	1,2,3,7,8-PeCDD	U	0.134	pg/g	0.134	5.00
39227-28-6	1,2,3,4,7,8-HxCDD	U	0.210	pg/g	0.210	5.00
57653-85-7	1,2,3,6,7,8-HxCDD	U	0.204	pg/g	0.204	5.00
19408-74-3	1,2,3,7,8,9-HxCDD	U	0.210	pg/g	0.210	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	0.328	pg/g	0.328	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD	J	0.662	pg/g	0.532	10.0
51207-31-9	2,3,7,8-TCDF	U	0.115	pg/g	0.115	1.00
57117-41-6	1,2,3,7,8-PeCDF	JK	0.126	pg/g	0.118	5.00
57117-31-4	2,3,4,7,8-PeCDF	U	0.120	pg/g	0.120	5.00
70648-26-9	1,2,3,4,7,8-HxCDF	U	0.117	pg/g	0.117	5.00
57117-44-9	1,2,3,6,7,8-HxCDF	U	0.119	pg/g	0.119	5.00
72918-21-9	1,2,3,7,8,9-HxCDF	U	0.171	pg/g	0.171	5.00
60851-34-5	2,3,4,6,7,8-HxCDF	U	0.115	pg/g	0.115	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	0.204	pg/g	0.204	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	0.338	pg/g	0.338	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	0.360	pg/g	0.360	10.0
41903-57-5	Total TeCDD	U	0.152	pg/g	0.152	1.00
36088-22-9	Total PeCDD	U	0.134	pg/g	0.134	5.00
34465-46-8	Total HxCDD	U	0.204	pg/g	0.204	5.00
37871-00-4	Total HpCDD	U	0.328	pg/g	0.328	5.00
30402-14-3	Total TeCDF	U	0.115	pg/g	0.115	1.00
30402-15-4	Total PeCDF	JK	0.126	pg/g	0.118	5.00
55684-94-1	Total HxCDF	U	0.115	pg/g	0.115	5.00
38998-75-3	Total HpCDF	U	0.204	pg/g	0.204	5.00
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.00398	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		0.233	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		152	200	pg/g	75.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		138	200	pg/g	69.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		117	200	pg/g	58.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		145	200	pg/g	72.6	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		124	200	pg/g	62.1	(23%-140%)
13C-OCDD		252	400	pg/g	62.9	(17%-157%)
13C-2,3,7,8-TCDF		155	200	pg/g	77.7	(24%-169%)
13C-1,2,3,7,8-PeCDF		172	200	pg/g	86.2	(24%-185%)
13C-2,3,4,7,8-PeCDF		147	200	pg/g	73.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		125	200	pg/g	62.4	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		144	200	pg/g	71.9	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		144	200	pg/g	72.2	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		133	200	pg/g	66.7	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026272		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396		
<b>Client ID:</b> MB for batch 43396		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 19:23	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%      Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			126	200	pg/g	62.8      (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			122	200	pg/g	61.1      (26%-138%)
37Cl-2,3,7,8-TCDD			18.1	20.0	pg/g	90.5      (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026273		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396		
<b>Client ID:</b> LCS for batch 43396		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 17:45	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-1		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		20.5	pg/g	0.244	1.00
40321-76-4	1,2,3,7,8-PeCDD		98.2	pg/g	0.962	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		99.8	pg/g	1.77	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		98.5	pg/g	1.56	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		101	pg/g	1.67	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		93.1	pg/g	2.28	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		175	pg/g	6.08	10.0
51207-31-9	2,3,7,8-TCDF		17.2	pg/g	0.342	1.00
57117-41-6	1,2,3,7,8-PeCDF		90.0	pg/g	1.08	5.00
57117-31-4	2,3,4,7,8-PeCDF		103	pg/g	1.06	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		98.7	pg/g	1.62	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		103	pg/g	1.53	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		98.4	pg/g	2.56	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		93.6	pg/g	1.54	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		102	pg/g	1.73	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		94.7	pg/g	2.86	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		200	pg/g	4.12	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		167	200	pg/g	83.7	(20%-175%)
13C-1,2,3,7,8-PeCDD		145	200	pg/g	72.3	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		114	200	pg/g	57.1	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		147	200	pg/g	73.7	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		118	200	pg/g	58.9	(22%-166%)
13C-OCDD		228	400	pg/g	56.9	(13%-199%)
13C-2,3,7,8-TCDF		158	200	pg/g	79.1	(22%-152%)
13C-1,2,3,7,8-PeCDF		180	200	pg/g	89.8	(21%-192%)
13C-2,3,4,7,8-PeCDF		150	200	pg/g	74.9	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		124	200	pg/g	62.1	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		141	200	pg/g	70.3	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		144	200	pg/g	71.8	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		131	200	pg/g	65.6	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		119	200	pg/g	59.7	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		117	200	pg/g	58.4	(20%-186%)
37Cl-2,3,7,8-TCDD		22.1	20.0	pg/g	110	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026274		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396		
<b>Client ID:</b> LCSD for batch 43396		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 18:34	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		21.2	pg/g	0.256	1.00
40321-76-4	1,2,3,7,8-PeCDD		107	pg/g	0.674	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		99.4	pg/g	2.14	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		101	pg/g	1.87	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		101	pg/g	2.02	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		92.9	pg/g	1.84	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		178	pg/g	6.36	10.0
51207-31-9	2,3,7,8-TCDF		17.5	pg/g	0.392	1.00
57117-41-6	1,2,3,7,8-PeCDF		92.1	pg/g	0.656	5.00
57117-31-4	2,3,4,7,8-PeCDF		105	pg/g	0.712	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		100	pg/g	1.60	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		99.6	pg/g	1.66	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		96.2	pg/g	2.70	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		93.1	pg/g	1.61	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		103	pg/g	2.08	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		91.4	pg/g	2.82	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		199	pg/g	3.52	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		163	200	pg/g	81.4	(20%-175%)
13C-1,2,3,7,8-PeCDD		144	200	pg/g	72.0	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		117	200	pg/g	58.6	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		149	200	pg/g	74.6	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		124	200	pg/g	61.8	(22%-166%)
13C-OCDD		247	400	pg/g	61.6	(13%-199%)
13C-2,3,7,8-TCDF		165	200	pg/g	82.6	(22%-152%)
13C-1,2,3,7,8-PeCDF		186	200	pg/g	92.8	(21%-192%)
13C-2,3,4,7,8-PeCDF		154	200	pg/g	76.9	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		130	200	pg/g	65.0	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		149	200	pg/g	74.3	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		150	200	pg/g	75.1	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		138	200	pg/g	68.9	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		124	200	pg/g	62.2	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		126	200	pg/g	63.1	(20%-186%)
37Cl-2,3,7,8-TCDD		19.3	20.0	pg/g	96.6	(31%-191%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026275	<b>Date Collected:</b> 02/17/2020 08:40	<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396	<b>Date Received:</b> 02/26/2020 09:38	<b>%Moisture:</b> 29.1
<b>Client ID:</b> ISM-A0I88-0.5---After Processing(1)		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 21:02	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 14.8 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		19.4	pg/g	0.318	0.953
40321-76-4	1,2,3,7,8-PeCDD		101	pg/g	1.02	4.77
39227-28-6	1,2,3,4,7,8-HxCDD		96.8	pg/g	2.80	4.77
57653-85-7	1,2,3,6,7,8-HxCDD		107	pg/g	2.67	4.77
19408-74-3	1,2,3,7,8,9-HxCDD		98.0	pg/g	2.76	4.77
35822-46-9	1,2,3,4,6,7,8-HpCDD		309	pg/g	6.10	4.77
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2670	pg/g	8.29	9.53
51207-31-9	2,3,7,8-TCDF		17.6	pg/g	0.585	0.953
57117-41-6	1,2,3,7,8-PeCDF		87.1	pg/g	0.839	4.77
57117-31-4	2,3,4,7,8-PeCDF		100	pg/g	0.938	4.77
70648-26-9	1,2,3,4,7,8-HxCDF		112	pg/g	1.94	4.77
57117-44-9	1,2,3,6,7,8-HxCDF		98.0	pg/g	2.00	4.77
72918-21-9	1,2,3,7,8,9-HxCDF		105	pg/g	2.92	4.77
60851-34-5	2,3,4,6,7,8-HxCDF		95.5	pg/g	1.98	4.77
67562-39-4	1,2,3,4,6,7,8-HpCDF		167	pg/g	2.23	4.77
55673-89-7	1,2,3,4,7,8,9-HpCDF		95.7	pg/g	3.62	4.77
39001-02-0	1,2,3,4,6,7,8,9-OCDF		263	pg/g	3.16	9.53

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		111	191	pg/g	58.3	(25%-164%)
13C-1,2,3,7,8-PeCDD		92.8	191	pg/g	48.7	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		81.2	191	pg/g	42.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		92.2	191	pg/g	48.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		86.8	191	pg/g	45.5	(23%-140%)
13C-OCDD		188	381	pg/g	49.4	(17%-157%)
13C-2,3,7,8-TCDF		104	191	pg/g	54.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		122	191	pg/g	63.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		102	191	pg/g	53.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		89.3	191	pg/g	46.9	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		94.6	191	pg/g	49.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		98.6	191	pg/g	51.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		92.0	191	pg/g	48.3	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF		85.6	191	pg/g	44.9	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		85.0	191	pg/g	44.6	(26%-138%)
37Cl-2,3,7,8-TCDD		19.8	19.1	pg/g	104	(35%-197%)

**Comments:**

**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026276	<b>Date Collected:</b> 02/17/2020 08:40	<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396	<b>Date Received:</b> 02/26/2020 09:38	<b>%Moisture:</b> 29.1
<b>Client ID:</b> ISM-A0I88-0.5---After Processing(1)		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 21:51	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-6		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 14.85 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		20.2	pg/g	0.357	0.950
40321-76-4	1,2,3,7,8-PeCDD		98.9	pg/g	1.21	4.75
39227-28-6	1,2,3,4,7,8-HxCDD		100	pg/g	2.24	4.75
57653-85-7	1,2,3,6,7,8-HxCDD		115	pg/g	2.01	4.75
19408-74-3	1,2,3,7,8,9-HxCDD		104	pg/g	2.15	4.75
35822-46-9	1,2,3,4,6,7,8-HpCDD		342	pg/g	7.62	4.75
3268-87-9	1,2,3,4,6,7,8,9-OCDD		3160	pg/g	9.37	9.50
51207-31-9	2,3,7,8-TCDF		17.7	pg/g	0.570	0.950
57117-41-6	1,2,3,7,8-PeCDF		93.9	pg/g	0.847	4.75
57117-31-4	2,3,4,7,8-PeCDF		104	pg/g	0.849	4.75
70648-26-9	1,2,3,4,7,8-HxCDF		114	pg/g	1.90	4.75
57117-44-9	1,2,3,6,7,8-HxCDF		103	pg/g	1.99	4.75
72918-21-9	1,2,3,7,8,9-HxCDF		96.2	pg/g	2.53	4.75
60851-34-5	2,3,4,6,7,8-HxCDF		102	pg/g	1.99	4.75
67562-39-4	1,2,3,4,6,7,8-HpCDF		173	pg/g	3.02	4.75
55673-89-7	1,2,3,4,7,8,9-HpCDF		104	pg/g	4.14	4.75
39001-02-0	1,2,3,4,6,7,8,9-OCDF		275	pg/g	4.08	9.50

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		113	190	pg/g	59.3	(25%-164%)
13C-1,2,3,7,8-PeCDD		110	190	pg/g	58.0	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		89.9	190	pg/g	47.3	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		108	190	pg/g	56.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		92.7	190	pg/g	48.8	(23%-140%)
13C-OCDD		200	380	pg/g	52.6	(17%-157%)
13C-2,3,7,8-TCDF		115	190	pg/g	60.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		136	190	pg/g	71.4	(24%-185%)
13C-2,3,4,7,8-PeCDF		116	190	pg/g	61.3	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		97.2	190	pg/g	51.2	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		108	190	pg/g	57.1	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		109	190	pg/g	57.4	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		115	190	pg/g	60.7	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF		93.3	190	pg/g	49.1	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		89.7	190	pg/g	47.2	(26%-138%)
37Cl-2,3,7,8-TCDD		17.5	19.0	pg/g	91.9	(35%-197%)

**Comments:**

U Analyte was analyzed for, but not detected above the specified detection limit.

April 22, 2020

Mr. Philip Nerenberg  
Apex Laboratories  
6700 SW Sandburg Street  
Portland, Oregon 97223

Re: 2018 DXN & PCB IDIQ  
Work Order: 16260  
SDG: A0B0466

Dear Mr. Nerenberg:

Cape Fear Analytical, LLC (CFA) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 26, 2020. This revised data report has been prepared and reviewed in accordance with CFA's standard operating procedures. Refer to the fractional case narrative for revision details.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (910) 795-0421.

Sincerely,



Cynde Larkins  
Project Manager

Enclosures

SUBCONTRACT ORDER

Apex Laboratories

A0B0466

TAT  
HAD  
2/20/2020

SENDING LABORATORY:

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Cape Fear Analytical, LLC  
3306 Kitty Hawk Rd Suite 120  
Wilmington, NC 28405  
Phone : (910) 795-0421  
Fax: -

CFA WO#16260

Sample Name: ISM-A0188-0.5---After Processing      Soil      Sampled: 02/17/20 08:40      (A0B0466-02)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) Containers Supplied: (B)4 oz Glass Jar	03/13/20 17:00	08/15/20 08:40	

Sample Name: ROW-090E-1---After Processing      Soil      Sampled: 02/17/20 08:48      (A0B0466-04)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) Containers Supplied: (B)4 oz Glass Jar	03/13/20 17:00	08/15/20 08:48	

Cf 26 Feb 20

Cancelled  
per client  
email 24 Feb 20

Standard  
TAT

temp. = 20.2°C

BOB 2/20/20 1400

Fed Ex (Shipper)

Released By	Date	Received By	Date
Fed Ex (Shipper)		Cynde Larkins	20 Feb 20 0938
Released By	Date	Received By	Date

**SAMPLE RECEIPT CHECKLIST**  
Cape Fear Analytical

Client: <u>APEX</u>	Work Order:
Shipping Company: <u>FedEx</u>	Date/Time Received: <u>26 Feb 20 0938</u>

Suspected Hazard Information	Yes	NA	No
Shipped as DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

DOE Site Sample Packages	Yes	NA	No*
Screened <0.5 mR/hr?			<input checked="" type="checkbox"/>
Samples < 2x background?			<input checked="" type="checkbox"/>

\* Notify RSO of any responses in this column immediately.

Air Sample Receipt Specifics	Yes	NA	No
Air sample in shipment?			<input checked="" type="checkbox"/>

Air Witness: \_\_\_\_\_

#	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken   damaged container   leaking container   other(describe)
2	Custody seal/s present on cooler?			<input checked="" type="checkbox"/>	Seal intact?   Yes   No
3	Chain of Custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Samples requiring cold preservation within 0-6°C?			<input checked="" type="checkbox"/>	Preservation Method:   Temperature Blank present: <input checked="" type="checkbox"/> Yes   No ice bags   blue ice   dry ice   none   other (describe) <u>20.0 + 0.2 = 20.2°C</u>
5	Aqueous samples found to have visible solids?		<input checked="" type="checkbox"/>		Sample IDs, containers affected:
5	Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample IDs, containers affected and pH observed: If preservative added, Lot#:
7	Samples requiring preservation have no residual chlorine?		<input checked="" type="checkbox"/>		Sample IDs, containers affected: If preservative added, Lot#:
8	Samples received within holding time?	<input checked="" type="checkbox"/>			Sample IDs, tests affected:
9	Sample IDs on COC match IDs on containers?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:
10	Date & time of COC match date & time on containers?	<input checked="" type="checkbox"/>			Sample IDs, containers affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			List type and number of containers / Sample IDs, containers affected: <u>2-4oz clear glass soil jars</u>
12	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

Checklist performed by: Initials: CJ Date: 26 Feb 20



RE: also cancelled- this one we did send

**Subject:** RE: also cancelled- this one we did send  
**From:** Philip Nerenberg <pnerenberg@apex-labs.com>  
**Date:** 2/26/2020, 3:59 PM  
**To:** 'Cynde Larkins' <Cynde.larkins@cfanalytical.com>

Yes footnote however you wish and proceed.

---

**From:** Cynde Larkins [mailto:Cynde.larkins@cfanalytical.com]  
**Sent:** Wednesday, February 26, 2020 12:57 PM  
**To:** Philip Nerenberg  
**Subject:** Re: also cancelled- this one we did send

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

It was received out of temp at 20.2°C - are we still good to analyze?

On 2/26/2020 3:56 PM, Philip Nerenberg wrote:

Cancel sample AOB0466-04, run the other one AOB0466-02. Equis EDD, [REDACTED]

---

**From:** Cynde Larkins [mailto:Cynde.larkins@cfanalytical.com]  
**Sent:** Wednesday, February 26, 2020 10:47 AM  
**To:** Philip Nerenberg  
**Subject:** Re: also cancelled- this one we did send

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Verifying: cancel AoBo388 and AoBo466?

On 2/24/2020 4:15 PM, Philip Nerenberg wrote:

AOB0466-04

If you have already prepared it, charge us for that portion- just let me know.

P

---

**From:** Philip Nerenberg  
**Sent:** Monday, February 24, 2020 1:08 PM  
**To:** 'Cynde Larkins'; Lisa Domenighini  
**Subject:** RE: Rush request--EPA 1613

Sorry for the fire drill, this one has been cancelled.



**Subject:** FW: CFA APEX 16260 Results

**From:** Philip Nerenberg <pnerenberg@apex-labs.com>

**Date:** 4/16/2020, 2:51 PM

**To:** Cynde Larkins <Cynde.larkins@cfanalytical.com>

Hi Cynde,

I need another report re-done for an ID error (not yours) please.

ID for 'ISM-A0I88-0.5---After Processing', between the A and the I should be letter O, not zero. Just need new pdf not EDD.

Thanks,

P

-----Original Message-----

From: Cynde Larkins [<mailto:cynde.larkins@cfanalytical.com>]

Sent: Monday, April 06, 2020 9:35 AM

To: Philip Nerenberg

Cc: LabData

Subject: CFA APEX 16260 Results

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Please find attached the mini package and EDD results for your work order A0B0466. The raw data and EDD have been uploaded to the FTP site (log-in information below). Let me know if there is anything else needed.

Website: [https://urldefense.proofpoint.com/v2/url?u=https-3A\\_clientftp.gel.com&d=DwIFAg&c=euGZstcaTD1lvimEN8b7jXrwqOf-v5A\\_CdpgnVfiiMM&r=uvLI-gjBINWyoNFKNcKUOE7MT\\_QqNvpqp5iVrth2sI&m=zQYKnvEhPn6HDzpSA6WLbpI3WtWi7Xf8gfyT1RTjQvc&s=T8pik\\_BjgMBD78xPKkx2C3gmPiM2Y90884IeKAWAx-g&e=](https://urldefense.proofpoint.com/v2/url?u=https-3A_clientftp.gel.com&d=DwIFAg&c=euGZstcaTD1lvimEN8b7jXrwqOf-v5A_CdpgnVfiiMM&r=uvLI-gjBINWyoNFKNcKUOE7MT_QqNvpqp5iVrth2sI&m=zQYKnvEhPn6HDzpSA6WLbpI3WtWi7Xf8gfyT1RTjQvc&s=T8pik_BjgMBD78xPKkx2C3gmPiM2Y90884IeKAWAx-g&e=)

Username: apex

Password: 2nH58a2F

NOTE - username and password are case sensitive.

Thank you,  
Cynde Larkins

— Attachments: —

---

16260.EFW2Lab.zip	5.9 KB
<hr/>	
WO16260 Level 2 - APEX AoBo466.pdf	1.3 MB

# **High Resolution Dioxins and Furans Analysis**

# Case Narrative

**HDOX Case Narrative  
Apex Laboratories (APEX)  
SDG A0B0466  
Work Order 16260**

**Revision 1**

This data package has been revised to change the Client Sample ID, per client request.

**Method/Analysis Information**

**Product:** Dioxins/Furans by EPA 1613B-3546 in Solids  
Analytical Method: EPA Method 1613B  
Extraction Method: EPA Method 1613B-3546  
Analytical Batch Number: 43398  
Clean Up Batch Number: 43397  
Extraction Batch Number: 43396

**Sample Analysis**

Samples were received at 20.2°C (16260001, 16260002). The following samples were analyzed using the analytical protocol as established in Method 1613B:

<b>Sample ID</b>	<b>Client ID</b>
12026272	Method Blank (MB)
12026273	Laboratory Control Sample (LCS)
12026274	Laboratory Control Sample Duplicate (LCSD)
12026275	16260001(ISM-AOI88-0.5---After Processing) Matrix Spike (MS)
12026276	16260001(ISM-AOI88-0.5---After Processing) Matrix Spike Duplicate (MSD)
16260001	ISM-AOI88-0.5---After Processing

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by Cape Fear Analytical LLC (CFA) as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with CF-OA-E-002 REV# 15.

Raw data reports are processed and reviewed by the analyst using the TargetLynx software package.

**Calibration Information**

**Initial Calibration**

All initial calibration requirements have been met for this sample delivery group (SDG).

### **Continuing Calibration Verification (CCV) Requirements**

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

### **Quality Control (QC) Information**

#### **Certification Statement**

The test results presented in this document are certified to meet all requirements of the 2009 TNI Standard.

#### **Method Blank (MB) Statement**

The MB(s) analyzed with this SDG met the acceptance criteria.

#### **Surrogate Recoveries**

All surrogate recoveries were within the established acceptance criteria for this SDG.

#### **Laboratory Control Sample (LCS) Recovery**

The LCS spike recoveries met the acceptance limits.

#### **Laboratory Control Sample Duplicate (LCSD) Recovery**

The LCSD spike recoveries met the acceptance limits.

#### **LCS/LCSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the LCS and LCSD met the acceptance limits.

#### **QC Sample Designation**

Sample 16260001 (ISM-AOI88-0.5---After Processing)- Batch 43398 was selected for analysis as the matrix spike and matrix spike duplicate.

#### **Matrix Spike/Duplicate (MS/MSD) Recovery Statement**

The MS recoveries for this SDG were not within the acceptance limits. The failures confirm in the matrix spike duplicate and are attributed to matrix interference. 12026275 (ISM-AOI88-0.5--After Processing) and 12026276 (ISM-AOI88-0.5---After Processing)- Batch 43398.

#### **MS/MSD Relative Percent Difference (RPD) Statement**

The RPD(s) between the MS and MSD met the acceptance limits.

### **Technical Information**

#### **Holding Time Specifications**

CFA assigns holding times based on the associated methodology, which assigns the date and time from sample collection. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

#### **Preparation/Analytical Method Verification**

All procedures were performed as stated in the SOP.

**Sample Dilutions**

The samples in this SDG did not require dilutions.

**Sample Re-extraction/Re-analysis**

Re-extractions or re-analyses were not required in this SDG.

**Miscellaneous Information****Nonconformance (NCR) Documentation**

The following NCR was generated for this SDG: 647796 12026276 (ISM-AOI88-0.5---After Processing)- Batch 43398.

**Manual Integrations**

Certain standards and QC samples required manual integrations to correctly position the baseline as set in the calibration standard injections. Where manual integrations were performed, copies of all manual integration peak profiles are included in the raw data section of this fraction. Manual integrations were required for data files in this SDG.

**Sample preparation**

No difficulties were encountered during sample preparation.

**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted: Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

# Sample Data Summary



## Cape Fear Analytical, LLC

3306 Kitty Hawk Road Suite 120, Wilmington, NC 28405 - (910) 795-0421 - www.capefearanalytical.com

### Qualifier Definition Report for

APEX001 Apex Laboratories

Client SDG: A0B0466 CFA Work Order: 16260

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a surrogate compound
- J Value is estimated
- K Estimated Maximum Possible Concentration
- U Analyte was analyzed for, but not detected above the specified detection limit.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

**Review/Validation**

Cape Fear Analytical requires all analytical data to be verified by a qualified data reviewer.

The following data validator verified the information presented in this case narrative:

Signature: 

Name: Heather Patterson

Date: 22 APR 2020

Title: Group Leader

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 2

<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 16260001	<b>Date Collected:</b> 02/17/2020 08:40	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 02/26/2020 09:38	<b>%Moisture:</b> 29.1
<b>Client ID:</b> ISM-AOI88-0.5---After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 20:13	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 14.87 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	JK	0.321	pg/g	0.286	0.949
40321-76-4	1,2,3,7,8-PeCDD	J	1.03	pg/g	0.753	4.74
39227-28-6	1,2,3,4,7,8-HxCDD	JK	2.94	pg/g	1.51	4.74
57653-85-7	1,2,3,6,7,8-HxCDD		8.91	pg/g	1.43	4.74
19408-74-3	1,2,3,7,8,9-HxCDD	JK	4.26	pg/g	1.49	4.74
35822-46-9	1,2,3,4,6,7,8-HpCDD		204	pg/g	5.37	4.74
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2320	pg/g	10.4	9.49
51207-31-9	2,3,7,8-TCDF	JK	0.467	pg/g	0.419	0.949
57117-41-6	1,2,3,7,8-PeCDF	U	0.592	pg/g	0.592	4.74
57117-31-4	2,3,4,7,8-PeCDF	J	3.30	pg/g	0.615	4.74
70648-26-9	1,2,3,4,7,8-HxCDF		18.3	pg/g	1.02	4.74
57117-44-9	1,2,3,6,7,8-HxCDF	J	3.81	pg/g	1.02	4.74
72918-21-9	1,2,3,7,8,9-HxCDF	J	2.89	pg/g	1.60	4.74
60851-34-5	2,3,4,6,7,8-HxCDF		5.11	pg/g	1.04	4.74
67562-39-4	1,2,3,4,6,7,8-HpCDF		59.0	pg/g	1.33	4.74
55673-89-7	1,2,3,4,7,8,9-HpCDF		7.63	pg/g	2.20	4.74
39001-02-0	1,2,3,4,6,7,8,9-OCDF		69.7	pg/g	2.24	9.49
41903-57-5	Total TeCDD	JK	1.43	pg/g	0.286	0.949
36088-22-9	Total PeCDD	JK	6.65	pg/g	0.753	4.74
34465-46-8	Total HxCDD	JK	50.9	pg/g	1.43	4.74
37871-00-4	Total HpCDD		368	pg/g	5.37	4.74
30402-14-3	Total TeCDF	JK	4.70	pg/g	0.419	0.949
30402-15-4	Total PeCDF	JK	31.8	pg/g	0.132	4.74
55684-94-1	Total HxCDF	J	126	pg/g	1.02	4.74
38998-75-3	Total HpCDF	JK	206	pg/g	1.33	4.74
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		10.4	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		10.4	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		98.8	190	pg/g	52.1	(25%-164%)
13C-1,2,3,7,8-PeCDD		89.7	190	pg/g	47.3	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		80.9	190	pg/g	42.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		95.0	190	pg/g	50.1	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		85.3	190	pg/g	45.0	(23%-140%)
13C-OCDD		185	379	pg/g	48.7	(17%-157%)
13C-2,3,7,8-TCDF		100	190	pg/g	52.9	(24%-169%)
13C-1,2,3,7,8-PeCDF		114	190	pg/g	60.3	(24%-185%)
13C-2,3,4,7,8-PeCDF		97.0	190	pg/g	51.1	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		88.7	190	pg/g	46.8	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		97.7	190	pg/g	51.5	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		99.0	190	pg/g	52.2	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		96.4	190	pg/g	50.8	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 16260001	<b>Date Collected:</b> 02/17/2020 08:40	<b>Matrix:</b> SOIL
<b>Client Sample:</b> 1613B Soil	<b>Date Received:</b> 02/26/2020 09:38	<b>%Moisture:</b> 29.1
<b>Client ID:</b> ISM-AOI88-0.5---After Processing		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 20:13	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-4		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 14.87 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%</b>
						<b>Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			88.3	190	pg/g	46.5 (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			85.9	190	pg/g	45.3 (26%-138%)
37Cl-2,3,7,8-TCDD			18.2	19.0	pg/g	96.0 (35%-197%)

**Comments:**  
**J** Value is estimated  
**K** Estimated Maximum Possible Concentration  
**U** Analyte was analyzed for, but not detected above the specified detection limit.

# **Quality Control Summary**

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A0B0466

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
12026273	LCS for batch 43396	13C-2,3,7,8-TCDD		83.7	(20%-175%)
		13C-1,2,3,7,8-PeCDD		72.3	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		57.1	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		73.7	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		58.9	(22%-166%)
		13C-OCDD		56.9	(13%-199%)
		13C-2,3,7,8-TCDF		79.1	(22%-152%)
		13C-1,2,3,7,8-PeCDF		89.8	(21%-192%)
		13C-2,3,4,7,8-PeCDF		74.9	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		62.1	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		70.3	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		71.8	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		65.6	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		59.7	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		58.4	(20%-186%)
		37Cl-2,3,7,8-TCDD		110	(31%-191%)
12026274	LCSD for batch 43396	13C-2,3,7,8-TCDD		81.4	(20%-175%)
		13C-1,2,3,7,8-PeCDD		72.0	(21%-227%)
		13C-1,2,3,4,7,8-HxCDD		58.6	(21%-193%)
		13C-1,2,3,6,7,8-HxCDD		74.6	(25%-163%)
		13C-1,2,3,4,6,7,8-HpCDD		61.8	(22%-166%)
		13C-OCDD		61.6	(13%-199%)
		13C-2,3,7,8-TCDF		82.6	(22%-152%)
		13C-1,2,3,7,8-PeCDF		92.8	(21%-192%)
		13C-2,3,4,7,8-PeCDF		76.9	(13%-328%)
		13C-1,2,3,4,7,8-HxCDF		65.0	(19%-202%)
		13C-1,2,3,6,7,8-HxCDF		74.3	(21%-159%)
		13C-2,3,4,6,7,8-HxCDF		75.1	(22%-176%)
		13C-1,2,3,7,8,9-HxCDF		68.9	(17%-205%)
		13C-1,2,3,4,6,7,8-HpCDF		62.2	(21%-158%)
		13C-1,2,3,4,7,8,9-HpCDF		63.1	(20%-186%)
		37Cl-2,3,7,8-TCDD		96.6	(31%-191%)
12026272	MB for batch 43396	13C-2,3,7,8-TCDD		75.8	(25%-164%)
		13C-1,2,3,7,8-PeCDD		69.2	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		58.4	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		72.6	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		62.1	(23%-140%)
		13C-OCDD		62.9	(17%-157%)
		13C-2,3,7,8-TCDF		77.7	(24%-169%)
		13C-1,2,3,7,8-PeCDF		86.2	(24%-185%)
		13C-2,3,4,7,8-PeCDF		73.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		62.4	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		71.9	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		72.2	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		66.7	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		62.8	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		61.1	(26%-138%)
		37Cl-2,3,7,8-TCDD		90.5	(35%-197%)
16260001	ISM-AOI88-0.5---After Processing	13C-2,3,7,8-TCDD		52.1	(25%-164%)

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A0B0466

Matrix Type: SOLID

Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
16260001	ISM-AOI88-0.5---After Processing	13C-1,2,3,7,8-PeCDD		47.3	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		42.6	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		50.1	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		45.0	(23%-140%)
		13C-OCDD		48.7	(17%-157%)
		13C-2,3,7,8-TCDF		52.9	(24%-169%)
		13C-1,2,3,7,8-PeCDF		60.3	(24%-185%)
		13C-2,3,4,7,8-PeCDF		51.1	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		46.8	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		51.5	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		52.2	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		50.8	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		46.5	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		45.3	(26%-138%)
		37Cl-2,3,7,8-TCDD		96.0	(35%-197%)
12026275	ISM-AOI88-0.5---After Processing(1626000)	13C-2,3,7,8-TCDD		58.3	(25%-164%)
		13C-1,2,3,7,8-PeCDD		48.7	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		42.6	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		48.4	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		45.5	(23%-140%)
		13C-OCDD		49.4	(17%-157%)
		13C-2,3,7,8-TCDF		54.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		63.9	(24%-185%)
		13C-2,3,4,7,8-PeCDF		53.6	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		46.9	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		49.6	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		51.7	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		48.3	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		44.9	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		44.6	(26%-138%)
37Cl-2,3,7,8-TCDD		104	(35%-197%)		
12026276	ISM-AOI88-0.5---After Processing(1626000)	13C-2,3,7,8-TCDD		59.3	(25%-164%)
		13C-1,2,3,7,8-PeCDD		58.0	(25%-181%)
		13C-1,2,3,4,7,8-HxCDD		47.3	(32%-141%)
		13C-1,2,3,6,7,8-HxCDD		56.8	(28%-130%)
		13C-1,2,3,4,6,7,8-HpCDD		48.8	(23%-140%)
		13C-OCDD		52.6	(17%-157%)
		13C-2,3,7,8-TCDF		60.6	(24%-169%)
		13C-1,2,3,7,8-PeCDF		71.4	(24%-185%)
		13C-2,3,4,7,8-PeCDF		61.3	(21%-178%)
		13C-1,2,3,4,7,8-HxCDF		51.2	(26%-152%)
		13C-1,2,3,6,7,8-HxCDF		57.1	(26%-123%)
		13C-2,3,4,6,7,8-HxCDF		57.4	(28%-136%)
		13C-1,2,3,7,8,9-HxCDF		60.7	(29%-147%)
		13C-1,2,3,4,6,7,8-HpCDF		49.1	(28%-143%)
		13C-1,2,3,4,7,8,9-HpCDF		47.2	(26%-138%)
37Cl-2,3,7,8-TCDD		91.9	(35%-197%)		

\* Recovery outside Acceptance Limits

**Hi-Res Dioxins/Furans  
Surrogate Recovery Report**

SDG Number: A0B0466

Matrix Type: SOLID

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Sample ID	Client ID	Surrogate	QUAL	Recovery (%)	Acceptance Limits
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\* Recovery outside Acceptance Limits  
# Column to be used to flag recovery values  
D Sample Diluted



**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

**SDG Number:** A0B0466  
**Client ID:** LCS for batch 43396  
**Lab Sample ID:** 12026273  
**Instrument:** HRP750  
**Analyst:** MLL

**Sample Type:** Laboratory Control Sample  
**Matrix:** SOIL  
**Analysis Date:** 03/30/2020 17:45  
**Prep Batch ID:** 43396  
**Batch ID:** 43398  
**Dilution:** 1

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits
1746-01-6	LCS 2,3,7,8-TCDD	20.0	20.5	103	67-158
40321-76-4	LCS 1,2,3,7,8-PeCDD	100	98.2	98.2	70-142
39227-28-6	LCS 1,2,3,4,7,8-HxCDD	100	99.8	99.8	70-164
57653-85-7	LCS 1,2,3,6,7,8-HxCDD	100	98.5	98.5	76-134
19408-74-3	LCS 1,2,3,7,8,9-HxCDD	100	101	101	64-162
35822-46-9	LCS 1,2,3,4,6,7,8-HpCDD	100	93.1	93.1	70-140
3268-87-9	LCS 1,2,3,4,6,7,8,9-OCDD	200	175	87.3	78-144
51207-31-9	LCS 2,3,7,8-TCDF	20.0	17.2	85.9	75-158
57117-41-6	LCS 1,2,3,7,8-PeCDF	100	90.0	90	80-134
57117-31-4	LCS 2,3,4,7,8-PeCDF	100	103	103	68-160
70648-26-9	LCS 1,2,3,4,7,8-HxCDF	100	98.7	98.7	72-134
57117-44-9	LCS 1,2,3,6,7,8-HxCDF	100	103	103	84-130
72918-21-9	LCS 1,2,3,7,8,9-HxCDF	100	98.4	98.4	78-130
60851-34-5	LCS 2,3,4,6,7,8-HxCDF	100	93.6	93.6	70-156
67562-39-4	LCS 1,2,3,4,6,7,8-HpCDF	100	102	102	82-122
55673-89-7	LCS 1,2,3,4,7,8,9-HpCDF	100	94.7	94.7	78-138
39001-02-0	LCS 1,2,3,4,6,7,8,9-OCDF	200	200	99.8	63-170

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

SDG Number: A0B0466

Sample Type: Laboratory Control Sample Duplicate

Client ID: LCSD for batch 43396

Matrix: SOIL

Lab Sample ID: 12026274

Instrument: HRP750

Analysis Date: 03/30/2020 18:34

Dilution: 1

Analyst: MLL

Prep Batch ID: 43396

Batch ID: 43398

CAS No.	Parmname	Amount Added pg/g	Spike Conc. pg/g	Recovery %	Acceptance Limits	RPD %	Acceptance Limits
1746-01-6	LCSD 2,3,7,8-TCDD	20.0	21.2	106	67-158	3.40	0-20
40321-76-4	LCSD 1,2,3,7,8-PeCDD	100	107	107	70-142	8.94	0-20
39227-28-6	LCSD 1,2,3,4,7,8-HxCDD	100	99.4	99.4	70-164	0.383	0-20
57653-85-7	LCSD 1,2,3,6,7,8-HxCDD	100	101	101	76-134	2.53	0-20
19408-74-3	LCSD 1,2,3,7,8,9-HxCDD	100	101	101	64-162	0.377	0-20
35822-46-9	LCSD 1,2,3,4,6,7,8-HpCDD	100	92.9	92.9	70-140	0.209	0-20
3268-87-9	LCSD 1,2,3,4,6,7,8,9-OCDD	200	178	88.9	78-144	1.82	0-20
51207-31-9	LCSD 2,3,7,8-TCDF	20.0	17.5	87.5	75-158	1.79	0-20
57117-41-6	LCSD 1,2,3,7,8-PeCDF	100	92.1	92.1	80-134	2.32	0-20
57117-31-4	LCSD 2,3,4,7,8-PeCDF	100	105	105	68-160	1.56	0-20
70648-26-9	LCSD 1,2,3,4,7,8-HxCDF	100	100	100	72-134	1.76	0-20
57117-44-9	LCSD 1,2,3,6,7,8-HxCDF	100	99.6	99.6	84-130	3.14	0-20
72918-21-9	LCSD 1,2,3,7,8,9-HxCDF	100	96.2	96.2	78-130	2.31	0-20
60851-34-5	LCSD 2,3,4,6,7,8-HpCDF	100	93.1	93.1	70-156	0.563	0-20
67562-39-4	LCSD 1,2,3,4,6,7,8-HpCDF	100	103	103	82-122	1.68	0-20
55673-89-7	LCSD 1,2,3,4,7,8,9-HpCDF	100	91.4	91.4	78-138	3.53	0-20
39001-02-0	LCSD 1,2,3,4,6,7,8,9-OCDF	200	199	99.4	63-170	0.400	0-20

Hi-Res Dioxins/Furans  
Quality Control Summary  
Spike Recovery Report

SDG Number: A0B0466  
Client ID: ISM-AOI88-0.5---After  
Processing(1626000)  
Lab Sample ID: 12026275  
Instrument: HRP750  
Analyst: MLL

Sample Type: Matrix Spike  
Matrix: SOIL  
%Moisture: 29.1  
Analysis Date: 03/30/2020 21:02  
Prep Batch ID:43396  
Batch ID: 43398  
Dilution: 1

CAS No.	Parmname	Amount Added		Spike	Recovery %	Acceptance Limits	
		pg/g		Conc. pg/g			
1746-01-6	MS	2,3,7,8-TCDD	19.1	JK	19.4	99.9	70-130
40321-76-4	MS	1,2,3,7,8-PeCDD	95.3	J	101	105	70-130
39227-28-6	MS	1,2,3,4,7,8-HxCDD	95.3	JK	96.8	98.5	70-130
57653-85-7	MS	1,2,3,6,7,8-HxCDD	95.3		107	103	70-130
19408-74-3	MS	1,2,3,7,8,9-HxCDD	95.3	JK	98.0	98.4	70-130
35822-46-9	MS	1,2,3,4,6,7,8-HpCDD	95.3		309	111	70-130
3268-87-9	MS	1,2,3,4,6,7,8,9-OCDD	191		2670	181 *	70-130
51207-31-9	MS	2,3,7,8-TCDF	19.1	JK	17.6	89.9	70-130
57117-41-6	MS	1,2,3,7,8-PeCDF	95.3	U	87.1	91.4	70-130
57117-31-4	MS	2,3,4,7,8-PeCDF	95.3	J	100	102	70-130
70648-26-9	MS	1,2,3,4,7,8-HxCDF	95.3		112	97.9	70-130
57117-44-9	MS	1,2,3,6,7,8-HxCDF	95.3	J	98.0	98.8	70-130
72918-21-9	MS	1,2,3,7,8,9-HxCDF	95.3	J	105	107	70-130
60851-34-5	MS	2,3,4,6,7,8-HxCDF	95.3		95.5	94.8	70-130
67562-39-4	MS	1,2,3,4,6,7,8-HpCDF	95.3		167	113	70-130
55673-89-7	MS	1,2,3,4,7,8,9-HpCDF	95.3		95.7	92.4	70-130
39001-02-0	MS	1,2,3,4,6,7,8,9-OCDF	191		263	101	70-130

**Hi-Res Dioxins/Furans**  
**Quality Control Summary**  
**Spike Recovery Report**

**SDG Number:** A0B0466  
**Client ID:** ISM-AOI88-0.5---After  
 Processing(1626000)  
**Lab Sample ID:** 12026276  
**Instrument:** HRP750  
**Analyst:** MLL

**Sample Type:** Matrix Spike Duplicate  
**Matrix:** SOIL  
**%Moisture:** 29.1  
**Analysis Date:** 03/30/2020 21:51  
**Dilution:** 1  
**Prep Batch ID:** 43396  
**Batch ID:** 43398

CAS No.	Parmname	Amount Added		Spike Conc.		Recovery	Acceptance	RPD	Acceptance
		pg/g		pg/g		%	Limits	%	Limits
1746-01-6	MSD	2,3,7,8-TCDD	19.0	JK	20.2	105	70-130	4.14	0-20
40321-76-4	MSD	1,2,3,7,8-PeCDD	95.0	J	98.9	103	70-130	2.01	0-20
39227-28-6	MSD	1,2,3,4,7,8-HxCDD	95.0	JK	100	103	70-130	3.76	0-20
57653-85-7	MSD	1,2,3,6,7,8-HxCDD	95.0		115	111	70-130	7.05	0-20
19408-74-3	MSD	1,2,3,7,8,9-HxCDD	95.0	JK	104	105	70-130	5.58	0-20
35822-46-9	MSD	1,2,3,4,6,7,8-HpCDD	95.0		342	146 *	70-130	10.1	0-20
3268-87-9	MSD	1,2,3,4,6,7,8,9-OCDD	190		3160	441 *	70-130	16.9	0-20
51207-31-9	MSD	2,3,7,8-TCDF	19.0	JK	17.7	90.5	70-130	0.299	0-20
57117-41-6	MSD	1,2,3,7,8-PeCDF	95.0	U	93.9	98.9	70-130	7.49	0-20
57117-31-4	MSD	2,3,4,7,8-PeCDF	95.0	J	104	106	70-130	3.57	0-20
70648-26-9	MSD	1,2,3,4,7,8-HxCDF	95.0		114	100	70-130	1.87	0-20
57117-44-9	MSD	1,2,3,6,7,8-HxCDF	95.0	J	103	104	70-130	4.77	0-20
72918-21-9	MSD	1,2,3,7,8,9-HxCDF	95.0	J	96.2	98.3	70-130	8.46	0-20
60851-34-5	MSD	2,3,4,6,7,8-HxCDF	95.0		102	102	70-130	6.79	0-20
67562-39-4	MSD	1,2,3,4,6,7,8-HpCDF	95.0		173	120	70-130	3.39	0-20
55673-89-7	MSD	1,2,3,4,7,8,9-HpCDF	95.0		104	102	70-130	8.41	0-20
39001-02-0	MSD	1,2,3,4,6,7,8,9-OCDF	190		275	108	70-130	4.35	0-20

## Method Blank Summary

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SDG Number: A0B0466  
Client ID: MB for batch 43396  
Lab Sample ID: 12026272  
Column:

Client: APEX001  
Instrument ID: HRP750  
Prep Date: 26-MAR-20

Matrix: SOIL  
Data File: A28MAR20B\_6-3  
Analyzed: 03/30/20 19:23

This method blank applies to the following samples and quality control samples:

Client Sample ID	Lab Sample ID	File ID	Date Analyzed	Time Analyzed
01 LCS for batch 43396	12026273	A28MAR20B_6-1	03/30/20	1745
02 LCSD for batch 43396	12026274	A28MAR20B_6-2	03/30/20	1834
03 ISM-AOI88-0.5---After Processing	16260001	A28MAR20B_6-4	03/30/20	2013
04 ISM-AOI88-0.5---After Processing(1626000	12026275	A28MAR20B_6-5	03/30/20	2102
05 ISM-AOI88-0.5---After Processing(1626000	12026276	A28MAR20B_6-6	03/30/20	2151

**Hi-Res Dioxins/Furans  
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Sample Summary**

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<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026272		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396		
<b>Client ID:</b> MB for batch 43396		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 19:23	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD	U	0.152	pg/g	0.152	1.00
40321-76-4	1,2,3,7,8-PeCDD	U	0.134	pg/g	0.134	5.00
39227-28-6	1,2,3,4,7,8-HxCDD	U	0.210	pg/g	0.210	5.00
57653-85-7	1,2,3,6,7,8-HxCDD	U	0.204	pg/g	0.204	5.00
19408-74-3	1,2,3,7,8,9-HxCDD	U	0.210	pg/g	0.210	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD	U	0.328	pg/g	0.328	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD	J	0.662	pg/g	0.532	10.0
51207-31-9	2,3,7,8-TCDF	U	0.115	pg/g	0.115	1.00
57117-41-6	1,2,3,7,8-PeCDF	JK	0.126	pg/g	0.118	5.00
57117-31-4	2,3,4,7,8-PeCDF	U	0.120	pg/g	0.120	5.00
70648-26-9	1,2,3,4,7,8-HxCDF	U	0.117	pg/g	0.117	5.00
57117-44-9	1,2,3,6,7,8-HxCDF	U	0.119	pg/g	0.119	5.00
72918-21-9	1,2,3,7,8,9-HxCDF	U	0.171	pg/g	0.171	5.00
60851-34-5	2,3,4,6,7,8-HxCDF	U	0.115	pg/g	0.115	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF	U	0.204	pg/g	0.204	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF	U	0.338	pg/g	0.338	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF	U	0.360	pg/g	0.360	10.0
41903-57-5	Total TeCDD	U	0.152	pg/g	0.152	1.00
36088-22-9	Total PeCDD	U	0.134	pg/g	0.134	5.00
34465-46-8	Total HxCDD	U	0.204	pg/g	0.204	5.00
37871-00-4	Total HpCDD	U	0.328	pg/g	0.328	5.00
30402-14-3	Total TeCDF	U	0.115	pg/g	0.115	1.00
30402-15-4	Total PeCDF	JK	0.126	pg/g	0.118	5.00
55684-94-1	Total HxCDF	U	0.115	pg/g	0.115	5.00
38998-75-3	Total HpCDF	U	0.204	pg/g	0.204	5.00
3333-30-2	TEQ WHO2005 ND=0 with EMPCs		0.00398	pg/g		
3333-30-3	TEQ WHO2005 ND=0.5 with EMPCs		0.233	pg/g		

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		152	200	pg/g	75.8	(25%-164%)
13C-1,2,3,7,8-PeCDD		138	200	pg/g	69.2	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		117	200	pg/g	58.4	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		145	200	pg/g	72.6	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		124	200	pg/g	62.1	(23%-140%)
13C-OCDD		252	400	pg/g	62.9	(17%-157%)
13C-2,3,7,8-TCDF		155	200	pg/g	77.7	(24%-169%)
13C-1,2,3,7,8-PeCDF		172	200	pg/g	86.2	(24%-185%)
13C-2,3,4,7,8-PeCDF		147	200	pg/g	73.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		125	200	pg/g	62.4	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		144	200	pg/g	71.9	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		144	200	pg/g	72.2	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		133	200	pg/g	66.7	(29%-147%)

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026272		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396		
<b>Client ID:</b> MB for batch 43396		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 19:23	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-3		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
<b>Surrogate/Tracer recovery</b>						
		<b>Qual</b>	<b>Result</b>	<b>Nominal</b>	<b>Units</b>	<b>Recovery%      Acceptable Limits</b>
13C-1,2,3,4,6,7,8-HpCDF			126	200	pg/g	62.8      (28%-143%)
13C-1,2,3,4,7,8,9-HpCDF			122	200	pg/g	61.1      (26%-138%)
37Cl-2,3,7,8-TCDD			18.1	20.0	pg/g	90.5      (35%-197%)

**Comments:**

- J** Value is estimated
- K** Estimated Maximum Possible Concentration
- U** Analyte was analyzed for, but not detected above the specified detection limit.



**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026273		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396		
<b>Client ID:</b> LCS for batch 43396		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 17:45	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-1		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		20.5	pg/g	0.244	1.00
40321-76-4	1,2,3,7,8-PeCDD		98.2	pg/g	0.962	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		99.8	pg/g	1.77	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		98.5	pg/g	1.56	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		101	pg/g	1.67	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		93.1	pg/g	2.28	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		175	pg/g	6.08	10.0
51207-31-9	2,3,7,8-TCDF		17.2	pg/g	0.342	1.00
57117-41-6	1,2,3,7,8-PeCDF		90.0	pg/g	1.08	5.00
57117-31-4	2,3,4,7,8-PeCDF		103	pg/g	1.06	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		98.7	pg/g	1.62	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		103	pg/g	1.53	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		98.4	pg/g	2.56	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		93.6	pg/g	1.54	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		102	pg/g	1.73	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		94.7	pg/g	2.86	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		200	pg/g	4.12	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		167	200	pg/g	83.7	(20%-175%)
13C-1,2,3,7,8-PeCDD		145	200	pg/g	72.3	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		114	200	pg/g	57.1	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		147	200	pg/g	73.7	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		118	200	pg/g	58.9	(22%-166%)
13C-OCDD		228	400	pg/g	56.9	(13%-199%)
13C-2,3,7,8-TCDF		158	200	pg/g	79.1	(22%-152%)
13C-1,2,3,7,8-PeCDF		180	200	pg/g	89.8	(21%-192%)
13C-2,3,4,7,8-PeCDF		150	200	pg/g	74.9	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		124	200	pg/g	62.1	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		141	200	pg/g	70.3	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		144	200	pg/g	71.8	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		131	200	pg/g	65.6	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		119	200	pg/g	59.7	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		117	200	pg/g	58.4	(20%-186%)
37Cl-2,3,7,8-TCDD		22.1	20.0	pg/g	110	(31%-191%)

**Comments:**

**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026274		<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396		
<b>Client ID:</b> LCSD for batch 43396		<b>Prep Basis:</b> As Received
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 18:34	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-2		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 10 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		21.2	pg/g	0.256	1.00
40321-76-4	1,2,3,7,8-PeCDD		107	pg/g	0.674	5.00
39227-28-6	1,2,3,4,7,8-HxCDD		99.4	pg/g	2.14	5.00
57653-85-7	1,2,3,6,7,8-HxCDD		101	pg/g	1.87	5.00
19408-74-3	1,2,3,7,8,9-HxCDD		101	pg/g	2.02	5.00
35822-46-9	1,2,3,4,6,7,8-HpCDD		92.9	pg/g	1.84	5.00
3268-87-9	1,2,3,4,6,7,8,9-OCDD		178	pg/g	6.36	10.0
51207-31-9	2,3,7,8-TCDF		17.5	pg/g	0.392	1.00
57117-41-6	1,2,3,7,8-PeCDF		92.1	pg/g	0.656	5.00
57117-31-4	2,3,4,7,8-PeCDF		105	pg/g	0.712	5.00
70648-26-9	1,2,3,4,7,8-HxCDF		100	pg/g	1.60	5.00
57117-44-9	1,2,3,6,7,8-HxCDF		99.6	pg/g	1.66	5.00
72918-21-9	1,2,3,7,8,9-HxCDF		96.2	pg/g	2.70	5.00
60851-34-5	2,3,4,6,7,8-HxCDF		93.1	pg/g	1.61	5.00
67562-39-4	1,2,3,4,6,7,8-HpCDF		103	pg/g	2.08	5.00
55673-89-7	1,2,3,4,7,8,9-HpCDF		91.4	pg/g	2.82	5.00
39001-02-0	1,2,3,4,6,7,8,9-OCDF		199	pg/g	3.52	10.0

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		163	200	pg/g	81.4	(20%-175%)
13C-1,2,3,7,8-PeCDD		144	200	pg/g	72.0	(21%-227%)
13C-1,2,3,4,7,8-HxCDD		117	200	pg/g	58.6	(21%-193%)
13C-1,2,3,6,7,8-HxCDD		149	200	pg/g	74.6	(25%-163%)
13C-1,2,3,4,6,7,8-HpCDD		124	200	pg/g	61.8	(22%-166%)
13C-OCDD		247	400	pg/g	61.6	(13%-199%)
13C-2,3,7,8-TCDF		165	200	pg/g	82.6	(22%-152%)
13C-1,2,3,7,8-PeCDF		186	200	pg/g	92.8	(21%-192%)
13C-2,3,4,7,8-PeCDF		154	200	pg/g	76.9	(13%-328%)
13C-1,2,3,4,7,8-HxCDF		130	200	pg/g	65.0	(19%-202%)
13C-1,2,3,6,7,8-HxCDF		149	200	pg/g	74.3	(21%-159%)
13C-2,3,4,6,7,8-HxCDF		150	200	pg/g	75.1	(22%-176%)
13C-1,2,3,7,8,9-HxCDF		138	200	pg/g	68.9	(17%-205%)
13C-1,2,3,4,6,7,8-HpCDF		124	200	pg/g	62.2	(21%-158%)
13C-1,2,3,4,7,8,9-HpCDF		126	200	pg/g	63.1	(20%-186%)
37Cl-2,3,7,8-TCDD		19.3	20.0	pg/g	96.6	(31%-191%)

**Comments:**

**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

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<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026275	<b>Date Collected:</b> 02/17/2020 08:40	<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396	<b>Date Received:</b> 02/26/2020 09:38	<b>%Moisture:</b> 29.1
<b>Client ID:</b> ISM-AOI88-0.5---After Processing(1)		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 21:02	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-5		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 14.8 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		19.4	pg/g	0.318	0.953
40321-76-4	1,2,3,7,8-PeCDD		101	pg/g	1.02	4.77
39227-28-6	1,2,3,4,7,8-HxCDD		96.8	pg/g	2.80	4.77
57653-85-7	1,2,3,6,7,8-HxCDD		107	pg/g	2.67	4.77
19408-74-3	1,2,3,7,8,9-HxCDD		98.0	pg/g	2.76	4.77
35822-46-9	1,2,3,4,6,7,8-HpCDD		309	pg/g	6.10	4.77
3268-87-9	1,2,3,4,6,7,8,9-OCDD		2670	pg/g	8.29	9.53
51207-31-9	2,3,7,8-TCDF		17.6	pg/g	0.585	0.953
57117-41-6	1,2,3,7,8-PeCDF		87.1	pg/g	0.839	4.77
57117-31-4	2,3,4,7,8-PeCDF		100	pg/g	0.938	4.77
70648-26-9	1,2,3,4,7,8-HxCDF		112	pg/g	1.94	4.77
57117-44-9	1,2,3,6,7,8-HxCDF		98.0	pg/g	2.00	4.77
72918-21-9	1,2,3,7,8,9-HxCDF		105	pg/g	2.92	4.77
60851-34-5	2,3,4,6,7,8-HxCDF		95.5	pg/g	1.98	4.77
67562-39-4	1,2,3,4,6,7,8-HpCDF		167	pg/g	2.23	4.77
55673-89-7	1,2,3,4,7,8,9-HpCDF		95.7	pg/g	3.62	4.77
39001-02-0	1,2,3,4,6,7,8,9-OCDF		263	pg/g	3.16	9.53

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		111	191	pg/g	58.3	(25%-164%)
13C-1,2,3,7,8-PeCDD		92.8	191	pg/g	48.7	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		81.2	191	pg/g	42.6	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		92.2	191	pg/g	48.4	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		86.8	191	pg/g	45.5	(23%-140%)
13C-OCDD		188	381	pg/g	49.4	(17%-157%)
13C-2,3,7,8-TCDF		104	191	pg/g	54.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		122	191	pg/g	63.9	(24%-185%)
13C-2,3,4,7,8-PeCDF		102	191	pg/g	53.6	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		89.3	191	pg/g	46.9	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		94.6	191	pg/g	49.6	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		98.6	191	pg/g	51.7	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		92.0	191	pg/g	48.3	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF		85.6	191	pg/g	44.9	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		85.0	191	pg/g	44.6	(26%-138%)
37Cl-2,3,7,8-TCDD		19.8	19.1	pg/g	104	(35%-197%)

**Comments:**

**U** Analyte was analyzed for, but not detected above the specified detection limit.

**Hi-Res Dioxins/Furans  
Certificate of Analysis  
Sample Summary**

Page 1 of 1

<b>SDG Number:</b> A0B0466	<b>Client:</b> APEX001	<b>Project:</b> APEX00217
<b>Lab Sample ID:</b> 12026276	<b>Date Collected:</b> 02/17/2020 08:40	<b>Matrix:</b> SOIL
<b>Client Sample:</b> QC for batch 43396	<b>Date Received:</b> 02/26/2020 09:38	<b>%Moisture:</b> 29.1
<b>Client ID:</b> ISM-AOI88-0.5---After Processing(1)		<b>Prep Basis:</b> Dry Weight
<b>Batch ID:</b> 43398	<b>Method:</b> EPA Method 1613B	
<b>Run Date:</b> 03/30/2020 21:51	<b>Analyst:</b> MLL	<b>Instrument:</b> HRP750
<b>Data File:</b> A28MAR20B_6-6		<b>Dilution:</b> 1
<b>Prep Batch:</b> 43396	<b>Prep Method:</b> EPA Method 1613B-3546	
<b>Prep Date:</b> 26-MAR-20	<b>Prep Aliquot:</b> 14.85 g	

CAS No.	Parmname	Qual	Result	Units	EDL	PQL
1746-01-6	2,3,7,8-TCDD		20.2	pg/g	0.357	0.950
40321-76-4	1,2,3,7,8-PeCDD		98.9	pg/g	1.21	4.75
39227-28-6	1,2,3,4,7,8-HxCDD		100	pg/g	2.24	4.75
57653-85-7	1,2,3,6,7,8-HxCDD		115	pg/g	2.01	4.75
19408-74-3	1,2,3,7,8,9-HxCDD		104	pg/g	2.15	4.75
35822-46-9	1,2,3,4,6,7,8-HpCDD		342	pg/g	7.62	4.75
3268-87-9	1,2,3,4,6,7,8,9-OCDD		3160	pg/g	9.37	9.50
51207-31-9	2,3,7,8-TCDF		17.7	pg/g	0.570	0.950
57117-41-6	1,2,3,7,8-PeCDF		93.9	pg/g	0.847	4.75
57117-31-4	2,3,4,7,8-PeCDF		104	pg/g	0.849	4.75
70648-26-9	1,2,3,4,7,8-HxCDF		114	pg/g	1.90	4.75
57117-44-9	1,2,3,6,7,8-HxCDF		103	pg/g	1.99	4.75
72918-21-9	1,2,3,7,8,9-HxCDF		96.2	pg/g	2.53	4.75
60851-34-5	2,3,4,6,7,8-HxCDF		102	pg/g	1.99	4.75
67562-39-4	1,2,3,4,6,7,8-HpCDF		173	pg/g	3.02	4.75
55673-89-7	1,2,3,4,7,8,9-HpCDF		104	pg/g	4.14	4.75
39001-02-0	1,2,3,4,6,7,8,9-OCDF		275	pg/g	4.08	9.50

Surrogate/Tracer recovery	Qual	Result	Nominal	Units	Recovery%	Acceptable Limits
13C-2,3,7,8-TCDD		113	190	pg/g	59.3	(25%-164%)
13C-1,2,3,7,8-PeCDD		110	190	pg/g	58.0	(25%-181%)
13C-1,2,3,4,7,8-HxCDD		89.9	190	pg/g	47.3	(32%-141%)
13C-1,2,3,6,7,8-HxCDD		108	190	pg/g	56.8	(28%-130%)
13C-1,2,3,4,6,7,8-HpCDD		92.7	190	pg/g	48.8	(23%-140%)
13C-OCDD		200	380	pg/g	52.6	(17%-157%)
13C-2,3,7,8-TCDF		115	190	pg/g	60.6	(24%-169%)
13C-1,2,3,7,8-PeCDF		136	190	pg/g	71.4	(24%-185%)
13C-2,3,4,7,8-PeCDF		116	190	pg/g	61.3	(21%-178%)
13C-1,2,3,4,7,8-HxCDF		97.2	190	pg/g	51.2	(26%-152%)
13C-1,2,3,6,7,8-HxCDF		108	190	pg/g	57.1	(26%-123%)
13C-2,3,4,6,7,8-HxCDF		109	190	pg/g	57.4	(28%-136%)
13C-1,2,3,7,8,9-HxCDF		115	190	pg/g	60.7	(29%-147%)
13C-1,2,3,4,6,7,8-HpCDF		93.3	190	pg/g	49.1	(28%-143%)
13C-1,2,3,4,7,8,9-HpCDF		89.7	190	pg/g	47.2	(26%-138%)
37Cl-2,3,7,8-TCDD		17.5	19.0	pg/g	91.9	(35%-197%)

**Comments:**

**U** Analyte was analyzed for, but not detected above the specified detection limit.



ANALYTICAL REPORT

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

Wednesday, March 6, 2024

Meaghan Pollock  
Maul Foster & Alongi, INC.  
3140 NE Broadway Street  
Portland, OR 97232

RE: A3L1035 - Port of Ridgefield - M9003.01.061

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A3L1035, which was received by the laboratory on 12/6/2023 at 5:05:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information	
<u>Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.</u>	
(See Cooler Receipt Form for details)	
<u>Default Cooler</u>	4.3 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.



Apex Laboratories

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b><u>Maul Foster &amp; Alongi, INC.</u></b> 3140 NE Broadway Street Portland, OR 97232	Project: <b><u>Port of Ridgefield</u></b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> <b>A3L1035 - 03 06 24 2341</b>
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
AOI-087-1.0-1.5	A3L1035-01	Soil	12/06/23 10:30	12/06/23 17:05
AOI-043-1.0-1.5	A3L1035-03	Soil	12/06/23 10:00	12/06/23 17:05
AOI-083-1.0-1.5	A3L1035-05	Soil	12/06/23 11:00	12/06/23 17:05
AOI-089-1.0-1.5	A3L1035-07	Soil	12/06/23 11:30	12/06/23 17:05
AOI-056-1.0-1.5	A3L1035-09	Soil	12/06/23 12:15	12/06/23 17:05
AOI-046-1.0-1.5	A3L1035-11	Soil	12/06/23 13:05	12/06/23 17:05
AOI-061-1.0-1.5	A3L1035-13	Soil	12/06/23 13:30	12/06/23 17:05
AOI-066-1.0-1.5	A3L1035-15	Soil	12/06/23 14:00	12/06/23 17:05

Apex Laboratories

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

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ORELAP ID: OR100062

<u>Maul Foster &amp; Alongi, INC.</u> 3140 NE Broadway Street Portland, OR 97232	Project: <u>Port of Ridgefield</u> Project Number: M9003.01.061 Project Manager: Meaghan Pollock	<u>Report ID:</u> A3L1035 - 03 06 24 2341
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ANALYTICAL CASE NARRATIVE

A3L1035	Apex Laboratories
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Samples were subcontracted to Enthalpy Analytical for dioxin analysis, see report attached.

Apex Laboratories

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Philip Nerenberg, Lab Director





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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

There are No Qualifiers on Sample or QC Data for this report

Apex Laboratories

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Philip Nerenberg, Lab Director



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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

Results for Volatiles analyses on soils and sediments that are reported on a "dry weight" basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an "As Received" basis do not have the WMS correction applied, as dry weight was not performed.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Apex Laboratories

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client (Maul Foster & Alongi, INC.), Project (Port of Ridgefield), and Report ID (A3L1035 - 03 06 24 2341)

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.
-Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.
'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Benzofluoranthene Isomer Reporting:

Due to coelution on the analytical column, the Benzo(b)fluoranthene results represent the concentration of both Benzo(b)fluoranthene and Benzo(j) fluoranthene. Calibration is based on the response of Benzo(b)fluoranthene, and the results represent the combined Benzo(b+j)fluoranthene(s).

Apex Laboratories

Philip Nerenberg (signature)

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC
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503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client (Maul Foster & Alongi, INC.), Project (Port of Ridgefield), and Report ID (A3L1035 - 03 06 24 2341).

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Table with 6 columns: Matrix, Analysis, TNI\_ID, Analyte, TNI\_ID, Accreditation. Content: All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Handwritten signature of Philip Nerenberg

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b>Maul Foster &amp; Alongi, INC.</b> 3140 NE Broadway Street Portland, OR 97232	Project: <b>Port of Ridgefield</b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> <b>A3L1035 - 03 06 24 2341</b>
--	--	---

**APEX LABS**  
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

**CHAIN OF CUSTODY**

Company: MFA  
Project Mgr: Meaghan Pollock  
Address: 169 E 13th Street, New Canaan, WA 98004  
Phone: 360-713-1500  
Email: mpollock@maulfooster.com

Sampled by: Y. Nerenberg, L. Baragona

Site Location: WA  
State: WA  
County: Clark

Lab # **A3L1035** coc 1 of 2

Project Name: **Port of Ridgefield Yard Sampling**  
Project #: **149003.01.061**  
PO #

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-G	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pesticides	RCRA Metals (8)	Priority Metals (13)	AL, SP, AS, BA, BE, CD, CA, CR, CO, CU, FE, PB, HG, MG, MN, MO, NI, K, Se, Ag, Na, TL, V, Zn, TCPLP	TOTAL DISS.	TCPLP Metals (8)	Hold Sample	Frozen Archive	
																						Signature
A01-087-1.5-2	12/23/2020	10:30	S	1																	X	
A01-089-1.5-2	12/23/2020	10:36	S	1																	X	
A01-043-1.0-1.5	1/00	10:00	S	1																	X	
A01-043-1.5-2.0	1/00	10:03	S	1																	X	
A01-083-1.0-1.5	1/06	11:06	S	1																	X	
A01-083-1.5-2.0	1/00	11:00	S	1																	X	
A01-089-1.0-1.5	1/30	11:30	S	1																	X	
A01-089-1.5-2.0	1/30	11:30	S	1																	X	
ADJ-056-1.0-1.5	12/15	12:15	S	1																	X	
A01-056-1.5-2.0	12/15	12:15	S	1																	X	

SPECIAL INSTRUCTIONS:  
Standard Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day    2 Day    3 Day    5 Day    **Standard**    Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Signature: <i>[Signature]</i> Date: 12/16/23 Printed Name: <i>[Name]</i> Time: 12:16:23 Company: MFA	RECEIVED BY: Signature: <i>[Signature]</i> Date: 12/16/23 Printed Name: <i>[Name]</i> Time: 12:16:23 Company: APEX
--	---

Apex Laboratories

*Philip Nerenberg*

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Philip Nerenberg, Lab Director





ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

Project: Port of Ridgefield
Project Number: M9003.01.061
Project Manager: Meaghan Pollock

Report ID:
A3L1035 - 03 06 24 2341

CHAIN OF CUSTODY
APEX LABS
6700 SW Sandburg St., Tigard, OR 97223
Project Mgr: Meaghan Pollock
Project Name: Port of Ridgefield
Project #: M9003.01.061
Date: 12/16/13
Time: 1305
Signature: Philip Nerenberg
Printed Name: Philip Nerenberg
Company: MFA
ANALYSIS REQUEST
Priority Metals (13)
RCRA Metals (8)
8081 Pesticides
8082 PCBs
8270 Semt-Volb Full List
8270 SIM PAHs
8260 HMO VOCs
8260 RDM VOCs
8260 BTEX
NWTPH-GX
NWTPH-DX
NWTPH-HCID
# OF CONTAINERS
MATRIX
DATE
TIME
SAMPLE ID
State: WA
County: Clark
TAT Requested (circle): Standard
RECEIVED BY:
Signature: Meaghan Pollock
Printed Name: Meaghan Pollock
Company: APEX
Date: 12/16/13
Time: 12:15
Signature: Philip Nerenberg
Printed Name: Philip Nerenberg
Company: MFA
Date: 12/16/13
Time: 1305

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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503-718-2323  
ORELAP ID: OR100062

<b>Maul Foster &amp; Alongi, INC.</b> 3140 NE Broadway Street Portland, OR 97232	Project: <b>Port of Ridgefield</b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> <b>A3L1035 - 03 06 24 2341</b>
--	--	---

**Anissa Kepa**

A3L1035

**From:** Anissa Kepa  
**Sent:** Tuesday, December 12, 2023 3:04 PM  
**To:** Anissa Kepa  
**Subject:** FW: Apex Laboratories Login Notification: A3L1035

-----Original Message-----  
**From:** Meaghan Pollock [<mailto:mpollock@maulfoster.com>]  
**Sent:** Tuesday, December 12, 2023 1:55 PM  
**To:** Communications; Philip Nerenberg  
**Subject:** RE: Apex Laboratories Login Notification: A3L1035

CAUTION! THIS IS AN EXTERNAL EMAIL:  
 This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Thank you! A few things:

Looks like the "I" in AOI was transcribed as a "1". Is it possible to update all instances to the letter I?

It also looks like sample AOI-087-1.5-2 had the last ".0" left off the sample name. Can we update to "AOI-087-1.5-2.0" consistent with the other samples? This should match the label on the jar as well, though please let me know if there is a discrepancy.

Samples AOI-065-1.0-1.5 and AOI-065-1.5-2.0 should instead be AOI-066-1.0-1.5 and AOI-066-1.5-2.0 (must've been a field error so hoping it's not too much trouble to change!)

Thank you,

MEAGHAN POLLOCK LG, RG | MAUL FOSTER & ALONGI, INC.  
 Project Geologist  
 m. 360 713 1500 | d. 360 947 2206

109 East 13th Street, Vancouver, WA 98660 [www.maulfoster.com](http://www.maulfoster.com)

Please note that MFA offices will be closed December 25-January 1.

-----Original Message-----  
**From:** Apex Laboratories <[Communications@apex-labs.com](mailto:Communications@apex-labs.com)>  
**Sent:** Tuesday, December 12, 2023 12:20 PM  
**To:** Meaghan Pollock <[mpollock@maulfoster.com](mailto:mpollock@maulfoster.com)>  
**Subject:** Apex Laboratories Login Notification: A3L1035

[You don't often get email from [communications@apex-labs.com](mailto:communications@apex-labs.com). Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification> ]

[External Sender - Confirm Sender and Beware of Links and Attachments]

Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director





ANALYTICAL REPORT

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b>Maul Foster &amp; Alongi, INC.</b> 3140 NE Broadway Street Portland, OR 97232	Project: <b>Port of Ridgefield</b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> <b>A3L1035 - 03 06 24 2341</b>
--	--	---

**APEX LABS COOLER RECEIPT FORM**

**Client:** Maul Foster Alongi Element WO#: A3L1035

**Project/Project #:** port of Ridgefield yard Sampling | 149003.01.061

**Delivery Info:**  
Date/time received: 12/1/23 @ 1705 By: RHP  
Delivered by: Apex Client  YESS FedEx  UPS  Radio  Morgan  SDS  Evergreen  Other

**Cooler Inspection** Date/time inspected: 12/1/23 @ 1706 By: RHP  
Chain of Custody included? Yes  No   
Signed/dated by client? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>4.3</u>						
Custody seals? (Y/N)	<u>N</u>						
Received on ice? (Y/N)	<u>y</u>						
Temp. blanks? (Y/N)	<u>y</u>						
Ice type: (Gel/Real/Other)	<u>Gel</u>						
Condition (In/Out):	<u>IN</u>						

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_  
Green dots applied to out of temperature samples?  Yes  No  
Out of temperature samples form initiated? Yes  No

**Sample Inspection:** Date/time inspected: 12.8.23 @ 1120 By: DJS  
All samples intact? Yes  No  Comments: \_\_\_\_\_  
Bottle labels/COCs agree? Yes  No  Comments: \_\_\_\_\_  
COC/container discrepancies form initiated? Yes  No   
Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_  
Do VOA vials have visible headspace? Yes  No  NA   
Comments: \_\_\_\_\_  
Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA  pH ID: \_\_\_\_\_  
Comments: \_\_\_\_\_

**Additional information:**  
\_\_\_\_\_  
\_\_\_\_\_

Labeled by: DJS Witness: APW Cooler Inspected by: RHP

Form Y-003 R-01

Apex Laboratories

*Philip Nerenberg*

*The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director



January 31, 2024

**Enthalpy Analytical - El Dorado Hills  
Work Order No. 2312096**

Mr. Philip Nerenberg  
Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223

Dear Mr. Nerenberg,

Enclosed are the results for the sample set received at Enthalpy Analytical - EDH on December 12, 2023 under your Project Name 'A3L1035'.

Enthalpy Analytical - EDH is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [kathy.zipp@enthalpy.com](mailto:kathy.zipp@enthalpy.com).

Thank you for choosing Enthalpy Analytical - EDH as part of your analytical support team.

Sincerely,

Kathy Zipp  
Project Manager

*Enthalpy Analytical - EDH certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Enthalpy Analytical - EDH.*

## **Enthalpy Analytical - EDH Work Order No. 2312096**

### **Case Narrative**

#### **Sample Condition on Receipt:**

Eight soil samples were received and stored securely in accordance with Enthalpy Analytical - EDH standard operating procedures and EPA methodology. The samples were received in good condition and within the method temperature requirements.

#### **Analytical Notes:**

##### **EPA Method 8290A**

The samples were extracted and analyzed for tetra-through-octa chlorinated dioxins and furans by EPA Method 8290A using a ZB-DIOXIN GC column.

##### **Holding Times**

The method holding time criteria were met for all samples, except "AOI-087-1.0-1.5" and "AOI-043-1.0-1.5" which were re-extracted outside the method holding time and analyzed within the analytical hold time.

##### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each preparation batch. No analytes were detected in either Method Blank. The OPR recoveries were within the method acceptance criteria for preparation batch B24A176. The OPR recoveries for 1,2,3,4,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDF, 1,2,3,4,7,8,9-HpCDF, and OCDF were outside the method acceptance criteria for preparation batch B24A018. All other OPR recoveries were within the method acceptance criteria in the batch.

The labeled standard recoveries outside the acceptance criteria are flagged with an "H" qualifier.

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# Sample Inventory Report

Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2312096-01	AIO-087-1.0-1.5	06-Dec-23 10:30	12-Dec-23 09:56	Clear Glass Jar, 250mL
2312096-02	AIO-043-1.0-1.5	06-Dec-23 10:00	12-Dec-23 09:56	Clear Glass Jar, 250mL
2312096-03	AIO-083-1.0-1.5	06-Dec-23 11:00	12-Dec-23 09:56	Clear Glass Jar, 250mL
2312096-04	AIO-089-1.0-1.5	06-Dec-23 11:30	12-Dec-23 09:56	Clear Glass Jar, 250mL
2312096-05	AIO-056-1.0-1.5	06-Dec-23 12:15	12-Dec-23 09:56	Clear Glass Jar, 250mL
2312096-06	AIO-046-1.0-1.5	06-Dec-23 13:05	12-Dec-23 09:56	Clear Glass Jar, 250mL
2312096-07	AIO-061-1.0-1.5	06-Dec-23 13:30	12-Dec-23 09:56	Clear Glass Jar, 250mL
2312096-08	AIO-066-1.0-1.5	06-Dec-23 14:00	12-Dec-23 09:56	Clear Glass Jar, 250mL

## **ANALYTICAL RESULTS**

**Sample ID: Method Blank**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	B24A018-BLK1	Date Extracted:	03-Jan-24
Project:	A3L1035	QC Batch:	B24A018	Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	10.0 g		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.611	0.190			08-Jan-24 13:07	1
1,2,3,7,8-PeCDD	ND	0.869	0.784			08-Jan-24 13:07	1
1,2,3,4,7,8-HxCDD	ND	1.44	0.633			08-Jan-24 13:07	1
1,2,3,6,7,8-HxCDD	ND	1.46	0.640			08-Jan-24 13:07	1
1,2,3,7,8,9-HxCDD	ND	1.49	0.717			08-Jan-24 13:07	1
1,2,3,4,6,7,8-HpCDD	ND	1.63	0.706			08-Jan-24 13:07	1
OCDD	ND	3.22	1.62			08-Jan-24 13:07	1
2,3,7,8-TCDF	ND	0.511	0.183			08-Jan-24 13:07	1
1,2,3,7,8-PeCDF	ND	0.630	0.576			08-Jan-24 13:07	1
2,3,4,7,8-PeCDF	ND	0.524	0.686			08-Jan-24 13:07	1
1,2,3,4,7,8-HxCDF	ND	0.839	0.659			08-Jan-24 13:07	1
1,2,3,6,7,8-HxCDF	ND	0.835	0.621			08-Jan-24 13:07	1
2,3,4,6,7,8-HxCDF	ND	0.891	0.661			08-Jan-24 13:07	1
1,2,3,7,8,9-HxCDF	ND	1.30	0.716			08-Jan-24 13:07	1
1,2,3,4,6,7,8-HpCDF	ND	0.981	0.649			08-Jan-24 13:07	1
1,2,3,4,7,8,9-HpCDF	ND	1.39	0.818			08-Jan-24 13:07	1
OCDF	ND	2.20	3.84			08-Jan-24 13:07	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	0.00
---------------------	------

**Totals**

Total TCDD	ND	0.611					
Total PeCDD	ND	0.869					
Total HxCDD	ND	1.49					
Total HpCDD	ND	1.63					
Total TCDF	ND	0.511					
Total PeCDF	ND	0.630					
Total HxCDF	ND	1.30					
Total HpCDF	ND	1.39					

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	40.7	40 - 135		08-Jan-24 13:07	1
13C-1,2,3,7,8-PeCDD	IS	35.1	40 - 135	H	08-Jan-24 13:07	1
13C-1,2,3,4,7,8-HxCDD	IS	33.4	40 - 135	H	08-Jan-24 13:07	1
13C-1,2,3,6,7,8-HxCDD	IS	35.6	40 - 135	H	08-Jan-24 13:07	1
13C-1,2,3,7,8,9-HxCDD	IS	34.5	40 - 135	H	08-Jan-24 13:07	1
13C-1,2,3,4,6,7,8-HpCDD	IS	31.7	40 - 135	H	08-Jan-24 13:07	1
13C-OCDD	IS	25.7	40 - 135	H	08-Jan-24 13:07	1
13C-2,3,7,8-TCDF	IS	38.1	40 - 135	H	08-Jan-24 13:07	1
13C-1,2,3,7,8-PeCDF	IS	36.5	40 - 135	H	08-Jan-24 13:07	1
13C-2,3,4,7,8-PeCDF	IS	37.8	40 - 135	H	08-Jan-24 13:07	1
13C-1,2,3,4,7,8-HxCDF	IS	35.8	40 - 135	H	08-Jan-24 13:07	1
13C-1,2,3,6,7,8-HxCDF	IS	36.1	40 - 135	H	08-Jan-24 13:07	1
13C-2,3,4,6,7,8-HxCDF	IS	35.6	40 - 135	H	08-Jan-24 13:07	1
13C-1,2,3,7,8,9-HxCDF	IS	34.3	40 - 135	H	08-Jan-24 13:07	1
13C-1,2,3,4,6,7,8-HpCDF	IS	30.6	40 - 135	H	08-Jan-24 13:07	1
13C-1,2,3,4,7,8,9-HpCDF	IS	31.4	40 - 135	H	08-Jan-24 13:07	1
13C-OCDF	IS	26.4	40 - 135	H	08-Jan-24 13:07	1
37Cl-2,3,7,8-TCDD	CRS	85.3	40 - 135		08-Jan-24 13:07	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.



**Sample ID: OPR**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	B24A018-BS1	Date Extracted:	03-Jan-24 07:58
Project:	A3L1035	QC Batch:	B24A018	Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	10.0 g		

Analyte	Amt Found (pg/g )	Spike Amt	% Recovery	Limits	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	16.6	20.0	83.2	70-130		05-Jan-24 18:27	1
1,2,3,7,8-PeCDD	80.5	100	80.5	70-130		05-Jan-24 18:27	1
1,2,3,4,7,8-HxCDD	77.8	100	77.8	70-130		05-Jan-24 18:27	1
1,2,3,6,7,8-HxCDD	77.5	100	77.5	70-130		05-Jan-24 18:27	1
1,2,3,7,8,9-HxCDD	80.1	100	80.1	70-130		05-Jan-24 18:27	1
1,2,3,4,6,7,8-HpCDD	72.5	100	72.5	70-130		05-Jan-24 18:27	1
OCDD	150	200	74.9	70-130		05-Jan-24 18:27	1
2,3,7,8-TCDF	15.3	20.0	76.4	70-130		05-Jan-24 18:27	1
1,2,3,7,8-PeCDF	75.2	100	75.2	70-130		05-Jan-24 18:27	1
2,3,4,7,8-PeCDF	75.2	100	75.2	70-130		05-Jan-24 18:27	1
1,2,3,4,7,8-HxCDF	68.8	100	68.8	70-130	H	05-Jan-24 18:27	1
1,2,3,6,7,8-HxCDF	71.4	100	71.4	70-130		05-Jan-24 18:27	1
2,3,4,6,7,8-HxCDF	69.1	100	69.1	70-130	H	05-Jan-24 18:27	1
1,2,3,7,8,9-HxCDF	69.1	100	69.1	70-130	H	05-Jan-24 18:27	1
1,2,3,4,6,7,8-HpCDF	70.5	100	70.5	70-130		05-Jan-24 18:27	1
1,2,3,4,7,8,9-HpCDF	68.2	100	68.2	70-130	H	05-Jan-24 18:27	1
OCDF	139	200	69.5	70-130	H	05-Jan-24 18:27	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	32.3	40-135	H	05-Jan-24 18:27	1
13C-1,2,3,7,8-PeCDD	IS	28.7	40-135	H	05-Jan-24 18:27	1
13C-1,2,3,4,7,8-HxCDD	IS	24.9	40-135	H	05-Jan-24 18:27	1
13C-1,2,3,6,7,8-HxCDD	IS	28.3	40-135	H	05-Jan-24 18:27	1
13C-1,2,3,7,8,9-HxCDD	IS	27.0	40-135	H	05-Jan-24 18:27	1
13C-1,2,3,4,6,7,8-HpCDD	IS	25.6	40-135	H	05-Jan-24 18:27	1
13C-OCDD	IS	20.0	40-135	H	05-Jan-24 18:27	1
13C-2,3,7,8-TCDF	IS	28.1	40-135	H	05-Jan-24 18:27	1
13C-1,2,3,7,8-PeCDF	IS	28.8	40-135	H	05-Jan-24 18:27	1
13C-2,3,4,7,8-PeCDF	IS	28.0	40-135	H	05-Jan-24 18:27	1
13C-1,2,3,4,7,8-HxCDF	IS	27.2	40-135	H	05-Jan-24 18:27	1
13C-1,2,3,6,7,8-HxCDF	IS	28.8	40-135	H	05-Jan-24 18:27	1
13C-2,3,4,6,7,8-HxCDF	IS	27.6	40-135	H	05-Jan-24 18:27	1
13C-1,2,3,7,8,9-HxCDF	IS	27.6	40-135	H	05-Jan-24 18:27	1
13C-1,2,3,4,6,7,8-HpCDF	IS	24.0	40-135	H	05-Jan-24 18:27	1
13C-1,2,3,4,7,8,9-HpCDF	IS	25.1	40-135	H	05-Jan-24 18:27	1
13C-OCDF	IS	20.6	40-135	H	05-Jan-24 18:27	1
37Cl-2,3,7,8-TCDD	CRS	98.2	40-135		05-Jan-24 18:27	1

**Sample ID: Method Blank**
**EPA Method 8290A**

Client Data		Laboratory Data				
Name:	Apex Laboratories	Lab Sample:	B24A176-BLK1		Date Extracted:	23-Jan-24
Project:	A3L1035	QC Batch:	B24A176		Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	10.0 g			

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.116	0.190			25-Jan-24 17:08	1
1,2,3,7,8-PeCDD	ND	0.206	0.784			25-Jan-24 17:08	1
1,2,3,4,7,8-HxCDD	ND	0.218	0.633			25-Jan-24 17:08	1
1,2,3,6,7,8-HxCDD	ND	0.247	0.640			25-Jan-24 17:08	1
1,2,3,7,8,9-HxCDD	ND	0.260	0.717			25-Jan-24 17:08	1
1,2,3,4,6,7,8-HpCDD	ND	0.266	0.706			25-Jan-24 17:08	1
OCDD	ND	0.519	1.62			25-Jan-24 17:08	1
2,3,7,8-TCDF	ND	0.111	0.183			25-Jan-24 17:08	1
1,2,3,7,8-PeCDF	ND	0.145	0.576			25-Jan-24 17:08	1
2,3,4,7,8-PeCDF	ND	0.138	0.686			25-Jan-24 17:08	1
1,2,3,4,7,8-HxCDF	ND	0.122	0.659			25-Jan-24 17:08	1
1,2,3,6,7,8-HxCDF	ND	0.128	0.621			25-Jan-24 17:08	1
2,3,4,6,7,8-HxCDF	ND	0.147	0.661			25-Jan-24 17:08	1
1,2,3,7,8,9-HxCDF	ND	0.0995	0.716			25-Jan-24 17:08	1
1,2,3,4,6,7,8-HpCDF	ND	0.138	0.649			25-Jan-24 17:08	1
1,2,3,4,7,8,9-HpCDF	ND	0.229	0.818			25-Jan-24 17:08	1
OCDF	ND	0.427	3.84			25-Jan-24 17:08	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	0.00
---------------------	------

**Totals**

Total TCDD	ND	0.116					
Total PeCDD	ND	0.206					
Total HxCDD	ND	0.260					
Total HpCDD	ND	0.266					
Total TCDF	ND	0.111					
Total PeCDF	ND	0.145					
Total HxCDF	ND	0.147					
Total HpCDF	ND	0.229					

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	93.4	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,7,8-PeCDD	IS	84.4	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,4,7,8-HxCDD	IS	91.2	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,6,7,8-HxCDD	IS	92.9	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,7,8,9-HxCDD	IS	91.5	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,4,6,7,8-HpCDD	IS	87.6	40 - 135		25-Jan-24 17:08	1
13C-OCDD	IS	70.5	40 - 135		25-Jan-24 17:08	1
13C-2,3,7,8-TCDF	IS	92.4	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,7,8-PeCDF	IS	87.3	40 - 135		25-Jan-24 17:08	1
13C-2,3,4,7,8-PeCDF	IS	79.6	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,4,7,8-HxCDF	IS	86.6	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,6,7,8-HxCDF	IS	89.8	40 - 135		25-Jan-24 17:08	1
13C-2,3,4,6,7,8-HxCDF	IS	84.4	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,7,8,9-HxCDF	IS	84.0	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,4,6,7,8-HpCDF	IS	78.5	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,4,7,8,9-HpCDF	IS	77.5	40 - 135		25-Jan-24 17:08	1
13C-OCDF	IS	66.1	40 - 135		25-Jan-24 17:08	1
37Cl-2,3,7,8-TCDD	CRS	93.4	40 - 135		25-Jan-24 17:08	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: OPR**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	B24A176-BS1	Date Extracted:	23-Jan-24 07:23
Project:	A3L1035	QC Batch:	B24A176	Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	10.0 g		

Analyte	Amt Found (pg/g )	Spike Amt	% Recovery	Limits	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	18.9	20.0	94.6	70-130		25-Jan-24 15:37	1
1,2,3,7,8-PeCDD	97.1	100	97.1	70-130		25-Jan-24 15:37	1
1,2,3,4,7,8-HxCDD	99.1	100	99.1	70-130		25-Jan-24 15:37	1
1,2,3,6,7,8-HxCDD	101	100	101	70-130		25-Jan-24 15:37	1
1,2,3,7,8,9-HxCDD	98.0	100	98.0	70-130		25-Jan-24 15:37	1
1,2,3,4,6,7,8-HpCDD	95.6	100	95.6	70-130		25-Jan-24 15:37	1
OCDD	202	200	101	70-130		25-Jan-24 15:37	1
2,3,7,8-TCDF	18.1	20.0	90.6	70-130		25-Jan-24 15:37	1
1,2,3,7,8-PeCDF	91.2	100	91.2	70-130		25-Jan-24 15:37	1
2,3,4,7,8-PeCDF	95.6	100	95.6	70-130		25-Jan-24 15:37	1
1,2,3,4,7,8-HxCDF	99.0	100	99.0	70-130		25-Jan-24 15:37	1
1,2,3,6,7,8-HxCDF	97.0	100	97.0	70-130		25-Jan-24 15:37	1
2,3,4,6,7,8-HxCDF	97.6	100	97.6	70-130		25-Jan-24 15:37	1
1,2,3,7,8,9-HxCDF	93.9	100	93.9	70-130		25-Jan-24 15:37	1
1,2,3,4,6,7,8-HpCDF	89.2	100	89.2	70-130		25-Jan-24 15:37	1
1,2,3,4,7,8,9-HpCDF	92.7	100	92.7	70-130		25-Jan-24 15:37	1
OCDF	199	200	99.6	70-130		25-Jan-24 15:37	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	87.9	40-135		25-Jan-24 15:37	1
13C-1,2,3,7,8-PeCDD	IS	88.4	40-135		25-Jan-24 15:37	1
13C-1,2,3,4,7,8-HxCDD	IS	84.6	40-135		25-Jan-24 15:37	1
13C-1,2,3,6,7,8-HxCDD	IS	84.1	40-135		25-Jan-24 15:37	1
13C-1,2,3,7,8,9-HxCDD	IS	88.7	40-135		25-Jan-24 15:37	1
13C-1,2,3,4,6,7,8-HpCDD	IS	80.3	40-135		25-Jan-24 15:37	1
13C-OCDD	IS	69.7	40-135		25-Jan-24 15:37	1
13C-2,3,7,8-TCDF	IS	86.3	40-135		25-Jan-24 15:37	1
13C-1,2,3,7,8-PeCDF	IS	87.2	40-135		25-Jan-24 15:37	1
13C-2,3,4,7,8-PeCDF	IS	89.2	40-135		25-Jan-24 15:37	1
13C-1,2,3,4,7,8-HxCDF	IS	79.9	40-135		25-Jan-24 15:37	1
13C-1,2,3,6,7,8-HxCDF	IS	81.7	40-135		25-Jan-24 15:37	1
13C-2,3,4,6,7,8-HxCDF	IS	77.2	40-135		25-Jan-24 15:37	1
13C-1,2,3,7,8,9-HxCDF	IS	78.7	40-135		25-Jan-24 15:37	1
13C-1,2,3,4,6,7,8-HpCDF	IS	72.8	40-135		25-Jan-24 15:37	1
13C-1,2,3,4,7,8,9-HpCDF	IS	73.1	40-135		25-Jan-24 15:37	1
13C-OCDF	IS	64.8	40-135		25-Jan-24 15:37	1
37Cl-2,3,7,8-TCDD	CRS	88.9	40-135		25-Jan-24 15:37	1

**Sample ID: AOI-087-1.0-1.5**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2312096-01	Date Received:	12-Dec-23 09:56
Project:	A3L1035	QC Batch:	B24A176	Date Extracted:	23-Jan-24
Matrix:	Soil	Sample Size:	1.32 g	Column:	ZB-DIOXIN
Date Collected:	06-Dec-23 10:30	% Solids:	77.9		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	1.46	1.85			25-Jan-24 21:00	1
1,2,3,7,8-PeCDD	ND	3.69	7.63			25-Jan-24 21:00	1
1,2,3,4,7,8-HxCDD	ND	6.83	6.16			25-Jan-24 21:00	1
1,2,3,6,7,8-HxCDD	17.1		6.23		J	25-Jan-24 21:00	1
1,2,3,7,8,9-HxCDD	11.0		6.97		J	25-Jan-24 21:00	1
1,2,3,4,6,7,8-HpCDD	203		6.87			25-Jan-24 21:00	1
OCDD	1200		15.8			25-Jan-24 21:00	1
2,3,7,8-TCDF	ND	1.45	1.78			25-Jan-24 21:00	1
1,2,3,7,8-PeCDF	ND	1.88	5.60			25-Jan-24 21:00	1
2,3,4,7,8-PeCDF	ND		6.67	3.47		25-Jan-24 21:00	1
1,2,3,4,7,8-HxCDF	ND		6.41	4.01		25-Jan-24 21:00	1
1,2,3,6,7,8-HxCDF	ND	3.83	6.04			25-Jan-24 21:00	1
2,3,4,6,7,8-HxCDF	6.32		6.43		J	25-Jan-24 21:00	1
1,2,3,7,8,9-HxCDF	ND	6.14	6.96			25-Jan-24 21:00	1
1,2,3,4,6,7,8-HpCDF	28.0		6.31			25-Jan-24 21:00	1
1,2,3,4,7,8,9-HpCDF	ND	7.40	7.96			25-Jan-24 21:00	1
OCDF	28.3		37.4		J	25-Jan-24 21:00	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	6.12
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**Totals**

Total TCDD	ND	1.46					
Total PeCDD	ND	3.69					
Total HxCDD	76.5						
Total HpCDD	344						
Total TCDF	4.90			6.93			
Total PeCDF	29.2			35.3			
Total HxCDF	60.6			64.6			
Total HpCDF	67.2						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	91.1	40 - 135		25-Jan-24 21:00	1
13C-1,2,3,7,8-PeCDD	IS	93.6	40 - 135		25-Jan-24 21:00	1
13C-1,2,3,4,7,8-HxCDD	IS	87.5	40 - 135		25-Jan-24 21:00	1
13C-1,2,3,6,7,8-HxCDD	IS	81.8	40 - 135		25-Jan-24 21:00	1
13C-1,2,3,7,8,9-HxCDD	IS	84.3	40 - 135		25-Jan-24 21:00	1
13C-1,2,3,4,6,7,8-HpCDD	IS	83.9	40 - 135		25-Jan-24 21:00	1
13C-OCDD	IS	69.5	40 - 135		25-Jan-24 21:00	1
13C-2,3,7,8-TCDF	IS	89.1	40 - 135		25-Jan-24 21:00	1
13C-1,2,3,7,8-PeCDF	IS	85.6	40 - 135		25-Jan-24 21:00	1
13C-2,3,4,7,8-PeCDF	IS	86.0	40 - 135		25-Jan-24 21:00	1
13C-1,2,3,4,7,8-HxCDF	IS	82.7	40 - 135		25-Jan-24 21:00	1
13C-1,2,3,6,7,8-HxCDF	IS	81.6	40 - 135		25-Jan-24 21:00	1
13C-2,3,4,6,7,8-HxCDF	IS	81.1	40 - 135		25-Jan-24 21:00	1
13C-1,2,3,7,8,9-HxCDF	IS	82.8	40 - 135		25-Jan-24 21:00	1
13C-1,2,3,4,6,7,8-HpCDF	IS	77.0	40 - 135		25-Jan-24 21:00	1
13C-1,2,3,4,7,8,9-HpCDF	IS	78.0	40 - 135		25-Jan-24 21:00	1
13C-OCDF	IS	71.0	40 - 135		25-Jan-24 21:00	1
37Cl-2,3,7,8-TCDD	CRS	139	40 - 135	H	25-Jan-24 21:00	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: AOI-043-1.0-1.5**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2312096-02	Date Received:	12-Dec-23 09:56
Project:	A3L1035	QC Batch:	B24A176	Date Extracted:	23-Jan-24
Matrix:	Soil	Sample Size:	1.30 g	Column:	ZB-DIOXIN
Date Collected:	06-Dec-23 10:00	% Solids:	78.1		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		1.87	2.07		25-Jan-24 21:46	1
1,2,3,7,8-PeCDD	11.7		7.72		J	25-Jan-24 21:46	1
1,2,3,4,7,8-HxCDD	14.1		6.23		J	25-Jan-24 21:46	1
1,2,3,6,7,8-HxCDD	66.5		6.30			25-Jan-24 21:46	1
1,2,3,7,8,9-HxCDD	34.0		7.06			25-Jan-24 21:46	1
1,2,3,4,6,7,8-HpCDD	984		6.95			25-Jan-24 21:46	1
OCDD	6280		16.0			25-Jan-24 21:46	1
2,3,7,8-TCDF	ND	2.27	1.80			25-Jan-24 21:46	1
1,2,3,7,8-PeCDF	ND		5.67	4.36		25-Jan-24 21:46	1
2,3,4,7,8-PeCDF	30.4		6.76			25-Jan-24 21:46	1
1,2,3,4,7,8-HxCDF	22.9		6.49		J	25-Jan-24 21:46	1
1,2,3,6,7,8-HxCDF	16.1		6.12		J	25-Jan-24 21:46	1
2,3,4,6,7,8-HxCDF	21.1		6.51		J	25-Jan-24 21:46	1
1,2,3,7,8,9-HxCDF	7.24		7.05		J	25-Jan-24 21:46	1
1,2,3,4,6,7,8-HpCDF	131		6.39			25-Jan-24 21:46	1
1,2,3,4,7,8,9-HpCDF	12.0		8.06		J	25-Jan-24 21:46	1
OCDF	152		37.8			25-Jan-24 21:46	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	52.2
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**Totals**

Total TCDD	8.19			13.1
Total PeCDD	29.9			56.1
Total HxCDD	320			
Total HpCDD	1700			
Total TCDF	82.1			103
Total PeCDF	335			380
Total HxCDF	439			
Total HpCDF	357			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	95.2	40 - 135		25-Jan-24 21:46	1
13C-1,2,3,7,8-PeCDD	IS	93.2	40 - 135		25-Jan-24 21:46	1
13C-1,2,3,4,7,8-HxCDD	IS	93.8	40 - 135		25-Jan-24 21:46	1
13C-1,2,3,6,7,8-HxCDD	IS	89.7	40 - 135		25-Jan-24 21:46	1
13C-1,2,3,7,8,9-HxCDD	IS	96.4	40 - 135		25-Jan-24 21:46	1
13C-1,2,3,4,6,7,8-HpCDD	IS	89.8	40 - 135		25-Jan-24 21:46	1
13C-OCDD	IS	80.3	40 - 135		25-Jan-24 21:46	1
13C-2,3,7,8-TCDF	IS	93.5	40 - 135		25-Jan-24 21:46	1
13C-1,2,3,7,8-PeCDF	IS	85.6	40 - 135		25-Jan-24 21:46	1
13C-2,3,4,7,8-PeCDF	IS	78.0	40 - 135		25-Jan-24 21:46	1
13C-1,2,3,4,7,8-HxCDF	IS	87.8	40 - 135		25-Jan-24 21:46	1
13C-1,2,3,6,7,8-HxCDF	IS	89.4	40 - 135		25-Jan-24 21:46	1
13C-2,3,4,6,7,8-HxCDF	IS	87.4	40 - 135		25-Jan-24 21:46	1
13C-1,2,3,7,8,9-HxCDF	IS	88.0	40 - 135		25-Jan-24 21:46	1
13C-1,2,3,4,6,7,8-HpCDF	IS	80.2	40 - 135		25-Jan-24 21:46	1
13C-1,2,3,4,7,8,9-HpCDF	IS	81.2	40 - 135		25-Jan-24 21:46	1
13C-OCDF	IS	75.5	40 - 135		25-Jan-24 21:46	1
37Cl-2,3,7,8-TCDD	CRS	92.4	40 - 135		25-Jan-24 21:46	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: AOI-083-1.0-1.5**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2312096-03	Date Received:	12-Dec-23 09:56
Project:	A3L1035	QC Batch:	B24A018	Date Extracted:	21-Dec-23
Matrix:	Soil	Sample Size:	13.1 g	Column:	ZB-DIOXIN
Date Collected:	06-Dec-23 11:00	% Solids:	76.9		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	0.911		0.189			05-Jan-24 23:04	1
1,2,3,7,8-PeCDD	3.54		0.781			05-Jan-24 23:04	1
1,2,3,4,7,8-HxCDD	3.74		0.630			05-Jan-24 23:04	1
1,2,3,6,7,8-HxCDD	14.7		0.637			05-Jan-24 23:04	1
1,2,3,7,8,9-HxCDD	7.85		0.714			05-Jan-24 23:04	1
1,2,3,4,6,7,8-HpCDD	244		0.703			05-Jan-24 23:04	1
OCDD	1760		1.61			05-Jan-24 23:04	1
2,3,7,8-TCDF	2.84		0.182			05-Jan-24 23:04	1
1,2,3,7,8-PeCDF	2.63		0.574			05-Jan-24 23:04	1
2,3,4,7,8-PeCDF	6.08		0.683			05-Jan-24 23:04	1
1,2,3,4,7,8-HxCDF	6.18		0.656			05-Jan-24 23:04	1
1,2,3,6,7,8-HxCDF	3.86		0.619			05-Jan-24 23:04	1
2,3,4,6,7,8-HxCDF	2.43		0.658		J	05-Jan-24 23:04	1
1,2,3,7,8,9-HxCDF	0.507		0.713		J	05-Jan-24 23:04	1
1,2,3,4,6,7,8-HpCDF	49.2		0.646			05-Jan-24 23:04	1
1,2,3,4,7,8,9-HpCDF	2.62		0.815			05-Jan-24 23:04	1
OCDF	69.6		3.82			05-Jan-24 23:04	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	14.1
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**Totals**

Total TCDD	20.1			22.4
Total PeCDD	30.7			36.9
Total HxCDD	102			
Total HpCDD	453			
Total TCDF	60.4			60.7
Total PeCDF	64.1			64.4
Total HxCDF	93.8			
Total HpCDF	129			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	102	40 - 135		05-Jan-24 23:04	1
13C-1,2,3,7,8-PeCDD	IS	78.7	40 - 135		05-Jan-24 23:04	1
13C-1,2,3,4,7,8-HxCDD	IS	87.3	40 - 135		05-Jan-24 23:04	1
13C-1,2,3,6,7,8-HxCDD	IS	88.3	40 - 135		05-Jan-24 23:04	1
13C-1,2,3,7,8,9-HxCDD	IS	88.4	40 - 135		05-Jan-24 23:04	1
13C-1,2,3,4,6,7,8-HpCDD	IS	84.1	40 - 135		05-Jan-24 23:04	1
13C-OCDD	IS	67.7	40 - 135		05-Jan-24 23:04	1
13C-2,3,7,8-TCDF	IS	94.7	40 - 135		05-Jan-24 23:04	1
13C-1,2,3,7,8-PeCDF	IS	85.8	40 - 135		05-Jan-24 23:04	1
13C-2,3,4,7,8-PeCDF	IS	83.5	40 - 135		05-Jan-24 23:04	1
13C-1,2,3,4,7,8-HxCDF	IS	92.7	40 - 135		05-Jan-24 23:04	1
13C-1,2,3,6,7,8-HxCDF	IS	94.7	40 - 135		05-Jan-24 23:04	1
13C-2,3,4,6,7,8-HxCDF	IS	88.7	40 - 135		05-Jan-24 23:04	1
13C-1,2,3,7,8,9-HxCDF	IS	90.0	40 - 135		05-Jan-24 23:04	1
13C-1,2,3,4,6,7,8-HpCDF	IS	79.6	40 - 135		05-Jan-24 23:04	1
13C-1,2,3,4,7,8,9-HpCDF	IS	83.0	40 - 135		05-Jan-24 23:04	1
13C-OCDF	IS	72.6	40 - 135		05-Jan-24 23:04	1
37Cl-2,3,7,8-TCDD	CRS	92.9	40 - 135		05-Jan-24 23:04	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: AOI-089-1.0-1.5**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2312096-04	Date Received:	12-Dec-23 09:56
Project:	A3L1035	QC Batch:	B24A018	Date Extracted:	21-Dec-23
Matrix:	Soil	Sample Size:	12.9 g	Column:	ZB-DIOXIN
Date Collected:	06-Dec-23 11:30	% Solids:	77.4		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.190	0.303		05-Jan-24 23:50	1
1,2,3,7,8-PeCDD	3.19		0.784			05-Jan-24 23:50	1
1,2,3,4,7,8-HxCDD	6.74		0.633			05-Jan-24 23:50	1
1,2,3,6,7,8-HxCDD	35.2		0.640			05-Jan-24 23:50	1
1,2,3,7,8,9-HxCDD	13.5		0.717			05-Jan-24 23:50	1
1,2,3,4,6,7,8-HpCDD	597		0.706			05-Jan-24 23:50	1
OCDD	4280		1.62			05-Jan-24 23:50	1
2,3,7,8-TCDF	0.919		0.183			05-Jan-24 23:50	1
1,2,3,7,8-PeCDF	1.95		0.576		J	05-Jan-24 23:50	1
2,3,4,7,8-PeCDF	3.98		0.686			05-Jan-24 23:50	1
1,2,3,4,7,8-HxCDF	5.68		0.659			05-Jan-24 23:50	1
1,2,3,6,7,8-HxCDF	3.54		0.621			05-Jan-24 23:50	1
2,3,4,6,7,8-HxCDF	1.61		0.661		J	05-Jan-24 23:50	1
1,2,3,7,8,9-HxCDF	1.44		0.716		J	05-Jan-24 23:50	1
1,2,3,4,6,7,8-HpCDF	46.8		0.649			05-Jan-24 23:50	1
1,2,3,4,7,8,9-HpCDF	2.41		0.818		J	05-Jan-24 23:50	1
OCDF	30.8		3.84			05-Jan-24 23:50	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	19.1
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**Totals**

Total TCDD	3.48			4.98			
Total PeCDD	13.5			17.4			
Total HxCDD	145						
Total HpCDD	998						
Total TCDF	15.7			16.1			
Total PeCDF	35.8			36.0			
Total HxCDF	120			121			
Total HpCDF	129						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	99.5	40 - 135		05-Jan-24 23:50	1
13C-1,2,3,7,8-PeCDD	IS	79.8	40 - 135		05-Jan-24 23:50	1
13C-1,2,3,4,7,8-HxCDD	IS	85.4	40 - 135		05-Jan-24 23:50	1
13C-1,2,3,6,7,8-HxCDD	IS	89.6	40 - 135		05-Jan-24 23:50	1
13C-1,2,3,7,8,9-HxCDD	IS	85.2	40 - 135		05-Jan-24 23:50	1
13C-1,2,3,4,6,7,8-HpCDD	IS	82.0	40 - 135		05-Jan-24 23:50	1
13C-OCDD	IS	67.9	40 - 135		05-Jan-24 23:50	1
13C-2,3,7,8-TCDF	IS	94.1	40 - 135		05-Jan-24 23:50	1
13C-1,2,3,7,8-PeCDF	IS	84.9	40 - 135		05-Jan-24 23:50	1
13C-2,3,4,7,8-PeCDF	IS	85.5	40 - 135		05-Jan-24 23:50	1
13C-1,2,3,4,7,8-HxCDF	IS	90.2	40 - 135		05-Jan-24 23:50	1
13C-1,2,3,6,7,8-HxCDF	IS	91.2	40 - 135		05-Jan-24 23:50	1
13C-2,3,4,6,7,8-HxCDF	IS	89.3	40 - 135		05-Jan-24 23:50	1
13C-1,2,3,7,8,9-HxCDF	IS	91.5	40 - 135		05-Jan-24 23:50	1
13C-1,2,3,4,6,7,8-HpCDF	IS	76.1	40 - 135		05-Jan-24 23:50	1
13C-1,2,3,4,7,8,9-HpCDF	IS	82.6	40 - 135		05-Jan-24 23:50	1
13C-OCDF	IS	66.3	40 - 135		05-Jan-24 23:50	1
37Cl-2,3,7,8-TCDD	CRS	94.1	40 - 135		05-Jan-24 23:50	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.



**Sample ID: AOI-056-1.0-1.5**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2312096-05	Date Received:	12-Dec-23 09:56
Project:	A3L1035	QC Batch:	B24A018	Date Extracted:	21-Dec-23
Matrix:	Soil	Sample Size:	12.5 g	Column:	ZB-DIOXIN
Date Collected:	06-Dec-23 12:15	% Solids:	80.3		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.207	0.189			06-Jan-24 00:37	1
1,2,3,7,8-PeCDD	0.649		0.781		J	06-Jan-24 00:37	1
1,2,3,4,7,8-HxCDD	1.21		0.631		J	06-Jan-24 00:37	1
1,2,3,6,7,8-HxCDD	4.05		0.638			06-Jan-24 00:37	1
1,2,3,7,8,9-HxCDD	2.21		0.715		J	06-Jan-24 00:37	1
1,2,3,4,6,7,8-HpCDD	78.8		0.704			06-Jan-24 00:37	1
OCDD	492		1.61			06-Jan-24 00:37	1
2,3,7,8-TCDF	ND	0.216	0.182			06-Jan-24 00:37	1
1,2,3,7,8-PeCDF	0.522		0.574		J	06-Jan-24 00:37	1
2,3,4,7,8-PeCDF	1.04		0.684		J	06-Jan-24 00:37	1
1,2,3,4,7,8-HxCDF	2.04		0.657		J	06-Jan-24 00:37	1
1,2,3,6,7,8-HxCDF	1.14		0.619		J	06-Jan-24 00:37	1
2,3,4,6,7,8-HxCDF	0.427		0.659		J	06-Jan-24 00:37	1
1,2,3,7,8,9-HxCDF	0.253		0.714		J	06-Jan-24 00:37	1
1,2,3,4,6,7,8-HpCDF	10.9		0.647			06-Jan-24 00:37	1
1,2,3,4,7,8,9-HpCDF	0.808		0.815		J	06-Jan-24 00:37	1
OCDF	9.48		3.83			06-Jan-24 00:37	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	3.17
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**Totals**

Total TCDD	ND		0.313
Total PeCDD	2.59		
Total HxCDD	22.0		23.4
Total HpCDD	134		
Total TCDF	1.53		
Total PeCDF	8.62		9.05
Total HxCDF	26.5		26.9
Total HpCDF	27.5		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	106	40 - 135		06-Jan-24 00:37	1
13C-1,2,3,7,8-PeCDD	IS	86.8	40 - 135		06-Jan-24 00:37	1
13C-1,2,3,4,7,8-HxCDD	IS	86.4	40 - 135		06-Jan-24 00:37	1
13C-1,2,3,6,7,8-HxCDD	IS	93.4	40 - 135		06-Jan-24 00:37	1
13C-1,2,3,7,8,9-HxCDD	IS	88.8	40 - 135		06-Jan-24 00:37	1
13C-1,2,3,4,6,7,8-HpCDD	IS	82.4	40 - 135		06-Jan-24 00:37	1
13C-OCDD	IS	71.3	40 - 135		06-Jan-24 00:37	1
13C-2,3,7,8-TCDF	IS	95.6	40 - 135		06-Jan-24 00:37	1
13C-1,2,3,7,8-PeCDF	IS	90.8	40 - 135		06-Jan-24 00:37	1
13C-2,3,4,7,8-PeCDF	IS	88.0	40 - 135		06-Jan-24 00:37	1
13C-1,2,3,4,7,8-HxCDF	IS	93.5	40 - 135		06-Jan-24 00:37	1
13C-1,2,3,6,7,8-HxCDF	IS	103	40 - 135		06-Jan-24 00:37	1
13C-2,3,4,6,7,8-HxCDF	IS	93.7	40 - 135		06-Jan-24 00:37	1
13C-1,2,3,7,8,9-HxCDF	IS	94.4	40 - 135		06-Jan-24 00:37	1
13C-1,2,3,4,6,7,8-HpCDF	IS	83.6	40 - 135		06-Jan-24 00:37	1
13C-1,2,3,4,7,8,9-HpCDF	IS	82.1	40 - 135		06-Jan-24 00:37	1
13C-OCDF	IS	72.1	40 - 135		06-Jan-24 00:37	1
37Cl-2,3,7,8-TCDD	CRS	95.5	40 - 135		06-Jan-24 00:37	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: AOI-046-1.0-1.5**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2312096-06	Date Received:	12-Dec-23 09:56
Project:	A3L1035	QC Batch:	B24A018	Date Extracted:	21-Dec-23
Matrix:	Soil	Sample Size:	12.6 g	Column:	ZB-DIOXIN
Date Collected:	06-Dec-23 13:05	% Solids:	80.7		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.128	0.187			06-Jan-24 01:23	1
1,2,3,7,8-PeCDD	ND	0.339	0.773			06-Jan-24 01:23	1
1,2,3,4,7,8-HxCDD	ND	0.379	0.624			06-Jan-24 01:23	1
1,2,3,6,7,8-HxCDD	2.18		0.631		J	06-Jan-24 01:23	1
1,2,3,7,8,9-HxCDD	0.909		0.707		J	06-Jan-24 01:23	1
1,2,3,4,6,7,8-HpCDD	44.5		0.696			06-Jan-24 01:23	1
OCDD	353		1.60			06-Jan-24 01:23	1
2,3,7,8-TCDF	0.209		0.180		J	06-Jan-24 01:23	1
1,2,3,7,8-PeCDF	0.325		0.568		J	06-Jan-24 01:23	1
2,3,4,7,8-PeCDF	ND		0.676	0.850		06-Jan-24 01:23	1
1,2,3,4,7,8-HxCDF	1.56		0.649		J	06-Jan-24 01:23	1
1,2,3,6,7,8-HxCDF	0.630		0.612		J	06-Jan-24 01:23	1
2,3,4,6,7,8-HxCDF	0.651		0.651		J	06-Jan-24 01:23	1
1,2,3,7,8,9-HxCDF	ND		0.706	0.245		06-Jan-24 01:23	1
1,2,3,4,6,7,8-HpCDF	6.73		0.639			06-Jan-24 01:23	1
1,2,3,4,7,8,9-HpCDF	0.445		0.806		J	06-Jan-24 01:23	1
OCDF	5.07		3.78			06-Jan-24 01:23	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	1.25
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**Totals**

Total TCDD	ND	0.128					
Total PeCDD	ND			0.431			
Total HxCDD	10.2			10.6			
Total HpCDD	75.8						
Total TCDF	1.43			1.87			
Total PeCDF	6.09			7.19			
Total HxCDF	18.5			18.8			
Total HpCDF	16.9						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	103	40 - 135		06-Jan-24 01:23	1
13C-1,2,3,7,8-PeCDD	IS	74.6	40 - 135		06-Jan-24 01:23	1
13C-1,2,3,4,7,8-HxCDD	IS	86.8	40 - 135		06-Jan-24 01:23	1
13C-1,2,3,6,7,8-HxCDD	IS	88.1	40 - 135		06-Jan-24 01:23	1
13C-1,2,3,7,8,9-HxCDD	IS	89.5	40 - 135		06-Jan-24 01:23	1
13C-1,2,3,4,6,7,8-HpCDD	IS	82.2	40 - 135		06-Jan-24 01:23	1
13C-OCDD	IS	65.9	40 - 135		06-Jan-24 01:23	1
13C-2,3,7,8-TCDF	IS	97.0	40 - 135		06-Jan-24 01:23	1
13C-1,2,3,7,8-PeCDF	IS	82.1	40 - 135		06-Jan-24 01:23	1
13C-2,3,4,7,8-PeCDF	IS	79.0	40 - 135		06-Jan-24 01:23	1
13C-1,2,3,4,7,8-HxCDF	IS	95.5	40 - 135		06-Jan-24 01:23	1
13C-1,2,3,6,7,8-HxCDF	IS	95.0	40 - 135		06-Jan-24 01:23	1
13C-2,3,4,6,7,8-HxCDF	IS	92.9	40 - 135		06-Jan-24 01:23	1
13C-1,2,3,7,8,9-HxCDF	IS	92.2	40 - 135		06-Jan-24 01:23	1
13C-1,2,3,4,6,7,8-HpCDF	IS	78.6	40 - 135		06-Jan-24 01:23	1
13C-1,2,3,4,7,8,9-HpCDF	IS	82.3	40 - 135		06-Jan-24 01:23	1
13C-OCDF	IS	71.7	40 - 135		06-Jan-24 01:23	1
37Cl-2,3,7,8-TCDD	CRS	96.3	40 - 135		06-Jan-24 01:23	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: AOI-061-1.0-1.5**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2312096-07	Date Received:	12-Dec-23 09:56
Project:	A3L1035	QC Batch:	B24A018	Date Extracted:	21-Dec-23
Matrix:	Soil	Sample Size:	12.8 g	Column:	ZB-DIOXIN
Date Collected:	06-Dec-23 13:30	% Solids:	78.7		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.192	0.189			06-Jan-24 02:09	1
1,2,3,7,8-PeCDD	0.840		0.778		J	06-Jan-24 02:09	1
1,2,3,4,7,8-HxCDD	1.51		0.628		J	06-Jan-24 02:09	1
1,2,3,6,7,8-HxCDD	13.7		0.635			06-Jan-24 02:09	1
1,2,3,7,8,9-HxCDD	3.09		0.711			06-Jan-24 02:09	1
1,2,3,4,6,7,8-HpCDD	220		0.701			06-Jan-24 02:09	1
OCDD	1130		1.61			06-Jan-24 02:09	1
2,3,7,8-TCDF	ND	0.153	0.182			06-Jan-24 02:09	1
1,2,3,7,8-PeCDF	0.814		0.572		J	06-Jan-24 02:09	1
2,3,4,7,8-PeCDF	1.60		0.681		J	06-Jan-24 02:09	1
1,2,3,4,7,8-HxCDF	3.33		0.654			06-Jan-24 02:09	1
1,2,3,6,7,8-HxCDF	2.21		0.616		J	06-Jan-24 02:09	1
2,3,4,6,7,8-HxCDF	2.40		0.656		J	06-Jan-24 02:09	1
1,2,3,7,8,9-HxCDF	ND		0.710	0.822		06-Jan-24 02:09	1
1,2,3,4,6,7,8-HpCDF	31.4		0.644			06-Jan-24 02:09	1
1,2,3,4,7,8,9-HpCDF	2.05		0.812		J	06-Jan-24 02:09	1
OCDF	27.0		3.81			06-Jan-24 02:09	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	6.85
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**Totals**

Total TCDD	ND		0.257	
Total PeCDD	2.36		4.72	J
Total HxCDD	49.9			
Total HpCDD	344			
Total TCDF	2.73			
Total PeCDF	14.6		16.0	
Total HxCDF	72.8		74.2	
Total HpCDF	89.1			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	86.8	40 - 135		06-Jan-24 02:09	1
13C-1,2,3,7,8-PeCDD	IS	65.4	40 - 135		06-Jan-24 02:09	1
13C-1,2,3,4,7,8-HxCDD	IS	71.1	40 - 135		06-Jan-24 02:09	1
13C-1,2,3,6,7,8-HxCDD	IS	73.1	40 - 135		06-Jan-24 02:09	1
13C-1,2,3,7,8,9-HxCDD	IS	69.6	40 - 135		06-Jan-24 02:09	1
13C-1,2,3,4,6,7,8-HpCDD	IS	63.1	40 - 135		06-Jan-24 02:09	1
13C-OCDD	IS	48.3	40 - 135		06-Jan-24 02:09	1
13C-2,3,7,8-TCDF	IS	84.0	40 - 135		06-Jan-24 02:09	1
13C-1,2,3,7,8-PeCDF	IS	68.8	40 - 135		06-Jan-24 02:09	1
13C-2,3,4,7,8-PeCDF	IS	68.8	40 - 135		06-Jan-24 02:09	1
13C-1,2,3,4,7,8-HxCDF	IS	81.9	40 - 135		06-Jan-24 02:09	1
13C-1,2,3,6,7,8-HxCDF	IS	84.1	40 - 135		06-Jan-24 02:09	1
13C-2,3,4,6,7,8-HxCDF	IS	77.5	40 - 135		06-Jan-24 02:09	1
13C-1,2,3,7,8,9-HxCDF	IS	77.2	40 - 135		06-Jan-24 02:09	1
13C-1,2,3,4,6,7,8-HpCDF	IS	64.8	40 - 135		06-Jan-24 02:09	1
13C-1,2,3,4,7,8,9-HpCDF	IS	66.9	40 - 135		06-Jan-24 02:09	1
13C-OCDF	IS	54.9	40 - 135		06-Jan-24 02:09	1
37Cl-2,3,7,8-TCDD	CRS	84.2	40 - 135		06-Jan-24 02:09	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: AOI-066-1.0-1.5**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2312096-08	Date Received:	12-Dec-23 09:56
Project:	A3L1035	QC Batch:	B24A018	Date Extracted:	21-Dec-23
Matrix:	Soil	Sample Size:	12.6 g	Column:	ZB-DIOXIN
Date Collected:	06-Dec-23 14:00	% Solids:	79.7		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.212	0.190			06-Jan-24 02:55	1
1,2,3,7,8-PeCDD	0.762		0.784		J	06-Jan-24 02:55	1
1,2,3,4,7,8-HxCDD	1.21		0.633		J	06-Jan-24 02:55	1
1,2,3,6,7,8-HxCDD	3.36		0.640			06-Jan-24 02:55	1
1,2,3,7,8,9-HxCDD	2.51		0.717			06-Jan-24 02:55	1
1,2,3,4,6,7,8-HpCDD	73.1		0.706			06-Jan-24 02:55	1
OCDD	469		1.62			06-Jan-24 02:55	1
2,3,7,8-TCDF	ND	0.173	0.183			06-Jan-24 02:55	1
1,2,3,7,8-PeCDF	0.429		0.576		J	06-Jan-24 02:55	1
2,3,4,7,8-PeCDF	ND		0.686	0.483		06-Jan-24 02:55	1
1,2,3,4,7,8-HxCDF	1.12		0.659		J	06-Jan-24 02:55	1
1,2,3,6,7,8-HxCDF	1.21		0.621		J	06-Jan-24 02:55	1
2,3,4,6,7,8-HxCDF	0.712		0.661		J	06-Jan-24 02:55	1
1,2,3,7,8,9-HxCDF	ND	0.428	0.716			06-Jan-24 02:55	1
1,2,3,4,6,7,8-HpCDF	11.2		0.649			06-Jan-24 02:55	1
1,2,3,4,7,8,9-HpCDF	1.08		0.818		J	06-Jan-24 02:55	1
OCDF	15.7		3.84			06-Jan-24 02:55	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	2.79
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**Totals**

Total TCDD	ND	0.212		
Total PeCDD	3.13			
Total HxCDD	22.9			
Total HpCDD	117			
Total TCDF	0.619		1.02	
Total PeCDF	3.39		7.05	
Total HxCDF	18.9		19.5	
Total HpCDF	27.8			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	103	40 - 135		06-Jan-24 02:55	1
13C-1,2,3,7,8-PeCDD	IS	73.0	40 - 135		06-Jan-24 02:55	1
13C-1,2,3,4,7,8-HxCDD	IS	81.9	40 - 135		06-Jan-24 02:55	1
13C-1,2,3,6,7,8-HxCDD	IS	83.3	40 - 135		06-Jan-24 02:55	1
13C-1,2,3,7,8,9-HxCDD	IS	79.8	40 - 135		06-Jan-24 02:55	1
13C-1,2,3,4,6,7,8-HpCDD	IS	73.3	40 - 135		06-Jan-24 02:55	1
13C-OCDD	IS	59.3	40 - 135		06-Jan-24 02:55	1
13C-2,3,7,8-TCDF	IS	95.3	40 - 135		06-Jan-24 02:55	1
13C-1,2,3,7,8-PeCDF	IS	78.7	40 - 135		06-Jan-24 02:55	1
13C-2,3,4,7,8-PeCDF	IS	78.0	40 - 135		06-Jan-24 02:55	1
13C-1,2,3,4,7,8-HxCDF	IS	91.8	40 - 135		06-Jan-24 02:55	1
13C-1,2,3,6,7,8-HxCDF	IS	94.0	40 - 135		06-Jan-24 02:55	1
13C-2,3,4,6,7,8-HxCDF	IS	91.1	40 - 135		06-Jan-24 02:55	1
13C-1,2,3,7,8,9-HxCDF	IS	90.2	40 - 135		06-Jan-24 02:55	1
13C-1,2,3,4,6,7,8-HpCDF	IS	77.9	40 - 135		06-Jan-24 02:55	1
13C-1,2,3,4,7,8,9-HpCDF	IS	78.9	40 - 135		06-Jan-24 02:55	1
13C-OCDF	IS	65.1	40 - 135		06-Jan-24 02:55	1
37Cl-2,3,7,8-TCDD	CRS	98.1	40 - 135		06-Jan-24 02:55	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection Limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
MDL	Method Detection Limit
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
RL	For 537.1, the reported RLs are the MRLs.
TEQ	Toxic Equivalency, sum of the toxic equivalency factors (TEF) multiplied by the sample concentrations.
TEQMax	TEQ calculation that uses the detection limit as the concentration for non-detects
TEQMin	TEQ calculation that uses zero as the concentration for non-detects
TEQRisk	TEQ calculation that uses ½ the detection limit as the concentration for non-detects
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Enthalpy Analytical - EDH Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	21-023-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2020018
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	2211390
Nevada Division of Environmental Protection	CA00413
New Hampshire Environmental Accreditation Program	207721
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Ohio Environmental Protection Agency	87778
Oregon Laboratory Accreditation Program	4042-021
Texas Commission on Environmental Quality	T104704189-22-13
Vermont Department of Health	VT-4042
Virginia Department of General Services	11276
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters can be found at [Enthalpy.com/Resources/Accreditations](http://Enthalpy.com/Resources/Accreditations).*

**SUBCONTRACT ORDER**

Apex Laboratories  
A3L1035

— revised COC — rec'd via email on 12/12/23 1508 —  
MUS 12/12/23

**SENDING LABORATORY:**

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Philip Nerenberg

**RECEIVING LABORATORY:**

Enthalpy Analytical- CA  
1104 Windfield Way  
El Dorado Hills, CA 95762  
Phone : (916) 673-1520  
Fax: -

**Sample Name: AOI-087-1.0-1.5** Soil **Sampled: 12/06/23 10:30** (A3L1035-01)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) <i>Containers Supplied:</i> (A)8 oz Glass Jar	12/19/23 17:00	12/05/24 10:30	

**Sample Name: AOI-043-1.0-1.5** Soil **Sampled: 12/06/23 10:00** (A3L1035-03)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) <i>Containers Supplied:</i> (A)8 oz Glass Jar	12/19/23 17:00	12/05/24 10:00	

**Sample Name: AOI-083-1.0-1.5** Soil **Sampled: 12/06/23 11:00** (A3L1035-05)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) <i>Containers Supplied:</i> (A)8 oz Glass Jar	12/19/23 17:00	12/05/24 11:00	

**Sample Name: AOI-089-1.0-1.5** Soil **Sampled: 12/06/23 11:30** (A3L1035-07)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) <i>Containers Supplied:</i> (A)8 oz Glass Jar	12/19/23 17:00	12/05/24 11:30	

Fed Ex (Shipper)

Released By	Date	Received By	Date
Fed Ex (Shipper)		— see original COC —	
Released By	Date	Received By	Date



revised coc - rec'd via email on 12/12/23 1508 - 12/12/23

SUBCONTRACT ORDER

Apex Laboratories  
A3L1035

Sample Name: AOI-056-1.0-1.5 Soil Sampled: 12/06/23 12:15 (A3L1035-09)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 12:15	
<i>Containers Supplied:</i>			
(A)8 oz Glass Jar			

Sample Name: AOI-046-1.0-1.5 Soil Sampled: 12/06/23 13:05 (A3L1035-11)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 13:05	
<i>Containers Supplied:</i>			
(A)8 oz Glass Jar			

Sample Name: AOI-061-1.0-1.5 Soil Sampled: 12/06/23 13:30 (A3L1035-13)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 13:30	
<i>Containers Supplied:</i>			
(A)8 oz Glass Jar			

Sample Name: AOI-066-1.0-1.5 Soil Sampled: 12/06/23 14:00 (A3L1035-15)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 14:00	
<i>Containers Supplied:</i>			
(A)8 oz Glass Jar			

Fed Ex (Shipper)

Released By	Date	Received By	Date
Fed Ex (Shipper)			
Released By	Date	Received By	Date
		per original coc	

SUBCONTRACT ORDER

Apex Laboratories

A3L1035

- See revised COC -

AKC 12/11/23

SENDING LABORATORY:

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Enthalpy Analytical- CA  
1104 Windfield Way  
El Dorado Hills, CA 95762  
Phone: (916) 673-1520  
Fax: -

**Sample Name: A01-087-1.0-1.5** Soil **Sampled: 12/06/23 10:30** (A3L1035-01) ✓

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 10:30	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

**Sample Name: A01-043-1.0-1.5** Soil **Sampled: 12/06/23 10:00** (A3L1035-03) ✓

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 10:00	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

**Sample Name: A01-083-1.0-1.5** Soil **Sampled: 12/06/23 11:00** (A3L1035-05) ✓

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 11:00	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

**Sample Name: A01-089-1.0-1.5** Soil **Sampled: 12/06/23 11:30** (A3L1035-07) ✓

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 11:30	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

Standard TAT

Released By	Date	Received By	Date
<i>[Signature]</i>	12/11/23	Fed Ex (Shipper)	
Released By	Date	Received By	Date
Fed Ex (Shipper)		Xitabay Olivos <i>[Signature]</i>	12/12/23

SUBCONTRACT ORDER

- See revised GC -

Apex Laboratories

A3L1035

Sample Name: A01-056-1.0-1.5 Soil Sampled: 12/06/23 12:15 (A3L1035-09) ✓

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 12:15	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

Sample Name: A01-046-1.0-1.5 Soil Sampled: 12/06/23 13:05 (A3L1035-11) ✓

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 13:05	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

Sample Name: A01-061-1.0-1.5 Soil Sampled: 12/06/23 13:30 (A3L1035-13) ✓

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 13:30	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

Sample Name: A01-065-1.0-1.5 Soil Sampled: 12/06/23 14:00 (A3L1035-15) ✓

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	12/19/23 17:00	12/05/24 14:00	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

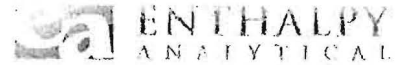
Standard TAT

Released By: [Signature] Date: 12/11/23 Received By: [Signature] Date: 12/12/23

Fed Ex (Shipper)

Released By: [Signature] Date: 12/11/23 Received By: Xitlaly Olivos [Signature] Date: 12/12/23

# Sample Log-In Checklist



Page # 1 of 1

Work Order #: 2312096 TAT STJ

Samples Arrival:	Date/Time <u>12/12/23</u> <u>9:56</u>	Initials: <u>VAC</u>	Location: <u>WR-1</u>
Delivered By:		Shelf/Rack: <u>N/A</u>	
<input checked="" type="radio"/> FedEx <input type="radio"/> UPS <input type="radio"/> On Trac <input type="radio"/> GLS <input type="radio"/> DHL <input type="radio"/> Hand Delivered <input type="radio"/> Other			
Preservation:		<input checked="" type="radio"/> Ice <input type="radio"/> Blue Ice <input type="radio"/> Techni Ice <input type="radio"/> Dry Ice <input type="radio"/> None	
Temp °C: <u>2.8</u> <sup>c</sup> (uncorrected)	Probe used: Y <input checked="" type="radio"/> N		Thermometer ID: <u>TR-4</u>
Temp °C: <u>2.8</u> <sup>c</sup> (corrected)			

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill <u>                    </u> Trk # <u>77443711 1753</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	Enthalpy	<input checked="" type="radio"/> Client	Retain <input checked="" type="radio"/> Return <input type="radio"/> Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Logged In:	Date/Time <u>12/14/23 08:34</u>	Initials: <u>JA</u>	Location: <u>WR2</u> Shelf/Rack: <u>G-6</u>
COC Anomaly/Sample Acceptance Form completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Comments:



# CoC/Label Reconciliation Report WO# 2312096

LabNumber	CoC Sample ID	Sample Alias	Sample Date/Time	Container	BaseMatrix	Sample Comments
2312096-01	A AOI-087-1.0-1.5	(A3L1035-01)	06-Dec-23 10:30	Clear Glass Jar, 250mL	Solid	
2312096-02	A AOI-043-1.0-1.5	(A3L1035-03)	06-Dec-23 10:00	Clear Glass Jar, 250mL	Solid	
2312096-03	A AOI-083-1.0-1.5	(A3L1035-05)	06-Dec-23 11:00	Clear Glass Jar, 250mL	Solid	
2312096-04	A AOI-089-1.0-1.5	(A3L1035-07)	06-Dec-23 11:30	Clear Glass Jar, 250mL	Solid	
2312096-05	A AOI-056-1.0-1.5	(A3L1035-09)	06-Dec-23 12:15	Clear Glass Jar, 250mL	Solid	
2312096-06	A AOI-046-1.0-1.5	(A3L1035-11)	06-Dec-23 13:05	Clear Glass Jar, 250mL	Solid	
2312096-07	A AOI-061-1.0-1.5	(A3L1035-13)	06-Dec-23 13:30	Clear Glass Jar, 250mL	Solid	
2312096-08	A AOI-066-1.0-1.5	(A3L1035-15)	06-Dec-23 14:00	Clear Glass Jar, 250mL	Solid	

B  
  
  
  
  
  
  
  
 A

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		

Comments: A) Sample label ID - AOI-065-1.0-1.5 - Sample ID was updated per revised COC.  
 B) Sample came in clean Jar

Preservation Documented: Na2S2O3    Trizma    NH4CH3CO2    None    Other

Verified by/Date: KA 12/14/23  
JT 12/14/23



ANALYTICAL REPORT

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

Wednesday, March 6, 2024

Meaghan Pollock  
Maul Foster & Alongi, INC.  
3140 NE Broadway Street  
Portland, OR 97232

RE: A3L1378 - Port of Ridgefield - M9003.01.061

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A3L1378, which was received by the laboratory on 12/18/2023 at 12:40:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information	
<p><u>Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.</u></p> <p>(See Cooler Receipt Form for details)</p>	
<p>Default Cooler</p> <hr style="width: 80%; margin-left: 0;"/>	<p>2.5 degC</p>

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.  
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.



Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director



**ANALYTICAL REPORT**

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b><u>Maul Foster &amp; Alongi, INC.</u></b> 3140 NE Broadway Street Portland, OR 97232	Project: <b><u>Port of Ridgefield</u></b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> <b>A3L1378 - 03 06 24 2338</b>
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
AOI081-1.0-1.5	A3L1378-01	Soil	12/15/23 09:30	12/18/23 12:40
AOI079-1.0-1.5	A3L1378-03	Soil	12/15/23 10:00	12/18/23 12:40
AOI057-1.0-1.5	A3L1378-05	Soil	12/15/23 10:40	12/18/23 12:40

Apex Laboratories

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Philip Nerenberg, Lab Director





ANALYTICAL REPORT

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<u>Maul Foster &amp; Alongi, INC.</u> 3140 NE Broadway Street Portland, OR 97232	Project: <u>Port of Ridgefield</u> Project Number: M9003.01.061 Project Manager: Meaghan Pollock	<u>Report ID:</u> A3L1378 - 03 06 24 2338
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ANALYTICAL CASE NARRATIVE

A3L1378	Apex Laboratories
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Samples were subcontracted to Enthalpy Analytical for dioxin analysis, see report attached.

Apex Laboratories

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Philip Nerenberg, Lab Director



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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

There are No Qualifiers on Sample or QC Data for this report

Apex Laboratories

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.
  - " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.
- Results for Volatiles analyses on soils and sediments that are reported on a "dry weight" basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an "As Received" basis do not have the WMS correction applied, as dry weight was not performed.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Apex Laboratories

Philip Nerenberg, Lab Director

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**ANALYTICAL REPORT**

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b>Maul Foster &amp; Alongi, INC.</b> 3140 NE Broadway Street Portland, OR 97232	Project: <b>Port of Ridgefield</b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> <b>A3L1378 - 03 06 24 2338</b>
--	--	---

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).

- For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
- For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.

For further details, please request a copy of this document.

- Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

**Benzofluoranthene Isomer Reporting:**

Due to coelution on the analytical column, the Benzo(b)fluoranthene results represent the concentration of both Benzo(b)fluoranthene and Benzo(j) fluoranthene. Calibration is based on the response of Benzo(b)fluoranthene, and the results represent the combined Benzo(b+j)fluoranthene(s).

Apex Laboratories

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client (Maul Foster & Alongi, INC.), Project (Port of Ridgefield), and Report ID (A3L1378 - 03 06 24 2338).

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Table with 6 columns: Matrix, Analysis, TNI\_ID, Analyte, TNI\_ID, Accreditation. Includes a note: All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Handwritten signature of Philip Nerenberg

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Philip Nerenberg, Lab Director





ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b>Maul Foster &amp; Alongi, INC.</b> 3140 NE Broadway Street Portland, OR 97232	Project: <b>Port of Ridgefield</b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	Report ID: <b>A3L1378 - 03 06 24 2338</b>
--	--	--

**APEX LABS COOLER RECEIPT FORM**

Client: MFA Element WO#: A3 L1378

Project/Project #: POR Yard Sample / M9003.01.061

**Delivery Info:**  
Date/time received: 12/18/23 @ 12:40 By: AJM  
Delivered by: Apex  Client  ESS  FedEx  UPS  Radio  Morgan  SDS  Evergreen  Other

**Cooler Inspection** Date/time inspected: 12/18/23 @ 13:53 By: AJM  
Chain of Custody included? Yes  No   
Signed/dated by client? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>2.5</u>						
Custody seals? (Y/N)	<u>N</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>Y</u>						
Ice type: (Gel/Real/Other)	<u>Ice</u>						
Condition (In/Out):	<u>In</u>						

Cooler out of temp? (Y/N) Possible reason why: (N)  
Green dots applied to out of temperature samples? Yes  No   
Out of temperature samples form initiated? Yes  No

**Sample Inspection:** Date/time inspected: 12/18/23 @ 17:52 By: APW  
All samples intact? Yes  No  Comments: \_\_\_\_\_  
Bottle labels/COCs agree? Yes  No  Comments: \_\_\_\_\_  
COC/container discrepancies form initiated? Yes  No   
Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_  
Do VOA vials have visible headspace? Yes  No  NA   
Comments: \_\_\_\_\_  
Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA  pH ID: \_\_\_\_\_  
Comments: \_\_\_\_\_

**Additional information:** \_\_\_\_\_  
\_\_\_\_\_

Labeled by: APW Witness: DJS Cooler Inspected by: APW  
Form Y-003 R-01

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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January 31, 2024

**Enthalpy Analytical - El Dorado Hills  
Work Order No. 2312158**

Mr. Philip Nerenberg  
Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223

Dear Mr. Nerenberg,

Enclosed are the results for the sample set received at Enthalpy Analytical - EDH on December 20, 2023 under your Project Name 'A3L1378 / Port of Ridgefield'.

Enthalpy Analytical - EDH is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [kathy.zipp@enthalpy.com](mailto:kathy.zipp@enthalpy.com).

Thank you for choosing Enthalpy Analytical - EDH as part of your analytical support team.

Sincerely,

Kathy Zipp  
Project Manager

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## **Enthalpy Analytical - EDH Work Order No. 2312158**

### **Case Narrative**

#### **Sample Condition on Receipt:**

Three soil samples were received and stored securely in accordance with Enthalpy Analytical - EDH standard operating procedures and EPA methodology. The samples were received in good condition and within the method temperature requirements.

#### **Analytical Notes:**

##### **EPA Method 8290A**

The samples were extracted and analyzed for tetra-through-octa chlorinated dioxins and furans by EPA Method 8290A using a ZB-DIOXIN GC column.

##### **Holding Times**

The samples were re-extracted outside the method holding time and analyzed within the analytical hold time.

##### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank. The OPR recoveries were within the method acceptance criteria.

Labeled standard recoveries for all QC and field samples were within method acceptance criteria.

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# Sample Inventory Report

Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2312158-01	AOI081-1.0-1.5	15-Dec-23 09:30	20-Dec-23 10:43	Clear Glass Jar, 250mL
2312158-02	AOI079-1.0-1.5	15-Dec-23 10:00	20-Dec-23 10:43	Clear Glass Jar, 250mL
2312158-03	AOI057-1.0-1.5	15-Dec-23 10:40	20-Dec-23 10:43	Clear Glass Jar, 250mL

## **ANALYTICAL RESULTS**

**Sample ID: Method Blank**
**EPA Method 8290A**

Client Data		Laboratory Data				
Name:	Apex Laboratories	Lab Sample:	B24A176-BLK1		Date Extracted:	23-Jan-24
Project:	A3L1378 / Port of Ridgefield	QC Batch:	B24A176		Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	10.0 g			

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.116	0.190			25-Jan-24 17:08	1
1,2,3,7,8-PeCDD	ND	0.206	0.784			25-Jan-24 17:08	1
1,2,3,4,7,8-HxCDD	ND	0.218	0.633			25-Jan-24 17:08	1
1,2,3,6,7,8-HxCDD	ND	0.247	0.640			25-Jan-24 17:08	1
1,2,3,7,8,9-HxCDD	ND	0.260	0.717			25-Jan-24 17:08	1
1,2,3,4,6,7,8-HpCDD	ND	0.266	0.706			25-Jan-24 17:08	1
OCDD	ND	0.519	1.62			25-Jan-24 17:08	1
2,3,7,8-TCDF	ND	0.111	0.183			25-Jan-24 17:08	1
1,2,3,7,8-PeCDF	ND	0.145	0.576			25-Jan-24 17:08	1
2,3,4,7,8-PeCDF	ND	0.138	0.686			25-Jan-24 17:08	1
1,2,3,4,7,8-HxCDF	ND	0.122	0.659			25-Jan-24 17:08	1
1,2,3,6,7,8-HxCDF	ND	0.128	0.621			25-Jan-24 17:08	1
2,3,4,6,7,8-HxCDF	ND	0.147	0.661			25-Jan-24 17:08	1
1,2,3,7,8,9-HxCDF	ND	0.0995	0.716			25-Jan-24 17:08	1
1,2,3,4,6,7,8-HpCDF	ND	0.138	0.649			25-Jan-24 17:08	1
1,2,3,4,7,8,9-HpCDF	ND	0.229	0.818			25-Jan-24 17:08	1
OCDF	ND	0.427	3.84			25-Jan-24 17:08	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	0.00
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**Totals**

Total TCDD	ND	0.116					
Total PeCDD	ND	0.206					
Total HxCDD	ND	0.260					
Total HpCDD	ND	0.266					
Total TCDF	ND	0.111					
Total PeCDF	ND	0.145					
Total HxCDF	ND	0.147					
Total HpCDF	ND	0.229					

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	93.4	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,7,8-PeCDD	IS	84.4	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,4,7,8-HxCDD	IS	91.2	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,6,7,8-HxCDD	IS	92.9	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,7,8,9-HxCDD	IS	91.5	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,4,6,7,8-HpCDD	IS	87.6	40 - 135		25-Jan-24 17:08	1
13C-OCDD	IS	70.5	40 - 135		25-Jan-24 17:08	1
13C-2,3,7,8-TCDF	IS	92.4	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,7,8-PeCDF	IS	87.3	40 - 135		25-Jan-24 17:08	1
13C-2,3,4,7,8-PeCDF	IS	79.6	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,4,7,8-HxCDF	IS	86.6	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,6,7,8-HxCDF	IS	89.8	40 - 135		25-Jan-24 17:08	1
13C-2,3,4,6,7,8-HxCDF	IS	84.4	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,7,8,9-HxCDF	IS	84.0	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,4,6,7,8-HpCDF	IS	78.5	40 - 135		25-Jan-24 17:08	1
13C-1,2,3,4,7,8,9-HpCDF	IS	77.5	40 - 135		25-Jan-24 17:08	1
13C-OCDF	IS	66.1	40 - 135		25-Jan-24 17:08	1
37Cl-2,3,7,8-TCDD	CRS	93.4	40 - 135		25-Jan-24 17:08	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: OPR**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	B24A176-BS1	Date Extracted:	23-Jan-24 07:23
Project:	A3L1378 / Port of Ridgefield	QC Batch:	B24A176	Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	10.0 g		

Analyte	Amt Found (pg/g)	Spike Amt	% Recovery	Limits	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	18.9	20.0	94.6	70-130		25-Jan-24 15:37	1
1,2,3,7,8-PeCDD	97.1	100	97.1	70-130		25-Jan-24 15:37	1
1,2,3,4,7,8-HxCDD	99.1	100	99.1	70-130		25-Jan-24 15:37	1
1,2,3,6,7,8-HxCDD	101	100	101	70-130		25-Jan-24 15:37	1
1,2,3,7,8,9-HxCDD	98.0	100	98.0	70-130		25-Jan-24 15:37	1
1,2,3,4,6,7,8-HpCDD	95.6	100	95.6	70-130		25-Jan-24 15:37	1
OCDD	202	200	101	70-130		25-Jan-24 15:37	1
2,3,7,8-TCDF	18.1	20.0	90.6	70-130		25-Jan-24 15:37	1
1,2,3,7,8-PeCDF	91.2	100	91.2	70-130		25-Jan-24 15:37	1
2,3,4,7,8-PeCDF	95.6	100	95.6	70-130		25-Jan-24 15:37	1
1,2,3,4,7,8-HxCDF	99.0	100	99.0	70-130		25-Jan-24 15:37	1
1,2,3,6,7,8-HxCDF	97.0	100	97.0	70-130		25-Jan-24 15:37	1
2,3,4,6,7,8-HxCDF	97.6	100	97.6	70-130		25-Jan-24 15:37	1
1,2,3,7,8,9-HxCDF	93.9	100	93.9	70-130		25-Jan-24 15:37	1
1,2,3,4,6,7,8-HpCDF	89.2	100	89.2	70-130		25-Jan-24 15:37	1
1,2,3,4,7,8,9-HpCDF	92.7	100	92.7	70-130		25-Jan-24 15:37	1
OCDF	199	200	99.6	70-130		25-Jan-24 15:37	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	87.9	40-135		25-Jan-24 15:37	1
13C-1,2,3,7,8-PeCDD	IS	88.4	40-135		25-Jan-24 15:37	1
13C-1,2,3,4,7,8-HxCDD	IS	84.6	40-135		25-Jan-24 15:37	1
13C-1,2,3,6,7,8-HxCDD	IS	84.1	40-135		25-Jan-24 15:37	1
13C-1,2,3,7,8,9-HxCDD	IS	88.7	40-135		25-Jan-24 15:37	1
13C-1,2,3,4,6,7,8-HpCDD	IS	80.3	40-135		25-Jan-24 15:37	1
13C-OCDD	IS	69.7	40-135		25-Jan-24 15:37	1
13C-2,3,7,8-TCDF	IS	86.3	40-135		25-Jan-24 15:37	1
13C-1,2,3,7,8-PeCDF	IS	87.2	40-135		25-Jan-24 15:37	1
13C-2,3,4,7,8-PeCDF	IS	89.2	40-135		25-Jan-24 15:37	1
13C-1,2,3,4,7,8-HxCDF	IS	79.9	40-135		25-Jan-24 15:37	1
13C-1,2,3,6,7,8-HxCDF	IS	81.7	40-135		25-Jan-24 15:37	1
13C-2,3,4,6,7,8-HxCDF	IS	77.2	40-135		25-Jan-24 15:37	1
13C-1,2,3,7,8,9-HxCDF	IS	78.7	40-135		25-Jan-24 15:37	1
13C-1,2,3,4,6,7,8-HpCDF	IS	72.8	40-135		25-Jan-24 15:37	1
13C-1,2,3,4,7,8,9-HpCDF	IS	73.1	40-135		25-Jan-24 15:37	1
13C-OCDF	IS	64.8	40-135		25-Jan-24 15:37	1
37Cl-2,3,7,8-TCDD	CRS	88.9	40-135		25-Jan-24 15:37	1



**Sample ID: AOI081-1.0-1.5**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2312158-01	Date Received:	20-Dec-23 10:43
Project:	A3L1378 / Port of Ridgefield	QC Batch:	B24A176	Date Extracted:	23-Jan-24
Matrix:	Soil	Sample Size:	12.5 g	Column:	ZB-DIOXIN
Date Collected:	15-Dec-23 09:30	% Solids:	81.0		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.141	0.188			25-Jan-24 22:32	1
1,2,3,7,8-PeCDD	0.496		0.775		J	25-Jan-24 22:32	1
1,2,3,4,7,8-HxCDD	ND		0.626	0.812		25-Jan-24 22:32	1
1,2,3,6,7,8-HxCDD	3.25		0.633			25-Jan-24 22:32	1
1,2,3,7,8,9-HxCDD	2.13		0.709		J	25-Jan-24 22:32	1
1,2,3,4,6,7,8-HpCDD	43.7		0.698			25-Jan-24 22:32	1
OCDD	262		1.60			25-Jan-24 22:32	1
2,3,7,8-TCDF	ND	0.243	0.181			25-Jan-24 22:32	1
1,2,3,7,8-PeCDF	ND		0.570	0.226		25-Jan-24 22:32	1
2,3,4,7,8-PeCDF	ND		0.678	0.428		25-Jan-24 22:32	1
1,2,3,4,7,8-HxCDF	0.717		0.652		J	25-Jan-24 22:32	1
1,2,3,6,7,8-HxCDF	ND		0.614	0.419		25-Jan-24 22:32	1
2,3,4,6,7,8-HxCDF	0.771		0.654		J	25-Jan-24 22:32	1
1,2,3,7,8,9-HxCDF	ND	0.561	0.708			25-Jan-24 22:32	1
1,2,3,4,6,7,8-HpCDF	5.61		0.642			25-Jan-24 22:32	1
1,2,3,4,7,8,9-HpCDF	ND	0.513	0.809			25-Jan-24 22:32	1
OCDF	7.40		3.80			25-Jan-24 22:32	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	1.76
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**Totals**

Total TCDD	1.34				
Total PeCDD	1.70			2.08	J
Total HxCDD	17.0			17.8	
Total HpCDD	75.6				
Total TCDF	1.36			2.31	
Total PeCDF	3.67			4.94	
Total HxCDF	12.2			12.6	
Total HpCDF	14.7				

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	86.7	40 - 135		25-Jan-24 22:32	1
13C-1,2,3,7,8-PeCDD	IS	80.7	40 - 135		25-Jan-24 22:32	1
13C-1,2,3,4,7,8-HxCDD	IS	79.4	40 - 135		25-Jan-24 22:32	1
13C-1,2,3,6,7,8-HxCDD	IS	85.3	40 - 135		25-Jan-24 22:32	1
13C-1,2,3,7,8,9-HxCDD	IS	78.3	40 - 135		25-Jan-24 22:32	1
13C-1,2,3,4,6,7,8-HpCDD	IS	95.7	40 - 135		25-Jan-24 22:32	1
13C-OCDD	IS	76.7	40 - 135		25-Jan-24 22:32	1
13C-2,3,7,8-TCDF	IS	90.1	40 - 135		25-Jan-24 22:32	1
13C-1,2,3,7,8-PeCDF	IS	84.1	40 - 135		25-Jan-24 22:32	1
13C-2,3,4,7,8-PeCDF	IS	77.5	40 - 135		25-Jan-24 22:32	1
13C-1,2,3,4,7,8-HxCDF	IS	85.5	40 - 135		25-Jan-24 22:32	1
13C-1,2,3,6,7,8-HxCDF	IS	75.7	40 - 135		25-Jan-24 22:32	1
13C-2,3,4,6,7,8-HxCDF	IS	72.4	40 - 135		25-Jan-24 22:32	1
13C-1,2,3,7,8,9-HxCDF	IS	77.9	40 - 135		25-Jan-24 22:32	1
13C-1,2,3,4,6,7,8-HpCDF	IS	79.0	40 - 135		25-Jan-24 22:32	1
13C-1,2,3,4,7,8,9-HpCDF	IS	88.3	40 - 135		25-Jan-24 22:32	1
13C-OCDF	IS	76.9	40 - 135		25-Jan-24 22:32	1
37Cl-2,3,7,8-TCDD	CRS	82.9	40 - 135		25-Jan-24 22:32	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: AOI079-1.0-1.5**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2312158-02	Date Received:	20-Dec-23 10:43
Project:	A3L1378 / Port of Ridgefield	QC Batch:	B24A176	Date Extracted:	23-Jan-24
Matrix:	Soil	Sample Size:	12.6 g	Column:	ZB-DIOXIN
Date Collected:	15-Dec-23 10:00	% Solids:	80.9		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	0.698		0.187			25-Jan-24 23:18	1
1,2,3,7,8-PeCDD	5.41		0.770			25-Jan-24 23:18	1
1,2,3,4,7,8-HxCDD	8.53		0.622			25-Jan-24 23:18	1
1,2,3,6,7,8-HxCDD	34.3		0.629			25-Jan-24 23:18	1
1,2,3,7,8,9-HxCDD	18.4		0.704			25-Jan-24 23:18	1
1,2,3,4,6,7,8-HpCDD	482		0.693			25-Jan-24 23:18	1
OCDD	2750		1.59			25-Jan-24 23:18	1
2,3,7,8-TCDF	1.33		0.180			25-Jan-24 23:18	1
1,2,3,7,8-PeCDF	2.17		0.566		J	25-Jan-24 23:18	1
2,3,4,7,8-PeCDF	6.94		0.674			25-Jan-24 23:18	1
1,2,3,4,7,8-HxCDF	8.89		0.647			25-Jan-24 23:18	1
1,2,3,6,7,8-HxCDF	5.18		0.610			25-Jan-24 23:18	1
2,3,4,6,7,8-HxCDF	5.59		0.649			25-Jan-24 23:18	1
1,2,3,7,8,9-HxCDF	1.98		0.703		J	25-Jan-24 23:18	1
1,2,3,4,6,7,8-HpCDF	58.1		0.637			25-Jan-24 23:18	1
1,2,3,4,7,8,9-HpCDF	3.38		0.803			25-Jan-24 23:18	1
OCDF	56.5		3.77			25-Jan-24 23:18	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	23.0
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**Totals**

Total TCDD	3.72			5.42
Total PeCDD	23.0			25.7
Total HxCDD	165			167
Total HpCDD	821			
Total TCDF	19.9			21.7
Total PeCDF	65.7			66.0
Total HxCDF	148			149
Total HpCDF	155			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	98.7	40 - 135		25-Jan-24 23:18	1
13C-1,2,3,7,8-PeCDD	IS	96.1	40 - 135		25-Jan-24 23:18	1
13C-1,2,3,4,7,8-HxCDD	IS	94.7	40 - 135		25-Jan-24 23:18	1
13C-1,2,3,6,7,8-HxCDD	IS	94.2	40 - 135		25-Jan-24 23:18	1
13C-1,2,3,7,8,9-HxCDD	IS	98.5	40 - 135		25-Jan-24 23:18	1
13C-1,2,3,4,6,7,8-HpCDD	IS	98.6	40 - 135		25-Jan-24 23:18	1
13C-OCDD	IS	86.9	40 - 135		25-Jan-24 23:18	1
13C-2,3,7,8-TCDF	IS	95.6	40 - 135		25-Jan-24 23:18	1
13C-1,2,3,7,8-PeCDF	IS	92.8	40 - 135		25-Jan-24 23:18	1
13C-2,3,4,7,8-PeCDF	IS	88.3	40 - 135		25-Jan-24 23:18	1
13C-1,2,3,4,7,8-HxCDF	IS	91.3	40 - 135		25-Jan-24 23:18	1
13C-1,2,3,6,7,8-HxCDF	IS	92.9	40 - 135		25-Jan-24 23:18	1
13C-2,3,4,6,7,8-HxCDF	IS	90.0	40 - 135		25-Jan-24 23:18	1
13C-1,2,3,7,8,9-HxCDF	IS	91.9	40 - 135		25-Jan-24 23:18	1
13C-1,2,3,4,6,7,8-HpCDF	IS	86.0	40 - 135		25-Jan-24 23:18	1
13C-1,2,3,4,7,8,9-HpCDF	IS	90.7	40 - 135		25-Jan-24 23:18	1
13C-OCDF	IS	82.2	40 - 135		25-Jan-24 23:18	1
37Cl-2,3,7,8-TCDD	CRS	93.0	40 - 135		25-Jan-24 23:18	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: AOI057-1.0-1.5**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2312158-03	Date Received:	20-Dec-23 10:43
Project:	A3L1378 / Port of Ridgefield	QC Batch:	B24A176	Date Extracted:	23-Jan-24
Matrix:	Soil	Sample Size:	12.7 g	Column:	ZB-DIOXIN
Date Collected:	15-Dec-23 10:40	% Solids:	80.6		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.138	0.186			26-Jan-24 00:05	1
1,2,3,7,8-PeCDD	ND		0.768	0.467		26-Jan-24 00:05	1
1,2,3,4,7,8-HxCDD	ND	0.654	0.620			26-Jan-24 00:05	1
1,2,3,6,7,8-HxCDD	1.95		0.627		J	26-Jan-24 00:05	1
1,2,3,7,8,9-HxCDD	ND		0.703	0.733		26-Jan-24 00:05	1
1,2,3,4,6,7,8-HpCDD	41.9		0.692			26-Jan-24 00:05	1
OCDD	411		1.59			26-Jan-24 00:05	1
2,3,7,8-TCDF	ND	0.174	0.179			26-Jan-24 00:05	1
1,2,3,7,8-PeCDF	ND		0.564	0.270		26-Jan-24 00:05	1
2,3,4,7,8-PeCDF	ND		0.672	0.184		26-Jan-24 00:05	1
1,2,3,4,7,8-HxCDF	ND		0.646	0.768		26-Jan-24 00:05	1
1,2,3,6,7,8-HxCDF	0.402		0.608		J	26-Jan-24 00:05	1
2,3,4,6,7,8-HxCDF	ND		0.648	0.330		26-Jan-24 00:05	1
1,2,3,7,8,9-HxCDF	ND	0.702	0.702			26-Jan-24 00:05	1
1,2,3,4,6,7,8-HpCDF	5.01		0.636			26-Jan-24 00:05	1
1,2,3,4,7,8,9-HpCDF	ND	0.560	0.801			26-Jan-24 00:05	1
OCDF	9.67		3.76			26-Jan-24 00:05	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	0.831
---------------------	-------

**Totals**

Total TCDD	0.297		0.522	J
Total PeCDD	0.631		2.23	J
Total HxCDD	4.51		10.2	
Total HpCDD	71.9			
Total TCDF	ND		1.20	
Total PeCDF	2.81		5.48	
Total HxCDF	10.6		12.0	
Total HpCDF	14.8			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	92.2	40 - 135		26-Jan-24 00:05	1
13C-1,2,3,7,8-PeCDD	IS	89.4	40 - 135		26-Jan-24 00:05	1
13C-1,2,3,4,7,8-HxCDD	IS	89.5	40 - 135		26-Jan-24 00:05	1
13C-1,2,3,6,7,8-HxCDD	IS	85.1	40 - 135		26-Jan-24 00:05	1
13C-1,2,3,7,8,9-HxCDD	IS	89.7	40 - 135		26-Jan-24 00:05	1
13C-1,2,3,4,6,7,8-HpCDD	IS	88.0	40 - 135		26-Jan-24 00:05	1
13C-OCDD	IS	77.1	40 - 135		26-Jan-24 00:05	1
13C-2,3,7,8-TCDF	IS	89.4	40 - 135		26-Jan-24 00:05	1
13C-1,2,3,7,8-PeCDF	IS	89.2	40 - 135		26-Jan-24 00:05	1
13C-2,3,4,7,8-PeCDF	IS	81.6	40 - 135		26-Jan-24 00:05	1
13C-1,2,3,4,7,8-HxCDF	IS	84.7	40 - 135		26-Jan-24 00:05	1
13C-1,2,3,6,7,8-HxCDF	IS	87.0	40 - 135		26-Jan-24 00:05	1
13C-2,3,4,6,7,8-HxCDF	IS	84.8	40 - 135		26-Jan-24 00:05	1
13C-1,2,3,7,8,9-HxCDF	IS	86.3	40 - 135		26-Jan-24 00:05	1
13C-1,2,3,4,6,7,8-HpCDF	IS	79.3	40 - 135		26-Jan-24 00:05	1
13C-1,2,3,4,7,8,9-HpCDF	IS	82.9	40 - 135		26-Jan-24 00:05	1
13C-OCDF	IS	73.7	40 - 135		26-Jan-24 00:05	1
37Cl-2,3,7,8-TCDD	CRS	92.2	40 - 135		26-Jan-24 00:05	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection Limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
MDL	Method Detection Limit
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
RL	For 537.1, the reported RLs are the MRLs.
TEQ	Toxic Equivalency, sum of the toxic equivalency factors (TEF) multiplied by the sample concentrations.
TEQMax	TEQ calculation that uses the detection limit as the concentration for non-detects
TEQMin	TEQ calculation that uses zero as the concentration for non-detects
TEQRisk	TEQ calculation that uses ½ the detection limit as the concentration for non-detects
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Enthalpy Analytical - EDH Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	21-023-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2020018
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	2211390
Nevada Division of Environmental Protection	CA00413
New Hampshire Environmental Accreditation Program	207721
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Ohio Environmental Protection Agency	87778
Oregon Laboratory Accreditation Program	4042-021
Texas Commission on Environmental Quality	T104704189-22-13
Vermont Department of Health	VT-4042
Virginia Department of General Services	11276
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters can be found at [Enthalpy.com/Resources/Accreditations](http://Enthalpy.com/Resources/Accreditations).*

SUBCONTRACT ORDER

Apex Laboratories

A3L1378

*MAC 12/18/23*

*2312158 5:20*

**SENDING LABORATORY:**

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Philip Nerenberg

**RECEIVING LABORATORY:**

Enthalpy Analytical- CA  
1104 Windfield Way  
El Dorado Hills, CA 95762  
Phone: (916) 673-1520  
Fax: -

*DAW*

**Sample Name: AOI081-1.0-1.5** Soil **Sampled: 12/15/23 09:30** (A3L1378-01)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	01/02/24 17:00	01/14/24 09:30	
<i>Containers Supplied:</i>			
(A)8 oz Glass Jar			

**Sample Name: AOI079-1.0-1.5** Soil **Sampled: 12/15/23 10:00** (A3L1378-03)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	01/02/24 17:00	01/14/24 10:00	
<i>Containers Supplied:</i>			
(A)8 oz Glass Jar			

**Sample Name: AOI057-1.0-1.5** Soil **Sampled: 12/15/23 10:40** (A3L1378-05)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	01/02/24 17:00	01/14/24 10:40	
<i>Containers Supplied:</i>			
(A)8 oz Glass Jar			

*Standard TAT*

*Jim M...*

*12/19/23*

Fed Ex (Shipper)

Released By Date

Received By Date

Fed Ex (Shipper)

*Karen M. Foster*

*12/20/23 10:00*

Released By Date

Received By Date



# Sample Log-In Checklist



Page # 1 of 1

Work Order #: 2312 158 TAT 572

Samples Arrival:	Date/Time <u>12/20/23 10:00</u>	Initials: <u>jm</u>	Location: <u>WR-2</u>
			Shelf/Rack: <u>M12</u>
Delivered By:	<input checked="" type="checkbox"/> FedEx	<input type="checkbox"/> UPS	<input type="checkbox"/> On Trac
	<input type="checkbox"/> GLS	<input type="checkbox"/> DHL	<input type="checkbox"/> Hand Delivered
Preservation:	<input checked="" type="checkbox"/> Ice	<input type="checkbox"/> Blue Ice	<input type="checkbox"/> Techni Ice
	<input type="checkbox"/> Dry Ice	<input type="checkbox"/> None	
Temp °C: <u>5.2</u> (uncorrected)	Probe used: Y / <input checked="" type="checkbox"/> N		Thermometer ID: <u>IR-4</u>
Temp °C: <u>5.2</u> (corrected)			

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill <u>/</u> Trk # <u>7745 4698 7659</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	<input checked="" type="checkbox"/> Enthalpy	<input type="checkbox"/> Client	<input type="checkbox"/> Retain
	<input type="checkbox"/> Return	<input type="checkbox"/> Dispose	
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Logged In:	Date/Time <u>12/20/23 16:43</u>	Initials: <u>jm</u>	Location: <u>WR-2</u>
			Shelf/Rack: <u>G-6</u>
COC Anomaly/Sample Acceptance Form completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Comments:



# CoC/Label Reconciliation Report WO# 2312158

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2312158-01	A AOI081-1.0-1.5	<input checked="" type="checkbox"/>	(A3L1378-01)	15-Dec-23 09:30	<input checked="" type="checkbox"/>	A ↓ Clear Glass Jar, 250mL	Solid	
2312158-02	A AOI079-1.0-1.5	<input checked="" type="checkbox"/>	(A3L1378-03)	15-Dec-23 10:00	<input checked="" type="checkbox"/>		Solid	
2312158-03	A AOI057-1.0-1.5	<input checked="" type="checkbox"/>	(A3L1378-05)	15-Dec-23 10:40	<input checked="" type="checkbox"/>		Solid	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		

Comments: A Sample received in clear Jar

Preservation Documented: Na2S2O3 Trizma NH4CH3CO2 None Other

Verified by/Date: WZ 12/21/23  
WWS 12/21/23



ANALYTICAL REPORT

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

Wednesday, March 6, 2024

Meaghan Pollock  
Maul Foster & Alongi, INC.  
3140 NE Broadway Street  
Portland, OR 97232

RE: A4B0754 - Port of Ridgefield - M9003.01.061

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A4B0754, which was received by the laboratory on 12/18/2023 at 12:40:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information	
<u>Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.</u>	
(See Cooler Receipt Form for details)	
Cooler #1    4.3    degC	Cooler #2    2.5    degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.  
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.



Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director



**ANALYTICAL REPORT**

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b><u>Maul Foster &amp; Alongi, INC.</u></b> 3140 NE Broadway Street Portland, OR 97232	Project: <b><u>Port of Ridgefield</u></b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> <b>A4B0754 - 03 06 24 2343</b>
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
AOI-043-1.5-2.0	A4B0754-01	Soil	12/06/23 10:03	12/18/23 12:40
AOI-079-1.5-2.0	A4B0754-02	Soil	12/15/23 10:05	12/18/23 12:40
AOI-083-1.5-2.0	A4B0754-03	Soil	12/06/23 11:00	12/18/23 12:40
AOI-089-1.5-2.0	A4B0754-04	Soil	12/06/23 11:30	12/18/23 12:40

Apex Laboratories

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Philip Nerenberg, Lab Director



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**ANALYTICAL CASE NARRATIVE**

<b>A4B0754</b>	<b>Apex Laboratories</b>
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Samples were subcontracted to Enthalpy Analytical for dioxin analysis, see report attached.

Apex Laboratories

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Philip Nerenberg, Lab Director



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<u>Maul Foster &amp; Alongi, INC.</u> 3140 NE Broadway Street Portland, OR 97232	Project: <u>Port of Ridgefield</u> Project Number: M9003.01.061 Project Manager: Meaghan Pollock	<u>Report ID:</u> A4B0754 - 03 06 24 2343
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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

There are No Qualifiers on Sample or QC Data for this report

Apex Laboratories

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

**Basis:** Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

Results for Volatiles analyses on soils and sediments that are reported on a "dry weight" basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an "As Received" basis do not have the WMS correction applied, as dry weight was not performed.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Apex Laboratories

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Philip Nerenberg, Lab Director



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<b>Maul Foster &amp; Alongi, INC.</b> 3140 NE Broadway Street Portland, OR 97232	Project: <b>Port of Ridgefield</b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> <b>A4B0754 - 03 06 24 2343</b>
--	--	---

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).

- For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
- For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.

For further details, please request a copy of this document.

- Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

**Benzofluoranthene Isomer Reporting:**

Due to coelution on the analytical column, the Benzo(b)fluoranthene results represent the concentration of both Benzo(b)fluoranthene and Benzo(j) fluoranthene. Calibration is based on the response of Benzo(b)fluoranthene, and the results represent the combined Benzo(b+j)fluoranthene(s).

Apex Laboratories

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Philip Nerenberg, Lab Director





ANALYTICAL REPORT

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client (Maul Foster & Alongi, INC.), Project (Port of Ridgefield), and Report ID (A4B0754 - 03 06 24 2343).

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Table with 6 columns: Matrix, Analysis, TNI\_ID, Analyte, TNI\_ID, Accreditation. Includes a note: All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Handwritten signature of Philip Nerenberg

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Philip Nerenberg, Lab Director



**ANALYTICAL REPORT**

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b>Maul Foster &amp; Alongi, INC.</b>	Project: <b>Port of Ridgefield</b>	Report ID:
3140 NE Broadway Street	Project Number: <b>M9003.01.061</b>	A4B0754 - 03 06 24 2343
Portland, OR 97232	Project Manager: <b>Meaghan Pollock</b>	

**APEX LABS**  
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Company: **MFA**

Address: **109 E 3rd Street, Wallaceton, WA 98560**

Sampled by: **Y. Nerenberg; L. Baragona**

Site Location: \_\_\_\_\_

State: **WA**

County: **Clark**

**CHAIN OF CUSTODY**

Project Mgr: **Meaghan Rollat**

Project Name: **Port of Ridgefield Yard Sampling**

Phone: **360-713-1500**

Email: **mpollock@maulalongi.com**

Project #: **M9003.01.061**

Lab #: **A4B0754**

Doc # of: **2**

Re-log **A4B0754**

Lab # **A4B0754**

Doc # of: **2**

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-DCD	NWTPH-GS	NWTPH-TEX	8260 RMDM VOCS	8260 Halo VOCS	8260 VOCs Full List	8270 SIMI PAHs	8270 Semi-Volat Full List	8082 PCBs	8081 Pesticides	RCRA Metals (9)	Priority Metals (13)	AL, SB, AS, BA, BS, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ	Ss, Ag, Na, TI, V, Zn	TOTAL DIS. TCAP	TCAP Metals (9)	Hold Sample	Frozen Archive		
																							DATE	TIME
A01-087-1.0-1.5	12/23/20	10:30	S	1																				
A01-087-1.5-2	12/23/20	10:30	S	1																				
A01-043-1.0-1.5	1/00	10:30	S	1																				
A01-043-1.5-2.0	1/00	10:30	S	1																				
A01-083-1.0-1.5	1/06	11:06	S	1																				
A01-083-1.5-2.0	1/06	11:06	S	1																				
A01-089-1.0-1.5	1/30	11:30	S	1																				
A01-089-1.5-2.0	1/30	11:30	S	1																				
AD1-056-1.0-1.5	1/25	12:15	S	1																				
AO1-056-1.5-2.0	1/25	12:15	S	1																				

Standard Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day    2 Day    3 Day    5 Day    **Standard**    Other: \_\_\_\_\_

**SPECIAL INSTRUCTIONS:**

RELINQUISHED BY: \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Company: **APEX**

RECEIVED BY: \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Company: \_\_\_\_\_

Form 1-02 R-00

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.





ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b>Maul Foster &amp; Alongi, INC.</b> 3140 NE Broadway Street Portland, OR 97232	Project: <b>Port of Ridgefield</b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	Report ID: <b>A4B0754 - 03 06 24 2343</b>
--	--	--

**APEX LABS COOLER RECEIPT FORM** Re-log A4B0754

Client: Maul Foster Alongi Element WO#: A3L1035

Project/Project #: port of ridgefield yard sampling 149003.01061

**Delivery Info:**  
Date/time received: 12/12/23 @ 1705 By: RHP  
Delivered by: Apex  Client  YESS FedEx  UPS  Radio  Morgan  SDS  Evergreen  Other

**Cooler Inspection** Date/time inspected: 12/12/23 @ 1706 By: RHP  
Chain of Custody included? Yes  No   
Signed/dated by client? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>4.3</u>						
Custody seals? (Y/N)	<u>N</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>Y</u>						
Ice type: (Gel/Real/Other)	<u>Gel</u>						
Condition (In/Out):	<u>IN</u>						

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_  
Green dots applied to out of temperature samples? Yes/No Yes/No  
Out of temperature samples form initiated? Yes/No No

**Sample Inspection:** Date/time inspected: 12-8-23 @ 1120 By: DJI  
All samples intact? Yes  No  Comments: \_\_\_\_\_  
Bottle labels/COCs agree? Yes  No  Comments: \_\_\_\_\_  
COC/container discrepancies form initiated? Yes  No   
Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_  
Do VOA vials have visible headspace? Yes  No  NA   
Comments: \_\_\_\_\_  
Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA  pH ID: \_\_\_\_\_  
Comments: \_\_\_\_\_

**Additional information:**  
\_\_\_\_\_  
\_\_\_\_\_

Labeled by: DJI Witness: AW Cooler Inspected by: RHP Form Y-003 R-01

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232
Project: Port of Ridgefield
Project Number: M9003.01.061
Project Manager: Meaghan Pollock
Report ID: A4B0754 - 03 06 24 2343

APEX LABS COOLER RECEIPT FORM
Client: MFA
Project/Project #: POR Yard Sample / M9003.01.061
Delivery Info: Date/time received: 12/18/23 @ 12:40
Cooler Inspection: Date/time inspected: 12/18/23 @ 13:53
Sample Inspection: Date/time inspected: 12/18/23 @ 17:52
Table with 7 columns: Cooler #1 to Cooler #7
Rows for Temperature, Custody seals, Received on ice, Temp. blanks, Ice type, Condition, Cooler out of temp, Green dots, Out of temp samples form initiated, All samples intact, Bottle labels/COCs agree, COC/container discrepancies form initiated, Containers/volumes received appropriate for analysis, Do VOA vials have visible headspace, Water samples: pH checked, pH appropriate, pH ID, Additional information, Labeled by, Witness, Cooler Inspected by

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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February 29, 2024

**Enthalpy Analytical - El Dorado Hills  
Work Order No. 2402080**

Mr. Philip Nerenberg  
Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223

Dear Mr. Nerenberg,

Enclosed are the results for the sample set received at Enthalpy Analytical - EDH on February 06, 2024 under your Project Name 'A4B0754 - Port of Ridgefield'.

Enthalpy Analytical - EDH is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [kathy.zipp@enthalpy.com](mailto:kathy.zipp@enthalpy.com).

Thank you for choosing Enthalpy Analytical - EDH as part of your analytical support team.

Sincerely,

Kathy Zipp  
Project Manager

*Enthalpy Analytical - EDH certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Enthalpy Analytical - EDH.*

## **Enthalpy Analytical - EDH Work Order No. 2402080**

### **Case Narrative**

#### **Sample Condition on Receipt:**

Four soil samples were received and stored securely in accordance with Enthalpy Analytical - EDH standard operating procedures and EPA methodology. The samples were received in good condition and within the method temperature requirements.

#### **Analytical Notes:**

##### **EPA Method 8290A**

The samples were extracted and analyzed for tetra-through-octa chlorinated dioxins and furans by EPA Method 8290A using a ZB-DIOXIN GC column.

##### **Holding Times**

The samples were extracted outside the method holding time and analyzed within the analytical hold time.

##### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are flagged with an "H" qualifier.



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## Sample Inventory Report

Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2402080-01	AOI-043-1.5-2.0	06-Dec-23 10:03	06-Feb-24 09:11	Clear Glass Jar, 250mL
2402080-02	AOI-079-1.5-2.0	15-Dec-23 10:05	06-Feb-24 09:11	Clear Glass Jar, 250mL
2402080-03	AOI-083-1.5-2.0	06-Dec-23 11:00	06-Feb-24 09:11	Clear Glass Jar, 250mL
2402080-04	AOI-089-1.5-2.0	06-Dec-23 11:30	06-Feb-24 09:11	Clear Glass Jar, 250mL

## **ANALYTICAL RESULTS**

**Sample ID: Method Blank**
**EPA Method 8290A**

Client Data		Laboratory Data				
Name:	Apex Laboratories	Lab Sample:	B24B183-BLK1		Date Extracted:	23-Feb-24
Project:	A4B0754 - Port of Ridgefield	QC Batch:	B24B183		Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	10.0 g			

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.0983	0.190			24-Feb-24 18:07	1
1,2,3,7,8-PeCDD	ND	0.142	0.784			24-Feb-24 18:07	1
1,2,3,4,7,8-HxCDD	ND	0.158	0.633			24-Feb-24 18:07	1
1,2,3,6,7,8-HxCDD	ND	0.171	0.640			24-Feb-24 18:07	1
1,2,3,7,8,9-HxCDD	ND	0.178	0.717			24-Feb-24 18:07	1
1,2,3,4,6,7,8-HpCDD	ND	0.191	0.706			24-Feb-24 18:07	1
OCDD	0.647		1.62		J	24-Feb-24 18:07	1
2,3,7,8-TCDF	ND	0.0967	0.183			24-Feb-24 18:07	1
1,2,3,7,8-PeCDF	ND	0.111	0.576			24-Feb-24 18:07	1
2,3,4,7,8-PeCDF	ND	0.0917	0.686			24-Feb-24 18:07	1
1,2,3,4,7,8-HxCDF	ND	0.0879	0.659			24-Feb-24 18:07	1
1,2,3,6,7,8-HxCDF	ND	0.0873	0.621			24-Feb-24 18:07	1
2,3,4,6,7,8-HxCDF	ND	0.0940	0.661			24-Feb-24 18:07	1
1,2,3,7,8,9-HxCDF	ND	0.129	0.716			24-Feb-24 18:07	1
1,2,3,4,6,7,8-HpCDF	ND	0.0987	0.649			24-Feb-24 18:07	1
1,2,3,4,7,8,9-HpCDF	ND	0.145	0.818			24-Feb-24 18:07	1
OCDF	ND	0.204	3.84			24-Feb-24 18:07	1

Toxic Equivalent	
TEQMinWHO2005Dioxin	0.000194

Totals		
Total TCDD	ND	0.0983
Total PeCDD	ND	0.142
Total HxCDD	ND	0.178
Total HpCDD	ND	0.191
Total TCDF	ND	0.0967
Total PeCDF	ND	0.111
Total HxCDF	ND	0.129
Total HpCDF	ND	0.145

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	100	40 - 135		24-Feb-24 18:07	1
13C-1,2,3,7,8-PeCDD	IS	102	40 - 135		24-Feb-24 18:07	1
13C-1,2,3,4,7,8-HxCDD	IS	74.8	40 - 135		24-Feb-24 18:07	1
13C-1,2,3,6,7,8-HxCDD	IS	94.1	40 - 135		24-Feb-24 18:07	1
13C-1,2,3,7,8,9-HxCDD	IS	88.0	40 - 135		24-Feb-24 18:07	1
13C-1,2,3,4,6,7,8-HpCDD	IS	72.7	40 - 135		24-Feb-24 18:07	1
13C-OCDD	IS	60.5	40 - 135		24-Feb-24 18:07	1
13C-2,3,7,8-TCDF	IS	86.6	40 - 135		24-Feb-24 18:07	1
13C-1,2,3,7,8-PeCDF	IS	93.6	40 - 135		24-Feb-24 18:07	1
13C-2,3,4,7,8-PeCDF	IS	94.4	40 - 135		24-Feb-24 18:07	1
13C-1,2,3,4,7,8-HxCDF	IS	80.7	40 - 135		24-Feb-24 18:07	1
13C-1,2,3,6,7,8-HxCDF	IS	92.9	40 - 135		24-Feb-24 18:07	1
13C-2,3,4,6,7,8-HxCDF	IS	86.7	40 - 135		24-Feb-24 18:07	1
13C-1,2,3,7,8,9-HxCDF	IS	84.4	40 - 135		24-Feb-24 18:07	1
13C-1,2,3,4,6,7,8-HpCDF	IS	75.1	40 - 135		24-Feb-24 18:07	1
13C-1,2,3,4,7,8,9-HpCDF	IS	77.1	40 - 135		24-Feb-24 18:07	1
13C-OCDF	IS	72.6	40 - 135		24-Feb-24 18:07	1
37Cl-2,3,7,8-TCDD	CRS	129	40 - 135		24-Feb-24 18:07	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: OPR**
**EPA Method 8290A**

Client Data		Laboratory Data				
Name:	Apex Laboratories	Lab Sample:	B24B183-BS1		Date Extracted:	23-Feb-24 02:58
Project:	A4B0754 - Port of Ridgefield	QC Batch:	B24B183		Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	10.0 g			

Analyte	Amt Found (pg/g)	Spike Amt	% Recovery	Limits	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	18.5	20.0	92.4	70-130		24-Feb-24 15:49	1
1,2,3,7,8-PeCDD	94.5	100	94.5	70-130		24-Feb-24 15:49	1
1,2,3,4,7,8-HxCDD	89.7	100	89.7	70-130		24-Feb-24 15:49	1
1,2,3,6,7,8-HxCDD	98.8	100	98.8	70-130		24-Feb-24 15:49	1
1,2,3,7,8,9-HxCDD	93.8	100	93.8	70-130		24-Feb-24 15:49	1
1,2,3,4,6,7,8-HpCDD	94.7	100	94.7	70-130		24-Feb-24 15:49	1
OCDD	194	200	97.1	70-130	B	24-Feb-24 15:49	1
2,3,7,8-TCDF	18.1	20.0	90.5	70-130		24-Feb-24 15:49	1
1,2,3,7,8-PeCDF	95.1	100	95.1	70-130		24-Feb-24 15:49	1
2,3,4,7,8-PeCDF	94.1	100	94.1	70-130		24-Feb-24 15:49	1
1,2,3,4,7,8-HxCDF	89.2	100	89.2	70-130		24-Feb-24 15:49	1
1,2,3,6,7,8-HxCDF	94.0	100	94.0	70-130		24-Feb-24 15:49	1
2,3,4,6,7,8-HxCDF	86.6	100	86.6	70-130		24-Feb-24 15:49	1
1,2,3,7,8,9-HxCDF	88.7	100	88.7	70-130		24-Feb-24 15:49	1
1,2,3,4,6,7,8-HpCDF	89.2	100	89.2	70-130		24-Feb-24 15:49	1
1,2,3,4,7,8,9-HpCDF	84.0	100	84.0	70-130		24-Feb-24 15:49	1
OCDF	171	200	85.4	70-130		24-Feb-24 15:49	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	78.7	40-135		24-Feb-24 15:49	1
13C-1,2,3,7,8-PeCDD	IS	86.4	40-135		24-Feb-24 15:49	1
13C-1,2,3,4,7,8-HxCDD	IS	64.7	40-135		24-Feb-24 15:49	1
13C-1,2,3,6,7,8-HxCDD	IS	84.9	40-135		24-Feb-24 15:49	1
13C-1,2,3,7,8,9-HxCDD	IS	77.9	40-135		24-Feb-24 15:49	1
13C-1,2,3,4,6,7,8-HpCDD	IS	58.2	40-135		24-Feb-24 15:49	1
13C-OCDD	IS	48.5	40-135		24-Feb-24 15:49	1
13C-2,3,7,8-TCDF	IS	67.2	40-135		24-Feb-24 15:49	1
13C-1,2,3,7,8-PeCDF	IS	80.6	40-135		24-Feb-24 15:49	1
13C-2,3,4,7,8-PeCDF	IS	83.1	40-135		24-Feb-24 15:49	1
13C-1,2,3,4,7,8-HxCDF	IS	71.1	40-135		24-Feb-24 15:49	1
13C-1,2,3,6,7,8-HxCDF	IS	83.2	40-135		24-Feb-24 15:49	1
13C-2,3,4,6,7,8-HxCDF	IS	77.7	40-135		24-Feb-24 15:49	1
13C-1,2,3,7,8,9-HxCDF	IS	67.0	40-135		24-Feb-24 15:49	1
13C-1,2,3,4,6,7,8-HpCDF	IS	65.0	40-135		24-Feb-24 15:49	1
13C-1,2,3,4,7,8,9-HpCDF	IS	60.3	40-135		24-Feb-24 15:49	1
13C-OCDF	IS	58.9	40-135		24-Feb-24 15:49	1
37Cl-2,3,7,8-TCDD	CRS	108	40-135		24-Feb-24 15:49	1

**Sample ID: AOI-043-1.5-2.0**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2402080-01	Date Received:	06-Feb-24 09:11
Project:	A4B0754 - Port of Ridgefield	QC Batch:	B24B183	Date Extracted:	23-Feb-24
Matrix:	Soil	Sample Size:	12.7 g	Column:	ZB-DIOXIN
Date Collected:	06-Dec-23 10:03	% Solids:	79.6		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	0.998		0.189			24-Feb-24 22:47	1
1,2,3,7,8-PeCDD	6.33		0.779			24-Feb-24 22:47	1
1,2,3,4,7,8-HxCDD	9.79		0.629			24-Feb-24 22:47	1
1,2,3,6,7,8-HxCDD	36.4		0.636			24-Feb-24 22:47	1
1,2,3,7,8,9-HxCDD	18.7		0.712			24-Feb-24 22:47	1
1,2,3,4,6,7,8-HpCDD	576		0.701			24-Feb-24 22:47	1
OCDD	3640		1.61		B	24-Feb-24 22:47	1
2,3,7,8-TCDF	1.72		0.182			24-Feb-24 22:47	1
1,2,3,7,8-PeCDF	3.05		0.572			24-Feb-24 22:47	1
2,3,4,7,8-PeCDF	17.3		0.681			24-Feb-24 22:47	1
1,2,3,4,7,8-HxCDF	14.9		0.654			24-Feb-24 22:47	1
1,2,3,6,7,8-HxCDF	9.62		0.617			24-Feb-24 22:47	1
2,3,4,6,7,8-HxCDF	5.93		0.656			24-Feb-24 22:47	1
1,2,3,7,8,9-HxCDF	1.45		0.711		J	24-Feb-24 22:47	1
1,2,3,4,6,7,8-HpCDF	81.6		0.645			24-Feb-24 22:47	1
1,2,3,4,7,8,9-HpCDF	5.64		0.812			24-Feb-24 22:47	1
OCDF	75.3		3.81			24-Feb-24 22:47	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	30.2
---------------------	------

**Totals**

Total TCDD	10.8			12.9	
Total PeCDD	47.3			47.4	
Total HxCDD	211				
Total HpCDD	1020				
Total TCDF	81.7			95.7	
Total PeCDF	300			310	
Total HxCDF	325				
Total HpCDF	234				

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	78.6	40 - 135		24-Feb-24 22:47	1
13C-1,2,3,7,8-PeCDD	IS	77.8	40 - 135		24-Feb-24 22:47	1
13C-1,2,3,4,7,8-HxCDD	IS	62.1	40 - 135		24-Feb-24 22:47	1
13C-1,2,3,6,7,8-HxCDD	IS	73.5	40 - 135		24-Feb-24 22:47	1
13C-1,2,3,7,8,9-HxCDD	IS	67.6	40 - 135		24-Feb-24 22:47	1
13C-1,2,3,4,6,7,8-HpCDD	IS	60.7	40 - 135		24-Feb-24 22:47	1
13C-OCDD	IS	51.1	40 - 135		24-Feb-24 22:47	1
13C-2,3,7,8-TCDF	IS	71.0	40 - 135		24-Feb-24 22:47	1
13C-1,2,3,7,8-PeCDF	IS	71.8	40 - 135		24-Feb-24 22:47	1
13C-2,3,4,7,8-PeCDF	IS	77.4	40 - 135		24-Feb-24 22:47	1
13C-1,2,3,4,7,8-HxCDF	IS	72.4	40 - 135		24-Feb-24 22:47	1
13C-1,2,3,6,7,8-HxCDF	IS	78.3	40 - 135		24-Feb-24 22:47	1
13C-2,3,4,6,7,8-HxCDF	IS	72.8	40 - 135		24-Feb-24 22:47	1
13C-1,2,3,7,8,9-HxCDF	IS	67.3	40 - 135		24-Feb-24 22:47	1
13C-1,2,3,4,6,7,8-HpCDF	IS	60.1	40 - 135		24-Feb-24 22:47	1
13C-1,2,3,4,7,8,9-HpCDF	IS	61.5	40 - 135		24-Feb-24 22:47	1
13C-OCDF	IS	60.0	40 - 135		24-Feb-24 22:47	1
37Cl-2,3,7,8-TCDD	CRS	97.7	40 - 135		24-Feb-24 22:47	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: AOI-079-1.5-2.0**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2402080-02	Date Received:	06-Feb-24 09:11
Project:	A4B0754 - Port of Ridgefield	QC Batch:	B24B183	Date Extracted:	23-Feb-24
Matrix:	Soil	Sample Size:	12.4 g	Column:	ZB-DIOXIN
Date Collected:	15-Dec-23 10:05	% Solids:	81.5		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.188	0.200		24-Feb-24 23:34	1
1,2,3,7,8-PeCDD	1.35		0.776		J	24-Feb-24 23:34	1
1,2,3,4,7,8-HxCDD	2.32		0.627		J	24-Feb-24 23:34	1
1,2,3,6,7,8-HxCDD	8.67		0.634			24-Feb-24 23:34	1
1,2,3,7,8,9-HxCDD	5.31		0.710			24-Feb-24 23:34	1
1,2,3,4,6,7,8-HpCDD	113		0.699			24-Feb-24 23:34	1
OCDD	640		1.60		B	24-Feb-24 23:34	1
2,3,7,8-TCDF	0.532		0.181			24-Feb-24 23:34	1
1,2,3,7,8-PeCDF	0.619		0.570		J	24-Feb-24 23:34	1
2,3,4,7,8-PeCDF	ND		0.679	0.696		24-Feb-24 23:34	1
1,2,3,4,7,8-HxCDF	2.02		0.653		J	24-Feb-24 23:34	1
1,2,3,6,7,8-HxCDF	1.32		0.615		J	24-Feb-24 23:34	1
2,3,4,6,7,8-HxCDF	0.790		0.655		J	24-Feb-24 23:34	1
1,2,3,7,8,9-HxCDF	ND		0.709	0.339		24-Feb-24 23:34	1
1,2,3,4,6,7,8-HpCDF	13.9		0.643			24-Feb-24 23:34	1
1,2,3,4,7,8,9-HpCDF	0.739		0.810		J	24-Feb-24 23:34	1
OCDF	14.6		3.80			24-Feb-24 23:34	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	4.94
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**Totals**

Total TCDD	0.683			1.89
Total PeCDD	6.14			7.89
Total HxCDD	46.6			
Total HpCDD	200			
Total TCDF	7.21			8.30
Total PeCDF	24.8			25.8
Total HxCDF	39.1			39.7
Total HpCDF	37.9			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	74.2	40 - 135		24-Feb-24 23:34	1
13C-1,2,3,7,8-PeCDD	IS	72.6	40 - 135		24-Feb-24 23:34	1
13C-1,2,3,4,7,8-HxCDD	IS	55.0	40 - 135		24-Feb-24 23:34	1
13C-1,2,3,6,7,8-HxCDD	IS	59.4	40 - 135		24-Feb-24 23:34	1
13C-1,2,3,7,8,9-HxCDD	IS	51.5	40 - 135		24-Feb-24 23:34	1
13C-1,2,3,4,6,7,8-HpCDD	IS	49.8	40 - 135		24-Feb-24 23:34	1
13C-OCDD	IS	37.9	40 - 135	H	24-Feb-24 23:34	1
13C-2,3,7,8-TCDF	IS	64.8	40 - 135		24-Feb-24 23:34	1
13C-1,2,3,7,8-PeCDF	IS	65.4	40 - 135		24-Feb-24 23:34	1
13C-2,3,4,7,8-PeCDF	IS	65.0	40 - 135		24-Feb-24 23:34	1
13C-1,2,3,4,7,8-HxCDF	IS	61.2	40 - 135		24-Feb-24 23:34	1
13C-1,2,3,6,7,8-HxCDF	IS	64.5	40 - 135		24-Feb-24 23:34	1
13C-2,3,4,6,7,8-HxCDF	IS	61.1	40 - 135		24-Feb-24 23:34	1
13C-1,2,3,7,8,9-HxCDF	IS	58.7	40 - 135		24-Feb-24 23:34	1
13C-1,2,3,4,6,7,8-HpCDF	IS	51.0	40 - 135		24-Feb-24 23:34	1
13C-1,2,3,4,7,8,9-HpCDF	IS	54.1	40 - 135		24-Feb-24 23:34	1
13C-OCDF	IS	44.2	40 - 135		24-Feb-24 23:34	1
37Cl-2,3,7,8-TCDD	CRS	110	40 - 135		24-Feb-24 23:34	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.



**Sample ID: AOI-083-1.5-2.0**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2402080-03	Date Received:	06-Feb-24 09:11
Project:	A4B0754 - Port of Ridgefield	QC Batch:	B24B183	Date Extracted:	23-Feb-24
Matrix:	Soil	Sample Size:	13.1 g	Column:	ZB-DIOXIN
Date Collected:	06-Dec-23 11:00	% Solids:	77.0		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.189	0.312		25-Feb-24 00:20	1
1,2,3,7,8-PeCDD	1.14		0.780		J	25-Feb-24 00:20	1
1,2,3,4,7,8-HxCDD	1.27		0.630		J	25-Feb-24 00:20	1
1,2,3,6,7,8-HxCDD	4.87		0.637			25-Feb-24 00:20	1
1,2,3,7,8,9-HxCDD	2.45		0.713		J	25-Feb-24 00:20	1
1,2,3,4,6,7,8-HpCDD	83.7		0.702			25-Feb-24 00:20	1
OCDD	570		1.61		B	25-Feb-24 00:20	1
2,3,7,8-TCDF	ND		0.182	1.28		25-Feb-24 00:20	1
1,2,3,7,8-PeCDF	0.715		0.573		J	25-Feb-24 00:20	1
2,3,4,7,8-PeCDF	ND		0.683	1.27		25-Feb-24 00:20	1
1,2,3,4,7,8-HxCDF	2.18		0.656		J	25-Feb-24 00:20	1
1,2,3,6,7,8-HxCDF	1.15		0.618		J	25-Feb-24 00:20	1
2,3,4,6,7,8-HxCDF	1.13		0.658		J	25-Feb-24 00:20	1
1,2,3,7,8,9-HxCDF	0.412		0.712		J	25-Feb-24 00:20	1
1,2,3,4,6,7,8-HpCDF	15.5		0.646			25-Feb-24 00:20	1
1,2,3,4,7,8,9-HpCDF	0.567		0.814		J	25-Feb-24 00:20	1
OCDF	24.9		3.82			25-Feb-24 00:20	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	3.68
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**Totals**

Total TCDD	5.88			6.72			
Total PeCDD	12.0			13.6			
Total HxCDD	38.4						
Total HpCDD	159						
Total TCDF	17.7			25.0			
Total PeCDF	22.3			26.5			
Total HxCDF	33.2			33.4			
Total HpCDF	42.9						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	71.6	40 - 135		25-Feb-24 00:20	1
13C-1,2,3,7,8-PeCDD	IS	68.9	40 - 135		25-Feb-24 00:20	1
13C-1,2,3,4,7,8-HxCDD	IS	53.8	40 - 135		25-Feb-24 00:20	1
13C-1,2,3,6,7,8-HxCDD	IS	61.7	40 - 135		25-Feb-24 00:20	1
13C-1,2,3,7,8,9-HxCDD	IS	55.4	40 - 135		25-Feb-24 00:20	1
13C-1,2,3,4,6,7,8-HpCDD	IS	53.9	40 - 135		25-Feb-24 00:20	1
13C-OCDD	IS	46.1	40 - 135		25-Feb-24 00:20	1
13C-2,3,7,8-TCDF	IS	64.2	40 - 135		25-Feb-24 00:20	1
13C-1,2,3,7,8-PeCDF	IS	63.2	40 - 135		25-Feb-24 00:20	1
13C-2,3,4,7,8-PeCDF	IS	65.0	40 - 135		25-Feb-24 00:20	1
13C-1,2,3,4,7,8-HxCDF	IS	60.6	40 - 135		25-Feb-24 00:20	1
13C-1,2,3,6,7,8-HxCDF	IS	65.9	40 - 135		25-Feb-24 00:20	1
13C-2,3,4,6,7,8-HxCDF	IS	61.6	40 - 135		25-Feb-24 00:20	1
13C-1,2,3,7,8,9-HxCDF	IS	60.9	40 - 135		25-Feb-24 00:20	1
13C-1,2,3,4,6,7,8-HpCDF	IS	55.6	40 - 135		25-Feb-24 00:20	1
13C-1,2,3,4,7,8,9-HpCDF	IS	56.2	40 - 135		25-Feb-24 00:20	1
13C-OCDF	IS	54.2	40 - 135		25-Feb-24 00:20	1
37Cl-2,3,7,8-TCDD	CRS	119	40 - 135		25-Feb-24 00:20	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

**Sample ID: AOI-089-1.5-2.0**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2402080-04	Date Received:	06-Feb-24 09:11
Project:	A4B0754 - Port of Ridgefield	QC Batch:	B24B183	Date Extracted:	23-Feb-24
Matrix:	Soil	Sample Size:	13.2 g	Column:	ZB-DIOXIN
Date Collected:	06-Dec-23 11:30	% Solids:	75.8		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.155	0.190			25-Feb-24 01:07	1
1,2,3,7,8-PeCDD	ND		0.782	0.371		25-Feb-24 01:07	1
1,2,3,4,7,8-HxCDD	ND	0.465	0.632			25-Feb-24 01:07	1
1,2,3,6,7,8-HxCDD	2.67		0.639			25-Feb-24 01:07	1
1,2,3,7,8,9-HxCDD	1.24		0.715		J	25-Feb-24 01:07	1
1,2,3,4,6,7,8-HpCDD	44.5		0.704			25-Feb-24 01:07	1
OCDD	323		1.62		B	25-Feb-24 01:07	1
2,3,7,8-TCDF	ND	0.136	0.183			25-Feb-24 01:07	1
1,2,3,7,8-PeCDF	ND	0.230	0.575			25-Feb-24 01:07	1
2,3,4,7,8-PeCDF	ND		0.684	0.425		25-Feb-24 01:07	1
1,2,3,4,7,8-HxCDF	0.572		0.658		J	25-Feb-24 01:07	1
1,2,3,6,7,8-HxCDF	ND		0.620	0.221		25-Feb-24 01:07	1
2,3,4,6,7,8-HxCDF	ND		0.660	0.225		25-Feb-24 01:07	1
1,2,3,7,8,9-HxCDF	ND	0.399	0.714			25-Feb-24 01:07	1
1,2,3,4,6,7,8-HpCDF	4.21		0.648			25-Feb-24 01:07	1
1,2,3,4,7,8,9-HpCDF	ND	0.476	0.816			25-Feb-24 01:07	1
OCDF	3.51		3.83		J	25-Feb-24 01:07	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	1.03
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**Totals**

Total TCDD	ND		0.511	
Total PeCDD	0.339		2.01	J
Total HxCDD	13.2			
Total HpCDD	80.6			
Total TCDF	1.38		1.62	
Total PeCDF	3.97		4.39	
Total HxCDF	9.79		10.5	
Total HpCDF	11.5			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	71.8	40 - 135		25-Feb-24 01:07	1
13C-1,2,3,7,8-PeCDD	IS	66.0	40 - 135		25-Feb-24 01:07	1
13C-1,2,3,4,7,8-HxCDD	IS	51.6	40 - 135		25-Feb-24 01:07	1
13C-1,2,3,6,7,8-HxCDD	IS	57.0	40 - 135		25-Feb-24 01:07	1
13C-1,2,3,7,8,9-HxCDD	IS	49.3	40 - 135		25-Feb-24 01:07	1
13C-1,2,3,4,6,7,8-HpCDD	IS	45.8	40 - 135		25-Feb-24 01:07	1
13C-OCDD	IS	35.6	40 - 135	H	25-Feb-24 01:07	1
13C-2,3,7,8-TCDF	IS	66.6	40 - 135		25-Feb-24 01:07	1
13C-1,2,3,7,8-PeCDF	IS	65.2	40 - 135		25-Feb-24 01:07	1
13C-2,3,4,7,8-PeCDF	IS	66.0	40 - 135		25-Feb-24 01:07	1
13C-1,2,3,4,7,8-HxCDF	IS	58.1	40 - 135		25-Feb-24 01:07	1
13C-1,2,3,6,7,8-HxCDF	IS	59.0	40 - 135		25-Feb-24 01:07	1
13C-2,3,4,6,7,8-HxCDF	IS	55.0	40 - 135		25-Feb-24 01:07	1
13C-1,2,3,7,8,9-HxCDF	IS	56.7	40 - 135		25-Feb-24 01:07	1
13C-1,2,3,4,6,7,8-HpCDF	IS	46.4	40 - 135		25-Feb-24 01:07	1
13C-1,2,3,4,7,8,9-HpCDF	IS	51.1	40 - 135		25-Feb-24 01:07	1
13C-OCDF	IS	42.6	40 - 135		25-Feb-24 01:07	1
37Cl-2,3,7,8-TCDD	CRS	115	40 - 135		25-Feb-24 01:07	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

The results are reported in dry weight.

The sample size is reported in wet weight.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection Limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
MDL	Method Detection Limit
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
RL	For 537.1, the reported RLs are the MRLs.
TEQ	Toxic Equivalency, sum of the toxic equivalency factors (TEF) multiplied by the sample concentrations.
TEQMax	TEQ calculation that uses the detection limit as the concentration for non-detects
TEQMin	TEQ calculation that uses zero as the concentration for non-detects
TEQRisk	TEQ calculation that uses ½ the detection limit as the concentration for non-detects
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Enthalpy Analytical - EDH Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	21-023-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2020018
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	2211390
Nevada Division of Environmental Protection	CA00413
New Hampshire Environmental Accreditation Program	207721
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Ohio Environmental Protection Agency	87778
Oregon Laboratory Accreditation Program	4042-021
Texas Commission on Environmental Quality	T104704189-22-13
Vermont Department of Health	VT-4042
Virginia Department of General Services	11276
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters can be found at [Enthalpy.com/Resources/Accreditations](http://Enthalpy.com/Resources/Accreditations).*

SUBCONTRACT ORDER

Apex Laboratories

AKL 2/1/24 / CB 2/1/24

A4B0754

2402080 3.6°C

SENDING LABORATORY:

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Enthalpy Analytical- CA  
1104 Windfield Way  
El Dorado Hills, CA 95762  
Phone : (916) 673-1520  
Fax: -

*DW*

Sample Name: AOI-043-1.5-2.0 Soil Sampled: 12/06/23 10:03 (A4B0754-01)  
Re-logged from A3L1035-04

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	02/20/24 17:00	01/05/24 10:03	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

Sample Name: AOI-079-1.5-2.0 Soil Sampled: 12/15/23 10:05 (A4B0754-02)  
Re-logged from A3L1378-04

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	02/20/24 17:00	01/14/24 10:05	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

Sample Name: AOI-083-1.5-2.0 Soil Sampled: 12/06/23 11:00 (A4B0754-03)  
Re-logged from A3L1035-06

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	02/20/24 17:00	01/05/24 11:00	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

Sample Name: AOI-089-1.5-2.0 Soil Sampled: 12/06/23 11:30 (A4B0754-04)  
Re-logged from A3L1035-08

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	02/20/24 17:00	01/05/24 11:30	
<i>Containers Supplied:</i> (A)8 oz Glass Jar			

Standard TAT

*AKL MW*

2/1/24

Fed Ex (Shipper)

Released By Date Received By Date

Fed Ex (Shipper)

*Jennifer Torres* 02/01/24 0911

Released By Date Received By Date



# Sample Log-In Checklist

Page # 1 of 1

Work Order #: 2402080 TAT 42

Samples Arrival:	Date/Time: <u>02/06/24 0911</u>	Initials: <u>JT</u>	Location: <u>WR-1</u>
			Shelf/Rack: <u>NA</u>
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac
	<input type="radio"/> GLS	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered
	<input type="radio"/> Other		
Preservation:	<input checked="" type="radio"/> Ice	<input type="radio"/> Blue Ice	<input type="radio"/> Techni Ice
	<input type="radio"/> Dry Ice	<input type="radio"/> None	
Temp °C: <u>3.0</u> (uncorrected)	Probe used: Y / <input checked="" type="radio"/> N		Thermometer ID: <u>IR-4</u>
Temp °C: <u>3.0</u> (corrected)			

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trk # <u>7750 7919 9959</u>			
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	<input type="checkbox"/> Enthalpy	<input checked="" type="checkbox"/> Client	<input type="checkbox"/> Retain
	<input type="checkbox"/> Return	<input type="checkbox"/> Dispose	
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Logged In:	Date/Time: <u>12:16</u> <u>02/07/24</u>	Initials: <u>BAC</u>	Location: <u>WR-2</u>
			Shelf/Rack: <u>D-4</u>
COC Anomaly/Sample Acceptance Form completed?			<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

Comments:

# CoC/Label Reconciliation Report WO# 2402080

LabNumber	CoC Sample ID	<input type="checkbox"/>	SampleAlias	Sample Date/Time	<input type="checkbox"/>	Container	BaseMatrix	Sample Comments
2402080-01	A AOI-043-1.5-2.0	<input checked="" type="checkbox"/>	(A4B0754-01)	06-Dec-23 10:03	<input checked="" type="checkbox"/>	Clear Glass Jar, 250mL	Solid	
2402080-02	A AOI-079-1.5-2.0	<input checked="" type="checkbox"/>	(A4B0754-02)	15-Dec-23 10:05	<input checked="" type="checkbox"/>	Clear Glass Jar, 250mL	Solid	
2402080-03	A AOI-083-1.5-2.0	<input checked="" type="checkbox"/>	(A4B0754-03)	06-Dec-23 11:00	<input checked="" type="checkbox"/>	Clear Glass Jar, 250mL	Solid	
2402080-04	A AOI-089-1.5-2.0	<input checked="" type="checkbox"/>	(A4B0754-04)	06-Dec-23 11:30	<input checked="" type="checkbox"/>	Clear Glass Jar, 250mL	Solid	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA	Comments:
Sample Container Intact?	✓			
Sample Custody Seals Intact?		✓	✓	
Adequate Sample Volume?	✓			
Container Type Appropriate for Analysis(es)	✓			

Preservation Documented: Na2S2O3    Trizma    NH4CH3CO2    None    Other

Verified by/Date: BAC 02/07/24





ANALYTICAL REPORT

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

Wednesday, May 1, 2024

Carolyn Wise  
Maul Foster & Alongi, INC.  
3140 NE Broadway Street  
Portland, OR 97232

RE: A4C1342 - Port of Ridgefield - M9003.01.061

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A4C1342, which was received by the laboratory on 3/14/2024 at 12:27:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [pnerenberg@apex-labs.com](mailto:pnerenberg@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information	
<u>Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.</u>	
(See Cooler Receipt Form for details)	
Default Cooler	3.9 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.  
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.



Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director



**ANALYTICAL REPORT**

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b><u>Maul Foster &amp; Alongi, INC.</u></b> 3140 NE Broadway Street Portland, OR 97232	Project: <b><u>Port of Ridgefield</u></b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Carolyn Wise</b>	<b>Report ID:</b> <b>A4C1342 - 05 01 24 1046</b>
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
AOI043-2.0-2.5	A4C1342-01	Soil	03/13/24 10:00	03/14/24 12:27
AOI043-2.5-3.0	A4C1342-02	Soil	03/13/24 10:15	03/14/24 12:27
BLANK-240313	A4C1342-03	Water	03/13/24 13:00	03/14/24 12:27

Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.*

Philip Nerenberg, Lab Director



**ANALYTICAL REPORT**

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b><u>Maul Foster &amp; Alongi, INC.</u></b> 3140 NE Broadway Street Portland, OR 97232	Project: <b><u>Port of Ridgefield</u></b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Carolyn Wise</b>	<b><u>Report ID:</u></b> <b>A4C1342 - 05 01 24 1046</b>
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**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

Apex Laboratories

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.
- Results for Volatiles analyses on soils and sediments that are reported on a "dry weight" basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an "As Received" basis do not have the WMS correction applied, as dry weight was not performed.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).

- For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
- For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.

For further details, please request a copy of this document.

- Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

**Benzofluoranthene Isomer Reporting:**

Due to coelution on the analytical column, the Benzo(b)fluoranthene results represent the concentration of both Benzo(b)fluoranthene and Benzo(j) fluoranthene. Calibration is based on the response of Benzo(b)fluoranthene, and the results represent the combined Benzo(b+j)fluoranthene(s).

Apex Laboratories

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Philip Nerenberg, Lab Director



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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client (Maul Foster & Alongi, INC.), Project (Port of Ridgefield), and Report ID (A4C1342 - 05 01 24 1046).

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Table with 6 columns: Matrix, Analysis, TNI\_ID, Analyte, TNI\_ID, Accreditation. Includes a note: All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Handwritten signature of Philip Nerenberg

Philip Nerenberg, Lab Director

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**Maul Foster & Alongi, INC.**  
3140 NE Broadway Street  
Portland, OR 97232

Project: **Port of Ridgefield**  
Project Number: **M9003.01.061**  
Project Manager: **Carolyn Wise**

**Report ID:**  
**A4C1342 - 05 01 24 1046**

**CHAIN OF CUSTODY**

APEX LABS 6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Lab # AM C1342 coc 1 of 1

Company: MFA Project Mgr: Carolyn Wise Project Name: PORTLAND STAMPA Project #: M9003.01.061

Address: 350 EMILLIAN BLVD, STE 405 VAN, WA 98005 Email: carolyn.wise@maulalongi.com PO #

Sampled by: Isabel Perez

Site Location: \_\_\_\_\_ State: WA County: CLATSOP

Phone: (360) 594-8255

**ANALYSIS REQUEST**

DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-DX	NWTPH-GX	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pesticides	RCCA Metals (8)	Priority Metals (13)	AL, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, N, K, Se, Ag, Na, Tl, V, Zn	TOTAL DISS. TCLP	TCLP Metals (8)	Hold Sample	Frozen Archive	
<u>A01-043-20-2.5</u>	<u>3/19/2000</u>	<u>S</u>	<u>1</u>																			
<u>A01-043-25-3.0</u>	<u>3/19/2000</u>	<u>S</u>	<u>1</u>																			
<u>BLANK-240313</u>	<u>3/13/2013</u>		<u>2</u>																			

Standard Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day    2 Day    3 Day    5 Day    Standard    Other: \_\_\_\_\_

**SPECIAL INSTRUCTIONS:**

RELINQUISHED BY: Signature: <u>Emma Taylor</u> Printed Name: <u>Emma Taylor</u> Company: <u>MFA</u>	RECEIVED BY: Signature: <u>Carolyn Wise</u> Printed Name: <u>Carolyn Wise</u> Company: <u>Apex</u>
Date: <u>3/13/24</u> Time: <u>1:50 PM</u>	Date: <u>3/14/24</u> Time: <u>12:27</u>

Form Y-002 R-00

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

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**APEX LABS COOLER RECEIPT FORM**

Client: MEA Element WO#: A4 C1342

Project/Project #: Por Yard Sample M9003.01.061

**Delivery Info:**  
Date/time received: 3/14/24 @ 1227 By: JJ AM  
Delivered by: Apex  Client  ESS  FedEx  UPS  Radio  Morgan  SDS  Evergreen  Other   
From USDA Regulated Origin? Yes  No

**Cooler Inspection** Date/time inspected: 3/14/24 @ 1521 By: JJ  
Chain of Custody included? Yes  No   
Signed/dated by client? Yes  No   
Contains USDA Reg. Soils? Yes  No  Unsure (email RegSoils)

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>3.9</u>						
Custody seals? (Y/N)	<u>N</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>Y</u>						
Ice type: (Gel/Real/Other)	<u>real</u>						
Condition (In/Out):	<u>In</u>						

Cooler out of temp? (Y/N) Possible reason why: (N)  
Green dots applied to out of temperature samples? Yes  No   
Out of temperature samples form initiated? Yes  No

**Sample Inspection:** Date/time inspected: 3.14.24 @ 1730 By: MHM  
All samples intact? Yes  No  Comments: \_\_\_\_\_  
Bottle labels/COCs agree? Yes  No  Comments: \_\_\_\_\_  
COC/container discrepancies form initiated? Yes  No   
Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_  
Do VOA vials have visible headspace? Yes  No  NA   
Comments: \_\_\_\_\_  
Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA  pH ID: \_\_\_\_\_  
Comments: \_\_\_\_\_

Labeled by: AW Witness: AW Cooler Inspected by: MHM  
Form Y-003 R-02



April 19, 2024

**Enthalpy Analytical - El Dorado Hills  
Work Order No. 2403149**

Mr. Philip Nerenberg  
Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223

Dear Mr. Nerenberg,

Enclosed are the results for the sample set received at Enthalpy Analytical - EDH on March 19, 2024 under your Project Name 'A4C1342 / Port of Ridgefield'.

Enthalpy Analytical - EDH is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [kathy.zipp@enthalpy.com](mailto:kathy.zipp@enthalpy.com).

Thank you for choosing Enthalpy Analytical - EDH as part of your analytical support team.

Sincerely,

Kathy Zipp  
Project Manager

*Enthalpy Analytical - EDH certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Enthalpy Analytical - EDH.*

## **Enthalpy Analytical - EDH Work Order No. 2403149**

### **Case Narrative**

#### **Sample Condition on Receipt:**

One water and two soil samples were received and stored securely in accordance with Enthalpy Analytical - EDH standard operating procedures and EPA methodology. The samples were received in good condition and within the method temperature requirements. Sample "AOI043-2.0-2.5" was received in a broken glass jar. Transferred contents into an amber glass jar and proceeded with analysis.

#### **Analytical Notes:**

#### **EPA Method 8290A**

The samples were extracted and analyzed for tetra-through-octa chlorinated dioxins and furans by EPA Method 8290A using a ZB-DIOXIN GC column.

#### **Holding Times**

The method holding time criteria were met for these samples.

#### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each preparation batch. No analytes were detected in the Method Blank. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are flagged with an "H" qualifier.

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# Sample Inventory Report

Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2403149-01	AOI043-2.0-2.5	13-Mar-24 10:00	19-Mar-24 09:16	Amber Glass, 250mL
2403149-02	AOI043-2.5-3.0	13-Mar-24 10:15	19-Mar-24 09:16	Clear Glass Jar, 250mL
2403149-03	BLANK-240313	13-Mar-24 13:00	19-Mar-24 09:16	Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L

## **ANALYTICAL RESULTS**

**Sample ID: Method Blank**
**EPA Method 8290A**

Client Data		Laboratory Data				
Name:	Apex Laboratories	Lab Sample:	B24C271-BLK1		Date Extracted:	28-Mar-24
Project:	A4C1342 / Port of Ridgefield	QC Batch:	B24C271		Column:	ZB-DIOXIN
Matrix:	Aqueous	Sample Size:	1.00 L			

Analyte	Conc. (pg/L)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	1.02	1.78			02-Apr-24 04:31	1
1,2,3,7,8-PeCDD	ND	1.59	5.63			02-Apr-24 04:31	1
1,2,3,4,7,8-HxCDD	ND	2.01	4.18			02-Apr-24 04:31	1
1,2,3,6,7,8-HxCDD	ND	2.01	3.51			02-Apr-24 04:31	1
1,2,3,7,8,9-HxCDD	ND	2.18	4.46			02-Apr-24 04:31	1
1,2,3,4,6,7,8-HpCDD	ND	1.83	4.84			02-Apr-24 04:31	1
OCDD	ND	5.16	16.4			02-Apr-24 04:31	1
2,3,7,8-TCDF	ND	0.727	1.78			02-Apr-24 04:31	1
1,2,3,7,8-PeCDF	ND	1.36	5.01			02-Apr-24 04:31	1
2,3,4,7,8-PeCDF	ND	1.06	4.99			02-Apr-24 04:31	1
1,2,3,4,7,8-HxCDF	ND	0.954	6.87			02-Apr-24 04:31	1
1,2,3,6,7,8-HxCDF	ND	0.963	6.31			02-Apr-24 04:31	1
2,3,4,6,7,8-HxCDF	ND	1.09	5.80			02-Apr-24 04:31	1
1,2,3,7,8,9-HxCDF	ND	1.63	5.33			02-Apr-24 04:31	1
1,2,3,4,6,7,8-HpCDF	ND	1.50	5.96			02-Apr-24 04:31	1
1,2,3,4,7,8,9-HpCDF	ND	2.53	5.34			02-Apr-24 04:31	1
OCDF	ND	3.38	11.3			02-Apr-24 04:31	1

Toxic Equivalent	
TEQMinWHO2005Dioxin	0.00

Totals	
Total TCDD	ND 1.02
Total PeCDD	ND 1.59
Total HxCDD	ND 2.18
Total HpCDD	ND 1.83
Total TCDF	ND 0.727
Total PeCDF	ND 1.36
Total HxCDF	ND 1.63
Total HpCDF	ND 2.53

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	91.7	40 - 135		02-Apr-24 04:31	1
13C-1,2,3,7,8-PeCDD	IS	107	40 - 135		02-Apr-24 04:31	1
13C-1,2,3,4,7,8-HxCDD	IS	69.2	40 - 135		02-Apr-24 04:31	1
13C-1,2,3,6,7,8-HxCDD	IS	70.8	40 - 135		02-Apr-24 04:31	1
13C-1,2,3,7,8,9-HxCDD	IS	68.4	40 - 135		02-Apr-24 04:31	1
13C-1,2,3,4,6,7,8-HpCDD	IS	71.0	40 - 135		02-Apr-24 04:31	1
13C-OCDD	IS	60.4	40 - 135		02-Apr-24 04:31	1
13C-2,3,7,8-TCDF	IS	88.1	40 - 135		02-Apr-24 04:31	1
13C-1,2,3,7,8-PeCDF	IS	83.1	40 - 135		02-Apr-24 04:31	1
13C-2,3,4,7,8-PeCDF	IS	87.7	40 - 135		02-Apr-24 04:31	1
13C-1,2,3,4,7,8-HxCDF	IS	75.5	40 - 135		02-Apr-24 04:31	1
13C-1,2,3,6,7,8-HxCDF	IS	74.0	40 - 135		02-Apr-24 04:31	1
13C-2,3,4,6,7,8-HxCDF	IS	73.7	40 - 135		02-Apr-24 04:31	1
13C-1,2,3,7,8,9-HxCDF	IS	78.8	40 - 135		02-Apr-24 04:31	1
13C-1,2,3,4,6,7,8-HpCDF	IS	73.0	40 - 135		02-Apr-24 04:31	1
13C-1,2,3,4,7,8,9-HpCDF	IS	81.7	40 - 135		02-Apr-24 04:31	1
13C-OCDF	IS	65.6	40 - 135		02-Apr-24 04:31	1
37Cl-2,3,7,8-TCDD	CRS	108	40 - 135		02-Apr-24 04:31	1

EDL - Sample specific estimated detection limit  
EMPC - Estimated maximum possible concentration  
MDL - Method Detection Limit



**Sample ID: OPR**
**EPA Method 8290A**

Client Data		Laboratory Data				
Name:	Apex Laboratories	Lab Sample:	B24C271-BS1		Date Extracted:	28-Mar-24 15:41
Project:	A4C1342 / Port of Ridgefield	QC Batch:	B24C271		Column:	ZB-DIOXIN
Matrix:	Aqueous	Sample Size:	1.00 L			

Analyte	Amt Found (pg/L)	Spike Amt	% Recovery	Limits	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	219	200	110	70-130		02-Apr-24 02:58	1
1,2,3,7,8-PeCDD	989	1000	98.9	70-130		02-Apr-24 02:58	1
1,2,3,4,7,8-HxCDD	1100	1000	110	70-130		02-Apr-24 02:58	1
1,2,3,6,7,8-HxCDD	1080	1000	108	70-130		02-Apr-24 02:58	1
1,2,3,7,8,9-HxCDD	1070	1000	107	70-130		02-Apr-24 02:58	1
1,2,3,4,6,7,8-HpCDD	1050	1000	105	70-130		02-Apr-24 02:58	1
OCDD	2020	2000	101	70-130		02-Apr-24 02:58	1
2,3,7,8-TCDF	201	200	100	70-130		02-Apr-24 02:58	1
1,2,3,7,8-PeCDF	984	1000	98.4	70-130		02-Apr-24 02:58	1
2,3,4,7,8-PeCDF	997	1000	99.7	70-130		02-Apr-24 02:58	1
1,2,3,4,7,8-HxCDF	1020	1000	102	70-130		02-Apr-24 02:58	1
1,2,3,6,7,8-HxCDF	1050	1000	105	70-130		02-Apr-24 02:58	1
2,3,4,6,7,8-HxCDF	1070	1000	107	70-130		02-Apr-24 02:58	1
1,2,3,7,8,9-HxCDF	1060	1000	106	70-130		02-Apr-24 02:58	1
1,2,3,4,6,7,8-HpCDF	999	1000	99.9	70-130		02-Apr-24 02:58	1
1,2,3,4,7,8,9-HpCDF	1010	1000	101	70-130		02-Apr-24 02:58	1
OCDF	2080	2000	104	70-130		02-Apr-24 02:58	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	104	40-135		02-Apr-24 02:58	1
13C-1,2,3,7,8-PeCDD	IS	121	40-135		02-Apr-24 02:58	1
13C-1,2,3,4,7,8-HxCDD	IS	80.6	40-135		02-Apr-24 02:58	1
13C-1,2,3,6,7,8-HxCDD	IS	83.8	40-135		02-Apr-24 02:58	1
13C-1,2,3,7,8,9-HxCDD	IS	83.8	40-135		02-Apr-24 02:58	1
13C-1,2,3,4,6,7,8-HpCDD	IS	92.0	40-135		02-Apr-24 02:58	1
13C-OCDD	IS	87.3	40-135		02-Apr-24 02:58	1
13C-2,3,7,8-TCDF	IS	102	40-135		02-Apr-24 02:58	1
13C-1,2,3,7,8-PeCDF	IS	101	40-135		02-Apr-24 02:58	1
13C-2,3,4,7,8-PeCDF	IS	106	40-135		02-Apr-24 02:58	1
13C-1,2,3,4,7,8-HxCDF	IS	92.4	40-135		02-Apr-24 02:58	1
13C-1,2,3,6,7,8-HxCDF	IS	89.6	40-135		02-Apr-24 02:58	1
13C-2,3,4,6,7,8-HxCDF	IS	86.3	40-135		02-Apr-24 02:58	1
13C-1,2,3,7,8,9-HxCDF	IS	95.8	40-135		02-Apr-24 02:58	1
13C-1,2,3,4,6,7,8-HpCDF	IS	91.9	40-135		02-Apr-24 02:58	1
13C-1,2,3,4,7,8,9-HpCDF	IS	107	40-135		02-Apr-24 02:58	1
13C-OCDF	IS	95.5	40-135		02-Apr-24 02:58	1
37Cl-2,3,7,8-TCDD	CRS	125	40-135		02-Apr-24 02:58	1

**Sample ID: BLANK-240313**

**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2403149-03	Date Received:	19-Mar-24 09:16
Project:	A4C1342 / Port of Ridgefield	QC Batch:	B24C271	Date Extracted:	28-Mar-24
Matrix:	Water	Sample Size:	0.926 L	Column:	ZB-DIOXIN
Date Collected:	13-Mar-24 13:00				

Analyte	Conc. (pg/L)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	1.01	1.92			02-Apr-24 06:51	1
1,2,3,7,8-PeCDD	ND	1.52	6.08			02-Apr-24 06:51	1
1,2,3,4,7,8-HxCDD	ND	1.58	4.51			02-Apr-24 06:51	1
1,2,3,6,7,8-HxCDD	ND	1.59	3.79			02-Apr-24 06:51	1
1,2,3,7,8,9-HxCDD	ND	1.78	4.82			02-Apr-24 06:51	1
1,2,3,4,6,7,8-HpCDD	ND	2.40	5.23			02-Apr-24 06:51	1
OCDD	ND	8.24	17.7			02-Apr-24 06:51	1
2,3,7,8-TCDF	ND	0.790	1.92			02-Apr-24 06:51	1
1,2,3,7,8-PeCDF	ND	0.904	5.41			02-Apr-24 06:51	1
2,3,4,7,8-PeCDF	ND	0.800	5.39			02-Apr-24 06:51	1
1,2,3,4,7,8-HxCDF	ND	0.844	7.42			02-Apr-24 06:51	1
1,2,3,6,7,8-HxCDF	ND	0.886	6.81			02-Apr-24 06:51	1
2,3,4,6,7,8-HxCDF	ND	0.932	6.26			02-Apr-24 06:51	1
1,2,3,7,8,9-HxCDF	ND	1.38	5.76			02-Apr-24 06:51	1
1,2,3,4,6,7,8-HpCDF	ND	1.93	6.44			02-Apr-24 06:51	1
1,2,3,4,7,8,9-HpCDF	ND	3.05	5.77			02-Apr-24 06:51	1
OCDF	ND	3.75	12.2			02-Apr-24 06:51	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	0.00
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**Totals**

Total TCDD	ND	1.01		
Total PeCDD	ND		1.91	
Total HxCDD	ND	1.78		
Total HpCDD	ND	2.40		
Total TCDF	ND	0.790		
Total PeCDF	ND	0.904		
Total HxCDF	ND	1.38		
Total HpCDF	ND	3.05		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	103	40 - 135		02-Apr-24 06:51	1
13C-1,2,3,7,8-PeCDD	IS	115	40 - 135		02-Apr-24 06:51	1
13C-1,2,3,4,7,8-HxCDD	IS	75.9	40 - 135		02-Apr-24 06:51	1
13C-1,2,3,6,7,8-HxCDD	IS	79.1	40 - 135		02-Apr-24 06:51	1
13C-1,2,3,7,8,9-HxCDD	IS	78.3	40 - 135		02-Apr-24 06:51	1
13C-1,2,3,4,6,7,8-HpCDD	IS	74.1	40 - 135		02-Apr-24 06:51	1
13C-OCDD	IS	44.5	40 - 135		02-Apr-24 06:51	1
13C-2,3,7,8-TCDF	IS	103	40 - 135		02-Apr-24 06:51	1
13C-1,2,3,7,8-PeCDF	IS	101	40 - 135		02-Apr-24 06:51	1
13C-2,3,4,7,8-PeCDF	IS	103	40 - 135		02-Apr-24 06:51	1
13C-1,2,3,4,7,8-HxCDF	IS	87.0	40 - 135		02-Apr-24 06:51	1
13C-1,2,3,6,7,8-HxCDF	IS	84.1	40 - 135		02-Apr-24 06:51	1
13C-2,3,4,6,7,8-HxCDF	IS	86.8	40 - 135		02-Apr-24 06:51	1
13C-1,2,3,7,8,9-HxCDF	IS	91.6	40 - 135		02-Apr-24 06:51	1
13C-1,2,3,4,6,7,8-HpCDF	IS	72.6	40 - 135		02-Apr-24 06:51	1
13C-1,2,3,4,7,8,9-HpCDF	IS	85.4	40 - 135		02-Apr-24 06:51	1
13C-OCDF	IS	54.5	40 - 135		02-Apr-24 06:51	1
37Cl-2,3,7,8-TCDD	CRS	122	40 - 135		02-Apr-24 06:51	1

EDL - Sample specific estimated detection limit

EMPC - Estimated maximum possible concentration

MDL - Method Detection Limit

**Sample ID: Method Blank**
**EPA Method 8290A**

Client Data		Laboratory Data				
Name:	Apex Laboratories	Lab Sample:	B24D090-BLK1		Date Extracted:	11-Apr-24
Project:	A4C1342 / Port of Ridgefield	QC Batch:	B24D090		Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	10.0 g			

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.130	0.190			16-Apr-24 21:28	1
1,2,3,7,8-PeCDD	ND	0.275	0.784			16-Apr-24 21:28	1
1,2,3,4,7,8-HxCDD	ND	0.296	0.633			16-Apr-24 21:28	1
1,2,3,6,7,8-HxCDD	ND	0.272	0.640			16-Apr-24 21:28	1
1,2,3,7,8,9-HxCDD	ND	0.357	0.717			16-Apr-24 21:28	1
1,2,3,4,6,7,8-HpCDD	ND	0.308	0.706			16-Apr-24 21:28	1
OCDD	ND	0.606	1.62			16-Apr-24 21:28	1
2,3,7,8-TCDF	ND	0.127	0.183			16-Apr-24 21:28	1
1,2,3,7,8-PeCDF	ND	0.145	0.576			16-Apr-24 21:28	1
2,3,4,7,8-PeCDF	ND	0.118	0.686			16-Apr-24 21:28	1
1,2,3,4,7,8-HxCDF	ND	0.156	0.659			16-Apr-24 21:28	1
1,2,3,6,7,8-HxCDF	ND	0.163	0.621			16-Apr-24 21:28	1
2,3,4,6,7,8-HxCDF	ND	0.184	0.661			16-Apr-24 21:28	1
1,2,3,7,8,9-HxCDF	ND	0.295	0.716			16-Apr-24 21:28	1
1,2,3,4,6,7,8-HpCDF	ND	0.170	0.649			16-Apr-24 21:28	1
1,2,3,4,7,8,9-HpCDF	ND	0.284	0.818			16-Apr-24 21:28	1
OCDF	ND	0.398	3.84			16-Apr-24 21:28	1

Toxic Equivalent	
TEQMinWHO2005Dioxin	0.00

Totals	
Total TCDD	ND 0.130
Total PeCDD	ND 0.275
Total HxCDD	ND 0.357
Total HpCDD	ND 0.308
Total TCDF	ND 0.127
Total PeCDF	ND 0.145
Total HxCDF	ND 0.295
Total HpCDF	ND 0.284

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	65.0	40 - 135		16-Apr-24 21:28	1
13C-1,2,3,7,8-PeCDD	IS	77.2	40 - 135		16-Apr-24 21:28	1
13C-1,2,3,4,7,8-HxCDD	IS	61.0	40 - 135		16-Apr-24 21:28	1
13C-1,2,3,6,7,8-HxCDD	IS	69.4	40 - 135		16-Apr-24 21:28	1
13C-1,2,3,7,8,9-HxCDD	IS	63.2	40 - 135		16-Apr-24 21:28	1
13C-1,2,3,4,6,7,8-HpCDD	IS	63.6	40 - 135		16-Apr-24 21:28	1
13C-OCDD	IS	55.4	40 - 135		16-Apr-24 21:28	1
13C-2,3,7,8-TCDF	IS	68.5	40 - 135		16-Apr-24 21:28	1
13C-1,2,3,7,8-PeCDF	IS	65.4	40 - 135		16-Apr-24 21:28	1
13C-2,3,4,7,8-PeCDF	IS	67.5	40 - 135		16-Apr-24 21:28	1
13C-1,2,3,4,7,8-HxCDF	IS	64.5	40 - 135		16-Apr-24 21:28	1
13C-1,2,3,6,7,8-HxCDF	IS	64.4	40 - 135		16-Apr-24 21:28	1
13C-2,3,4,6,7,8-HxCDF	IS	62.5	40 - 135		16-Apr-24 21:28	1
13C-1,2,3,7,8,9-HxCDF	IS	63.6	40 - 135		16-Apr-24 21:28	1
13C-1,2,3,4,6,7,8-HpCDF	IS	62.3	40 - 135		16-Apr-24 21:28	1
13C-1,2,3,4,7,8,9-HpCDF	IS	61.0	40 - 135		16-Apr-24 21:28	1
13C-OCDF	IS	56.3	40 - 135		16-Apr-24 21:28	1
37Cl-2,3,7,8-TCDD	CRS	79.1	40 - 135		16-Apr-24 21:28	1

EDL - Sample specific estimated detection limit  
 EMPC - Estimated maximum possible concentration  
 MDL - Method Detection Limit

The results are reported in dry weight.  
 The sample size is reported in wet weight.

**Sample ID: OPR**
**EPA Method 8290A**

Client Data		Laboratory Data				
Name:	Apex Laboratories	Lab Sample:	B24D090-BS1		Date Extracted:	11-Apr-24 06:49
Project:	A4C1342 / Port of Ridgefield	QC Batch:	B24D090		Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	10.0 g			

Analyte	Amt Found (pg/g)	Spike Amt	% Recovery	Limits	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	20.2	20.0	101	70-130		16-Apr-24 19:08	1
1,2,3,7,8-PeCDD	107	100	107	70-130		16-Apr-24 19:08	1
1,2,3,4,7,8-HxCDD	109	100	109	70-130		16-Apr-24 19:08	1
1,2,3,6,7,8-HxCDD	113	100	113	70-130		16-Apr-24 19:08	1
1,2,3,7,8,9-HxCDD	117	100	117	70-130		16-Apr-24 19:08	1
1,2,3,4,6,7,8-HpCDD	105	100	105	70-130		16-Apr-24 19:08	1
OCDD	205	200	102	70-130		16-Apr-24 19:08	1
2,3,7,8-TCDF	20.2	20.0	101	70-130		16-Apr-24 19:08	1
1,2,3,7,8-PeCDF	106	100	106	70-130		16-Apr-24 19:08	1
2,3,4,7,8-PeCDF	102	100	102	70-130		16-Apr-24 19:08	1
1,2,3,4,7,8-HxCDF	103	100	103	70-130		16-Apr-24 19:08	1
1,2,3,6,7,8-HxCDF	106	100	106	70-130		16-Apr-24 19:08	1
2,3,4,6,7,8-HxCDF	104	100	104	70-130		16-Apr-24 19:08	1
1,2,3,7,8,9-HxCDF	105	100	105	70-130		16-Apr-24 19:08	1
1,2,3,4,6,7,8-HpCDF	107	100	107	70-130		16-Apr-24 19:08	1
1,2,3,4,7,8,9-HpCDF	111	100	111	70-130		16-Apr-24 19:08	1
OCDF	213	200	106	70-130		16-Apr-24 19:08	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	55.5	40-135		16-Apr-24 19:08	1
13C-1,2,3,7,8-PeCDD	IS	66.8	40-135		16-Apr-24 19:08	1
13C-1,2,3,4,7,8-HxCDD	IS	55.5	40-135		16-Apr-24 19:08	1
13C-1,2,3,6,7,8-HxCDD	IS	58.8	40-135		16-Apr-24 19:08	1
13C-1,2,3,7,8,9-HxCDD	IS	55.9	40-135		16-Apr-24 19:08	1
13C-1,2,3,4,6,7,8-HpCDD	IS	55.2	40-135		16-Apr-24 19:08	1
13C-OCDD	IS	52.8	40-135		16-Apr-24 19:08	1
13C-2,3,7,8-TCDF	IS	62.7	40-135		16-Apr-24 19:08	1
13C-1,2,3,7,8-PeCDF	IS	60.6	40-135		16-Apr-24 19:08	1
13C-2,3,4,7,8-PeCDF	IS	61.8	40-135		16-Apr-24 19:08	1
13C-1,2,3,4,7,8-HxCDF	IS	58.4	40-135		16-Apr-24 19:08	1
13C-1,2,3,6,7,8-HxCDF	IS	57.3	40-135		16-Apr-24 19:08	1
13C-2,3,4,6,7,8-HxCDF	IS	58.8	40-135		16-Apr-24 19:08	1
13C-1,2,3,7,8,9-HxCDF	IS	56.8	40-135		16-Apr-24 19:08	1
13C-1,2,3,4,6,7,8-HpCDF	IS	53.4	40-135		16-Apr-24 19:08	1
13C-1,2,3,4,7,8,9-HpCDF	IS	52.4	40-135		16-Apr-24 19:08	1
13C-OCDF	IS	50.3	40-135		16-Apr-24 19:08	1
37Cl-2,3,7,8-TCDD	CRS	63.6	40-135		16-Apr-24 19:08	1

**Sample ID: AOI043-2.0-2.5**

**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2403149-01	Date Received:	19-Mar-24 09:16
Project:	A4C1342 / Port of Ridgefield	QC Batch:	B24D090	Date Extracted:	11-Apr-24
Matrix:	Soil	Sample Size:	13.7 g	Column:	ZB-DIOXIN
Date Collected:	13-Mar-24 10:00	% Solids:	73.2		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.385	0.190			16-Apr-24 23:01	1
1,2,3,7,8-PeCDD	ND		0.784	0.954		16-Apr-24 23:01	1
1,2,3,4,7,8-HxCDD	ND	1.51	0.633			16-Apr-24 23:01	1
1,2,3,6,7,8-HxCDD	4.66		0.640			16-Apr-24 23:01	1
1,2,3,7,8,9-HxCDD	3.33		0.717			16-Apr-24 23:01	1
1,2,3,4,6,7,8-HpCDD	67.5		0.706			16-Apr-24 23:01	1
OCDD	335		1.62			16-Apr-24 23:01	1
2,3,7,8-TCDF	ND	0.545	0.183			16-Apr-24 23:01	1
1,2,3,7,8-PeCDF	0.678		0.576		J	16-Apr-24 23:01	1
2,3,4,7,8-PeCDF	3.88		0.686			16-Apr-24 23:01	1
1,2,3,4,7,8-HxCDF	2.77		0.659			16-Apr-24 23:01	1
1,2,3,6,7,8-HxCDF	1.99		0.621		J	16-Apr-24 23:01	1
2,3,4,6,7,8-HxCDF	2.17		0.661		J	16-Apr-24 23:01	1
1,2,3,7,8,9-HxCDF	0.947		0.716		J	16-Apr-24 23:01	1
1,2,3,4,6,7,8-HpCDF	8.08		0.649			16-Apr-24 23:01	1
1,2,3,4,7,8,9-HpCDF	ND		0.818	0.733		16-Apr-24 23:01	1
OCDF	8.03		3.84			16-Apr-24 23:01	1

**Toxic Equivalent**

TEQMinWHO2005Dioxin	3.63
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**Totals**

Total TCDD	1.41	
Total PeCDD	10.5	11.4
Total HxCDD	32.0	
Total HpCDD	117	
Total TCDF	16.8	17.2
Total PeCDF	50.0	50.9
Total HxCDF	49.9	50.3
Total HpCDF	23.5	24.2

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	32.9	40 - 135	H	16-Apr-24 23:01	1
13C-1,2,3,7,8-PeCDD	IS	43.2	40 - 135		16-Apr-24 23:01	1
13C-1,2,3,4,7,8-HxCDD	IS	39.5	40 - 135	H	16-Apr-24 23:01	1
13C-1,2,3,6,7,8-HxCDD	IS	44.3	40 - 135		16-Apr-24 23:01	1
13C-1,2,3,7,8,9-HxCDD	IS	42.4	40 - 135		16-Apr-24 23:01	1
13C-1,2,3,4,6,7,8-HpCDD	IS	47.6	40 - 135		16-Apr-24 23:01	1
13C-OCDD	IS	44.9	40 - 135		16-Apr-24 23:01	1
13C-2,3,7,8-TCDF	IS	35.9	40 - 135	H	16-Apr-24 23:01	1
13C-1,2,3,7,8-PeCDF	IS	35.8	40 - 135	H	16-Apr-24 23:01	1
13C-2,3,4,7,8-PeCDF	IS	39.9	40 - 135	H	16-Apr-24 23:01	1
13C-1,2,3,4,7,8-HxCDF	IS	40.1	40 - 135		16-Apr-24 23:01	1
13C-1,2,3,6,7,8-HxCDF	IS	38.2	40 - 135	H	16-Apr-24 23:01	1
13C-2,3,4,6,7,8-HxCDF	IS	38.1	40 - 135	H	16-Apr-24 23:01	1
13C-1,2,3,7,8,9-HxCDF	IS	40.8	40 - 135		16-Apr-24 23:01	1
13C-1,2,3,4,6,7,8-HpCDF	IS	45.1	40 - 135		16-Apr-24 23:01	1
13C-1,2,3,4,7,8,9-HpCDF	IS	46.5	40 - 135		16-Apr-24 23:01	1
13C-OCDF	IS	40.8	40 - 135		16-Apr-24 23:01	1
37Cl-2,3,7,8-TCDD	CRS	101	40 - 135		16-Apr-24 23:01	1

EDL - Sample specific estimated detection limit  
 EMPC - Estimated maximum possible concentration  
 MDL - Method Detection Limit

The results are reported in dry weight.  
 The sample size is reported in wet weight.

**Sample ID: AOI043-2.5-3.0**

**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2403149-02	Date Received:	19-Mar-24 09:16
Project:	A4C1342 / Port of Ridgefield	QC Batch:	B24D090	Date Extracted:	11-Apr-24
Matrix:	Soil	Sample Size:	12.8 g	Column:	ZB-DIOXIN
Date Collected:	13-Mar-24 10:15	% Solids:	78.6		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.131	0.190			16-Apr-24 23:48	1
1,2,3,7,8-PeCDD	ND	0.246	0.782			16-Apr-24 23:48	1
1,2,3,4,7,8-HxCDD	ND	0.330	0.631			16-Apr-24 23:48	1
1,2,3,6,7,8-HxCDD	0.629		0.638		J	16-Apr-24 23:48	1
1,2,3,7,8,9-HxCDD	0.421		0.715		J	16-Apr-24 23:48	1
1,2,3,4,6,7,8-HpCDD	6.29		0.704			16-Apr-24 23:48	1
OCDD	29.3		1.62			16-Apr-24 23:48	1
2,3,7,8-TCDF	ND	0.121	0.183			16-Apr-24 23:48	1
1,2,3,7,8-PeCDF	ND	0.133	0.575			16-Apr-24 23:48	1
2,3,4,7,8-PeCDF	ND		0.684	0.562		16-Apr-24 23:48	1
1,2,3,4,7,8-HxCDF	0.347		0.657		J	16-Apr-24 23:48	1
1,2,3,6,7,8-HxCDF	ND		0.619	0.200		16-Apr-24 23:48	1
2,3,4,6,7,8-HxCDF	ND	0.247	0.659			16-Apr-24 23:48	1
1,2,3,7,8,9-HxCDF	ND	0.392	0.714			16-Apr-24 23:48	1
1,2,3,4,6,7,8-HpCDF	0.935		0.647		J	16-Apr-24 23:48	1
1,2,3,4,7,8,9-HpCDF	ND	0.274	0.816			16-Apr-24 23:48	1
OCDF	1.05		3.83		J	16-Apr-24 23:48	1

Toxic Equivalent	
TEQMinWHO2005Dioxin	0.221

Totals		
Total TCDD	ND	0.156
Total PeCDD	ND	1.61
Total HxCDD	1.05	3.89
Total HpCDD	12.0	
Total TCDF	1.18	1.78
Total PeCDF	5.77	6.92
Total HxCDF	6.19	6.76
Total HpCDF	3.17	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	89.7	40 - 135		16-Apr-24 23:48	1
13C-1,2,3,7,8-PeCDD	IS	100	40 - 135		16-Apr-24 23:48	1
13C-1,2,3,4,7,8-HxCDD	IS	80.1	40 - 135		16-Apr-24 23:48	1
13C-1,2,3,6,7,8-HxCDD	IS	88.3	40 - 135		16-Apr-24 23:48	1
13C-1,2,3,7,8,9-HxCDD	IS	82.2	40 - 135		16-Apr-24 23:48	1
13C-1,2,3,4,6,7,8-HpCDD	IS	81.3	40 - 135		16-Apr-24 23:48	1
13C-OCDD	IS	78.9	40 - 135		16-Apr-24 23:48	1
13C-2,3,7,8-TCDF	IS	90.8	40 - 135		16-Apr-24 23:48	1
13C-1,2,3,7,8-PeCDF	IS	87.8	40 - 135		16-Apr-24 23:48	1
13C-2,3,4,7,8-PeCDF	IS	91.3	40 - 135		16-Apr-24 23:48	1
13C-1,2,3,4,7,8-HxCDF	IS	86.0	40 - 135		16-Apr-24 23:48	1
13C-1,2,3,6,7,8-HxCDF	IS	84.0	40 - 135		16-Apr-24 23:48	1
13C-2,3,4,6,7,8-HxCDF	IS	83.9	40 - 135		16-Apr-24 23:48	1
13C-1,2,3,7,8,9-HxCDF	IS	84.8	40 - 135		16-Apr-24 23:48	1
13C-1,2,3,4,6,7,8-HpCDF	IS	79.5	40 - 135		16-Apr-24 23:48	1
13C-1,2,3,4,7,8,9-HpCDF	IS	80.9	40 - 135		16-Apr-24 23:48	1
13C-OCDF	IS	79.2	40 - 135		16-Apr-24 23:48	1
37Cl-2,3,7,8-TCDD	CRS	110	40 - 135		16-Apr-24 23:48	1

EDL - Sample specific estimated detection limit  
 EMPC - Estimated maximum possible concentration  
 MDL - Method Detection Limit

The results are reported in dry weight.  
 The sample size is reported in wet weight.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection Limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
MDL	Method Detection Limit
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
RL	For 537.1, the reported RLs are the MRLs.
TEQ	Toxic Equivalency, sum of the toxic equivalency factors (TEF) multiplied by the sample concentrations.
TEQMax	TEQ calculation that uses the detection limit as the concentration for non-detects
TEQMin	TEQ calculation that uses zero as the concentration for non-detects
TEQRisk	TEQ calculation that uses ½ the detection limit as the concentration for non-detects
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.



### Enthalpy Analytical - EDH Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	21-023-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2020018
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	2211390
Nevada Division of Environmental Protection	CA00413
New Hampshire Environmental Accreditation Program	207721
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Ohio Environmental Protection Agency	87778
Oregon Laboratory Accreditation Program	4042-021
Texas Commission on Environmental Quality	T104704189-22-13
Vermont Department of Health	VT-4042
Virginia Department of General Services	11276
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters can be found at [Enthalpy.com/Resources/Accreditations](http://Enthalpy.com/Resources/Accreditations).*

SUBCONTRACT ORDER

Apex Laboratories

A4C1342

3.6°C  
2403149

APC 3/15/24

Jan

**SENDING LABORATORY:**

Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223  
Phone: (503) 718-2323  
Fax: (503) 336-0745  
Project Manager: Philip Nerenberg

**RECEIVING LABORATORY:**

Enthalpy Analytical- CA  
1104 Windfield Way  
El Dorado Hills, CA 95762  
Phone: (916) 673-1520  
Fax: -

**Sample Name:** AO1-043-2.0-2.5 **Soil** **Sampled:** 03/13/24 10:00 (A4C1342-01)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	03/27/24 17:00	04/12/24 10:00	
<i>Containers Supplied:</i>			
(A) 8 oz Glass Jar			

**Sample Name:** AO1-043-2.5-3.0 **Soil** **Sampled:** 03/13/24 10:15 (A4C1342-02)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	03/27/24 17:00	04/12/24 10:15	
<i>Containers Supplied:</i>			
(A) 8 oz Glass Jar			

**Sample Name:** BLANK-240313 **Water** **Sampled:** 03/13/24 13:00 (A4C1342-03)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	03/27/24 17:00	04/12/24 13:00	
<i>Containers Supplied:</i>			
(A) 1 L Amber Glass - Non Preserved			
(B) 1 L Amber Glass - Non Preserved			

Standard TAT

Released By: WAS 3/18/24 Date: \_\_\_\_\_ Received By: \_\_\_\_\_ Date: \_\_\_\_\_  
 Released By: Fed Ex (Shipper) Date: \_\_\_\_\_ Received By: Jennifer Torres Date: 03/19/24  
 Released By: \_\_\_\_\_ Date: \_\_\_\_\_ Received By: \_\_\_\_\_ Date: \_\_\_\_\_

# Sample Log-In Checklist

Page # 1 of 1

Work Order #: 2403149 TAT Std

Samples Arrival:	Date/Time <u>03/19/24 0916</u>		Initials: <u>JT</u>		Location: <u>WR-1</u>		
	Shelf/Rack: <u>NA</u>						
Delivered By:	<input checked="" type="checkbox"/> FedEx	<input type="checkbox"/> UPS	<input type="checkbox"/> On Trac	<input type="checkbox"/> GLS	<input type="checkbox"/> DHL	<input type="checkbox"/> Hand Delivered	<input type="checkbox"/> Other
Preservation:	<input checked="" type="checkbox"/> Ice		<input type="checkbox"/> Blue Ice		<input type="checkbox"/> Techni Ice	<input type="checkbox"/> Dry Ice	<input type="checkbox"/> None
Temp °C: <u>3.6</u> (uncorrected)	Probe used: Y / <input checked="" type="checkbox"/> N			Thermometer ID: <u>R-4</u>			
Temp °C: <u>3.6</u> (corrected)							

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trk # <u>7755 9074 4780</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	<input type="checkbox"/> Enthalpy	<input checked="" type="checkbox"/> Client	<input type="checkbox"/> Retain
	<input type="checkbox"/> Return	<input type="checkbox"/> Dispose	
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Logged In:	Date/Time <u>03/20/24 0935</u>		Initials: <u>JT</u>		Location: <u>WR-2</u>				
	Shelf/Rack: <u>B01C-3/G6</u>								
COC Anomaly/Sample Acceptance Form completed?							<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

# CoC/Label Reconciliation Report WO# 2403149

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
2403149-01	A AO1-043-2.0-2.5	(A4C1342-01)	13-Mar-24 10:00	Clear Glass Jar, 250mL	Solid	
2403149-02	A AO1-043-2.5-3.0	(A4C1342-02)	13-Mar-24 10:15	Clear Glass Jar, 250mL	Solid	
2403149-03	A BLANK-240313	(A4C1342-03)	13-Mar-24 13:00	Amber Glass NM Bottle, 1L	Aqueous	
2403149-03	B BLANK-240313	(A4C1342-03)	13-Mar-24 13:00	Amber Glass NM Bottle, 1L	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓	✓ <sup>(A)</sup>	
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		

Comments:

<sup>(A)</sup> Sample received in broken glass jar. Transferred contents in to an amber glass jar.

<sup>(B)</sup> Updated sample ID per client request. Sample ID: AO1043-2.0-2.5<sub>JT</sub>

<sup>(C)</sup> Updated sample ID per client request. Sample ID: AO1043-2.5-3.0<sub>JT</sub>  
03/22/24

Preservation Documented: Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> Trizma NH<sub>4</sub>CH<sub>3</sub>CO<sub>2</sub> None Other

Verified by/Date: JT 03/20/24  
XAO 03/20/24



# ANOMALY FORM

Work Order # 2403149

Initial/Date      The following checked issues were noted during sample receipt and login:

- 1. **The samples were received out of temperature at (WI-PHT):** \_\_\_\_\_  
Was Ice present: Yes No Melted Blue Ice
- 2. The Chain-of-Custody (CoC) was not relinquished properly.
- 3. The CoC did not include collection time(s). 00:00 will be used unless notified otherwise.
- 4. The sample(s) did not include a sample collection time. All or Sample Name: \_\_\_\_\_
- 5. A sample ID discrepancy was found. See the Reconciliation report.  
The CoC Sample ID will be used unless notified otherwise.
- 6. A sample date and/or time discrepancy was found. See the Reconciliation report.  
The CoC Sample date/time will be used unless notified otherwise.
- 7. The CoC did not include a sample matrix. The following sample matrix will be used: \_\_\_\_\_
- 8. Insufficient volume received for analysis. All or Sample Name: \_\_\_\_\_
- 9. The backup bottle was received broken. Sample Name: \_\_\_\_\_
- 10. CoC not received, illegible or destroyed.
- 11. The sample(s) were received out of holding time. All or Sample Name: \_\_\_\_\_
- 12. The CoC did not include an analysis. All or Sample Name: \_\_\_\_\_
- 13. Sample(s) received without collection date. All or Sample Name: \_\_\_\_\_
- 14. Sample(s) not received. All or Sample Name: \_\_\_\_\_
- IT 03/20/24  15. Sample(s) received broken. All or Sample Name: AO1-043-2.0-2.5
- 16. An incorrect container-type was used. All or Sample Name: \_\_\_\_\_
- 17. The Field Reagent Blank (FRB) preservative was from a different lot than the field samples.  
Will proceed with analysis and narrate unless notified otherwise.
- 18. Other:

Bolded items require sign-off

Client Contacted: Philip Nerenberg

Date of Contact: 3/20/24

Lab Project Manager: Kathy Zipp

Resolution: The sample was transferred to a client glass amber jar.

Client approved to proceed with analysis.



ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Thursday, July 25, 2024
Meaghan Pollock
Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

RE: A4F1474 - Port of Ridgefield - M9003.01.061

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A4F1474, which was received by the laboratory on 6/24/2024 at 10:48:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information
Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.
(See Cooler Receipt Form for details)
Default Cooler 2.3 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report. All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.



Apex Laboratories

Philip Nerenberg (signature)

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.



**ANALYTICAL REPORT**

**AMENDED REPORT**

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b><u>Maul Foster &amp; Alongi, INC.</u></b> 3140 NE Broadway Street Portland, OR 97232	Project: <b><u>Port of Ridgefield</u></b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> <b>A4F1474 - 07 25 24 1417</b>
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
COMP-AOI081-0.5	A4F1474-01	Soil	06/21/24 12:07	06/24/24 10:48

Apex Laboratories

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Philip Nerenberg, Lab Director





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QUALIFIER DEFINITIONS

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

Apex Laboratories

Philip Nerenberg, Lab Director

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis. The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.
- Results for Volatiles analyses on soils and sediments that are reported on a "dry weight" basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an "As Received" basis do not have the WMS correction applied, as dry weight was not performed.

**QC Source:**

- In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.
- Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Apex Laboratories

Philip Nerenberg, Lab Director

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**ANALYTICAL REPORT**

**AMENDED REPORT**

**Apex Laboratories, LLC**

6700 S.W. Sandburg Street

Tigard, OR 97223

503-718-2323

ORELAP ID: OR100062

<b>Maul Foster &amp; Alongi, INC.</b> 3140 NE Broadway Street Portland, OR 97232	Project: <b>Port of Ridgefield</b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> <b>A4F1474 - 07 25 24 1417</b>
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to one half of the Reporting Limit (RL). Blank results for gravimetric analyses are evaluated to the Reporting Level, not to half of the Reporting Level.

- For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
- For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.

For further details, please request a copy of this document.

- Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

**Benzofluoranthene Isomer Reporting:**

Due to coelutions present on the analytical column, the results reported for Benzo(b+j)fluoranthene(s) represent the concentration of both the Benzo(b)fluoranthene and Benzo(j)fluoranthene isomers. Calibration, validation and accreditation are based on the Benzo(b)fluoranthene isomer.

Apex Laboratories

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Philip Nerenberg, Lab Director



**ANALYTICAL REPORT**

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503-718-2323  
ORELAP ID: OR100062

<b>Maul Foster &amp; Alongi, INC.</b> 3140 NE Broadway Street Portland, OR 97232	Project: <b>Port of Ridgefield</b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> A4F1474 - 07 25 24 1417
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**LABORATORY ACCREDITATION INFORMATION**

**ORELAP Certification ID: OR100062 (Primary Accreditation) -**  
**EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Philip Nerenberg, Lab Director

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**ANALYTICAL REPORT**

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**APEX LABS**  
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Company: **MFA**  
Address: **570 Emil Plum Blvd, Suite 405, Vancouver, WA 98660**  
Sampled by: **E. Rosen**

**CHAIN OF CUSTODY**

Project Mgr: **M. Pollock**  
Project Name: **PWT-Yard Cleanup**  
Project #: **M9003.01.061**  
Address: **570 Emil Plum Blvd, Suite 405, Vancouver, WA 98660**  
Email: **mpollock@maulfooster.com**  
Phone: **3607131500**

Lab # **A4F1474** of **1**  
CBC  
**MMB 6/25/24**

DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-DCID	NWTPH-DX	NWTPH-GX	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pesticides	R CRA Metals (8)	Priority Metals (13)	AL, SH, AS, BA, BE, CA, CR, CO, CU, FE, PB, HG, MG, MN, MO, NI, K, SE, AG, NA, TL, V, ZN, TCCLP DISS, TCCLP	TCCLP Metals (8)	Hold Sample	Frozen Archive
6/11/24	12:07	Soil	1																	
<p>State <u>WA</u> County <u>Clark</u></p> <p>SAMPLE ID <u>Ø81-55 - Basement</u></p>																				
<p>ANALYSIS REQUEST</p>																				
<p>SPECIAL INSTRUCTIONS:</p> <p>Standard Turn Around Time (TAT) = 10 Business Days</p> <p>TAT Requested (circle) <u>5 Day</u>    1 Day    2 Day    3 Day    Other: _____</p> <p>SAMPLES ARE HELD FOR 30 DAYS</p>																				
<p>RELINQUISHED BY: Signature: <i>[Signature]</i> Date: <u>6/21/24</u> Printed Name: <u>Eric Acker</u> Company: <u>Maul Foster &amp; Alongi, Inc.</u></p>						<p>RECEIVED BY: Signature: <i>[Signature]</i> Date: <u>6/24/24</u> Printed Name: <u>Rickman 10:48</u> Company: <u>APEX</u></p>						<p>RELINQUISHED BY: Signature: _____ Date: _____ Printed Name: _____ Time: _____ Company: _____</p>								

Apex Laboratories

*Philip Nerenberg*

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.



ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street  
Tigard, OR 97223  
503-718-2323  
ORELAP ID: OR100062

<b>Maul Foster &amp; Alongi, INC.</b> 3140 NE Broadway Street Portland, OR 97232	Project: <b>Port of Ridgefield</b> Project Number: <b>M9003.01.061</b> Project Manager: <b>Meaghan Pollock</b>	<b>Report ID:</b> <b>A4F1474 - 07 25 24 1417</b>
--	--	---

A4F1474  
revised

**Cameron O'Brien**

**From:** Philip Nerenberg  
**Sent:** Thursday, July 25, 2024 12:31 PM  
**To:** Cameron O'Brien  
**Subject:** FW: A4F1474 sample name change

Scan/add this

**From:** Mary Benzinger [mailto:mbenzinger@maulfoster.com]  
**Sent:** Tuesday, July 23, 2024 4:27 PM  
**To:** Philip Nerenberg  
**Subject:** A4F1474 sample name change

**CAUTION! THIS IS AN EXTERNAL EMAIL:**  
 This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Philip,  
 Could we have report A4F1474 with appended Enthalpy report 2406186 reissued with a sample name change?  
 Lab sample ID A4F1474-01 currently has sample name 081-SS-Basement. We would like to revise the sample name to COMP-AOI081-0.5.  
 "AOI" contains only capital letters, and the "081" portion is numeric.  
 Could you attach this email to the COC portion of the revised report?

Thank you,

**MARY BENZINGER** | MAUL FOSTER & ALONGI, INC.  
 Senior Chemist  
 pronouns: she/her  
 m. 503 319 7132



*Philip Nerenberg*





ANALYTICAL REPORT

AMENDED REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street

Tigard, OR 97223

503-718-2323

ORELAP ID: OR100062

Maul Foster & Alongi, INC.

3140 NE Broadway Street

Portland, OR 97232

Project: Port of Ridgefield

Project Number: M9003.01.061

Project Manager: Meaghan Pollock

Report ID:

A4F1474 - 07 25 24 1417

APEX LABS COOLER RECEIPT FORM

Client: MFA Element WO#: A4 F1474

Project/Project #: PWT - Yard Cleanup M9003.01.061

Delivery Info:

Date/time received: 6/24/24 @ 1048 By: EK

Delivered by: Apex Client ESS FedEx UPS Radio Morgan SDS Evergreen Other

From USDA Regulated Origin? Yes No X

Cooler Inspection Date/time inspected: 6/24/24 @ 1247 By: EST

Chain of Custody included? Yes X No

Signed/dated by client? Yes X No

Contains USDA Reg. Soils? Yes No X Unsure (email RegSoils)

Table with 7 columns: Cooler #1 to Cooler #7. Rows include Temperature (2.3), Custody seals (N), Received on ice (Y), Temp. blanks (Y), Ice type (Real), and Condition (In/Out).

Cooler out of temp? (Y/N) Possible reason why:

Green dots applied to out of temperature samples? Yes No

Out of temperature samples form initiated? Yes No

Sample Inspection: Date/time inspected: 6/24/24 @ 1550 By: JS

All samples intact? Yes X No Comments:

Bottle labels/COCs agree? Yes X No Comments:

COC/container discrepancies form initiated? Yes No X

Containers/volumes received appropriate for analysis? Yes X No Comments:

Do VOA vials have visible headspace? Yes No NA X

Comments:

Water samples: pH checked: Yes No NA X pH appropriate? Yes No NA X pH ID:

Comments:

Labeled by: B

Witness: [Signature]

Cooler Inspected by: EST

Form Y-003 R-02

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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July 25, 2024

**Enthalpy Analytical - El Dorado Hills  
Work Order No. 2406186**

Mr. Philip Nerenberg  
Apex Laboratories  
6700 S.W. Sandburg Street  
Tigard, OR 97223

Dear Mr. Nerenberg,

Enclosed are the amended results for the sample set received at Enthalpy Analytical - EDH on June 26, 2024 under your Project Name 'A4F1474'.

Enthalpy Analytical - EDH is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [kathy.zipp@enthalpy.com](mailto:kathy.zipp@enthalpy.com).

Thank you for choosing Enthalpy Analytical - EDH as part of your analytical support team.

Sincerely,

Kathy Zipp  
Project Manager

*Enthalpy Analytical - EDH certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Enthalpy Analytical - EDH.*

## **Enthalpy Analytical - EDH Work Order No. 2406186**

### **Case Narrative**

#### **Sample Condition on Receipt:**

One soil sample was received and stored securely in accordance with Enthalpy Analytical - EDH standard operating procedures and EPA methodology. The sample was received in good condition and within the method temperature requirements. As directed, this report has been amended to change the sample ID from "081-SS-Basement" to "COMP-AOI081-0.5".

#### **Analytical Notes:**

#### **EPA Method 8290A**

The sample was extracted and analyzed for tetra-through-octa chlorinated dioxins and furans by EPA Method 8290A using a ZB-DIOXIN GC column.

#### **Holding Times**

The method holding time criteria was met for this sample.

#### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected above the sample quantitation limits in the Method Blank. The OPR recoveries were within the method acceptance criteria.

Labeled standard recoveries for all QC and field samples were within method acceptance criteria.

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# Sample Inventory Report

Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2406186-01	COMP-AOI081-0.5	21-Jun-24 12:07	26-Jun-24 09:17	Clear Glass Jar, 250mL

## **ANALYTICAL RESULTS**

**Sample ID: Method Blank**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	B24F209-BLK1	Date Extracted:	27-Jun-24
Project:	A4F1474	QC Batch:	B24F209	Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	5.00 g		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.305	0.380			02-Jul-24 18:04	1
1,2,3,7,8-PeCDD	ND	0.390	1.57			02-Jul-24 18:04	1
1,2,3,4,7,8-HxCDD	ND	0.474	1.27			02-Jul-24 18:04	1
1,2,3,6,7,8-HxCDD	ND	0.457	1.28			02-Jul-24 18:04	1
1,2,3,7,8,9-HxCDD	ND	0.521	1.43			02-Jul-24 18:04	1
1,2,3,4,6,7,8-HpCDD	ND	0.480	1.41			02-Jul-24 18:04	1
OCDD	ND	0.847	3.24			02-Jul-24 18:04	1
2,3,7,8-TCDF	ND	0.226	0.366			02-Jul-24 18:04	1
1,2,3,7,8-PeCDF	ND	0.287	1.15			02-Jul-24 18:04	1
2,3,4,7,8-PeCDF	ND	0.217	1.37			02-Jul-24 18:04	1
1,2,3,4,7,8-HxCDF	ND	0.247	1.32			02-Jul-24 18:04	1
1,2,3,6,7,8-HxCDF	ND	0.260	1.24			02-Jul-24 18:04	1
2,3,4,6,7,8-HxCDF	ND	0.286	1.32			02-Jul-24 18:04	1
1,2,3,7,8,9-HxCDF	ND	0.410	1.43			02-Jul-24 18:04	1
1,2,3,4,6,7,8-HpCDF	ND	0.268	1.30			02-Jul-24 18:04	1
1,2,3,4,7,8,9-HpCDF	ND	0.399	1.64			02-Jul-24 18:04	1
OCDF	ND	0.798	7.68			02-Jul-24 18:04	1

Toxic Equivalent	
TEQMinWHO2005Dioxin	0.00

Totals	
Total TCDD	ND 0.305
Total PeCDD	ND 0.390
Total HxCDD	ND 0.521
Total HpCDD	ND 0.480
Total TCDF	ND 0.226
Total PeCDF	ND 0.287
Total HxCDF	ND 0.410
Total HpCDF	ND 0.399

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	57.2	40 - 135		02-Jul-24 18:04	1
13C-1,2,3,7,8-PeCDD	IS	63.2	40 - 135		02-Jul-24 18:04	1
13C-1,2,3,4,7,8-HxCDD	IS	52.5	40 - 135		02-Jul-24 18:04	1
13C-1,2,3,6,7,8-HxCDD	IS	59.6	40 - 135		02-Jul-24 18:04	1
13C-1,2,3,7,8,9-HxCDD	IS	51.9	40 - 135		02-Jul-24 18:04	1
13C-1,2,3,4,6,7,8-HpCDD	IS	53.2	40 - 135		02-Jul-24 18:04	1
13C-OCDD	IS	43.1	40 - 135		02-Jul-24 18:04	1
13C-2,3,7,8-TCDF	IS	60.1	40 - 135		02-Jul-24 18:04	1
13C-1,2,3,7,8-PeCDF	IS	52.5	40 - 135		02-Jul-24 18:04	1
13C-2,3,4,7,8-PeCDF	IS	52.7	40 - 135		02-Jul-24 18:04	1
13C-1,2,3,4,7,8-HxCDF	IS	59.6	40 - 135		02-Jul-24 18:04	1
13C-1,2,3,6,7,8-HxCDF	IS	60.5	40 - 135		02-Jul-24 18:04	1
13C-2,3,4,6,7,8-HxCDF	IS	58.8	40 - 135		02-Jul-24 18:04	1
13C-1,2,3,7,8,9-HxCDF	IS	56.8	40 - 135		02-Jul-24 18:04	1
13C-1,2,3,4,6,7,8-HpCDF	IS	54.4	40 - 135		02-Jul-24 18:04	1
13C-1,2,3,4,7,8,9-HpCDF	IS	52.3	40 - 135		02-Jul-24 18:04	1
13C-OCDF	IS	47.3	40 - 135		02-Jul-24 18:04	1
37Cl-2,3,7,8-TCDD	CRS	99.2	40 - 135		02-Jul-24 18:04	1

EDL - Sample specific estimated detection limit  
 EMPC - Estimated maximum possible concentration  
 MDL - Method Detection Limit

The results are reported in dry weight.  
 The sample size is reported in wet weight.

**Sample ID: OPR**
**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	B24F209-BS1	Date Extracted:	27-Jun-24 12:28
Project:	A4F1474	QC Batch:	B24F209	Column:	ZB-DIOXIN
Matrix:	Solid	Sample Size:	5.00 g		

Analyte	Amt Found (pg/g)	Spike Amt	% Recovery	Limits	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	46.8	40.0	117	70-130		02-Jul-24 15:45	1
1,2,3,7,8-PeCDD	218	200	109	70-130		02-Jul-24 15:45	1
1,2,3,4,7,8-HxCDD	222	200	111	70-130		02-Jul-24 15:45	1
1,2,3,6,7,8-HxCDD	218	200	109	70-130		02-Jul-24 15:45	1
1,2,3,7,8,9-HxCDD	213	200	107	70-130		02-Jul-24 15:45	1
1,2,3,4,6,7,8-HpCDD	209	200	104	70-130		02-Jul-24 15:45	1
OCDD	427	400	107	70-130		02-Jul-24 15:45	1
2,3,7,8-TCDF	40.8	40.0	102	70-130		02-Jul-24 15:45	1
1,2,3,7,8-PeCDF	216	200	108	70-130		02-Jul-24 15:45	1
2,3,4,7,8-PeCDF	217	200	108	70-130		02-Jul-24 15:45	1
1,2,3,4,7,8-HxCDF	215	200	108	70-130		02-Jul-24 15:45	1
1,2,3,6,7,8-HxCDF	234	200	117	70-130		02-Jul-24 15:45	1
2,3,4,6,7,8-HxCDF	218	200	109	70-130		02-Jul-24 15:45	1
1,2,3,7,8,9-HxCDF	221	200	110	70-130		02-Jul-24 15:45	1
1,2,3,4,6,7,8-HpCDF	227	200	113	70-130		02-Jul-24 15:45	1
1,2,3,4,7,8,9-HpCDF	215	200	107	70-130		02-Jul-24 15:45	1
OCDF	431	400	108	70-130		02-Jul-24 15:45	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	52.9	40-135		02-Jul-24 15:45	1
13C-1,2,3,7,8-PeCDD	IS	60.7	40-135		02-Jul-24 15:45	1
13C-1,2,3,4,7,8-HxCDD	IS	51.1	40-135		02-Jul-24 15:45	1
13C-1,2,3,6,7,8-HxCDD	IS	57.7	40-135		02-Jul-24 15:45	1
13C-1,2,3,7,8,9-HxCDD	IS	54.4	40-135		02-Jul-24 15:45	1
13C-1,2,3,4,6,7,8-HpCDD	IS	53.2	40-135		02-Jul-24 15:45	1
13C-OCDD	IS	44.1	40-135		02-Jul-24 15:45	1
13C-2,3,7,8-TCDF	IS	55.3	40-135		02-Jul-24 15:45	1
13C-1,2,3,7,8-PeCDF	IS	54.4	40-135		02-Jul-24 15:45	1
13C-2,3,4,7,8-PeCDF	IS	53.9	40-135		02-Jul-24 15:45	1
13C-1,2,3,4,7,8-HxCDF	IS	58.8	40-135		02-Jul-24 15:45	1
13C-1,2,3,6,7,8-HxCDF	IS	57.6	40-135		02-Jul-24 15:45	1
13C-2,3,4,6,7,8-HxCDF	IS	57.6	40-135		02-Jul-24 15:45	1
13C-1,2,3,7,8,9-HxCDF	IS	55.3	40-135		02-Jul-24 15:45	1
13C-1,2,3,4,6,7,8-HpCDF	IS	53.2	40-135		02-Jul-24 15:45	1
13C-1,2,3,4,7,8,9-HpCDF	IS	53.0	40-135		02-Jul-24 15:45	1
13C-OCDF	IS	46.0	40-135		02-Jul-24 15:45	1
37Cl-2,3,7,8-TCDD	CRS	96.3	40-135		02-Jul-24 15:45	1



**Sample ID: COMP-AOI081-0.5**

**EPA Method 8290A**

Client Data		Laboratory Data			
Name:	Apex Laboratories	Lab Sample:	2406186-01	Date Received:	26-Jun-24 09:17
Project:	A4F1474	QC Batch:	B24F209	Date Extracted:	27-Jun-24
Matrix:	Soil	Sample Size:	11.9 g	Column:	ZB-DIOXIN
Date Collected:	21-Jun-24 12:07	% Solids:	84.4		

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.190	0.193		03-Jul-24 21:04	1
1,2,3,7,8-PeCDD	1.10		0.782		J	03-Jul-24 21:04	1
1,2,3,4,7,8-HxCDD	2.22		0.632		J	03-Jul-24 21:04	1
1,2,3,6,7,8-HxCDD	10.3		0.639			03-Jul-24 21:04	1
1,2,3,7,8,9-HxCDD	4.69		0.715			03-Jul-24 21:04	1
1,2,3,4,6,7,8-HpCDD	155		0.705			03-Jul-24 21:04	1
OCDD	1080		1.62			03-Jul-24 21:04	1
2,3,7,8-TCDF	0.261		0.183		J	03-Jul-24 21:04	1
1,2,3,7,8-PeCDF	ND		0.575	0.416		03-Jul-24 21:04	1
2,3,4,7,8-PeCDF	0.919		0.685		J	03-Jul-24 21:04	1
1,2,3,4,7,8-HxCDF	ND		0.658	1.46		03-Jul-24 21:04	1
1,2,3,6,7,8-HxCDF	1.09		0.620		J	03-Jul-24 21:04	1
2,3,4,6,7,8-HxCDF	1.41		0.660		J	03-Jul-24 21:04	1
1,2,3,7,8,9-HxCDF	ND		0.714	0.377		03-Jul-24 21:04	1
1,2,3,4,6,7,8-HpCDF	22.2		0.648			03-Jul-24 21:04	1
1,2,3,4,7,8,9-HpCDF	1.61		0.816		J	03-Jul-24 21:04	1
OCDF	112		3.83			03-Jul-24 21:04	1

Toxic Equivalent	
TEQMinWHO2005Dioxin	5.52

Totals				
Total TCDD	0.244		1.13	J
Total PeCDD	3.78		4.30	
Total HxCDD	44.7			
Total HpCDD	268			
Total TCDF	3.34		3.79	
Total PeCDF	12.8		13.7	
Total HxCDF	40.3		42.7	
Total HpCDF	104			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	63.2	40 - 135		03-Jul-24 21:04	1
13C-1,2,3,7,8-PeCDD	IS	62.7	40 - 135		03-Jul-24 21:04	1
13C-1,2,3,4,7,8-HxCDD	IS	53.8	40 - 135		03-Jul-24 21:04	1
13C-1,2,3,6,7,8-HxCDD	IS	56.6	40 - 135		03-Jul-24 21:04	1
13C-1,2,3,7,8,9-HxCDD	IS	53.2	40 - 135		03-Jul-24 21:04	1
13C-1,2,3,4,6,7,8-HpCDD	IS	50.7	40 - 135		03-Jul-24 21:04	1
13C-OCDD	IS	45.0	40 - 135		03-Jul-24 21:04	1
13C-2,3,7,8-TCDF	IS	67.6	40 - 135		03-Jul-24 21:04	1
13C-1,2,3,7,8-PeCDF	IS	54.9	40 - 135		03-Jul-24 21:04	1
13C-2,3,4,7,8-PeCDF	IS	53.3	40 - 135		03-Jul-24 21:04	1
13C-1,2,3,4,7,8-HxCDF	IS	60.4	40 - 135		03-Jul-24 21:04	1
13C-1,2,3,6,7,8-HxCDF	IS	58.2	40 - 135		03-Jul-24 21:04	1
13C-2,3,4,6,7,8-HxCDF	IS	58.5	40 - 135		03-Jul-24 21:04	1
13C-1,2,3,7,8,9-HxCDF	IS	62.1	40 - 135		03-Jul-24 21:04	1
13C-1,2,3,4,6,7,8-HpCDF	IS	43.7	40 - 135		03-Jul-24 21:04	1
13C-1,2,3,4,7,8,9-HpCDF	IS	51.4	40 - 135		03-Jul-24 21:04	1
13C-OCDF	IS	45.9	40 - 135		03-Jul-24 21:04	1
37Cl-2,3,7,8-TCDD	CRS	124	40 - 135		03-Jul-24 21:04	1

EDL - Sample specific estimated detection limit  
 EMPC - Estimated maximum possible concentration  
 MDL - Method Detection Limit

The results are reported in dry weight.  
 The sample size is reported in wet weight.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection Limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
MDL	Method Detection Limit
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
RL	For 537.1, the reported RLs are the MRLs.
TEQ	Toxic Equivalency, sum of the toxic equivalency factors (TEF) multiplied by the sample concentrations.
TEQMax	TEQ calculation that uses the detection limit as the concentration for non-detects
TEQMin	TEQ calculation that uses zero as the concentration for non-detects
TEQRisk	TEQ calculation that uses ½ the detection limit as the concentration for non-detects
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Enthalpy Analytical - EDH Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	21-023-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2020018
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	2211390
Nevada Division of Environmental Protection	CA00413
New Hampshire Environmental Accreditation Program	207721
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Ohio Environmental Protection Agency	87778
Oregon Laboratory Accreditation Program	4042-021
Texas Commission on Environmental Quality	T104704189-22-13
Vermont Department of Health	VT-4042
Virginia Department of General Services	11276
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters can be found at [Enthalpy.com/Resources/Accreditations](http://Enthalpy.com/Resources/Accreditations).*



# Sample Log-In Checklist



Page # 1 of 1

Work Order #: 2406186 TAT Std

Samples Arrival:	Date/Time <u>06/26/24</u> <u>0917</u>	Initials: <u>WWS</u>	Location: <u>WR-1</u> Shelf/Rack: <u>W/B</u>
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac
	<input type="radio"/> GLS	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered
Preservation:	<input checked="" type="radio"/> Ice	<input type="radio"/> Blue Ice	<input type="radio"/> Techni Ice
	<input type="radio"/> Dry Ice	<input type="radio"/> None	
Temp °C: <u>6.0</u> (uncorrected)	Probe used: Y / <input checked="" type="radio"/> N		Thermometer ID: <u>IR-4</u>
Temp °C: <u>6.0</u> (corrected)			

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill <u>—</u> Trk # <u>7770 5903 9561</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	Enthalpy	<input checked="" type="radio"/> Client	Retain
			<input checked="" type="radio"/> Return
			Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Logged In:	Date/Time <u>06/26/24</u> <u>11:31</u>	Initials: <u>XAO</u>	Location: <u>WR-2</u> Shelf/Rack: <u>D-4</u>
COC Anomaly/Sample Acceptance Form completed?			
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Comments:

X.O  
06/26/24

# CoC/Label Reconciliation Report WO# 2406186

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
2406186-01	A 081-SS-Basement	<input checked="" type="checkbox"/> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">A</span>	21-Jun-24 12:07 <input checked="" type="checkbox"/>	Clear Glass Jar, 250mL	Solid	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	<input checked="" type="checkbox"/>		
Sample Custody Seals Intact?			<input checked="" type="checkbox"/>
Adequate Sample Volume?	<input checked="" type="checkbox"/>		
Container Type Appropriate for Analysis(es)	<input checked="" type="checkbox"/>		

Comments: A Sample sealed wrapped in foil

Preservation Documented: Na2S2O3    Trizma    NH4CH3CO2    None    Other

Verified by/Date: XAO 06/26/24  
WWS 06/26/24



# Data Quality Assurance/Quality Control Review

Project No. M9081.01.061 | July 24, 2024 | Port of Ridgefield

Maul Foster & Alongi, Inc. (MFA), conducted an independent Stage 2A review of the quality of analytical results for soil samples collected in December 2023 and March and June 2024, from the off-property portion of the former Pacific Wood Treating Co. site in Ridgefield, Washington.

Apex Laboratories, LLC (Apex), and Enthalpy Analytical, LLC, El Dorado Hills (Enthalpy), performed the analyses. MFA reviewed Apex report numbers A3L1035, A3L1378, A4B0754, A4C1342, and A4F1474 and Enthalpy report numbers 2312096, 2312158, 2402080, 2403149, and 2406186. Apex did not perform any analyses; samples submitted to Apex were subcontracted to Enthalpy for dioxin and furan analysis, and these results are appended to the Apex laboratory reports. Samples included in report A4B0754 and 2402080 were originally submitted to Apex on hold with work orders A3L1035 and A3L1378. The analyses performed and the samples analyzed are listed in the following tables. Samples submitted to the laboratory on hold are also indicated.

Analysis	Reference
Dioxins and furans	EPA 8290A <sup>(a)</sup>

**Notes**

EPA = U.S. Environmental Protection Agency.

<sup>(a)</sup>Percent moisture measurement for dry-weight calculation is included in EPA Method 8290A.

Samples Analyzed				
Report A3L1035/2312096		Report A3L1378/2312158	Report A4B0754/2402080	Report A4F1474/2406186
AOI-087-1.0-1.5	AOI-056-1.0-1.5	AOI081-1.0-1.5	AOI-043-1.5-2.0	COMP-AOI081-0.5
AOI-087-1.5-2.0 (hold)	AOI-056-1.5-2.0 (hold)	AOI081-1.5-2.0 (hold)	AOI-079-1.5-2.0	--
AOI-043-1.0-1.5	AOI-046-1.0-1.5	AOI079-1.0-1.5	AOI-083-1.5-2.0	--
AOI-043-1.5-2.0 (hold) <sup>(a)</sup>	AOI-046-1.5-2.0 (hold)	AOI079-1.5-2.0 (hold) <sup>(a)</sup>	AOI-089-1.5-2.0	--
AOI-083-1.0-1.5	AOI-061-1.0-1.5	AOI057-1.0-1.5	<b>Report A4C1342/2403149</b>	--
AOI-083-1.5-2.0 (hold) <sup>(a)</sup>	AOI-061-1.5-2.0 (hold)	AOI057-1.5-2.0 (hold)	AOI043-2.0-2.5	--
AOI-089-1.0-1.5	AOI-066-1.0-1.5	--	AOI043-2.5-3.0	--
AOI-089-1.5-2.0 (hold) <sup>(a)</sup>	AOI-066-1.5-2.0 (hold)	--	BLANK-240313	--

**Note**

<sup>(a)</sup>Sample removed from hold and logged to Apex Laboratories, LLC, work order A4B0754 and Enthalpy Analytical, LLC, work order 2402080.

## Data Qualification

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA 2014, EPA 2020) and appropriate laboratory- and method-specific guidelines (Apex 2023, Enthalpy 2023, EPA 1986).



Based on the results of the data quality review procedures described below, the data, with the appropriate final data qualifiers assigned, are considered acceptable for their intended use. Final data qualifiers represent qualifiers originating from the laboratory and accepted by the reviewer, and data qualifiers assigned by the reviewer during validation.

Final data qualifiers:

- J = result is estimated.
- J- = result is estimated, but the result may be biased low.
- U = result is non-detect at the estimated detection limit (EDL).
- UJ = result is non-detect at the EDL and qualified as estimated.
- UJK = result is non-detect at the estimated maximum potential concentration (EMPC) and qualified as estimated.
- UK = result is non-detect at the EMPC.

## Dioxins and Furans

### Second Column Confirmation

Positive identification of 2,3,7,8-TCDF cannot be achieved using typical EPA Method 8290A analytical columns; therefore, analysis using a second column is required to confirm and qualify any detections above the method reporting limit (MRL). Enthalpy noted in case narratives provided with all reports that EPA Method 8290A analysis of all samples was performed with a column that resolves 2,3,7,8-TCDD and 2,3,7,8-TCDF. Second column confirmation of 2,3,7,8-TCDF detected results was therefore not required.

### Estimated Maximum Potential Concentration Results

In accordance with EPA Region 10 guidance for data validation of dioxins and furans (EPA 2014) and EPA national functional guidelines for high-resolution Superfund methods data review (EPA 2020), the reviewer qualified EPA Method 8290A results that were identified by Enthalpy as EMPC detections. The reviewer confirmed that, where Enthalpy provided a lower result concentration along with an EMPC result, the EMPC is considered the final result value.

Where Enthalpy flagged non-detect congener results below MRLs as EMPCs, the reviewer qualified the results with UJK. The reviewer qualified congener results above MRLs that were flagged as EMPCs with UK.

Where Enthalpy flagged detected total homolog results as EMPCs, and all associated congeners were either EMPCs or non-detect, the reviewer qualified the total homolog result as non-detect at the reported concentration. Final qualification for total homolog results above MRLs is UK. Final qualification for total homolog results below MRLs is UJK.

Where Enthalpy flagged total homolog results as EMPCs and one or more associated congeners were detected without an EMPC flag, the reviewer accepted the laboratory qualification. Final qualification for total homolog results above MRLs is K. Final qualification for total homolog results below MRLs is JK.

Final data qualifiers for EMPC results are shown in the following table. Some EMPC results were also qualified based on holding time or laboratory control sample (LCS) recovery. Final qualification is shown.

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
2312096	AOI-087-1.0-1.5	2,3,4,7,8-PeCDF	3.47 K	3.47 UJK <sup>(a)</sup>
		1,2,3,4,7,8-HxCDF	4.01 K	4.01 UJK <sup>(a)</sup>
		Total TCDF	6.93 K	6.93 UJK <sup>(a)</sup>
		Total PeCDF	35.3 K	35.3 UJK <sup>(a)</sup>
		Total HxCDF	64.6 K	64.6 JK <sup>(a)</sup>
	AOI-043-1.0-1.5	2,3,7,8-TCDD	2.07 K	2.07 UJK <sup>(a)</sup>
		1,2,3,7,8-PeCDF	4.36 K	4.36 UJK <sup>(a)</sup>
		Total TCDD	13.1 K	13.1 UJK <sup>(a)</sup>
		Total PeCDD	56.1 K	56.1 JK <sup>(a)</sup>
		Total TCDF	103 K	103 UJK <sup>(a)</sup>
		Total PeCDF	380 K	380 JK <sup>(a)</sup>
	AOI-083-1.0-1.5	Total TCDD	22.4 K	22.4 K
		Total PeCDD	36.9 K	36.9 K
		Total TCDF	60.7 K	60.7 K
		Total PeCDF	64.4 K	64.4 K
	AOI-089-1.0-1.5	2,3,7,8-TCDD	0.303 K	0.303 UJK
		Total TCDD	4.98 K	4.98 UK
		Total PeCDD	17.4 K	17.4 K
		Total TCDF	16.1 K	16.1 K
		Total PeCDF	36.0 K	36.0 K
		Total HxCDF	121 K	121 K
	AOI-056-1.0-1.5	Total TCDD	0.313 K	0.313 UJK
		Total HxCDD	23.4 K	23.4 K
		Total PeCDF	9.05 K	9.05 K
		Total HxCDF	26.9 K	26.9 K
	AOI-046-1.0-1.5	2,3,4,7,8-PeCDF	0.850 K	0.850 UJK
		1,2,3,7,8,9-HxCDF	0.245 K	0.245 UJK <sup>(b)</sup>
		Total PeCDD	0.431 K	0.431 UJK
		Total HxCDD	10.6 K	10.6 K
		Total TCDF	1.87 K	1.87 K
		Total PeCDF	7.19 K	7.19 K
		Total HxCDF	18.8 K	18.8 K
AOI-061-1.0-1.5	1,2,3,7,8,9-HxCDF	0.822 K	0.822 UJK <sup>(b)</sup>	
	Total TCDD	0.257 K	0.257 UJK	
	Total PeCDD	4.72 JK	4.72 JK	
	Total PeCDF	16.0 K	16.0 K	
	Total HxCDF	74.2 K	74.2 K	
AOI-066-1.0-1.5	2,3,4,7,8-PeCDF	0.483 K	0.483 UJK	
	Total TCDF	1.02 K	1.02 UK	
	Total PeCDF	7.05 K	7.05 K	
	Total HxCDF	19.5 K	19.5 K	

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)	
2312158	AOI081-1.0-1.5	1,2,3,4,7,8-HxCDD	0.812 K	0.812 UJK <sup>(a)</sup>	
		1,2,3,7,8-PeCDF	0.226 K	0.226 UJK <sup>(a)</sup>	
		2,3,4,7,8-PeCDF	0.428 K	0.428 UJK <sup>(a)</sup>	
		1,2,3,6,7,8-HxCDF	0.419 K	0.419 UJK <sup>(a)</sup>	
		Total PeCDD	2.08 JK	2.08 JK <sup>(a)</sup>	
		Total HxCDD	17.8 K	17.8 JK <sup>(a)</sup>	
		Total TCDF	2.31 K	2.31 UJK <sup>(a)</sup>	
		Total PeCDF	4.94 K	4.94 UJK <sup>(a)</sup>	
	AOI079-1.0-1.5	Total HxCDF	12.6 K	12.6 UJK <sup>(a)</sup>	
		Total TCDD	5.42 K	5.42 JK <sup>(a)</sup>	
		Total PeCDD	25.7 K	25.7 JK <sup>(a)</sup>	
		Total HxCDD	167 K	167 JK <sup>(a)</sup>	
		Total TCDF	21.7 K	21.7 JK <sup>(a)</sup>	
		Total PeCDF	66.0 K	66.0 JK <sup>(a)</sup>	
	AOI057-1.0-1.5	Total HxCDF	149 K	149 JK <sup>(a)</sup>	
		1,2,3,7,8-PeCDD	0.467 K	0.467 UJK <sup>(a)</sup>	
		1,2,3,7,8,9-HxCDD	0.733 K	0.733 UJK <sup>(a)</sup>	
		1,2,3,7,8-PeCDF	0.270 K	0.270 UJK <sup>(a)</sup>	
		2,3,4,7,8-PeCDF	0.184 K	0.184 UJK <sup>(a)</sup>	
		1,2,3,4,7,8-HxCDF	0.768 K	0.768 UJK <sup>(a)</sup>	
		2,3,4,6,7,8-HxCDF	0.330 K	0.330 UJK <sup>(a)</sup>	
		Total TCDD	0.522 JK	0.522 UJK <sup>(a)</sup>	
		Total PeCDD	2.23 JK	2.23 UJK <sup>(a)</sup>	
		Total HxCDD	10.2 K	10.2 JK <sup>(a)</sup>	
		Total TCDF	1.20 K	1.20 UJK <sup>(a)</sup>	
		Total PeCDF	5.48 K	5.48 UJK <sup>(a)</sup>	
	2402080	AOI-043-1.5-2.0	Total HxCDF	12.0 K	12.0 JK <sup>(a)</sup>
			Total TCDD	12.9 K	12.9 JK <sup>(a)</sup>
Total PeCDD			47.4 K	47.4 JK <sup>(a)</sup>	
Total TCDF			95.7 K	95.7 JK <sup>(a)</sup>	
AOI-079-1.5-2.0		Total PeCDF	310 K	310 JK <sup>(a)</sup>	
		2,3,7,8-TCDD	0.200 K	0.200 UJK <sup>(a)</sup>	
		2,3,4,7,8-PeCDF	0.696 K	0.696 UJK <sup>(a)</sup>	
		2,3,4,7,8-PeCDF	0.339 K	0.339 UJK <sup>(a)</sup>	
		Total TCDD	1.89 K	1.89 UJK <sup>(a)</sup>	
		Total PeCDD	7.89 K	7.89 JK <sup>(a)</sup>	
		Total TCDF	8.30 K	8.30 JK <sup>(a)</sup>	
		Total PeCDF	25.8 K	25.8 JK <sup>(a)</sup>	
AOI-083-1.5-2.0		Total HxCDF	39.7 K	39.7 JK <sup>(a)</sup>	
		2,3,7,8-TCDD	0.312 K	0.312 UJK <sup>(a)</sup>	
		2,3,7,8-TCDF	1.28 K	1.28 UJK <sup>(a)</sup>	
		2,3,4,7,8-PeCDF	1.27 K	1.27 UJK <sup>(a)</sup>	
		Total TCDD	6.72 K	6.72 UJK <sup>(a)</sup>	
Total PeCDD		13.6 K	13.6 JK <sup>(a)</sup>		

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
		Total TCDF	25.0 K	25.0 UJK <sup>(a)</sup>
		Total PeCDF	26.5 K	26.5 JK <sup>(a)</sup>
		Total HxCDF	33.4 K	33.4 JK <sup>(a)</sup>
	AOI-089-1.5-2.0	1,2,3,7,8-PeCDD	0.371 K	0.371 UJK <sup>(a)</sup>
		2,3,4,7,8-PeCDF	0.425 K	0.425 UJK <sup>(a)</sup>
		1,2,3,6,7,8-HxCDF	0.221 K	0.221 UJK <sup>(a)</sup>
		2,3,4,6,7,8-HxCDF	0.225 K	0.225 UJK <sup>(a)</sup>
		Total TCDD	0.511 K	0.511 UJK <sup>(a)</sup>
		Total PeCDD	2.01 JK	2.01 UJK <sup>(a)</sup>
		Total TCDF	1.62 K	1.62 UJK <sup>(a)</sup>
		Total PeCDF	4.39 K	4.39 UJK <sup>(a)</sup>
Total HxCDF	10.5 K	10.5 JK <sup>(a)</sup>		
2403149	AOI043-2.0-2.5	1,2,3,7,8-PeCDD	0.954 K	0.954 UJK <sup>(c)</sup>
		1,2,3,4,7,8,9-HpCDF	0.733 K	0.733 UJK <sup>(c)</sup>
		Total PeCDD	11.4 K	11.4 UJK <sup>(c)</sup>
		Total TCDF	17.2 K	17.2 UJK <sup>(d)</sup>
		Total PeCDF	50.9 K	50.9 JK <sup>(d)</sup>
		Total HxCDF	50.3 K	50.3 JK <sup>(d)</sup>
	AOI043-2.5-3.0	Total HpCDF	24.2 K	24.2 JK <sup>(c)</sup>
		2,3,4,7,8-PeCDF	0.562 K	0.562 UJK
		1,2,3,6,7,8-HxCDF	0.200 K	0.200 UJK
		Total TCDD	0.156 K	0.156 UJK
		Total PeCDD	1.61 K	1.61 UJK
		Total HxCDD	3.89 K	3.89 JK
		Total TCDF	1.78 K	1.78 UK
		Total PeCDF	6.92 K	6.92 UK
Total HxCDF	6.76 K	6.76 JK		
A4F1474	COMP-AOI081-0.5	2,3,7,8-TCDD	0.193 K	0.193 UK
		1,2,3,7,8-PeCDF	0.416 UK	0.416 UJK
		1,2,3,4,7,8-HxCDF	1.46 UK	1.46 UJK
		1,2,3,7,8,9-HxCDF	0.377 UK	0.377 UJK
		Total TCDD	1.13 JK	1.13 UJK
		Total PeCDD	4.30 K	4.30 K
		Total TCDF	3.79 K	3.79 K
		Total PeCDF	13.7 K	13.7 K
		Total HxCDF	42.7 K	42.7 K

**Notes**

J = result is estimated.

JK = result is qualified as estimated and an estimated maximum potential concentration.

K = result is an estimated maximum potential concentration.

pg/g = picograms per gram.

UJK = result is non-detect at the estimated maximum potential concentration and qualified as estimated.

UK = result is non-detect at the estimated maximum potential concentration.

<sup>(a)</sup>Result also qualified based on holding time exceedance. Final qualification is shown.

<sup>(b)</sup>Result also qualified based on laboratory control sample recovery. Final qualification is shown.

<sup>(c)</sup>Result also qualified based on receipt by Enthalpy in a broken container.

<sup>(d)</sup>Result also qualified based on internal standard recovery. Final qualification is shown.

## Sample Conditions

### Sample Custody

Sample custody was appropriately documented on the chain-of-custody (COC) form accompanying the reports with the following exceptions:

According to the chain-of-custody (COC) forms provided with all reports, sample relinquishment time was not recorded by Apex for shipments to Enthalpy. The reviewer notified the laboratory. No qualification was required.

The reviewer confirmed that the gaps in custody on the COC forms accompanying all Enthalpy reports are due to shipment via a third-party service.

### Holding Times

According to report 2312096, EPA Method 8290A extraction was performed for samples AOI-087-1.0-1.5 and AOI-043-1.0-1.5 18 days after the 30-day method-recommended holding time.

According to report 2312158, all samples were re-extracted for EPA Method 8290A nine days after the 30-day method-recommended holding time. According to report 2402080, all samples were re-extracted for EPA Method 8290A 40 to 49 days after the 30-day method-recommended holding time.

EPA Method 8290A notes that dioxins and furans are very stable in a variety of matrices and that, when stored at less than or equal to 6 degrees Celsius, the holding times may be as long as a year for certain matrices. Because storage stability for dioxins and furans was not evaluated in soil from the project site, the holding time was not extended. The reviewer qualified associated detected sample results with J, and non-detect results with UJ. Results already flagged by Enthalpy with J due to detection below the MRL were not additionally qualified but are presented for a complete record. Results also qualified based on EMPCs, LCS recovery, and internal standard recovery are shown with final qualification.

Report	Sample	Analysis	Original Results	Qualification
	AOI-087-1.0-1.5 AOI-043-1.0-1.5	EPA 8290A	Detected	J <sup>(a)(b)</sup>
				JK <sup>(c)</sup>
			Non-detect	UJ
				UJK <sup>(d)</sup>
2312158	AOI081-1.0-1.5 AOI079-1.0-1.5 AOI057-1.0-1.5		Detected	J <sup>(a)</sup>
			Non-detect	UJ
				UJK <sup>(d)</sup>
2402080	AOI-043-1.5-2.0 AOI-079-1.5-2.0 AOI-083-1.5-2.0 AOI-089-1.5-2.0		Detected	J <sup>(a)</sup>
		J <sup>-(e)</sup>		
		Non-detect	UJ	
			UJK <sup>(d)</sup>	

**Notes**

EPA = U.S. Environmental Protection Agency.

J = result is estimated.

J- = result is estimated, but the result may be biased low.

JK = result is qualified as estimated and an estimated maximum potential concentration.

K = result is an estimated maximum potential concentration.

LCS = laboratory control sample.

UJ = result is non-detect at the estimated detection limit and qualified as estimated.

UJK = result is non-detect at the estimated maximum potential concentration and qualified as estimated.

<sup>(a)</sup>Results already flagged with J due to detection below the method reporting limit did not require additional qualification.

<sup>(b)</sup>Results qualified with J due to LCS recovery did not require additional qualification. Specific results are presented in the Laboratory Control Sample and Laboratory Control Sample Duplicate Results section below.

<sup>(c)</sup>Total HxCDF result for sample AOI-087-1.0-1.5 and total PeCDD result for sample AOI-043-1.0-1.5 also qualified with K based on estimated maximum potential concentration. Final qualification of JK is shown. Specific results are presented in the Estimated Maximum Potential Concentration Results section above.

<sup>(d)</sup>Results also qualified with UJK based on estimated maximum potential concentration. Final qualification is shown. Specific results are presented in the Estimated Maximum Potential Concentration Results section above.

<sup>(e)</sup>OCDD result for sample AOI-079-1.5-2.0 also qualified with J- based on internal standard recovery. Final qualification is shown. The specific qualified result is presented in the Labeled Analog Results section below.

The remaining extractions and analyses were performed within the method-recommended holding times.

### Preservation and Sample Storage

The samples were preserved and stored appropriately. Enthalpy noted on the COC label reconciliation report provided with reports 2312096, 2312158, 2402080, 2403149, and 2406186 that the container types received were appropriate for the analyses requested but that the containers were clear jars. EPA Method 8290A states that soil samples must be stored in glass containers and stored in the dark. The reviewer confirmed that samples were stored in closed coolers immediately after sampling as well as walk-in freezers, both of which prevent light exposure. There are no EPA qualification recommendations for EPA Method 8290A dioxin and furan sample results associated with soil samples stored in clear glass containers. Because the samples were stored away from light, no qualification was performed.

The COC/label reconciliation report provided with report 2406186 noted that the sample container was wrapped in foil. The reviewer confirmed with the field staff that the sample container had been covered in foil in the field after the jar was sealed. No qualification was required.

According to the COC/label reconciliation report provided with report 2403149, sample AOI043-2.0-2.5 was received by Enthalpy in a broken glass sample container. At the MFA project manager's request, the sample was recovered and transferred to a new amber glass container. The reviewer qualified all associated sample results with J applied to detected results and UJ applied to non-detect results. Results already flagged by Enthalpy with J due to detection below the MRL were not additionally qualified.

Report	Sample	Analysis	Original Results	Qualification
2403149	AOI043-2.0-2.5	EPA 8290A	Detected	J <sup>(a)</sup>
				JK <sup>(b)</sup>
			Non-detect	UJ <sup>(c)</sup>
				UJK <sup>(b)</sup>

**Notes**

EPA = U.S. Environmental Protection Agency.

J = result is estimated.

JK = result is qualified as estimated and an estimated maximum potential concentration.

K = result is an estimated maximum potential concentration.

UJ = result is non-detect at the estimated detection limit and qualified as estimated.

UJK = result is non-detect at the estimated maximum potential concentration and qualified as estimated.

<sup>(a)</sup>Some results were already flagged with J due to detection below the method reporting limit; these results did not require additional qualification.

<sup>(b)</sup>Results also qualified based on estimated maximum potential concentration and/or internal standard recovery. Final qualification is shown.

<sup>(c)</sup>Results also qualified based on internal standard recovery. Final qualification is shown .

## Reporting Limits

Enthalpy reported EPA Method 8290A non-detect results to EDLs. EDLs are sample-specific detection limits calculated for non-detect results. Method detection limits (MDLs) were also provided for all EPA Method 8290A dioxin and furan congener results. MRLs were not included in any reports due to reporting system limitations. No sample results were reported from dilution analyses.

Enthalpy qualified results detected between the MDL and MRL with J. Because MRLs were not included in the reports, the reviewer confirmed that results flagged by Enthalpy with J were detected below MRLs by reviewing the electronic data deliverable file that accompanied the report. These qualifiers were accepted by the reviewer.

## Blanks

### Method Blanks

Laboratory method blanks are used to assess whether laboratory contamination was introduced during sample preparation and analysis. Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the laboratory method blanks were associated with all samples prepared in the analytical batch.

According to report 2402080, the EPA Method 8290A batch B24B183 laboratory method blank had a detection of OCDD below the MDL. All associated sample results were detected at concentrations



greater than ten times the laboratory method blank concentration; thus, qualification was not required.

All remaining laboratory method blank results were non-detect to EDLs.

### Equipment Rinsate Blanks

Equipment rinsate blanks are used to evaluate field equipment decontamination.

An equipment rinsate blank (BLANK-240313) was submitted for EPA Method 8290A analysis. According to report 2403149, the EPA Method 8290A batch B24C271 equipment rinsate blank had an EMPC detection of total PeCDD, at 1.91 picograms per liter (pg/L). The associated sample results also had EMPC detections of total PeCDD, which the reviewer qualified in the EMPC Results section above. No additional qualification was required.

All remaining equipment rinsate blank results were non-detect to EDLs.

### Trip Blanks

Trip blanks are used to evaluate whether volatile organic compound contamination was introduced during sample storage and during shipment between the sampling location and the laboratory. Trip blank samples were not required because samples were not analyzed for volatile organic compounds.

## Laboratory Control Sample and Laboratory Control Sample Duplicate Results

An LCS and a laboratory control sample duplicate (LCSD) are spiked with target analytes to provide information about laboratory precision and accuracy. No LCSDs were reported, in accordance with the method. The LCSs were prepared and analyzed at the required frequency. Enthalpy reported LCSs as “ongoing precision and recovery” samples.

According to report 2312096, the EPA Method 8290A batch B24A0I8 LCS results for 1,2,3,4,7,8-HxCDF; 2,3,4,6,7,8-HxCDF; 1,2,3,7,8,9-HxCDF; 1,2,3,4,7,8,9-HpCDF; and OCDF were below the lower percent recovery acceptance limits of 70 percent, ranging from 68.2 percent to 69.5 percent. All results were also associated with a holding time exceedance, as discussed in the Holding Times section above. The reviewer qualified associated detected sample results with J and non-detect results with UJ, as shown in the following table. Results already flagged by Enthalpy with J due to detection below the MRL did not require additional qualification. Results also flagged by Enthalpy as EMPCs were also as discussed in the Estimated Maximum Potential Concentration Results section above. Final qualified results are presented in the following table:

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
2312096	AOI-083-1.0-1.5	1,2,3,4,7,8-HxCDF	6.18	6.18 J
		2,3,4,6,7,8-HxCDF	2.43 J	2.43 J
		1,2,3,7,8,9-HxCDF	0.507 J	0.507 J
		1,2,3,4,7,8,9-HpCDF	2.62	2.62 J
		OCDF	69.6	69.6 J
	AOI-089-1.0-1.5	1,2,3,4,7,8-HxCDF	5.68	5.68 J
		2,3,4,6,7,8-HxCDF	1.61 J	1.61 J
		1,2,3,7,8,9-HxCDF	1.44 J	1.44 J
		1,2,3,4,7,8,9-HpCDF	2.41 J	2.41 J

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
		OCDF	30.8	30.8 J
	AOI-056-1.0-1.5	1,2,3,4,7,8-HxCDF	2.04 J	2.04 J
		2,3,4,6,7,8-HxCDF	0.427 J	0.427 J
		1,2,3,7,8,9-HxCDF	0.253 J	0.253 J
		1,2,3,4,7,8,9-HpCDF	0.808 J	0.808 J
		OCDF	9.48	9.48 J
	AOI-046-1.0-1.5	1,2,3,4,7,8-HxCDF	1.56 J	1.56 J
		2,3,4,6,7,8-HxCDF	0.651 J	0.651 J
		1,2,3,7,8,9-HxCDF	0.245 K	0.245 UJK <sup>(a)</sup>
		1,2,3,4,7,8,9-HpCDF	0.445 J	0.445 J
		OCDF	5.07	5.07 J
	AOI-061-1.0-1.5	1,2,3,4,7,8-HxCDF	3.33	3.33 J
		2,3,4,6,7,8-HxCDF	2.40 J	2.40 J
		1,2,3,7,8,9-HxCDF	0.822 K	0.822 UJK <sup>(a)</sup>
		1,2,3,4,7,8,9-HpCDF	2.05 J	2.05 J
		OCDF	27.0	27.0 J
	AOI-066-1.0-1.5	1,2,3,4,7,8-HxCDF	1.12 J	1.12 J
		2,3,4,6,7,8-HxCDF	0.712 J	0.712 J
		1,2,3,7,8,9-HxCDF	0.428 U	0.428 UJ
		1,2,3,4,7,8,9-HpCDF	1.08 J	1.08 J
		OCDF	15.7	15.7 J

**Notes**

- J = result is estimated.
- K = result is an estimated maximum potential concentration.
- pg/g = picograms per gram.
- U = result is non-detect at the estimated detection limit.
- UJ = result is non-detect at the estimated detection limit and is qualified as estimated.
- UJK = result is non-detect at the estimated detection limit, qualified as estimated, and is an estimated maximum potential concentration.
- <sup>(a)</sup>Result also qualified based on estimated maximum potential concentration. Final qualification is shown.

All remaining LCS results were within acceptance limits for percent recovery.

**Laboratory Duplicate Results**

Laboratory duplicate results are used to evaluate laboratory precision. Laboratory duplicate samples are optional for EPA Method 8290A and were not reported by Enthalpy.

**Matrix Spike and Matrix Spike Duplicate Results**

Matrix spike (MS) and matrix spike duplicate (MSD) results are used to evaluate laboratory precision, accuracy, and the effect of the sample matrix on sample preparation and analysis. MS and MSD results were not reported by Enthalpy.

**Labeled Analog Results**

All EPA Method 8290A project samples and associated batch quality control samples were spiked with carbon-13 (C13) labeled analogs as internal standards to quantify the relative response of

analytes in each sample. Samples were also spiked with labeled cleanup standards to evaluate the efficiency of extract cleanup.

According to report 2312096, almost all EPA Method 8290A batch B24A018 laboratory method blank labeled internal standards and all LCS labeled internal standards had percent recoveries below the lower percent recovery acceptance limit of 40 percent, ranging from 20.0 percent to 38.1 percent. EPA Method 8290A notes that low recoveries for a laboratory method blank do not require discarding associated analytical data but may indicate potential problems with future analytical data. Qualification of associated sample results based on laboratory method blank and LCS internal standard recovery was not required.

According to report 2312096, the EPA Method 8290A cleanup standard for sample AOI-087-1.0-1.5 exceeded the upper percent recovery acceptance limit of 135 percent, at 139 percent. All associated detected sample results were previously qualified based on holding time exceedance; additional qualification was not required. Qualification of non-detect sample results was not required.

According to report 2402080, the EPA Method 8290A labeled internal standard 13C-OCDD results for samples AOI-079-1.5-2.0 and AOI-089-1.5-2.0 were below the lower percent recovery acceptance limit of 40 percent, at 37.9 percent and 35.6 percent, respectively. The same sample results were also associated with holding time exceedance. The reviewer determined the qualification as estimated with a potential low bias was appropriate and qualified the associated OCDD sample results with J-, as shown in the following table:

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
2402080	AOI-079-1.5-2.0	OCDD	640	640 J-
	AOI-089-1.5-2.0		323	323 J-(a)

**Notes**

J-= result is estimated, but the result may be biased low.

pg/g = picograms per gram.

(a)Result also qualified based on holding time exceedance. Final qualification is shown.

According to report 2403149, the EPA Method 8290A labeled internal standards 13C- 2,3,7,8-TCDD, 13C-1,2,3,4,7,8-HxCDD, 13C-2,3,7,8-TCDF, 13C-1,2,3,7,8-PeCDF, 13C-2,3,4,7,8-PeCDF, 13C-1,2,3,6,7,8-HxCDF, and 13C-2,3,4,6,7,8-HxCDF results for sample AOI043-2.0-2.5 were below the lower percent recovery acceptance limit of 40 percent, ranging from 32.9 percent and 39.9 percent. Sample AOI043-2.0-2.5 was received by Enthalpy in a broken sample container, as discussed in the Preservation and Sample Storage section above. Additionally, some results were qualified by the reviewer based on EMPCs, as discussed in the Estimated Maximum Potential Concentration Results section above. Final qualified results are shown in the following table:

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
2403149	AOI043-2.0-2.5	2,3,7,8-TCDD	0.385 U	0.385 UJ
		1,2,3,4,7,8-HxCDD	1.51 U	1.51 UJ
		2,3,7,8-TCDF	0.545 U	0.545 UJ
		1,2,3,7,8-PeCDF	0.678 J	0.678 J
		2,3,4,7,8-PeCDF	3.88	3.88 J
		1,2,3,6,7,8-HxCDF	1.99 J	1.99 J
		2,3,4,6,7,8-HxCDF	2.17 J	2.17 J
		Total TCDD	1.41	1.41 J

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
		Total HxCDD	32.0	32.0 J
		Total TCDF	17.2 K	17.2 UJK <sup>(a)</sup>
		Total PeCDF	50.9 K	50.9 JK <sup>(a)</sup>
		Total HxCDF	50.3 K	50.3 JK <sup>(a)</sup>

**Notes**

JK = result is qualified as estimated and an estimated maximum potential concentration.

K = result is an estimated maximum potential concentration.

pg/g = picograms per gram.

U = result is non-detect at the laboratory estimated detection limit.

UJ = result is non-detect at the estimated detection limit and qualified as estimated.

UJK = result is non-detect at the estimated maximum potential concentration and qualified as estimated.

<sup>(a)</sup>Result also qualified based on estimated maximum potential concentration. Final qualification is shown.

All remaining labeled standard recoveries were within acceptance limits.

**Field Duplicate Results**

Field duplicate samples measure both field and laboratory precision. Field duplicate samples were not submitted for analysis.

**Data Package**

The data packages were reviewed for transcription errors, omissions, and anomalies.

According to an email communication attached to report A3L1034, sample names originally submitted on the COC form were corrected by changing “A01” to “AOI.” Sample AOI-087-1.5-2 was changed to AOI-087-1.5-2.0. Additionally, samples AOI-065-1.0-1.5 and AOI-065-1.5-2.0 were changed to AOI-066-1.0-1.5 and AOI-066-1.5-2.0, respectively. This information is also documented on a revised COC form issued by Apex to Enthalpy for report 2312096. No action was required by the reviewer.

According to the sample inventory report provided with report 2312096 (appended to report A3L1034), the sample names were incorrectly reported with the prefix “AIO.” The reviewer confirmed that associated COC forms, the sample label reconciliation form, and the final sample results included with report 2312096 all referenced the correct sample names with prefix “AOI.” Because the sample names were shown correctly with sample results, a revised laboratory report was not requested.

According to the COC label reconciliation report provided with report 2312096, a sample label provided for sample AOI-066-1.0-1.5 was recorded with “AOI-065-1.0-1.5.” Enthalpy logged and reported the sample based on the name provided on the revised subcontract COC form received on December 12, 2023. The reviewer confirmed that Enthalpy used the correct sample name. No additional action was required.

As noted on the COC/label reconciliation report provided with report 2403149, sample names were changed at the MFA project manager’s request after samples were received by both laboratories. Sample name A01-043-2.0-2.5 was changed to AOI043-2.0-2.5 and sample name A01-043-2.5-3.0 was changed to AOI043-2.5-3.0.

According to the COC provided with report A4F1474, sample relinquishment time was not recorded by MFA. The reviewer confirmed with the sampler that the samples were stored in the MFA warehouse, which is a secured location, until received by the laboratory.

No additional issues were found.

## References

Apex. 2023. *Quality Systems Manual*. Rev. 11. Apex Laboratories, LLC: Tigard, OR. June 20.

Enthalpy. 2023. *Quality Manual*. Rev. 33. Enthalpy Analytical, LLC: El Dorado Hills, CA. February 20.

EPA. 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. EPA publication SW-846. 3rd ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), VI phase III (2019), VII phase I (2019), and VII phase II (2020).

EPA. 2014. *R10 Data Validation and Review Guidelines for Polychlorinated Dibenzo-p-dioxin and Polychlorinated Dibenzofuran Data (PCDD/PCDF) Using Method 1613B and SW846 Method 8290A*. EPA-910-R-14-003. U.S. Environmental Protection Agency, Office of Environmental Assessment. May.

EPA. 2020. *National Functional Guidelines for High Resolution Superfund Methods Data Review*. EPA 542-R-20-007. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. November.

# APPENDIX G

## SAMPLING RESULTS LETTER





STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

*Vancouver Field Office • 2108 Grand Blvd, Vancouver, WA 98661-4622 • (360) 690-7171  
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341  
If you need this letter in another format, please call (360) 407-6300*

DATE

This summer, the Department of Ecology (Ecology) and Port of Ridgefield (port) took soil samples from the yard at ADDRESS. **The dioxin level in your yard is above the state cleanup level.** We will contact the homeowner in the next few months to discuss soil replacement and yard restoration options, at no cost. The homeowner's consent will be required for any cleanup. The enclosed map shows your results and the yard sample locations. The cleanup plan for your yard may cover a larger area than was sampled.

Additionally, the right-of-way areas near your property are **above the state cleanup level.** Soil will be replaced in the right-of-ways (see enclosed sampling results neighborhood map). Again, we will contact the homeowner to discuss the cleanup in right-of-ways adjacent to your property, before any work is done. The purpose of this letter is to inform you of the sampling results and help you reduce contact with contaminated soils in your yard and neighborhood now.

**What is the health risk?**

There is no immediate health concern but there is a long term risk. Long-term, daily exposure to the dioxin level found in your yard raises the risk of certain health problems. The health risk comes from accidentally swallowing, or breathing in the dust from soil.

**We recommend that you take these healthy actions now to limit you and your family's exposure to soil:**

- Wash hands after contact with soil, especially for children.
- Take off shoes at the door or use a doormat.
- Vacuum regularly and dust with a damp cloth.
- Wipe pets' paws and brush off their fur before coming inside.

The enclosed materials offer more advice. Please take the time to review them. For health questions, please contact the WA Department of Health at [Lenford.OGarro@doh.wa.gov](mailto:Lenford.OGarro@doh.wa.gov) or (360) 236-3376.



Additional sampling may be needed at your property to determine the depth of soil contamination. We will be contacting you in the next few months to select a sampling date and time that is convenient for you. These samples will inform us about how much soil we will need to remove during cleanup.

We also included a copy of the mailer that will be delivered to your neighborhood to update them on the progress of the cleanup. For the latest information visit our website at <https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=3020>.

If you have questions or concerns, please contact me.

We look forward to working with you!

Sincerely,



**Craig Rankine**  
Cleanup Project Manager  
(360) 690-4795  
[Craig.Rankine@ecy.wa.gov](mailto:Craig.Rankine@ecy.wa.gov)

**Enclosed Materials**

- Yard results and sampling locations map
- Neighborhood soil sampling results map
- Soil sampling update neighborhood mailer
- Healthy actions handout
- What happens during soil replacement handout

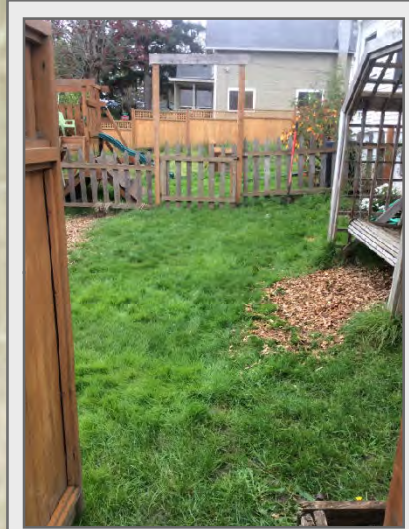


Path: X:\9003.01\Port of Ridgefield\39\Of-Property Yard Sampling\Projects\Public\Documents\SSAP 2\Mailer\Fig\_AOI-017\_6A.sh St.mxd  
 Print Date: 10/9/2015  
 Approved By: mmovak  
 Produced By: jmillier  
 Project: 9003.01.39

Your property is eligible for cleanup. The Dioxin level is 39.4 nanograms per kilogram (ng/kg).  
 Cleanup level for Dioxins is 13 ng/kg. We will contact you in the next few months to work with you on a cleanup plan.  
 The soil from each sample location on the property was combined into one sample giving an average dioxin level for the Sample Area.



1 Former blacktop driveway exclusion area



2a Side yard sampling area



2b Front yard sampling area, facing north



2c Front yard sampling area, facing west



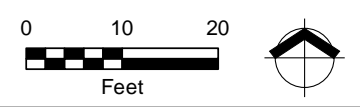
3b Side yard sampling area



3a Side / front yard sampling area



**Yard Soil Sampling Results and Sample Locations, ADDRESS, Map Number XXX**  
 Ridgefield, Washington



**Legend**

- |                               |          |
|-------------------------------|----------|
| Sampling Area Extent          | Series A |
| Property Boundary             | Series B |
| Clark County Tax Lot Boundary | Series C |
| Photo Location and Direction  |          |

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 2/13/2015 and 4/13/2015.

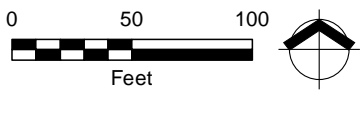


This product is for informational purposes and may not have been prepared for, or be suitable for, legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.





**Neighborhood Soil Sampling Results Map**  
 Ridgfield, Washington



- Legend**
- Study Area
  - Property Location Number
  - Yard Soil Sampling Results**
    - Dioxins below state cleanup level
    - Dioxins above state cleanup level
  - No Sample Results
  - Property Excluded
  - Right-of-Way Cleanup Area

Source: Aerial photograph obtained from Esri ArcGIS Online. Tax Lot data (2014) obtained from Clark County GIS.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.



# Update on Off-Property Soil Study

## Background

From 1964-1993, Pacific Wood Treating (PWT) operated on the Port of Ridgefield (port) waterfront property at 111 West Division in Ridgefield. PWT pressure treated wood products with a variety of toxic chemicals. Over the past 17 years, the port cleaned up or used a soil cap to cover areas where contamination was found on port property. In this last phase, the Department of Ecology (Ecology) and the port are studying and cleaning up dioxins in the neighborhood east of the port property (off-property area). Ecology and the port are funding the study and cleanup.

In 2009, the port began sampling in right-of-ways to define the extent of contamination in the off-property area. The initial samples were analyzed for multiple wood treating-related compounds such as pentachlorophenol (PCP), arsenic, polycyclic aromatic hydrocarbons (PAHs), and dioxins. Dioxins were the only contaminant found above cleanup levels. It was clear from the right-of-way sample results that dioxins might also be in yards. The yard soil sampling program started spring 2015.

This FAQ is to update you on the progress the port has made in sampling yards in the off-property area, summarize soil sampling results, and provide information about dioxins. We will update this document and our website when we have more information about the project.

## Yard Sampling and the Off-Property Study

### Q: What is happening now?

**A:** The port and Ecology are continuing to sample the soil in the off-property area to determine the extent of contamination.

- Sample results from yards and right-of-ways have been sent to owners and tenants (see page 3 map of results).
- Sampling shows contamination does not extend north of Maple Street.
- Additional soil samples are needed from Main and Mill Streets. We will start with the right-of-ways and continue until the extent of contamination is found.
- We are attempting to sample all homes within the off-property area
- Cleanup plans for the right-of-ways and yards will be developed with homeowners. Cleanup will begin summer/fall 2016.
- When the extent of contamination has been defined it will be documented in a series of reports that will be available for public comment.

## TOPICS

- Background
- Next steps
- Dioxin information
- Yard soil sampling results map

## FOR MORE INFORMATION

### Site Investigation

#### Craig Rankine

Toxics Cleanup Program  
PO Box 47775  
Olympia, WA 98504-7775  
Phone: (360) 690-4795  
Craig.Rankine@ecy.wa.gov

### Public Involvement

#### Stacy Galleher

Phone: (360) 407-6255  
Stacy.Galleher@ecy.wa.gov

### Health-Related Questions

#### Len O'Garro

WA State Department of Health  
Phone: (360) 236-3376  
E-mail:  
Lenford.OGarro@doh.wa.gov

### Ecology's Website

<https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=3020>

### Accommodation Requests

To request materials in a format for the visually impaired, call Ecology at (360) 407-6300, Washington Relay Service at 711, or TTY 877-833-6341.

Facility Site ID# 1019

Cleanup Site ID# 3020

## Dioxin Information

### Q: What are dioxins?

**A:** Dioxins are a family of chemicals with similar chemical structures and effects on living things. They are byproducts of both human activities and natural processes. They do not break down easily in the environment, and as a result, are found everywhere. Most people are exposed to very low levels of dioxins when they consume food or milk, breathe air, or have contact with dioxin contaminated soils or other materials.

### Q: Where do dioxins come from?

**A:** We believe the elevated levels of dioxins in the off-property area likely came from air-borne dust while Pacific Wood Treating was operating. Dust blew off the port property, was tracked onto roads from truck tires, and came off trucks hauling treated wood on Division St.

Additionally, dioxins are byproducts of both human activities and natural processes. Dioxins can be formed during industrial processes, from home burn barrels\*, fireplaces, wood stoves, and exhaust from diesel engines. Natural sources of dioxins are from forest fires or volcanoes.

Due to changes in environmental regulations and industrial processes, emissions of dioxins in the U.S. have decreased significantly since the 1970s.

*\*Please contact the Southwest Clean Air Agency for more information about the health effects of home burning, and how to reduce your risk. Phone: (360) 574-3058, Website: [www.swcleanair.org](http://www.swcleanair.org).*

### Q: How could I be exposed to dioxins?

**A:** Everyone is exposed to low levels of dioxins because they are present throughout our environment. Most exposure comes from food (especially meat and dairy products). Soil, air, and water usually contribute only a small part of our exposure to dioxins. However, because of the soil contamination, people living in and near the off-property area have a greater potential of exposure to soil dioxins. Exposure in the off-property area could occur by accidentally inhaling (breathing) in dust that carries dioxins or ingesting (eating) soil containing dioxins.

### Q: Could dioxins affect the health of my family?

**A:** Long-term exposure to low levels of dioxins, like those found on the PWT site, does not pose an immediate health risk but may pose a long-term health risk. The odds of developing health problems are different for each person.

Based on data from animal studies, there is some concern that exposure to lower levels of dioxins over long periods (or higher levels at sensitive times) might affect human reproduction or cell development. Dioxins may also have harmful effects on the liver, peripheral nerves, the immune system, and may cause certain types of cancer. The health effects associated with low-level dioxin exposure are still being studied.

### Q: How can I keep my family safe from possible contamination?

**A:** There are several ways you can reduce your exposure to dioxins and other types of soil contamination. These healthy actions include:

- Washing your hands before eating, and after playing, or working outside.
- Removing your shoes before going inside.
- Preventing children from eating dirt.
- Washing children's toys and pacifiers often.
- Damp dusting, mopping and vacuuming often.
- Brush and bathe pets often to keep them clean.
- Eating a healthy and balanced diet and with low to moderate amounts of meat and dairy products.
- Washing fruits and vegetables before eating them, especially if they are grown at home.
- Gardening in raised beds with clean soil.
- Wearing gloves when gardening or landscaping.

### Q: Are the vegetables in my garden safe?

**A:** Fruits and vegetables are okay to eat because they take up only a small amount of dioxins that are in soil. However, since garden soils may cling to the edible portions, it is important to peel or wash produce to remove any possible contamination.



Properties and Right-of-Ways Soil Sample Results

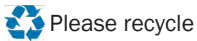




DEPARTMENT OF  
**ECOLOGY**  
State of Washington

PO Box 47775

Olympia, WA 98504-7775



Please recycle

## **Pacific Wood Treating Ridgefield, WA**

### **Update on Off-Property Soil Study**

**Facility Site ID #: 1019**

To request ADA accommodation including materials in a format for the visually impaired, call Ecology at (360) 407-6300.

Persons with impaired hearing may call Washington Relay Service at 711.  
Persons with speech disability may call TTY at 877-833-6341.

**¿Habla Español?** Si necesita esta información en español, contáctenos a [preguntas@ecy.wa.gov](mailto:preguntas@ecy.wa.gov).





# Healthy Actions

**to remove dirt from your home**



**WASH YOUR HANDS**  
before eating



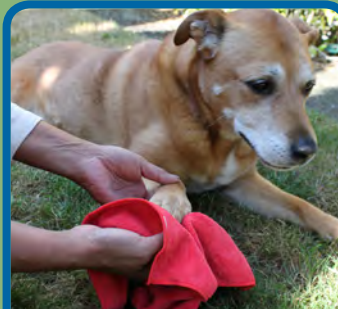
**MOP AND VACUUM**  
once a week



**WASH ALL FRUITS & VEGETABLES**  
before eating



**TAKE OFF YOUR SHOES**  
at the door



**CLEAN YOUR PETS**  
before they enter your home



**WEAR SHOES AND GLOVES**  
when gardening and working outdoors



**WASH CHILDREN'S TOYS & PACIFIERS**  
frequently

## Why is it important to do these healthy actions?

There are many unhealthy things in dirt, including harmful chemicals like dioxins that can hurt your body. Some areas in Ridgefield are contaminated with dioxins. These chemicals remain in the soil and can be a long term health risk.

**These healthy actions are simple steps you and your family can take to reduce contact with dioxins in the dirt.**

**Alternate formats available upon request**

**For more information please contact:**

**Site Manager**  
Craig Rankine - Dept. of Ecology  
360.690.4795 • [Craig.Rankine@ecy.wa.gov](mailto:Craig.Rankine@ecy.wa.gov)

**Public Involvement**  
Stacy Galleher - Dept. of Ecology  
360.407.6255 • [Stacy.Galleher@ecy.wa.gov](mailto:Stacy.Galleher@ecy.wa.gov)

<https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=3020>



 Printed on recycled material

This list of frequently asked questions explains how yard replacement works and what to expect during the cleanup process.

### **Q: While I wait for cleanup, what can I do to protect myself and my family?**

**A:** You can still use the areas of your yard that have dioxins, but we recommend reducing contact with soil. To reduce contact with soil we recommend you cover bare soil with mulch, repair bare patches of lawn, and garden in raised beds. See the healthy actions poster included in your packet for additional recommendations.

### **Q: What is the process for soil removal and replacement?**

**A:** Our cleanup staff will explain cleanup and landscaping options. We will:

1. Meet with you to gather information about your yard and draft a cleanup plan.
2. Meet again to review the plan, make any changes needed, and get final permission from the homeowner.
3. Create construction documents, get necessary permits, and go out to bid for a contractor.
4. Dig up contaminated soils and take them to the landfill.
5. Bring in new soil to backfill the area and restore the landscaping.
6. Give you documentation of the soil removal work completed on your yard.

### **Q: How will you restore my landscaping?**

**A:** We will restore the yard based on measurements and photographs taken during cleanup plan development and contractor's surveying. The options for landscaping include:

- Restore with the same or in-kind landscaping as before.
- Replace some of the lawn with mulched beds.

Some plants can be removed, transplanted, or replaced with nursery plants. The contractor will use either sod or hydro seed to replace lawn areas. They will maintain the new lawn for an agreed-upon length of time after installation.



We remove the top 6 to 18 inches of contaminated soil.



We bring in new soil to backfill the area.



We install sod or seed to replace the lawn.



**Q: When will cleanup work start on my yard?**

**A:** We hope to start planning this winter and begin cleanup summer/fall 2016.

**Q: How long will soil removal and yard restoration take?**

**A:** Planning and preparation for soil removal can take several months. Cleanup and restoration of the yard can take up to six weeks. Contractors may need more time if there is inclement weather or holidays.

**Q: What areas may not be included in soil removal?**

**A:** We likely cannot remove soil under:

- Buildings with foundations.
- Low decks.
- Sidewalks, patios, or driveways.
- Walls, ponds, or pools.
- Septic tanks or other underground structures.

We may place a covering of soil or other landscaping material in areas where we cannot remove soil.

**Q: Are there any costs to the property owner?**

**A:** A normal soil removal project should not cost the property owner anything. After cleanup, expenses may include watering and maintaining your new lawn or plants (after the contractor maintenance period has ended) and paying for any extra landscaping you want.

**Q: Can I opt out of the program now and join later?**

**A:** No, you cannot join after you have opted out. This cleanup is voluntary but only offered for a limited time.



The homeowner must mow, water and care for the new lawn after contractor maintenance period.

**Q: What are my responsibilities as the property owner?**

**A:** Provide yard access for any additional sampling or topographic surveying needed. Provide input during our yard restoration and cleanup planning visits.

Before work starts, you must provide access to the yard, driveway and adjacent street or alley. This may include parking vehicles on the street and out of the driveway, moving lawn equipment and furniture, and picking up kids' play equipment.

Our contractor will water and care for the new landscaping for an agreed-upon length of time. After this, you must care for the new lawn and other plants.

**For More Information**

Visit: <https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=3020>

Facility ID# 1019    Cleanup Site ID# 3020

**Questions?** Contact:

Cleanup Project Manager, Craig Rankine, 360-690-4795, Email: [Craig.Rankine@ecy.wa.gov](mailto:Craig.Rankine@ecy.wa.gov)

Public Involvement Coordinator, Stacy Galleher, 360-407-6255, Email: [Stacy.Galleher@ecy.wa.gov](mailto:Stacy.Galleher@ecy.wa.gov)

To request **ADA accommodation**, call Ecology at 360-407-6300, Relay Service 711, or TTY 877-833-6341.



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

*Vancouver Field Office • 12121 NE 99<sup>th</sup> St, Suite 2100  
Vancouver, WA 98661-4622 • (360) 690-7171*

*711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341  
If you need this letter in another format, please call (360) 407-6300*

DATE

The Department of Ecology (Ecology) and Port of Ridgefield (port) took soil samples from the yard at ADDRESS. The dioxin level in **this yard is below the state cleanup level**. This yard does not need cleanup. The enclosed map shows yard sample locations and results.

However, **some right-of-way areas near this property are above the state cleanup level**. Soil will eventually be replaced in areas that are above the cleanup level. We will continue sampling the neighborhood and develop a plan for cleanup. When we have more information we will provide it to homeowners.

**We still recommend that you take these healthy actions to limit exposure to neighborhood soil.** There is no immediate health concern but there is a long term risk. Long-term, daily exposure to the dioxin level found in your area raises the risk of certain health problems. The health risk comes from accidentally swallowing, or breathing in the dust from soil, but not from touching it. These simple actions will reduce your family's exposure:

- Wash hands after contact with soil, especially for children.
- Take off shoes at the door or use a doormat.
- Vacuum regularly and dust with a damp cloth.
- Wipe pets' paws and brush off their fur before coming inside.

The enclosed materials offer more advice. For health questions, please contact the WA Department of Health at Lenford.OGarro@doh.wa.gov or (360) 236-3376.

We are continuing to sample soil in the neighborhood. Once we have completed our sampling we will send out more information. Again, this yard does not need cleanup.

For the latest information on the cleanup process, visit our website at <https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=3020>.

If you have questions or concerns about the yard cleanup program, please contact me.

Thank you for your participation!

Sincerely,

A handwritten signature in black ink that reads "Craig Rankine". The signature is written in a cursive style with a large, prominent "C" and "R".

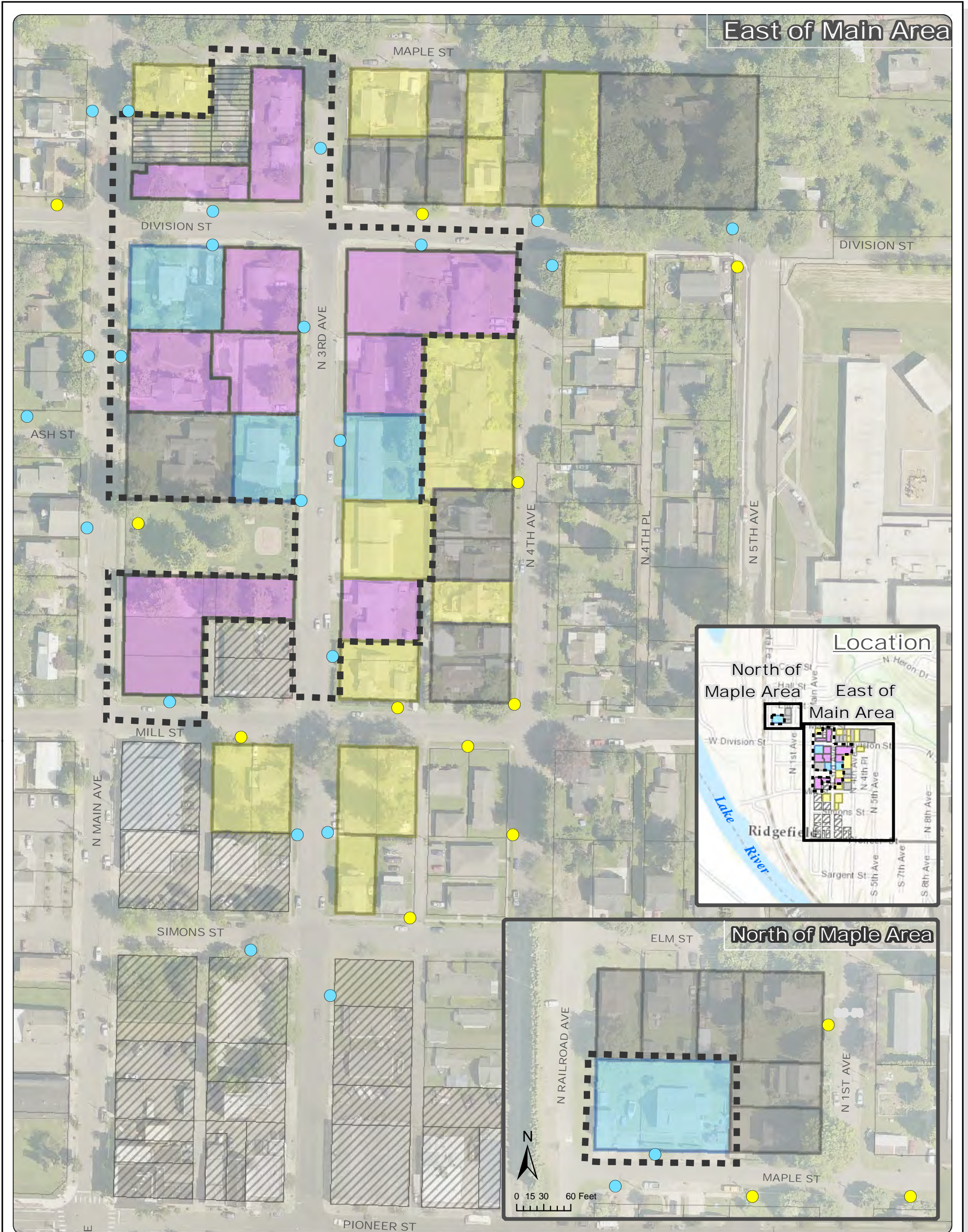
**Craig Rankine**  
Cleanup Project Manager  
(360) 690-4795  
[Craig.Rankine@ecy.wa.gov](mailto:Craig.Rankine@ecy.wa.gov)

**Enclosed Materials**

- Yard results and sampling locations map
- Neighborhood soil sampling results map
- Healthy actions handout



# Map of Neighborhood Results



Source: Aerial photograph (2014) and tax lots (2014) obtained from Clark County GIS.

Ridgefield, Washington

- Extent of Contamination
- Clark County Tax Lots (2014)

- Right of Way Surface Sample Locations (0-0.5 ft)**
- Results Below Cleanup Level
  - Results Above Cleanup Level

## Legend

### Property Type

- Results Below Cleanup Level
- Results Above Cleanup Level
- Want to Sample Yard
- Non-Residential or Minimal Exposed Soil
- Need for Sampling To Be Determined
- No Sampling Needed

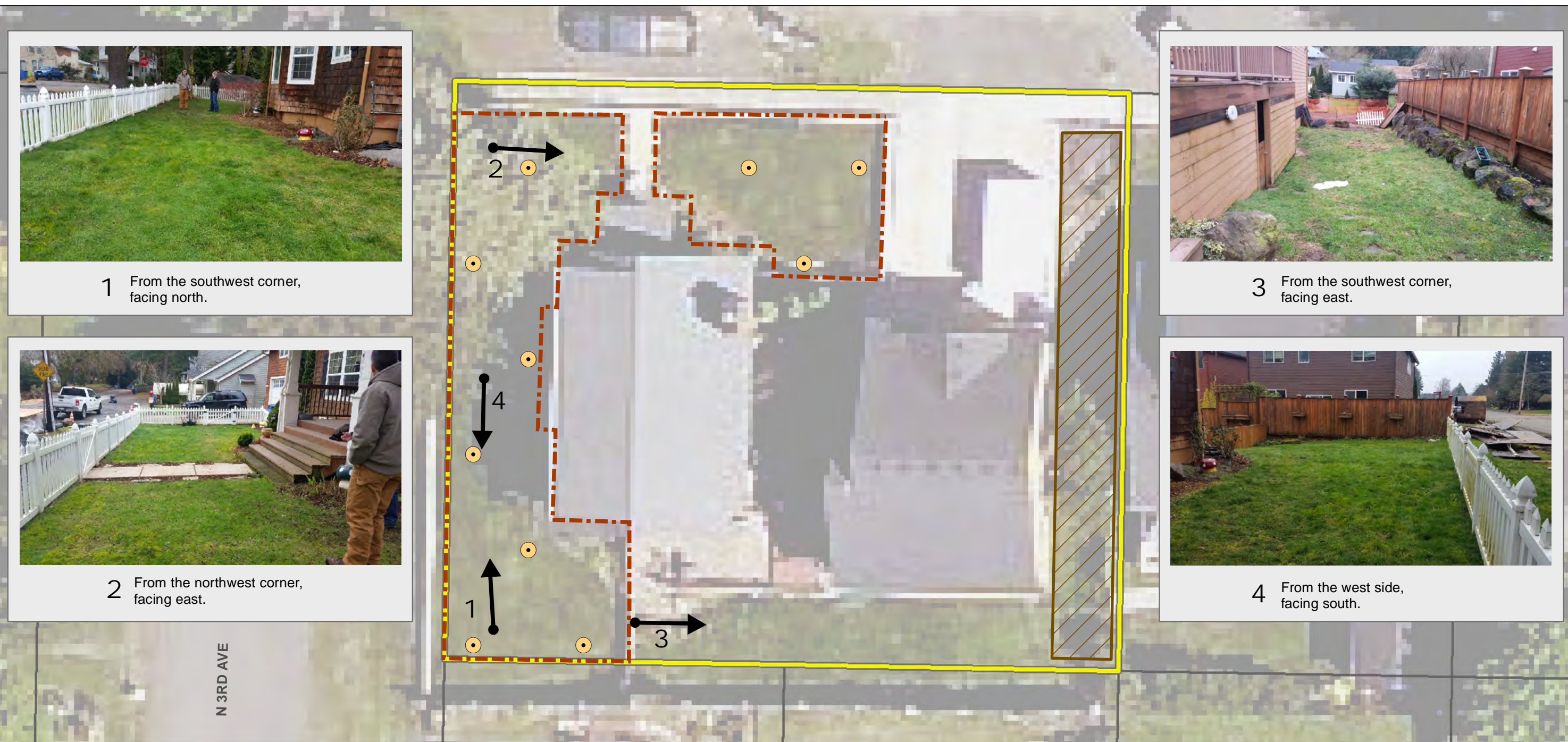




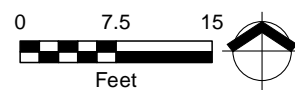
Path: X:\9003.01\Port of Ridgefield\39\Off-Property Yard Sampling\Projects\Phase 2\Public Documents\Maifig\_AOI\_049\_303 Maple St.mxd  
Print Date: 5/25/2017  
Approved By: pwiescher  
Produced By: apadilla  
Project: 9003.01.39

Your property does not need cleanup. The Dioxin level is 3.40 nanograms per kilogram (ng/kg).  
Cleanup level for Dioxins is 13 ng/kg.

The soil from each sample location on the property was combined into one sample giving an average dioxin level for the Sample Area.



**Yard Soil Sampling Results  
and Sample Locations,  
Map Number 049**  
Ridgefield, Washington



- Legend**
- Sampling Area
  - Property Boundary
  - Clark County Tax Lot Boundary
  - Photo Location and Direction
  - City of Ridgefield Sewer Excavation Area
  - Soil Sampling Location

Source: Aerial photograph and tax lots data (2014) obtained from Clark County GIS. Site photos taken 1/24/2017.



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.



# Healthy Actions

**to remove dirt from your home**



**WASH YOUR HANDS**  
before eating



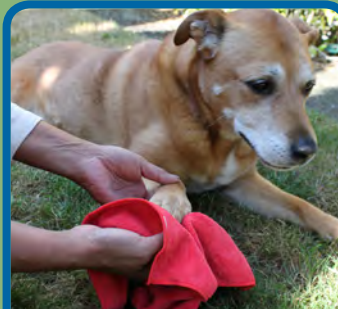
**MOP AND VACUUM**  
once a week



**WASH ALL FRUITS & VEGETABLES**  
before eating



**TAKE OFF YOUR SHOES**  
at the door



**CLEAN YOUR PETS**  
before they enter your home



**WEAR SHOES AND GLOVES**  
when gardening and working outdoors



**WASH CHILDREN'S TOYS & PACIFIERS**  
frequently

## Why is it important to do these healthy actions?

There are many unhealthy things in dirt, including harmful chemicals like dioxins that can hurt your body. Some areas in Ridgefield are contaminated with dioxins. These chemicals remain in the soil and can be a long term health risk.

**These healthy actions are simple steps you and your family can take to reduce contact with dioxins in the dirt.**

**Alternate formats available upon request**

**For more information please contact:**

**Site Manager**  
Craig Rankine - Dept. of Ecology  
360.690.4795 • [Craig.Rankine@ecy.wa.gov](mailto:Craig.Rankine@ecy.wa.gov)

**Public Involvement**  
Stacy Galleher - Dept. of Ecology  
360.407.6255 • [Stacy.Galleher@ecy.wa.gov](mailto:Stacy.Galleher@ecy.wa.gov)



<https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=3020>

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# APPENDIX H

## TECHNOLOGY SCREEN



# APPENDIX H TECHNOLOGY SCREENS

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H-1 SUMMARY OF REMEDIAL TECHNOLOGY SCREENING PROCESS FOR RESIDENTIAL AREAS

Table H-1  
**Summary of Remedial Technology Screening Process for Residential Areas and ROWs  
 Former PWT Site  
 Ridgefield, Washington**

General Response Action	Remedial Technology	Process Options	Description	Retained for Alternatives	Screening Comments
No Action	None	Not Applicable	No Action	No	A no-action alternative was considered and dismissed as an option because dioxins exceed the CUL.
Institutional Controls	Restrictions	Deed Notifications	Institutional controls are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. Institutional controls are meant to supplement engineering controls.	No	This technology is not retained for further evaluation, as it is incompatible with current or future land use (residential).
		Access / Fencing	Access restrictions such as fencing create a physical impedance in order to protect human receptors.	No	This technology is not retained for further evaluation, as it is incompatible with current or future land use (residential).
In Situ Containment	Capping	Clean Soil Cap	Capping is commonly used at contaminated sites because it is generally less expensive than active remediation technologies and can effectively manage the human and ecological risks associated with a remediation site. Caps can range from a one-layer system of vegetated soil to a complex, multi-layer system of soils, geosynthetics, and impervious surfaces. Capping does not lessen toxicity, mobility, or volume of hazardous wastes, but does mitigate migration and eliminates some exposure pathways.	No	This technology is not retained for further evaluation, as it is incompatible with current or future land use (residential). The highest concentrations of contaminants are near the ground surface; installing a cap above the existing grade while maintaining use of existing structures and infrastructure is infeasible.
In Situ Treatment	Biological	Natural Attenuation	Consideration of this option usually requires modeling and evaluation of contaminant degradation rates and pathways, as well as predicting contaminant concentration at downgradient receptor points, especially when the plume is still expanding/migrating. The primary objective of site modeling is to demonstrate that natural processes of contaminant degradation will reduce contaminant concentrations below regulatory standards or risk-based levels before potential exposure pathways are completed. In addition, long-term monitoring must be conducted throughout the process to confirm that degradation is proceeding at rates consistent with meeting cleanup objectives.	No	Dioxins do not readily degrade in the environment; therefore, the natural attenuation option is not retained.
		Slurry Bioremediation	Addition of nutrients and other amendments to enhance bioremediation, the process in which microorganisms degrade organic contaminants, converting them to innocuous end products.	No	Dioxins do not readily biodegrade; therefore, this technology is not retained for further evaluation.
		Phytoremediation	Use of plants to remove, transfer, stabilize, and destroy contaminants in soil and sediments.	No	The effectiveness of phytoremediation of dioxins has not been demonstrated; this technology is not retained for further evaluation.
		Aerobic Biodegradation / Bioventing	Bioremediation is a process in which microorganisms degrade organic contaminants, converting them to innocuous end products. Nutrients, oxygen, or other amendments may be used to enhance bioremediation and contaminant desorption from subsurface materials. Aerobic bioremediation requires an oxygen source. Bioventing stimulates the natural in situ biodegradation of any aerobically degradable compounds in soil by providing oxygen to existing soil microorganisms. Oxygen is most commonly supplied through direct air injection into residual contamination in soil.	No	This technology is not retained for further evaluation because of limited effectiveness against dioxins as well as implementability issues.
In Situ Treatment, cont.	Biological	Anaerobic Biodegradation	Bioremediation conducted in the absence of oxygen.	No	This technology is not retained for further evaluation because of limited effectiveness (especially related to dioxins) as well as implementability issues.

Table H-1  
**Summary of Remedial Technology Screening Process for Residential Areas and ROWs  
 Former PWT Site  
 Ridgefield, Washington**

General Response Action	Remedial Technology	Process Options	Description	Retained for Alternatives	Screening Comments
	Chemical	Chemical Oxidation	Application of chemical oxidants to contaminated soil to convert hazardous contaminants to nonhazardous or less toxic compounds that are more stable, less mobile, and/or inert. Chemical oxidation typically involves reduction/oxidation (redox) reactions. The oxidizing agents most commonly used are ozone, hydrogen peroxide (H <sub>2</sub> O <sub>2</sub> ), hypochlorites, chlorine, and chlorine dioxide.	No	This technology is not retained for further evaluation because of limited effectiveness as well as low implementability. Oxidation would not be effective for reducing total dioxin concentrations. Implementing this cleanup action alternative component would pose many logistical issues.
	Physical— Extractive Processes	Soil Flushing	In situ flushing is defined as the injection or infiltration of an aqueous solution into a zone of contaminated soil/groundwater, followed by downgradient extraction of groundwater and elutriate (flushing solution mixed with the contaminants) and aboveground treatment and discharge or reinjection.	No	This technology is not retained because of limited effectiveness as well as implementability issues. The technology mobilizes contaminants from the soils and should be used only where flushed contaminants and flushing fluid can be contained and recaptured. The potential exists for washing the contaminant beyond the capture zone. Costs associated with treatment of the recaptured fluids are high.
		Vapor Extraction	Soil vapor extraction (SVE) is an in situ unsaturated (vadose) zone soil remediation technology in which a vacuum is applied to the soil to induce the controlled flow of air and remove volatile and some semivolatile contaminants from the soil. The gas leaving the soil may be treated to recover or destroy the contaminants, depending on local and state air discharge regulations.	No	This technology is not effective for the remediation of dioxins and is therefore not retained for further consideration.
		Thermal Extraction	Thermally enhanced SVE is a full-scale technology that uses electrical resistance/electromagnetic/fiber optic/radio frequency heating or hot-air/steam injection to increase the volatilization rate of semivolatiles and facilitate extraction.	No	This technology is not effective for the remediation of dioxins and is therefore not retained for further consideration.
	Enhancement	Fracturing	Fracturing is an enhancement technology designed to increase the efficiency of other in situ technologies in difficult soil conditions. The fracturing extends and enlarges existing fissures and introduces new fractures, primarily in the horizontal direction. After fracturing has been completed, the formation is subjected to vapor extraction, either by applying a vacuum to all wells or by extracting from selected wells, while other wells are capped or used for passive air inlet or forced-air injection.	No	The retained technology will not benefit from fracturing enhancement; therefore, fracturing is not retained for further consideration.

Table H-1  
**Summary of Remedial Technology Screening Process for Residential Areas and ROWs  
 Former PWT Site  
 Ridgefield, Washington**

General Response Action	Remedial Technology	Process Options	Description	Retained for Alternatives	Screening Comments
In Situ Treatment, cont.	Physical— Immobilization	Solidification / Stabilization	The addition of reagents that immobilize and/or bind contaminants to soil in a solid matrix or chemically stable form.	No	The in situ solidification/stabilization of shallow soils is incompatible with the current or future (residential) land use. This technology is not retained for further evaluation.
		Vitrification	Use of strong electrical current to heat soil to temperatures above 2400°F to fuse it into a glassy solid.	No	This technology is not retained for further evaluation because of limited effectiveness and low implementability.
		Electrokinetic Separation	Application of a low-intensity, direct current through the soil between ceramic electrodes divided into a cathode array and an anode array mobilizing charged species. Two primary mechanisms transport contaminants through the soil toward one or the other electrode: electromigration and electro-osmosis.	No	This technology is effective only on polar contaminants and fine-grained soils, and is not retained for further evaluation because of limited effectiveness against dioxins and because of many implementability issues. Additionally, there have been few, if any, commercial applications of electrokinetic remediation in the United States.
		Ground Freezing	The ground-freezing process converts in situ pore water to ice through the circulation of a chilled liquid via a system of small-diameter pipes placed in drilled holes. The ice fuses the soil or rock particles together, creating a frozen mass of improved compressive strength and impermeability. Brine is the typical cooling agent, although liquid nitrogen can be used in emergency situations or where maintenance of the freeze is required only for a few days.	No	This technology is not retained for further evaluation because of limited effectiveness and significant implementability issues.
Ex Situ Treatment	Containment	Excavation, Off-Site Disposal, and Soil Replacement	Contaminated material is removed and transported to permitted off-site treatment and/or disposal facilities. Some pretreatment of the contaminated media may be required in order to meet land disposal restrictions. Excavated material is replaced with clean imported material.	Yes	Easily implementable, cost effective, appropriate for current and future land use, retained for further evaluation.
	Biological	Biopiles, Composting, Land Farming, Slurry Phase	Biopile treatment is a full-scale technology in which excavated soils are mixed with soil amendments and placed on a treatment area that includes leachate collection systems and some form of aeration. It is used to reduce concentrations of petroleum constituents in excavated soils through the use of biodegradation. Moisture, heat, nutrients, oxygen, and pH can be controlled to enhance biodegradation.	No	This technology is not retained for further evaluation because it is not effective for the remediation of dioxins. It also poses logistical implementability issues.
	Chemical	Extraction	Chemical extraction does not destroy wastes but is a means of separating hazardous contaminants from soils, sludges, and sediments, thereby reducing the volume of the hazardous waste that must be treated. The technology uses an extracting chemical and differs from soil washing, which generally uses water or water with wash-improving additives. Commercial-scale units are in operation. They vary in regard to the chemical employed, type of equipment used, and mode of operation.	No	This technology is not retained for further evaluation because the soil does not require treatment prior to disposal.



Table H-1  
**Summary of Remedial Technology Screening Process for Residential Areas and ROWs  
 Former PWT Site  
 Ridgefield, Washington**

General Response Action	Remedial Technology	Process Options	Description	Retained for Alternatives	Screening Comments
Ex Situ Treatment, cont.	Chemical	Reduction / Oxidation	Redox reactions chemically convert hazardous contaminants to nonhazardous or less toxic compounds that are more stable, less mobile, and/or inert. Redox reactions involve the transfer of electrons from one compound to another. Specifically, one reactant is oxidized (loses electrons) and one is reduced (gains electrons). The oxidizing agents most commonly used for treatment of hazardous contaminants are ozone, hydrogen peroxide, hypochlorites, chlorine, and chlorine dioxide. Chemical redox is a short- to medium-term technology.	No	This technology is not retained for further evaluation because the soil does not require treatment prior to disposal.
		Soil Washing	Ex situ soil separation processes (often referred to as "soil washing") are based mostly on mineral processing techniques. Soil washing is a water-based process for scrubbing soils ex situ to remove contaminants. The process removes contaminants from soils in one of the following two ways: by dissolving or suspending them in the wash solution (which can be sustained by chemical manipulation of pH for a period of time); or by concentrating them into a smaller volume of soil through particle size separation, gravity separation, and attrition scrubbing.	No	This technology is not retained for further evaluation because the soil does not require treatment prior to disposal.
		Dehalogenation	Contaminated soil is screened, processed with a crusher and pug mill, and mixed with reagents. The mixture is heated in a reactor. The dehalogenation process is achieved by either the replacement of the halogen molecules or the decomposition and partial volatilization of the contaminants.	No	This technology is not retained for further evaluation because the contamination levels in soil do not require treatment prior to disposal.
	Physical	Separation / Screening	The separation processes are used for removing contaminated concentrates from soils, to leave relatively uncontaminated fractions that can then be regarded as treated soil. Ex situ separation can be performed by many processes. Gravity separation and sieving/physical separation are two well-developed processes that have long been primary methods for treating municipal wastewaters. Magnetic separation, on the other hand, is a much newer separation process that is still being tested.	No	This technology is not retained for further evaluation because the contamination levels in soil do not require treatment prior to disposal.
		Solidification / Stabilization	Ex situ S/S contaminants are physically bound or enclosed within a stabilized mass (solidification), or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization). Ex situ S/S, however, typically requires disposal of the resultant materials.	No	This technology is not retained for further evaluation because the contamination levels in soil do not require treatment prior to disposal.
		Thermal Treatment	The process involves raising the temperature of the contaminated equipment or material to 260°C (500°F) for a specified period of time. The gas effluent from the material is treated in an afterburner system to destroy all volatilized contaminants. The method eliminates a waste that currently is stockpiled and requires disposal as a hazardous material. This method will permit reuse or disposal of scrap as nonhazardous material.	No	This technology is not retained for further evaluation because the contamination levels in soil do not require treatment prior to disposal.



# APPENDIX I

APPLICABLE OR RELEVANT AND APPROPRIATE LAWS  
AND REGULATIONS



# APPENDIX I

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## APPLICABLE OR RELEVANT AND APPROPRIATE LAWS AND REGULATIONS—OFF-PROPERTY PORTION



# 1 INTRODUCTION

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Washington Administrative Code (WAC) 173-340-710 states that cleanup actions conducted under the Model Toxics Control Act (MTCA) shall comply with applicable state and federal laws. This WAC section also addresses relevant and appropriate requirements, substantive (as opposed to procedural) requirements, and local government permits and approvals. This appendix summarizes the analysis completed to ensure conformance with WAC 173-340 710.

## 1.1 EXEMPTIONS FOR REMEDIAL ACTIONS

MTCA exempts persons conducting a remedial action at a facility, under a consent decree, order, or agreed order, from the procedural requirements of Chapters 70.94 (Air), 70.95 (Solid Waste), 70.105 (Hazardous Waste), 75.20 (Hydraulic Permit), 90.48 (Water Quality), and 90.58 (Shorelands) of the Revised Code of Washington (RCW), and the procedural requirements of any laws requiring or authorizing local government permits or approvals for the remedial action. This exemption does not apply to independent actions.

The Washington State Department of Ecology (Ecology) is required to ensure compliance with the substantive provisions of Chapters 70.94, 70.95, 70.105, 75.20, 90.48, and 90.58 RCW, and the substantive provisions for laws requiring or authorizing local government permits or approvals. Ecology makes the final decision regarding which substantive provisions are applicable. Under policy and procedure directive 130B, Ecology describes how compliance will be assured and these exemptions will be implemented.

The remedial action will be conducted in accordance with an amended order or consent decree. Therefore, an evaluation of the allowed exemptions to the laws, regulations, and rules will be conducted during the design phase. The remedial action will be developed to ensure conformance with the substantive provisions of these laws, regulations, and rules.

## 2 SUMMARY OF GENERALLY APPLICABLE OR RELEVANT AND APPROPRIATE FEDERAL LAWS AND REGULATIONS

---

Remediation at the off-property portion (OPP) of the Port site will be subject to the variety of federal laws and regulations that govern site cleanup. The applicable or relevant and appropriate requirements (ARARs) are discussed below.

## 2.1 Clean Water Act

The Federal Water Pollution Control Act (FWPCA) Amendments of 1972, commonly referred to as the Clean Water Act (CWA), set forth a number of provisions that require the development of regulations to protect the nation's waters. Section 402 of the CWA requires the development of comprehensive programs for preventing, reducing, or eliminating pollution in the nation's waterways. National Pollutant Discharge Elimination System (NPDES) requirements are specified in Section 402. This program has been delegated to the State of Washington (see Section 3.4).

The objective of the CWA (33 U.S. Code [USC] 1251-1376 and 40 Code of Federal Regulations [CFR] 129 and 131) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Sections 303 and 304 of the CWA require the U.S. Environmental Protection Agency (USEPA) to issue ambient surface water quality criteria for the protection of aquatic life and human health. The federal water quality criteria (FWQC), as specified in 40 CFR 131, are non-enforceable guidelines to be used by states to set water quality standards for surface water. FWQC, based on chronic and acute effects to aquatic life, have been developed for 120 priority toxic pollutants and 45 non-priority pollutants for marine waters and freshwater.

### *Effect on Design:*

During construction, water will be directed through erosion- and sediment-control features to meet any water quality standards. There should be no releases of water to the surrounding waterways associated with the upland off-property work. Any water discharged to Carty Lake or Lake River will be required to meet the FWQC. The State of Washington has been delegated as the authority to implement the CWA and has rules and regulations corresponding to all of those stated in the CWA. Therefore, for the Port, any discharges to surface water will be managed under the state program.

## 2.2 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918 makes it unlawful to kill or harass migratory birds by any means unless permitted by regulations. Furthermore, the MBTA requires that identified ecosystems of special importance to migratory birds be protected against pollution, detrimental alterations, and other environmental degradations.

### *Effect on Design:*

Implementing the remedial action in conformance with MTCA will protect wildlife, including migratory birds. Consequently, no additional actions are needed to conform to the MBTA.

## 2.3 The Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was initially passed by Congress in 1974 and then amended in 1986. The SDWA establishes maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs) for the protection of the nation's public water systems. The USEPA has established MCLs in 40 CFR Part 141 as the maximum permissible concentrations of specific

contaminants in water that is delivered to any user of a public water system. While non-enforceable, MCLGs represent the maximum level beyond which persons drinking the water may experience adverse effects.

Under the SDWA amendments, the USEPA is required, every three years, to develop a list of contaminants that must be regulated in the form of MCLs or MCLGs. Those regulations must be finalized within a year of its proposal. In addition, the USEPA identifies contaminants that are under consideration for listing as MCLs, as well as contaminants that are under consideration for modification of the MCL concentration.

The State of Washington has authorization from the USEPA to administer and enforce this act. Although the state has developed, and continues to develop state-specific MCLs and MCLGs, it incorporates the federal standards by reference.

*Effect on Design:*

The OPP remedial action will have no effect on groundwater or any other water source used as drinking water.

## 2.4 Natural Resource Damages

The Natural Resource Damage provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Oil Pollution Act of 1990, and the CWA allow natural-resource trustees to assess damages for losses arising from injury to public natural resources caused by the release of oil or hazardous substances. The 43 CFR 11.62 provides the definitions of what constitutes an injury to a natural resource, particularly the definitions of injury to surface-water resources, groundwater resources, air resources, geologic resources, and biological resources. The definition of injury either must be met, or will likely be met, for natural resource damages to be included for a given facility or property.

Once natural resource damages have been established by federal, state, or Native American Tribe trustees, the responsible party must take actions to restore the damaged resource. These actions can either take the form of cash payment to a trustee, or the responsible party can undertake its own restoration projects, or both.

*Effect on Design:*

Consistent with MTCA, the remedial design will establish means and methods to ensure that the remedial action minimizes short-term risks during implementation. Consequently, natural resource damages caused by remedial action implementation will be avoided.

## 2.5 National Pretreatment Standards for Discharges to a Publicly Owned Sewer System

In general, the discharge of wastewater to publicly owned treatment works is considered an off-site activity. Requirements of the National Pretreatment Program include general and specific discharge prohibitions (40 CFR 403).

### *Effect on Design:*

There will be no discharge to a publicly owned sewer system as part of the remedial action; therefore, this requirement is not applicable.

## 2.6 Identification and Listing of Hazardous Waste and Standards for Generators

The Solid Waste Disposal Act (42 USC 6921 Subtitle C) incorporated under the federal Resource Conservation and Recovery Act (RCRA, 40 CFR § 260 through 266) contains requirements for “cradle to grave” management of materials that meet the RCRA definition of hazardous waste. These requirements may apply to waste generated during a remedial action.

RCRA defines hazardous waste as either waste specifically listed in 40 CFR § 261 Subpart D or waste exhibiting one of four hazardous characteristics: ignitability, corrosivity, reactivity, or toxicity, as determined by the toxicity characteristic leaching procedure (TCLP). Requirements to determine whether waste being generated is hazardous, whether by sampling and analysis or by process knowledge, are listed in 40 CFR § 262.11.

### *Effect on Design:*

The source of the material cannot be determined; therefore, under the guidelines provided by the USEPA, the dioxin-contaminated soil is not designated as hazardous waste, and this requirement is not applicable.

## 2.7 Treatment, Storage, and Disposal Facility Standards

The Solid Waste Disposal Act (42 USC 6921 Subtitle C) incorporated under RCRA (40 CFR § 264) provides design standards for treatment, storage, and disposal (TSD) facilities. The TSD requirements for hazardous waste are normally associated with facilities applying for, or having received, a RCRA permit.

### *Effect on Design:*

No treatment of the material is associated with the remedial action. Material will be disposed of off-site at a Subtitle D landfill facility with an existing permit. This requirement is not applicable.

## 2.8 Land-Disposal Restrictions

LDRs for RCRA wastes characterized as toxic (40 CFR § 268) require that the waste be treated to specified concentrations before placement in a land-based unit. LDRs would apply to wastes removed from the site that exceed treatment standards for waste codes or that fail a TCLP analysis.

### *Effect on Design:*

No waste characterized as toxic under RCRA is known to be present on site; this requirement is not applicable.

## 2.9 U.S. Department of Transportation Hazardous Materials Regulations

The U.S. Department of Transportation has published regulations, including requirements regarding communications and emergency response, shipping, and packaging (40 CFR 171 through 180), that govern the transportation of hazardous materials to or from the site.

The provisions of 40 CFR § 263 establish minimum standards that apply to persons transporting hazardous waste by air or water.

### *Effect on Design:*

The remedial action does not involve the off-site transportation of hazardous waste; this requirement is not applicable.

## 2.10 National Ambient Air Quality Standards Attainment Area

The USEPA has established national ambient air quality standards (NAAQS) for a variety of potentially airborne substances known as criteria pollutants. NAAQS are ARARs for any conditions at a site that may result in emissions to the air of any listed criteria pollutant. Criteria pollutants include carbon monoxide, nitrogen dioxide, ozone, lead, particulates smaller than 10 micrometers, and sulfur dioxide.

### *Effect on Design:*

The selected remedial alternative involves soil handling and excavation. The air emissions generated by handling soil at the site are subject to applicable air-quality standards to control or prevent the emission of air contaminants. Based on the contaminants present at the site, the applicable criteria pollutant would be particulate matter (dust).

## 2.11 Occupational Safety and Health Administration

Federal Occupational Safety and Health Administration (OSHA) regulations pertaining to hazardous waste sites are addressed under 29 CFR 1910.120, the Hazardous Waste Operations and Emergency



Response Standard. This standard applies to cleanup and corrective actions, as well as to operations involving hazardous waste, that are conducted at a permitted TSD facility, unless the employer can demonstrate that the operations do not involve employee exposure or the reasonable possibility of employee exposure to safety or health hazards.

*Effect on Design:*

All work will be performed under a site health and safety plan in conformance with applicable federal and state OSHA regulations.

## 2.12 Cultural Resources

The federal Antiquities Act (1906) laid out penalties for the unauthorized excavation of archaeological sites, granted the president the authority to designate national monuments, and authorized the managers of federal lands to grant permits for examinations of archaeological resources. The law granted the government the authority not only to declare landmarks on federal lands but also to receive “relinquished” segments of private land. Permits for “examination, excavation, and gathering...of objects of an antiquity” are to be granted by the secretaries of the interior, agriculture, and army only to organizations conducting work to expand the knowledge of those objects and only so that they may be displayed in public museums 16 USC 431-433).

The 1966 National Historical Preservation Act (NHPA) states the importance of “historic heritage” to the nation, and spells out in general terms the federal government’s intentions to protect and administer cultural resources. Section 101 directs the secretary of the interior to establish the National Register of Historic Places (NRHP); to set rules and guidelines relating to nominations; to appoint state historic preservation officers and establish state preservation programs; to assist tribes in historic preservation and in designating tribal historic preservation officers; and to make traditional cultural properties eligible for listing. Section 106 has had a large impact on, and is central to, resource management. Section 106 requires that federal agencies that have any indirect or direct jurisdiction over undertakings that involve federal funds or federal licensing take into account the effect the undertaking will have on a resource that is listed, or that is potentially eligible for listing, on the NRHP. Agencies are required to allow the Advisory Council on Historic Preservation (ACHP) time to comment on the proposed undertakings. 36 CFR provides regulations regarding parks, forests, and public property; 36 CFR 60.4 outlines criteria used to evaluate the eligibility of a property for listing on the NRHP. Section 110 of the law makes it the specific responsibility of federal agencies to implement historic preservation plans, list eligible properties, appoint preservation officers, and generally comply with the NHPA for properties under the agencies’ management. In other sections the law generally mandates federal agencies to protect, list on the NRHP, manage, and identify properties, and to assist and consult with other agencies and private groups on resource management. In Title II it establishes the ACHP and empowers it to implement NHPA regulations.

The 1978 American Indian Religious Freedom Act made it the policy of the U.S. government and federal agencies to “...protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions....” This protection is centered on religious practice but encompasses and recognizes the importance of place and objects. The act requires

federal agencies to consult with traditional religious leaders on potential impacts to rights and practices (42 USC 1996).

The 1979 Archaeological Resources Protection Act (ARPA) defines archaeological resources and stipulates that the act applies to resources more than 100 years old; furthermore, it strengthens the permit process for work on these resources on federal and Indian lands. Permits granted under this law for work that may disturb archaeological resources are subject to review by tribes “which may consider the site as having religious or cultural importance” 16 USC 470cc(c)). The law grants the secretary of the interior authority to develop regulations regarding the exchange and curation of excavated materials and encourages the coordination of efforts between federal agencies and private individuals with archaeological collections. 43 CFR 7.9 outlines permit requirements, including an agreement about the final disposition of collected artifacts. It also criminalizes the removal of resources without a permit, specifies criminal and civil penalties for doing so, and exempts the disclosure of the location of archaeological resources from the public record (16 USC 470aa-470mm). 32 CFR 229 provides the regulations, definitions, and standards for implementation of ARPA.

The 1990 Native American Graves Protection and Repatriation Act deals with the disposition of indigenous tribal cultural items recovered on tribal or federal lands. It defines and addresses human remains, funerary goods, sacred objects, and objects of cultural patrimony, which are referred to as cultural items, and specifies the return of those objects to lineal descendants of the individual or tribe on whose land the items were recovered. The act further outlines the process by which permits are granted (under the ARPA framework) for excavation of described cultural items.

36 CFR 79 (Curation of Federally Owned and Administered Archeological Collections) was codified in 1990 to “...establish definitions, standards, procedures and guidelines to be followed by Federal agencies to preserve collections of prehistoric and historic material remains, and associated records...” as stipulated in the Antiquities Act, the Reservoir Salvage Act, the NHPA, and ARPA (36 CFR 79.1). This complicated set of regulations lays out many guidelines on the care and management of existing and future collections of archaeological material.

State-funded capital construction projects, with no federal funding or permits, must comply with the Governor's Executive Order 05-05 (GEO 05-05). GEO 05-05 requires a similar cultural resources review process to section 106.

*Effect on Design:*

Systematic archaeological surveys have been conducted to determine if archaeological resources are present at the OPP. The remedial action will be conducted consistent with a cultural resources monitoring and inadvertent discovery plan to address any archaeological discoveries made during the proposed action.

# 3 SUMMARY OF GENERALLY APPLICABLE OR RELEVANT AND APPROPRIATE WASHINGTON STATE LAWS AND REGULATIONS

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The following state laws, regulations, and local requirements were determined to be ARARs.

## 3.1 Model Toxics Control Act

In Washington State, MTCA governs the investigation and cleanup of contaminated sites (Chapter 70.105D RCW). A contaminant is defined by MTCA 173-340-200 as any hazardous substance that does not occur naturally or that occurs at concentrations greater than natural levels.

MTCA became effective in March 1989 and was enacted through a voter-initiative process. The MTCA cleanup regulation, cited under Chapter 173 340 WAC, was amended in February 2001. MTCA contains provisions controlling site cleanup activities, including site discovery, priority, listing, investigation, and cleanup; liability provisions; administrative options for remedial actions, payment of costs, and funding; public participation; cleanup standards; and other general provisions. The law regulates the cleanup of sites contaminated with CERCLA hazardous substances, all state and federal RCRA hazardous and dangerous wastes, and petroleum products.

### *Effect on Design:*

All elements of the remedial design and remedial action will comply with MTCA standards.

## 3.2 Water Quality Standards for Surface Waters and Ground Waters of the State

In Washington, water quality standards for surface waters of the state are promulgated under Chapter 173-201A WAC. The purpose of this chapter is to establish water quality standards for surface waters of Washington State that are consistent with public health and related public enjoyment, and with the propagation and protection of fish, shellfish, and wildlife, pursuant to the provisions of Chapter 90.48 RCW. The criteria listed in Chapter 173-201A WAC for surface water quality provide protective numbers for both freshwater and marine aquatic life regarding both acute and chronic exposure to toxic substances.

Water quality standards for groundwater are also promulgated under Chapter 173-200 WAC. This chapter implements the FWPCA and Chapters 90.48 and 90.54 of the RCW, as well as the federal Water Resources Act of 1971. Chapter 173-200 WAC applies to all groundwaters of the state that occur in a saturated zone, stratum beneath the land surface, or below a surface-water body. The water quality standards listed in Chapter 173-200 WAC apply to cleanup actions conducted under MTCA that involve potable groundwater.

*Effect on Design:*

No water will be generated during construction. Stormwater will be directed through erosion and sediment control best management practices to meet the water quality standards. In addition, state water quality standards are considered screening criteria.

### 3.3 Washington Dangerous Waste Regulations

Washington regulations identify RCRA F-listed and K-listed waste as dangerous waste (WAC 173-303-9904). Designated dangerous waste may be treated, stored, or disposed of at a permitted TSD facility.

*Effect on Design:*

Material generated on site will not be considered dangerous waste; this requirement is not applicable.

### 3.4 National Pollutant Discharge Elimination System Stormwater Permit Program

Chapter 173-220 WAC establishes a state permit program, applicable to the discharge of pollutants and other wastes and materials to the surface waters of the state, operating under state law as part of the NPDES created by Section 402 of the FWPCA. Permits issued under this chapter are intended to satisfy the requirements for discharge permits issued under both Section 402(b) of the FWPCA and Chapter 90.48 RCW.

*Effect on Design*

NPDES construction stormwater permits are required for construction sites of one acre or larger. The selected remedial action alternative will have a construction footprint greater than one acre. As the NPDES program is a federal program administered by the state, the MTCA exemption for state and local permits does not apply. The project will obtain coverage under the state's NPDES construction stormwater general permit for the proposed work. As the project involves the disturbance of soil with known contamination, the notice of intent for coverage under the NPDES general permit will include a description of this contamination.

### 3.5 Shoreline Management Act

The state Shoreline Management Act (SMA) (Chapter 173-22 WAC) regulates any action within 200 feet of the ordinary high-water mark of a shoreline. Shorelines in towns and cities are regulated by shoreline master programs (Chapter 173-26 WAC) adopted by local municipalities.

*Effect on Design:*

The proposed locations for remedial actions are outside the shoreline's jurisdiction; this requirement is not applicable.

## 3.6 Air Quality Standards

Chapters 173-400, -460, and -470 WAC establish provisions for general regulation of air pollution sources, ambient air quality standards, and acceptable levels for particulate matter, and stipulate requirements for new sources of toxic air pollutant emissions. These regulations may be applicable to cleanup actions at the site; for example, to control particulate emissions generated during soil excavation activities, or emissions resulting from air stripping or other groundwater treatment technologies. These standards are typically administered and enforced by the local clean air agency, which in this case would be the Southwest Clean Air Agency. Chapter 173-401 operating permits may be required for fugitive emissions from new sources. Emission standards for volatile organic compounds are set in Chapter 173-490.

### *Effect on Design:*

The remedial work includes soil handling. During soil-excavation activities, it may be necessary to implement engineering controls such as soil wetting to control particulate emissions. Air testing may be required to show that emissions meet the substantive requirements of applicable air quality permits and rules. If results illustrate that substantive requirements have not been met, the design will require modification.

## 3.7 Noise Regulations

Maximum environmental noise levels have been determined and are contained in Chapter 173-60 WAC. Approved procedures for measurement of environmental noise are contained in Chapter 173-58 WAC.

### *Effect on Design:*

During design, expected noise levels will be estimated and compared to the limitations established in 173-60 WAC. The need to adjust the approach to meet these requirements will be determined. For example, the noise level regulations may limit the hours of operation for some parts of the remedial action. Construction equipment may be required to be outfitted with additional noise-minimizing equipment (larger or additional mufflers, etc.).

## 3.8 State Environmental Policy Act

The State of Washington administers and enforces a program equivalent to the federal National Environmental Policy Act. The State Environmental Policy Act (SEPA), contained in Chapter 43.21C RCW, provides the framework for agencies to consider the environmental consequences of a proposal before taking action. It also gives agencies the ability to condition or deny a proposal because of identified likely significant adverse impacts. The act is implemented through the SEPA Rules and Procedures, Chapters 197-11 and 173-802 WAC, respectively.

SEPA review is a comprehensive assessment of potential environmental, economic, and cultural impacts from a specific development project or a proposed policy, plan, or program. The SEPA

review process requires the preparation of an environmental checklist, which may be achieved by review of the environmental impacts and proposal of mitigation measures. The completed checklist helps to identify potential environmental impacts associated with the proposed action. Following a threshold determination, the lead agency will issue either a Determination of Non-Significance that will allow the action or permitting process to continue, or a Determination of Significance that will require that an environmental impact statement (EIS) be prepared before agency action can be taken. Typically, one checklist or EIS is required for a project, although it may require modification or application of numerous permits by federal, state, or local agencies.

*Effect on Design:*

SEPA review will be conducted for the project design. The Port or Ecology can act as the lead agency for SEPA review. The Port will prepare a SEPA checklist to be reviewed during Ecology's evaluation of the project design.

### 3.9 Washington Industrial Safety and Health Administration

Washington Industrial Safety and Health Administration (WISHA) regulations pertaining to hazardous waste sites are addressed under WAC 296-843, Hazardous Waste Operations. This standard applies to cleanup and corrective actions at MTCA-regulated sites.

*Effect on Design:*

All work will be performed under a site health and safety plan in conformance with the applicable WISHA regulations.

## 4 LOCAL REQUIREMENTS

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### 4.1 Shoreline Master Program

A cleanup action or “substantial development” conducted along any shoreline of statewide significance in the city of Ridgefield is regulated under the Shoreline Master Program (Chapter 18.820 of the Ridgefield Municipal Code [RMC]). A Substantial Development Permit (SDP) is required for such an action. In 2012, the City of Ridgefield adopted an updated Shoreline Master Program.

*Effect on Design:*

The proposed locations for remedial actions are outside the shoreline jurisdiction.

## 4.2 City of Ridgefield Critical Areas Ordinance

The City of Ridgefield Critical Areas Ordinance designates and regulates projects that may impact ecologically sensitive areas, including wetlands, fish and wildlife habitat conservation areas, or geophysical hazards such as geologically hazardous areas and frequently flooded areas (RMC 18.280.120).

### *Effect on Design:*

The off-property remedial action area is part of a category 2 critical aquifer recharge area. The off-property remedial action area is also identified as having a low to moderate liquefaction susceptibility, as indicated on the Alternative Liquefaction Susceptibility Map of Clark County, Washington. Relative to these items, the remedial design will meet the substantive requirements of the critical areas ordinance.

## 4.3 Street Tree Program

Work adjacent to street trees is regulated under Section 12.12 of the RMC. The RMC requires a permit for excavation within the drip line of any street tree and for the removal of any street tree. As a condition to the granting of a street tree permit, the director may require the applicant to relocate or replace trees. If a tree is interfering with the use of any utility that has been granted a franchise by the city of Ridgefield, it is required that notice of removal and/or excavation within the dripline be given to the director, but a permit is not required.

### *Effect on Design:*

Removal and work within the drip line of street trees will meet the substantive requirements of the street tree program. Street trees will be protected during the proposed work; excavation near street trees will be conducted under the oversight of a certified arborist.

## 4.4 Street/Right-of-Way Excavation Permit

Excavations within the city of Ridgefield rights-of-way are regulated under Section 12.15 of the RMC. An excavation permit is required for work that involves disturbing the surface of any street, alley, sidewalk, curb, drainage-way, or other structure within city right-of-way. Standards for work within the city rights-of-way are described in the City of Ridgefield Engineering Standards for Public Works Construction.

### *Effect on Design:*

Work within city rights-of-way will be completed consistent with the substantive requirements of the applicable sections of the City of Ridgefield Engineering Standards for Public Works Construction.



# APPENDIX J

## COST ESTIMATES



# APPENDIX J COST ESTIMATES

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J-1 PROPERTY COST ESTIMATE

J-2 ROW COST ESTIMATE

**Appendix J-1  
Property Cost Estimate  
Former PWT Site  
Ridgefield, Washington**



Item No.	Item	Units	No. of Units	Unit Cost	Cost
<b>1.0 Public Outreach, Design, Permitting, Construction Oversight, and Completion Reporting</b>					
1.1	Design Sampling	LS	1	\$ 2,500	\$ 2,500
1.2	Public Outreach, Engineering Design, and Permitting	LS	1	\$ 120,000	\$ 120,000
1.3	Construction Administration and Oversight	LS	1	\$ 100,000	\$ 100,000
1.4	Completion Reporting	LS	1	\$ 13,333	\$ 13,333
<b>Total Public Outreach, Design, Permitting, Construction Oversight, and Completion Reporting Cost</b>					<b>\$ 235,833</b>
<b>2.0 Remedy Construction</b>					
2.1	Mobilization	LS	1	\$ 193,333	\$ 193,333
2.2	Temporary Facilities and Controls	LS	1	\$ 18,000	\$ 18,000
2.3	Progress and Construction Surveying	LS	1	\$ 66,933	\$ 66,933
2.4	Temporary Erosion and Sediment Control	LS	1	\$ 22,000	\$ 22,000
2.5	Demolition and Salvage	LS	1	\$ 9,467	\$ 9,467
2.6	Clearing and Grubbing	LS	1	\$ 12,000	\$ 12,000
2.7	Tree and Stump Removal	LS	1	\$ 10,000	\$ 10,000
2.8	Excavation of Contaminated Soil	CY	2,744	\$ 52	\$ 142,688
2.9	Excavation of Contaminated Soil (Restricted Access)	CY	457	\$ 177	\$ 80,889
2.10	Contaminated Soil Transport and Disposal	Ton	4,802	\$ 53	\$ 254,506
2.11	Acquisition and Placement of Topsoil	Ton	4,802	\$ 88	\$ 422,576
2.12	Sod	SY	10,975	\$ 13.0	\$ 142,675
2.13	Plant Material	LS	1	\$ 20,000	\$ 20,000
2.14	Landscape Maintenance	LS	1	\$ 21,333	\$ 21,333
<b>Total Construction Cost</b>					<b>\$ 1,416,401</b>
<b>Subtotal</b>					<b>\$ 1,652,234</b>
<b>Tax</b>				<b>8.40%</b>	<b>\$ 138,788</b>
<b>Contingency</b>				<b>30%</b>	<b>\$ 495,670</b>
<b>TOTAL COST ESTIMATE, INCLUDING 30% CONTINGENCY</b>					<b>\$ 2,286,692</b>

**Appendix J-1  
Property Cost Estimate  
Former PWT Site  
Ridgefield, Washington**



ASSUMPTIONS:

1. Unit costs based on costs of Phase 1 work.
2. Excavation areas approximated from aerial imagery.
3. Excavation depth assumed to be 1 foot; excavation depth in restricted access areas assumed to be 0.5 feet.
4. In situ soil density assumed to be 1.5 cy/ton.

NOTES:

CY = cubic yard.

EA = each.

LF = lineal foot.

LS = lump sum.

SY = square yard.

**Appendix J-2  
ROW Cost Estimate  
Former PWT Site  
Ridgefield, Washington**



Item No.	Item	Units	No. of Units	Unit Cost	Cost
<b>1.0 Design, Permitting, Construction Oversight, and Completion Reporting</b>					
1.1	Design Sampling	LS	1	\$ 2,500	\$ 2,500
1.2	Engineering Design and Permitting	LS	1	\$ 30,000	\$ 30,000
1.3	Construction Administration and Oversight	LS	1	\$ 50,000	\$ 50,000
1.4	Completion Reporting	LS	1	\$ 6,667	\$ 6,667
<b>Total Design, Permitting, Construction Oversight, and Completion Reporting Cost</b>					<b>\$ 89,167</b>
<b>2.0 Remedy Construction</b>					
2.1	Mobilization	LS	1	\$ 96,667	\$ 96,667
2.2	Temporary Facilities and Controls	LS	1	\$ 9,000	\$ 9,000
2.3	Progress and Construction Surveying	LS	1	\$ 33,467	\$ 33,467
2.4	Temporary Erosion and Sediment Control	LS	1	\$ 11,000	\$ 11,000
2.5	Demolition and Salvage	LS	1	\$ 4,733	\$ 4,733
2.6	Clearing and Grubbing	LS	1	\$ 6,000	\$ 6,000
2.7	Tree and Stump Removal	LS	1	\$ 5,000	\$ 5,000
2.8	Excavation of Contaminated Soil	CY	2,660	\$ 52	\$ 138,320
2.9	Excavation of Contaminated Soil (Restricted Access)	CY	296	\$ 177	\$ 52,392
2.1	Contaminated Soil Transport and Disposal	Ton	4,434	\$ 53	\$ 235,002
2.11	Acquisition and Placement of Topsoil	Ton	4,434	\$ 88	\$ 390,192
2.12	Sod	SY	7,094	\$ 13	\$ 92,222
2.13	Landscape Maintenance	LS	1	\$ 8,000	\$ 8,000
<b>Total Construction Cost</b>					<b>\$ 1,081,995</b>
<b>Subtotal</b>					<b>\$ 1,171,161</b>
<b>Tax</b>				<b>8.40%</b>	<b>\$ 98,378</b>
<b>Contingency</b>				<b>30%</b>	<b>\$ 351,348</b>
<b>TOTAL COST ESTIMATE, INCLUDING 30% CONTINGENCY</b>					<b>\$ 1,620,887</b>
ASSUMPTIONS:					
1. Unit costs based on costs of Phase 1 work.					
2. Excavation areas approximated from aerial imagery.					
3. Excavation depth assumed to be 1.5 feet; excavation depth in restricted access areas assumed to be 0.5 feet.					
4. In situ soil density assumed to be 1.5 cy/ton.					
NOTES:					
CY = cubic yard.					
LS = lump sum.					
SY = square yard.					

# APPENDIX K

## WASTE DESIGNATION





**STATE OF WASHINGTON**  
**DEPARTMENT OF ECOLOGY**  
2108 Grand Boulevard ▪ Vancouver, Washington 98661-4622 ▪ (360) 690-7171

January 30, 2013

Mr. Brent Grening  
Executive Director  
Port of Ridgefield  
Post Office Box 55  
Ridgefield, WA 98642

Re: Approval of January 29, 2013, *Upland Off-Property Dioxin Waste Designation Former Pacific Wood Treating Site, Ridgefield Washington* Memorandum, prepared by Maul, Foster, Alongi, Inc.  
Ecology Facility Site Identification #1019

Dear Mr. Grening:

This letter provides the Port of Ridgefield (Port) with the Washington State Department of Ecology's (Ecology) written approval of the above-referenced memorandum. Approval of project documentation by this agency is required by Agreed Order Number 01TCPSR-3119 executed by Ecology and the Port of Ridgefield for cleanup efforts at the former Pacific Wood Treating (PWT) Corporation facility and surrounding environs.

If you have any questions or care to discuss items in this letter, please contact me by telephone at (360) 690-4795 or by e-mail at [cran461@ecy.wa.gov](mailto:cran461@ecy.wa.gov).

Sincerely,

Craig Rankine, RG, LHG  
Site Manager/Hydrogeologist  
Toxic Cleanup Program  
Vancouver Field Office

lc/CR

cc: Laurie Olin, Port of Ridgefield, Ridgefield, WA  
Steven Taylor and Alan Hughes Maul Foster & Alongi Inc., Vancouver, WA  
Madi Novak, Maul Foster & Alongi Inc., Portland, OR  
Cindy Donnerberg, CH2MHill, Portland, OR  
James DeMay, Ecology Southwest Regional Office, Lacey, WA



Ecology Southwest Regional Office Records Center, Lacey, WA

Via e-mail



## MEMORANDUM

To: Craig Rankine Date: January 29, 2013  
From: Madi Novak *Madi Novak* Project: 9003.01.39  
Steve Taylor, PE *Steve Taylor*  
RE: Upland Off-Property Dioxin Waste Designation  
Former Pacific Wood Treating Site, Ridgefield, Washington  
Agreed Order No. 01TCPSR-3119

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On behalf of the Port of Ridgefield (Port), Maul Foster & Alongi, Inc. (MFA) prepared this memorandum to determine whether soils located off-property of the Lake River Industrial Site (LRIS) in Ridgefield, Washington contain listed waste (see Figure 1).

The LRIS is the location of the former Pacific Wood Treating Corporation (PWT) facility where historical operations primarily involved pressure-treating wood products with oil-based treatment solutions containing creosote, pentachlorophenol (PCP), and water-based mixtures of copper, chromium, arsenic, and/or zinc. The F032, F034 and F035 waste codes have been applied to soils on the LRIS property because of known releases from the PWT operations. Soils in the LRIS are contaminated with dibenzo-p-dioxins and furans (collectively referred to as dioxins). Sources of dioxins may have included spent formulations from wood preserving processes, combustion of waste by PWT and a previous shingle mill, combustion of fuels at the facility, and by trucks and trains traveling adjacent to the facility and to the offsite properties. The shingle mill referenced above was located at the northern end McCuddy Marina Property seen on Figure 1.

Soils located off property of the LRIS in the adjoining residential neighborhood and McCuddy's Marina parking area (i.e., off-property area) are also contaminated with dioxins. Locations where dioxins were found in off-property soil can be seen on the attached Figure 1. (Soil sample results can be seen in *Supplemental Soil Sampling Results* reports from 2010 to present and the *Former Pacific Wood Treating Remedial Investigation and Feasibility Study* report prepared by MFA.) Several soil sampling events have been conducted in the upland off-property areas adjacent to the LRIS. Samples were analyzed for wood treating and related compounds found at the LRIS, including analytes listed in the lead paragraph above. The wood treating compounds PCP, polycyclic aromatic hydrocarbons (PAHs), and metals in off-property soils were absent or found at reduced concentrations compared to those on the LRIS.

Sources of off-property dioxins are the same as those listed above for the LRIS, with the exception of coming from spent formulations from the wood preserving process. There is no reason to expect wood treating compounds in off-property soil because no wood treating operations have been conducted and no wood treating compounds have been stored in any off-property locations. There are no historical records of a release from PWT's operations to surrounding properties that would result in the determination that the off-property soils contain listed hazardous waste, specifically the F032, F034 and F035 listings that are assigned to *wastewater, process residuals, preservative drippage, and spent formulations from wood preserving processes that used chlorophenolic formulations, creosote or arsenic based treating solutions respectively.*

A dioxin source evaluation was done using a principal component analysis documented in the May 17, 2010 *Supplemental Soil Sampling Results* report prepared by MFA. Dioxin signatures of the off-property samples are similar to each other just as the on-site samples are similar to each other. However, the off-property samples are slightly different from the LRIS sample signatures. A definitive source determination could not be made based only on a relative congener ratios for the off-site samples.

The soil sample results have also been reviewed for possible designation as a characteristic hazardous waste or a Washington state-only dangerous waste Per WAC 173-303-100 Dangerous Waste Criteria. The concentration of dioxins, PAHs and halogenated organic compounds (HOCs) were reviewed in accordance with the WAC 173-303-100 requirements as follows:

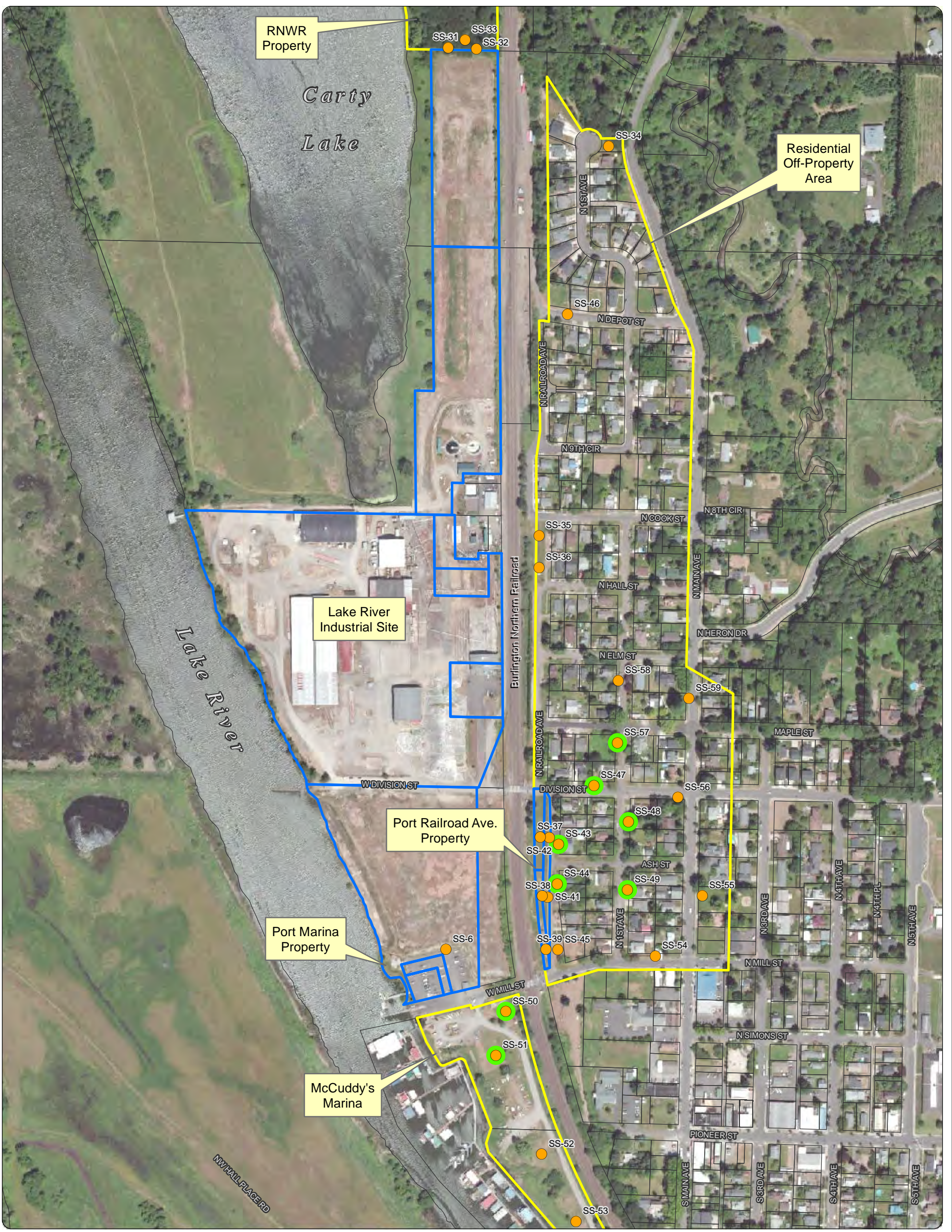
Toxic Dangerous Wastes - The equivalent concentration for the toxic constituents (metals, PAHs, HOCs, and dioxins) is below the 0.001 percent threshold in WAC 173-303-100(5), and the material does not designate as a state-only toxic waste.

Persistent Dangerous Wastes - PAHs, HOCs, and dioxins are below the 0.01 percent threshold for characterizing a material as a persistent dangerous waste as described in WAC 173-303-100(6).

Based on the above review, the soil to be generated during the off-property remedial action would not designate as a Washington state-only dangerous waste.

Given this historical and analytical information, the F032, F034 and F035 listed hazardous waste codes are not applicable to the soil that could be generated during any future remedial action in the off-property area.



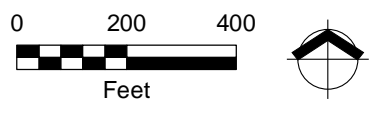


Source: Aerial photograph obtained from ESRI, Inc. ArcGIS Online/Bing Maps

- Notes:**
1. EIC = ecological indicator concentration
  2. TEQ = Toxicity Equivalent
  3. ng/kg = nanograms per kilogram

- Legend**
- Surface Soil Sample Locations
  - Composite Sample Locations
  - Port-owned Properties
  - Off-Property Study Area
  - Tax Lots

**Figure 1**  
**Soil Sample Locations**  
 Ridgefield, Washington





# APPENDIX L

## CULTURAL RESOURCES





## **TECHNICAL MEMORANDUM**

Cultural Resources Survey for the Port of Ridgefield's  
Ridgefield Upland Cleanup Project, Clark County, Washington

Daniel M. Gilmour, Breanne Taylor, Paul Solimano, and David V. Ellis

April 7, 2106

### **Management Summary**

Willamette Cultural Resources Associates, Ltd. (WillametteCRA) has conducted an archaeological survey for the proposed Ridgefield Upland Cleanup Project, in Ridgefield, Clark County, Washington. The investigation conducted by WillametteCRA consisted of a pedestrian survey and excavation of 49 shovel probes on 17 privately owned parcels in a residential neighborhood. Archaeologists identified no archaeological resources within those properties. There are no previously known archaeological sites within the project area.

### **Introduction**

The Port of Ridgefield (Port) previously completed the Lake River Industrial Site (LRIS) Remediation Project to cleanup hazardous substances deposited by a former wood treatment facility (Goodwin and Paraso 2014). The Port has now proposed the Ridgefield Upland Cleanup Project (project) to remediate contamination from LRIS in public rights-of-way (ROW) and on residential properties in the city of Ridgefield, Clark County, Washington. The contaminated area is situated in Donation Land Claims 38 and 48, of Township 4 North, Range 1 West, Willamette Meridian (Figures 1 and 2). The Port contracted Maul Foster & Alongi, Inc. (MFA), to conduct the remediation program. The project requires a permit under the state of Washington's State Environmental Policy Act (SEPA). SEPA requires a project proponent to consider potential impacts to archaeological, historic, and cultural resources. To address the provisions of SEPA, MFA contracted WillametteCRA to conduct an archaeological survey of the project area on behalf of the Port.

Forty-two residential lots were initially identified as locations of concern from contamination. MFA was granted access to conduct sampling at all but two of those lots and determined 27 lots exceeded the threshold of acceptable levels of dioxin in the soils. These lots are now scheduled for

removal actions beginning the summer of 2016. At the time of fieldwork the proposed project planned the removal and replacement of 1-2 feet (ft.) (~35-61 centimeters [cm]) of contaminated soil from public ROWs (sidewalk strips) and 26 yards. However, the current project now proposes the removal and replacement of 1-1.5 ft. (~35-46 cm) of contaminated soil from public ROWs (sidewalk strips) and 27 yards (Figures 2-6). On behalf of WillametteCRA, MFA obtained access to 17 parcels for archaeological investigations. The survey area lies immediately north of Ridgefield business center. The northern and southern boundaries are Maple Street and Mill Street, while Railroad Avenue and North Main Street form the western and eastern boundaries, respectively (see Figure 2). Each of the properties surveyed is privately owned and residential in nature. All areas where soil removal will occur are landscaped with grass or gardens.

The project area overlooks the Columbia River floodplain. The general landform is a ridge between the deeply incised Gee Creek drainage to the east and the Columbia lowlands to the west. Project lands include three relatively distinct landform elements. The first is the relatively level, higher elevation terrace tread between about 50 and 75 ft. above mean sea level (amsl). The second is the moderate slope below the terrace, between 30 and 50 ft. amsl, while the third is the footslopes and back of the Columbia River floodplain below ca. 30 ft. in elevation. The break between the terrace tread and slope is not well defined. In some places, grading for house construction has obscured this topographic break. The lower break between the footslopes and Columbia River floodplain is likewise poorly defined and irregular, but roughly marked by the approximate location of the north-south running Burlington Northern Railroad tracks.

## **Environmental and Cultural Context**

### **Environmental Setting**

The proposed project is in the Portland Basin, a broad lowland formed where the Columbia River bisects the north-south Puget Trough. In their seminal archaeological work in the area, Ames et al. (1999) refer to the study area as the Wapato Valley. The Wapato Valley is the southern end of the Puget Trough that extends from southeast Alaska to the southern end of the Willamette Valley. The dominant geographic features of the Wapato Valley are the Columbia and Willamette rivers and their associated floodplain systems of lakes, sloughs, and wetlands. Two topographic areas exist in the Wapato Valley: the alluvial bottom lands along the shores of the Columbia River and the uplands. Three prime factors account for the surficial geomorphology of the area: late Pleistocene glacial outburst floods, eustatic sea level rise, and Holocene alluvial deposition.

The Wapato Valley falls into Franklin and Dyrness' "*Pinus-Quercus-Pseudotsuga*" zone. Along the rivers are riparian forests of black cottonwood (*Populus trichocarpa*), Oregon ash (*Fraxinus latifolia*), bigleaf maple (*Acer macrophyllum*), Oregon white oak (*Quercus garryana*), red alder (*Alnus rubra*), and ponderosa pine (*Pinus ponderosa*). Oak woodlands dominate the zone's forests and savannas. Riparian



communities and poorly drained areas generally host a variety of minor hardwood species (Franklin and Dyrness 1988:124-126). In addition, the Wapato Valley was home to a rich array of terrestrial and aquatic mammals, as well as fish and birds (Ames et al. 1999).

The proposed project lies in an area developed as a residential center. Prior to European American settlement of this area, the project area would have been part of a closed canopy forest similar to today's forests in undeveloped portions of western Washington. A mosaic of wetlands, marshes and small lakes spread across the general area from the Cascade foothills to the Columbia River floodplain (General Land Office [GLO] 1854a, 1854b; United States Geological Survey [USGS] 1940). The morphology of drainages has been altered by commercial, industrial, and residential development of the area during the historic period.

### **Native Peoples**

From historical accounts and ethnographic data, anthropologists have reconstructed that the project area lies within the traditional homeland of the Chinookan peoples. Upper Chinookans in the Portland area consisted of two groups, the Multnomah and the Clackamas. Multnomah villages were concentrated on Sauvie Island, along the Multnomah Channel, and along the northern bank of the Columbia River downstream of the mouth of the Willamette (French and French 1998:360-363; Silverstein 1990:533-535).

The extensive wetlands on the nearby Columbia River offered a bounty of plant resources. The most important of these was wapato, a plant that grows in shallow ponds and lakes, the tubers of which were a staple food and major trade item for Chinookans. Wapato was so abundant in the area and such an important resource for Native Peoples that Lewis and Clark termed the area "Wap-pa-too Valley," Sauvie Island "Wappâto Island," and the local Indians "Wap-pa-to Indians" (Moulton 1990:24, 484). The river floodplains also had extensive prairies that attracted deer and elk, and some of those grasslands also supported camas, the bulbs of which were another dietary staple.

Indirect contact with European Americans began to disrupt Native ways of life in the 1700s, including a smallpox epidemic in the late 1770s that may have killed a third of the population and recurring every 20 to 25 years afterwards (Boyd 1990). Native populations in the lower Columbia and Willamette valleys were further decimated by a malaria epidemic that killed 90 to 95 percent of the population between 1830 and 1834 (Boyd 1990).

The first major expansion of European American settlements began in the 1840s, as thousands of American settlers flooded into western Oregon and Washington. They met with minimal resistance from the Native groups that had been devastated by the epidemics. For a brief period during the 1840s, immigrants and Native populations lived uneasily side by side. By 1850, however,

the need to clear Indian title to the land to provide a legal basis for the land claims of American settlers led to a series of treaty negotiations beginning in 1851.

The first treaties were signed with the surviving Tribes on the lower Columbia River and the Willamette Valley but none included lands in the Lewis River drainage. All of these treaties would have established reservations in western Oregon and southwestern Washington. None of these treaties were ratified by Congress. Washington Territorial Governor Isaac Stevens attempted to negotiate a treaty with Native groups in southwestern Washington. The negotiations were unsuccessful and no treaty was ever signed with those groups. Some of the Chinookan people from this area were relocated to the Grand Ronde Reservation in 1856. Other Chinookans on the lower Columbia relocated to the Chehalis Reservation (Beckham 1990:180-181; Marino 1990:171). The Ridgefield area is also within the traditional use area of the Cowlitz Indian Tribe and the Chinook Nation.

### **Archaeological Context**

Archaeological survey and excavation is relatively widespread in the Portland Basin, but little of this data has been synthesized into coherent narratives. Research topics are not widely agreed upon; rather, nearly all local archaeological work has been geared towards detailed material description and site age. Exceptions occur (Ames 1994), but for the vast amount of data available, models of hunter-gatherer adaptive strategies, settlement patterns or land-use are largely non-existent.

A fairly fine-grained, chronological framework is available for the past 2,500 years of Portland Basin prehistory (Pettigrew 1981), which has been integrated into a longer, broad regional archaeological framework for the Northwest coast (Ames 1994; Ames and Maschner 1999). The last 6,000 years of Northwest Coast prehistory saw dramatic changes in Native lifeways including increased populations and density and appearance of different settlement patterns hinged on winter sedentism and increases in logistical mobility. These changes were largely enabled by development of complex food storage technology, resource diversification and intensification, and increased social complexity (Ames 1994; Ames and Maschner 1999).

The Early Pacific Period (ca. 5,500-3,500 before present [BP]) was characterized by a cooler and moister climate and sea level was still low along the Washington and Oregon coasts (Ames and Maschner 1999). Early Pacific sites are relatively rare in the Portland Basin lowlands, but more common in the uplands, particularly inland Clark County. Assemblages often contain broad-necked, large stemmed and side-notched points. Regionally, bone and antler tools increase in frequency and groundstone appears. Resource use was diverse, suggesting a broad-spectrum diet. Few special purpose camps are evident. Storage was likely practiced in a limited fashion throughout the Early Pacific; however, it did not become important until the end of the period (Ames and Maschner 1999). No evidence for plankhouses dating to the Early Pacific has been found in the Portland area.

By the beginning of the Middle Pacific Period (ca. 3,500-1,500 BP) the climate is similar to modern conditions and sea level is near current levels. The basic economic and technological traits observed at historic contact are often found (Wessen 1983:25). Square or rectangular plankhouses and villages appear elsewhere on the coast after about 3,500 BP, although the earliest houses in the Portland Basin are about 2,000 years old (Ames 1994). Site types are diverse and site frequency increases. After about 3,000 years ago, site frequency on the Columbia floodplain increases.

Most investigated sites in the region generally and the Portland Basin specifically, date to after about 1,500 years ago, the Late Pacific Period (ca. 1,500 to 100 BP). Site frequency increases dramatically, particularly on the lowlands (Ames 1994; Wessen 1983). Assemblages are thought to be diverse and contain small, triangular-shaped, narrow-stemmed projectile points. Several Late Pacific period sites in the Portland Basin have been investigated in some manner, with the best known dating to the past 800 years, including the Meier and Cathlapotle sites. Resource use appears diverse and intensive.

### **European American Development**

The first documented visit to the area by a European American occurred in 1792, when British Royal Navy Lieutenant William Broughton noted a “large indian village” (Cathlapotle) during his expedition along the Columbia. On November 4, 1805 and March 29, 1806, the Lewis and Clark Expedition camped just south of present-day Ridgefield, meeting with the Chinook Indians and exchanging goods (Kirk and Alexander 1990). The European American presence grew after 1811, with fur trappers employed by the Northwest Fur Company, Pacific Fur Company, and Hudson's Bay Company (HBC) moving through the general project vicinity as part of mobile trapping and trading expeditions.

The first European American settler in the Ridgefield area was Irish immigrant James Carty, who was an employee of the HBC at Fort Vancouver. In 1839, Carty built his home between a lake (now called Carty Lake) and Vancouver Slough (now called Lake River) in the southwest quarter of Section 13, approximately 1 kilometer (km) (0.6 mi.) northwest of the current project area (see Figure 1). His residence would have been in close proximity to the remaining Cathlapotle plank houses. Carty received a permit in 1851 to operate a ferry across Lake River and in turn early residents like Arthur Quigley and Frederick Shobert constructed rudimentary landings on their properties to accommodate the influx of steamers on the river (Caldbeck 2010).

European American settlement in the area increased in the 1850s, with passage of the Donation Land Act in 1850, which allowed a single man or a married couple who settled in Oregon Territory by December 1, 1850, up to 320 acres for an unmarried man and 640 acres for a couple. The portion of the project area north of Division Street, would have been a part of James Carty's 322 acre Donation Land Claim (DLC) (depicted as claim no. 48 on GLO maps) (BLM 2016; GLO 1863a,

1863b). The portion of the project area south of Division Street, would have been within the 319-acre DLC of Arthur and Jane Quigley (BLM 2016; GLO 1863a, 1863b). The Quigleys arrived to Ridgefield in 1852. Arthur Quigley established a residence that would have been 83 m (273 ft.) west of the project area. Additionally, Quigley constructed a mud landing on his property, adjacent to Lake River, approximately 0.5 km (0.3 mi.) to the northwest (GLO 1854a).

The earliest depictions of structural developments within the project area come from Sanborn Insurance Maps from 1920. The 1920 Sanborn map of the project area depicts several individual developments within proposed clean-up areas, consisting of: 14 dwellings, 7 auto garages, 3 sheds, 1 privy, and 1 structure labeled "Board'g," which indicates a boarding house (Sanborn Map and Publishing Company 1920). The location of the privy is depicted in Figure 7. Commercial developments within the project area that are depicted on the 1920 Sanborn map consist of: a Creamery, Cheese Factory with lodgings on the second floor, and the Ridgefield Hotel, though none still exist.

Published a decade later, the 1920-1930 Sanborn Insurance Map depicts some changes within the project area, including the destruction of the Ridgefield Hotel and Creamery, however, the Cheese Factory is still depicted. Additional structural developments within proposed clean-up areas include: 2 more dwellings (one of which was constructed and one of which is the re-labeled boarding house from the 1920 map) and another auto garage. Shed structures in the area decrease to 2 (Sanborn Map and Publishing Company 1920-1930).

From the 1910's to 1950's, grist mills provided the dominant industry in Ridgefield, employing much of the town's population. Over the years, several of these mills caught fire. The town witnessed major fires in 1916, 1923, 1927, 1934, and 1943. The 1916 fire obliterated most of the Ridgefield business district (Caldbeck 2010). It is difficult to determine precisely what effect these disasters would have had on the current project area. A review of Metsker maps from the mid-20<sup>th</sup> century shows that the project area would have been partially within the "Railroad Addition" and partially within the "Abrams Addition." While no information about individual owners in the project area is decipherable from these maps, William Carty (the great nephew of James Carty) owned much of the land to the northwest of the current project area (Metsker 1956, 1961). By 1954, a total of 29 structures are depicted in the current project area (USGS 1954). At this time, several commercial structures are depicted to the south, indicating the growth of the Ridgefield city center. The 1954 USGS map depicts Interstate 5 to the east, which would have been completed in 1965.

### **Previous Archaeology**

The Ridgefield project area has a high probability for archaeological materials. The area is within the high probability zone as defined by the Department of Archaeology and Historic Preservation (DAHP) predictive model. In order to assess the project's potential to intersect

unidentified archaeological materials, WillametteCRA staff reviewed records on file with the DAHP and at the WillametteCRA offices. The project area has not been previously surveyed for archaeological materials, although several surveys have occurred nearby. No previously recorded archaeological sites are in the project area, but a relatively large number of precontact and historic sites are in the vicinity. One precontact and historic-era site that is directly applicable to the Ridgefield project is in close proximity.

Archaeological survey intensity in the Ridgefield area is variable. A vast amount of survey work has occurred on the lowlands, west of the project area. Most was focused closer to Lake River or other waterways and is often combined with archaeological monitoring (e.g., Reese et al. 2013). Some work has employed shovel probing (e.g., Gilmour et al. 2013), but most relied on surface, pedestrian survey (e.g., Abramowitz 1980; Freed 2008). Survey work in the uplands is mostly in response to residential development, east of the Ridgefield urban core. This work has routinely employed some level of shovel probing (e.g., Roulette 1998; Wilson 1997). The nearest archaeological survey to the Ridgefield project area was for a proposed sewer line (Smits 2008).

Most nearby precontact sites are immediately west of the project area on the lowlands adjacent to the Columbia River. These sites range from large complex residential sites with house and processing features to small limited-task sites probably related to resource procurement or processing, consisting primarily of lithic artifacts or a narrow range of features. Sparse, widespread artifact scatters are also common. Generally, these lowland sites post-date about 3,000 years ago and most are much younger. These sites are also usually found adjacent to lowland waterways such as Lake River or Carty Lake.

In the uplands, relatively few precontact sites are known nearby. A precontact component was found at 45-CL-981 just south of the project area and is discussed in more detail below. Large, but sparse scatters of choppers and flakes have been found in the terraces adjacent to Gee Creek. At least two small precontact sites with possible cairns, and thin scatters of burned rock, choppers and flakes are recorded in small tributaries east of Gee Creek (Wilson 1997; Woodward 1994). None of these sites are well understood or dated; however, some date to at least 8,000 years ago.

Historic sites are relatively common on the lowlands, but on the uplands commercial and relatively urban residential materials were found at 45-CL-981 (see below). Other historic sites in the uplands include materials related to early settlement (Daehnke 2010) dating to the later 1800s and early 1900s, as well as farming (Wilson 1997), mostly postdating 1900. Materials seem to be dumps or yard middens which commonly include scatters of glass, ceramic, and metal. Historic-era features such as trash pits or privies are not common.

### ***45-CL-981***

Site 45-CL-981 is located about 200 m south of the project area at the intersection of Pioneer Street and South Main Avenue. This site is in many ways a direct corollary for the Ridgefield project: the site is in close proximity, it has a precontact and a historic component (with commercial and residential aspects) and importantly it occupies some of the same landform elements. Moreover, 45-CL-981 has likely experienced similar historic developments and impacts as the Ridgefield project area. Site 45-CL-981, however, is located along the southern edge of a small drainage dissecting the terrace tread, a landform element not found in the Ridgefield project area.

Site 45-CL-981 was identified during survey for the Overlook Park Ridgefield Welcome Center. Background research revealed the vacant parcel had a bank, warehouse, general store, and residence. These structures were probably built between 1912 and 1920 and demolished by 1930. Precontact artifacts and historic-era items were found on the surface and in four shovel probes during inventory survey for the park's redevelopment (Jenkins et al. 2012). Subsequent evaluative test excavation at the site included two adjoining backhoe trenches focused on one structure's footprint and limited hand excavation of three 50 cm by 50 cm units (total hand excavation is 0.75 m<sup>2</sup> or 0.03 percent of the site area). Testing revealed the precontact component was contained mostly within the ca. 30 cm thick plowzone, although a few items migrated deeper due to bioturbation. The lithic assemblage (consisting of debitage, a core, and two choppers) included FCR, and trended towards expediency, with tools intensively used (Jenkins et al. 2012). No temporally diagnostic artifacts were found, but hand excavation was minimal. Burned and unburned bone was also found, but could not be definitively assigned to the precontact period. Overall, the precontact assemblage suggested a specialized site, possibly focused on processing plant materials.

Like the precontact component, testing showed nearly all historic materials were within the ca. 30 cm thick plowzone. No historic features were identified (although trenching did not appear geared towards historic feature identification). The historic assemblage consisted of brick and window glass, bottle and jar fragments, a variety of ceramics, wire and machine cut nails as well as undiagnostic metal (Jenkins et al. 2012). Materials dated to between the late 1800 and early 1900s, although modern artifacts were also found. Researchers recommended the precontact component as eligible for listing on the National Register of Historic Places (NRHP).

## **Field Survey**

### **Contaminant of Concern, PPE, and Decontamination Procedures**

Ground-disturbing activities associated with archaeological excavations could potentially expose workers to a hazardous substance, particularly dioxin (Tetrachlorodibenzo-p-dioxin or TCDD), resulting from the former wood treatment facility. The primary routes of entry for the contaminant of concern while working included inhalation, skin absorption, ingestion, skin and/or eye contact.

To minimize these exposure pathways personal protective equipment (PPE) was worn at all times when there was the potential for contact with contaminated soils. Dust suppression techniques were not necessary as the sediment was damp from rainfall. Personal Protective Equipment worn during shovel probing included polycoated Tyvek® coveralls, work boots with outer boot covers, and chemical resistant nitrile gloves. All PPE was inspected prior to donning. Doffing procedures included washing, rinsing, or dry brushing excess mud or dirt from outer boots and clothing; removing coveralls, boot covers, and nitrile gloves; placing disposable and reusable PPE in designated separate containers; washing face and hands thoroughly prior to eating, drinking, or smoking; and ultimately disposing of PPE in a sanitary landfill.

Decontamination procedures were required for reusable field equipment that was not discarded following use. Field equipment such as shovels, screens, and hand augers were decontaminated before vacating each property. The procedure included: shaking or dry brushing excess mud or dirt from equipment; cleaning equipment using paper towels and a deionized water→alconox soap→deionized water rinse procedure; placing electronics such as cell phones and cameras in plastic bags; completing field forms on-site, photographing, and then placing forms in a separate container to be disposed; and ultimately disposing cleaning supplies (e.g., paper towels), plastic bags, and field forms in a sanitary landfill.

All members of our field crew (Danny Gilmour, Matt Goodwin, and Breanne Taylor) have received the 40-hour HAZWOPER training and are current in their certification.

### **Pedestrian Survey Methods**

WillametteCRA conducted a systematic pedestrian survey of the project area. Archaeologists walked transects at no greater than 1.5-m (5-ft.) intervals across each of the 17 parcels (see Figure 3). The field crew examined one entire parcel before moving to the next property. Property lines were clear; the area is a developed residential neighborhood with fenced yards. During the survey, archaeologists examined the ground surface for artifacts or features.

### **Shovel Probe Methods**

The pedestrian survey was supplemented by a shovel probe survey. After completing the pedestrian survey of a parcel, WillametteCRA excavated subsurface shovel probes. The field crew placed 2-5 shovel probes in each of the 17 parcels. The specific number of probes was based upon the size of the lot (i.e., more probes were excavated in larger yards). The field director selected locations for probing with the goal of covering the area with shovel probes placed at approximately 20-m intervals. We excavated a total of 49 shovel probes in the 17 parcels (Table 1).

Shovel probes measured at least 40 cm in diameter. Field crews excavated round probes with straight walls (cylindrical rather than conical), in 10-cm arbitrary levels within natural strata. The field



crew excavated all probes to a depth of at least 50 cm below surface (cmbs) (see Table 1). At the time of fieldwork, in lots where the planned depth of disturbance will be 1 foot (~30 cm), we excavated shovel probes to a depth of 50 cmbs. In lots where the planned depth of disturbance at the time of fieldwork was 2 ft. (~61 cm), archaeologists excavated shovel probes to a depth of 65 cmbs. Field crews screened all excavated sediments through ¼-inch mesh. Staff documented all probes in the field and mapped each location using a tape and compass. The data collected for each shovel probe included the maximum depth of the probe, soil stratigraphy, depth of stratigraphic changes, sediment descriptions, extent of disturbance, depth to impenetrable layer, and presence/absence of cultural material. The field crew backfilled shovel probes and restored the surface to its original state as much as practicable.

Historic research indicated that some lots (e.g., Lots 012, 036, 037, and 039) housed outbuildings (see “European American Development” above), though only one of these outbuildings was identified as a privy (in Lot 012). In these lots, archaeologists supplemented the shovel probe program with the use of a 4-foot long metal rod to explore for subsurface deposits. Archaeologists proceed to the back of the lot (where outbuildings were indicated on historic maps) and pushed the rod into the ground in an attempt to find dense deposits of historic materials. Emphasis was placed on Lot 012 where a privy was mapped historically (Sanborn Map and Publishing Company 1920).

### **Results and Recommendations**

WillametteCRA conducted cultural resources surveys on March 16-17 and March 30, 2016. We examined 17 parcels and excavated 49 shovel probes. There was very limited ground surface visibility as all areas are landscaped. Archaeologists identified no cultural resources during the pedestrian survey. All shovel probes were negative for cultural material. Tabular results of the shovel-probe program are presented in Table 1. There are no previously recorded archaeological resources within the project area.

The field crew found much of the project area to be heavily disturbed. Twenty-six of the shovel probes contained fragments of modern materials such as plastic, wire nails, and modern beer bottle fragments (see Table 1). Many of the probes showed evidence of disturbance throughout the entire profile of the shovel probe. In addition, much of the landscape on the western side of the project area seems to have been heavily modified for the construction of houses. Houses constructed on the terrace riser have had their bases excavated into the hill slope. Based on our observations of differences in stratigraphy in adjoining lots, we assume that there has been substantial ground disturbance (both cutting and filling) along the hillslope and at its base near the railroad tracks.

It is our professional opinion that the proposed project is unlikely to affect any archaeological resources. However, information from the Cowlitz Indian Tribe revealed that the former

landowners of Lot 032 had recovered a mortar and pestle from their property. Due to a recent change in ownership of Lot 032, it was not possible to be granted access to that property. However, shovel probes were placed in several of the nearby lots (024, 025, 035, and 036) and all proved sterile of cultural material.

As a result of the report of the mortar and pestle within the project area, WillametteCRA recommends monitoring of Lot 032. WillametteCRA is currently preparing an inadvertent discovery plan for the construction phase of the project. It will include monitoring protocols and procedures for the unanticipated discoveries of archaeological or historical resources.

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United States Geological Society (USGS)

1940 *La Center, Washington*. 15-minute topographic map.  
1954 *La Center, Washington*. 15-minute topographic map.

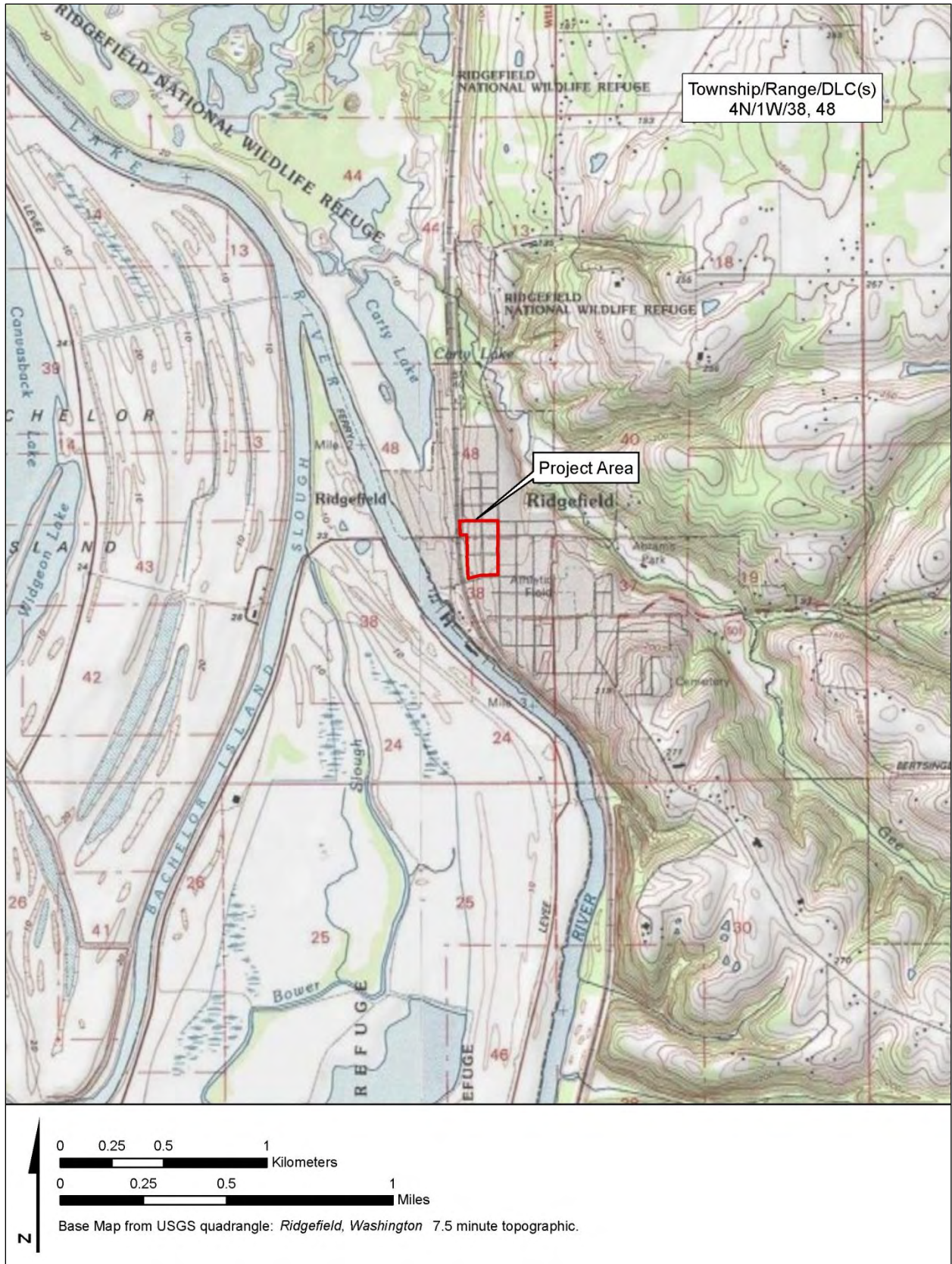


Figure 1. Project location.





Figure 2. Overview of current project area and proposed cleanup areas, depicting lots/parcel numbers.





Figure 3. Overview of current project area showing parcels surveyed and locations of shovel probes. Note: the only parcels that were surveyed are the ones where shovel probes occurred.





Figure 4. Overview of project area facing south, from the intersection of Railroad Avenue and Ash Street.



Figure 5. Overview of project area facing south, from the intersection of Ash Street and North 1<sup>st</sup> Avenue.





Figure 6. Overview of typical parcel in project area, facing west.

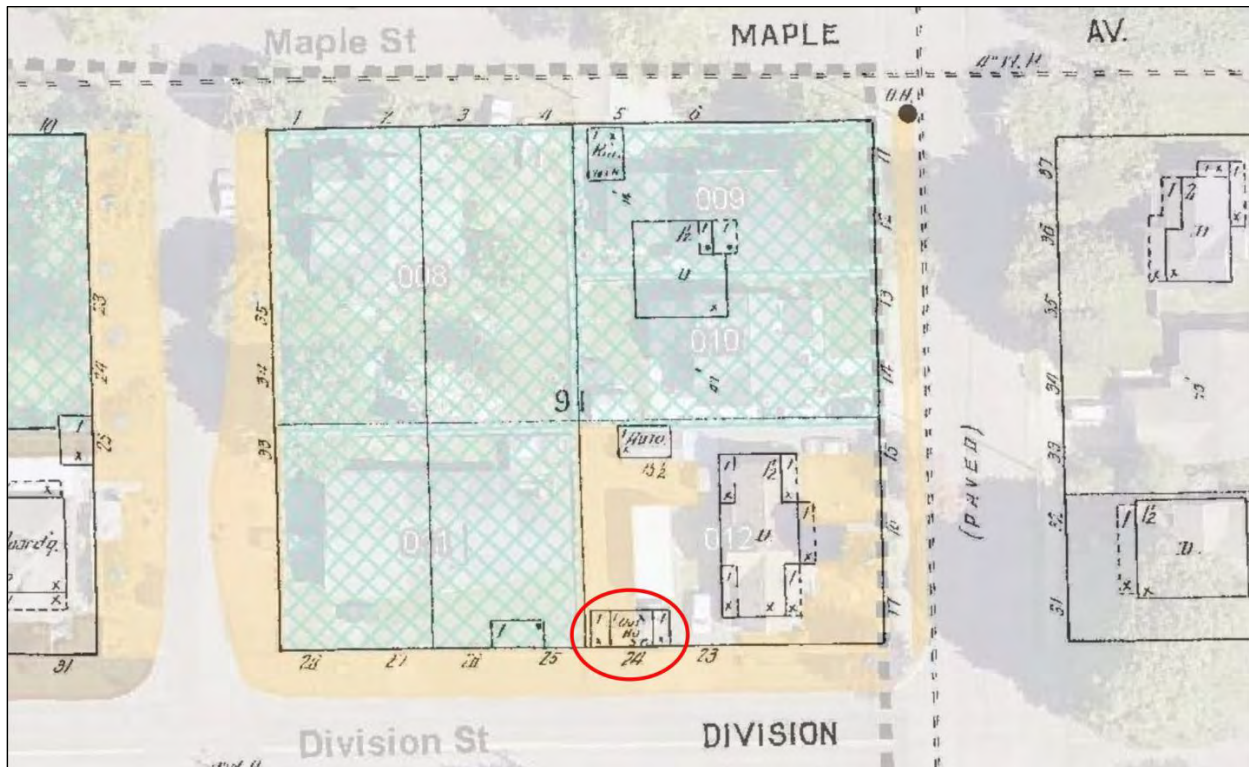


Figure 7. Close up of 1920 Sanborn showing privy location (highlighted in red) near the intersection of Division Street and North Main Street.

Table 1. Tabular Results of Shovel Probing.

Shovel Probe No.	Lot No.	Excavation depth (cmbs)	Recovery	Comment
1	39	50	Sterile	Modern glass 0-50 cmbs.
2	39	50	Sterile	Utility pipe at 25 cmbs. Modern glass, nails, and plastic 0-50 cmbs.
3	39	50	Sterile	None.
4	39	50	Sterile	Modern wire nails, glass, and plastic 0-50 cmbs.
5	37	50	Sterile	Modern trash 40-50 cmbs.
6	37	50	Sterile	Modern trash 0-40 cmbs.
7	35	50	Sterile	None.
8	35	50	Sterile	Plastic from 0-40 cmbs.
9	25	50	Sterile	Modern bottle glass and plastic 0-50 cmbs.
10	25	50	Sterile	Augered 50-90 cmbs. Water table at 90 cmbs.
11	24	50	Sterile	None.
12	24	50	Sterile	Modern glass 0-50 cmbs.
13	24	50	Sterile	90% gravel fill.
14	36	50	Sterile	Modern glass and nail 0-50 cmbs.
15	36	50	Sterile	Modern glass and nail 0-50 cmbs.
16	38	50	Sterile	Modern glass, round nail, river cobbles 0-45 cmbs.
17	38	50	Sterile	Modern glass 0-50 cmbs.
18	38	50	Sterile	Modern glass and round nails 0-50 cmbs.
19	14	65	Sterile	None.
20	14	65	Sterile	None.
21	14	65	Sterile	Modern nails 0-65 cmbs.
22	19	50	Sterile	Modern glass 0-50 cmbs.
23	19	50	Sterile	Modern glass 0-30 cmbs. Plastic 30-50 cmbs.
24	19	50	Sterile	Gravel fill, modern glass, charcoal, brick fragments 0-50 cmbs.
25	20A	60	Sterile	Plastic and modern glass 0-60 cmbs. Auger 60-200.
26	20A	50	Sterile	Modern trash 0-50 cmbs.
27	20A	50	Sterile	None.
28	20B	50	Sterile	None.
29	20B	50	Sterile	Modern nail 30-50 cmbs.
30	20B	66	Sterile	None.
31	12	50	Sterile	Plastic from 0-20 cmbs.
32	12	50	Sterile	None.
33	12	50	Sterile	None.
34	12	50	Sterile	Gravel fill 0-25 cmbs. Plastic 0-50 cmbs.
35	17	50	Sterile	None.
36	17	50	Sterile	None.
37	17	50	Sterile	None.

Table 1. Tabular Results of Shovel Probing (Cont.).

Shovel Probe No.	Lot No.	Excavation depth (cmbs)	Recovery	Comment
38	17	50	Sterile	None.
39	18	50	Sterile	None.
40	18	50	Sterile	None.
41	18	50	Sterile	None.
42	18	50	Sterile	Modern bottle glass and plastic 0-50 cmbs.
43	16	65	Sterile	None.
44	16	65	Sterile	None.
45	15	65	Sterile	None.
46	15	65	Sterile	Modern bottle glass 0-65 cmbs.
47	13	65	Sterile	None.
48	13	65	Sterile	None.
49	13	65	Sterile	None.



**Date:** March 23, 2017

**To:** Phil Wiescher, Maul Foster and Alongi, Inc.

**From:** Daniel Gilmour, Breanne Taylor, David V. Ellis  
Archaeologists, WillametteCRA

**Subject:** Addendum to Cultural Resources Survey for the Port of Ridgefield's  
Ridgefield Upland Cleanup Project, Clark County, Washington

### **Introduction**

The Port of Ridgefield (Port) previously proposed the Ridgefield Upland Cleanup Project (project) to remediate contamination from the Lake River Industrial Site (LRIS) in public rights-of-way (ROW) and on residential properties in the city of Ridgefield, Clark County, Washington. The remediation in residential neighborhoods is due to airborne deposition of dioxin from operation of the Pacific Wood Treating Company from 1964 to 1993. The contaminated area is situated in Donation Land Claims (DLC) 38 and 48, of Township 4 North, Range 1 West, Willamette Meridian (Figure 1). The Port contracted with Maul Foster & Alongi, Inc. (MFA), to conduct the remediation program. The project requires a permit under the State of Washington's State Environmental Policy Act (SEPA). SEPA requires a project proponent to consider potential impacts to archaeological, historic, and cultural resources. To address the provisions of SEPA, MFA contracted with WillametteCRA to conduct an archaeological survey of the project area on behalf of the Port. WillametteCRA conducted a shovel probe survey of 17 privately owned residential lots in the project area in 2016 and identified no archaeological resources within those properties (Gilmour et al. 2016).

During WillametteCRA's 2016 fieldwork, permission to conduct fieldwork on Lot 032 had not been granted by the property owner. The owner has recently granted right of entry. This addendum reports the results of WillametteCRA's archaeological survey of that property (Lot 032) conducted on March 14, 2017 (Figure 2). While there are no previously known archaeological resources on the property, information from the Cowlitz Indian Tribe revealed that the former landowners of Lot 032 had recovered a mortar and pestle from their property (Figure 3). Despite these reported finds of cultural material, WillametteCRA's shovel probing of several of the nearby lots proved sterile of cultural material (Gilmour et al. 2016).

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The general project area overlooks the Columbia River floodplain. The landform is a ridge between the deeply incised Gee Creek drainage to the east and the Columbia lowlands to the west. Project lands include three relatively distinct landform elements. The first is the relatively level, higher elevation terrace tread between about 50 and 75 ft. above mean sea level (amsl), on which Lot 032 is located. The second is the moderate slope below the terrace, between 30 and 50 ft. amsl, while the third is the footslopes and back of the Columbia River floodplain below ca. 30 ft. in elevation. The break between the terrace tread and slope is not well defined. In some places, grading for house construction has obscured this topographic break. The lower break between the footslopes and Columbia River floodplain is likewise poorly defined and irregular, but roughly marked by the approximate location of the north-south running Burlington Northern Railroad tracks.

Background information regarding previous archaeological work, native peoples, and historic period land use is available in WillametteCRA's previous report (Gilmour et al. 2016). Historic research indicates that Lot 032 would have been part of the 319-acre DLC (No. 38) of Arthur and Jane Quigley (BLM 2017; GLO 1863a, 1863b). The Quigleys arrived to Ridgefield in 1852. The earliest development within the Lot 032 parcel would have been a dwelling, roughly in the same location as the current house (Figure 4). This building is present on Sanborn Fire Insurance maps beginning in 1920 (Sanborn Map and Publishing Company 1920, 1920-1930).

## **Field Survey**

### **Contaminant of Concern, PPE, and Decontamination Procedures**

Ground-disturbing activities associated with archaeological excavations could potentially expose workers to a hazardous substance, particularly dioxin (Tetrachlorodibenzo-p-dioxin or TCDD). The primary routes of entry for the contaminant of concern while working included inhalation, skin absorption, ingestion, skin and/or eye contact. To minimize these exposure pathways personal protective equipment (PPE) was worn at all times when there was the potential for contact with contaminated soils. Both members of our field crew (Danny Gilmour and Breanne Taylor) have received the 40-hour HAZWOPER training and are current in their certification.

### **Shovel Probe Methods**

WillametteCRA excavated five subsurface shovel probes within Lot 032 (Table 1). The field crew placed two shovel probes in the front yard and three probes in the backyard of the parcel (see Figure 2, Figures 5 and 6). The field director selected locations for probing with the goal of covering the area with shovel probes placed at approximately 10-m intervals. Shovel probes measured at least 40 cm in diameter. We excavated round probes with straight walls (cylindrical rather than conical), in 10-cm arbitrary levels within natural strata. The field crew excavated all probes to a depth of 50 cm below surface (cmbs) as the planned depth of disturbance in Lot 032 will be 1 foot (~30 cm).



Table 1. Summary of Shovel Probe Results

Shovel Probe No.	Excavation Depth (cmbs)	Recovery	Comment
1	50	Sterile	Modern debris including wire nails and plastic throughout.
2	50	Sterile	Brick fragments throughout, coarse brick stain at 50 cmbs.
3	50	Sterile	Modern debris including metal, wire nails, plastic and paper fragments throughout.
4	50	Sterile	None.
5	50	Sterile	Modern debris throughout including wire nails, flat glass, and plastic fragments.

The field crew screened all excavated sediment through ¼-inch mesh. They documented all probes in the field and mapped each location using a tape and compass. The data collected for each shovel probe included the maximum depth of the probe, soil stratigraphy, depth of stratigraphic changes, sediment descriptions, extent of disturbance, depth to impenetrable layer, and presence/absence of cultural material. The field crew backfilled shovel probes and restored the surface to its original state as much as practicable. All PPE was inspected prior to donning. Doffing procedures included washing, rinsing, or dry brushing excess mud or dirt from outer boots and clothing; removing coveralls, boot covers, and nitrile gloves; placing disposable and reusable PPE in designated separate containers; washing face and hands thoroughly prior to eating, drinking, or smoking; and ultimately disposing of PPE in a sanitary landfill.

Decontamination procedures were required for reusable field equipment that was not discarded following use. Field equipment such as shovels and screens were decontaminated shaking or dry brushing excess mud or dirt from equipment; cleaning equipment using paper towels and a deionized water→alconox soap→deionized water rinse procedure; placing electronics such as cell phones and cameras in plastic bags; completing field forms on-site, photographing, and then placing forms in a separate container to be disposed; and ultimately disposing cleaning supplies (e.g., paper towels), plastic bags, and field forms in a sanitary landfill.

### Results and Recommendations

WillametteCRA conducted an archaeological survey of Lot 032 on March 14, 2017, for the Ridgefield Upland Cleanup Project. Most of Lot 032 is developed; there was little space available for shovel probing (see aerial photo – Figure 2). The house, concrete slabs, a garage, and multiple outbuildings are present on the property. Despite this, WillametteCRA endeavored to excavate more, rather than fewer, shovel probes given reports of archaeological materials having been previously collected on the property. While the lot measures roughly 0.1 acre in size, only approximately 10 percent of that was undeveloped and available for shovel probing.

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Prior to excavating shovel probes, archaeologists executed a systematic survey of the property. No artifacts or features were observed on the ground surface. Thereafter, we excavated a total of five shovel probes to a depth of 50 cms. Archaeologists identified no archaeological resources during the excavations; all shovel probes were sterile. The field crew found much of the project area to be heavily disturbed. All of the shovel probes contained fragments of modern materials such as plastic, wire nails, and paper fragments. Many of the probes showed evidence of disturbance throughout the entire profile of the shovel probe.

In conclusion, WillametteCRA has now conducted two archaeological surveys within the project area. We have not identified any archaeological resources. In addition, there are no previously recorded archaeological resources within the project area. However, the former landowners of Lot 032 reported having recovered a bedrock mortar and pestle from their property. In this iteration of fieldwork, WillametteCRA intensively shovel probed Lot 032 and found no evidence of archaeological materials. In addition, shovel probes placed in several of the nearby lots during the previous survey for this project also proved sterile of cultural material. It is our professional opinion that the proposed project is unlikely to affect any archaeological resources. At this time, we recommend no future work. WillametteCRA has prepared an inadvertent discovery plan for the construction phase of the project. It includes monitoring protocols and procedures for the unanticipated discoveries of archaeological or historical resources (Willamette Cultural Resources Associates, Ltd. 2016).

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### Gilmour, Daniel M., Breanne Taylor, Paul Solimano, and David Ellis

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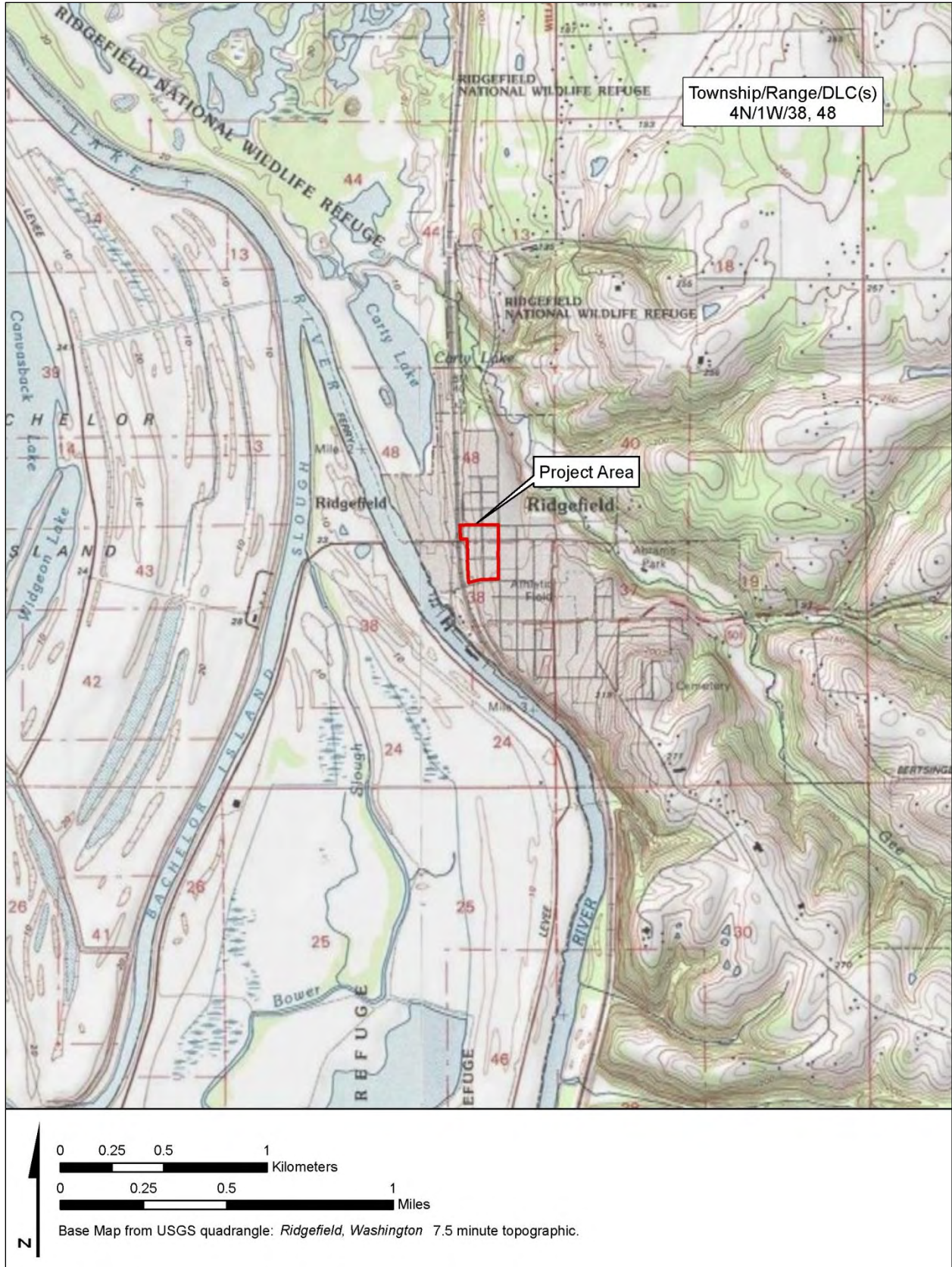


Figure 1. Project location map.





Figure 2. Location of Lot 032 with shovel probes depicted.



Figure 3. Mortar and pestle identified at Lot 032 by previous landowners (photograph courtesy of the Cowlitz Indian Tribe).

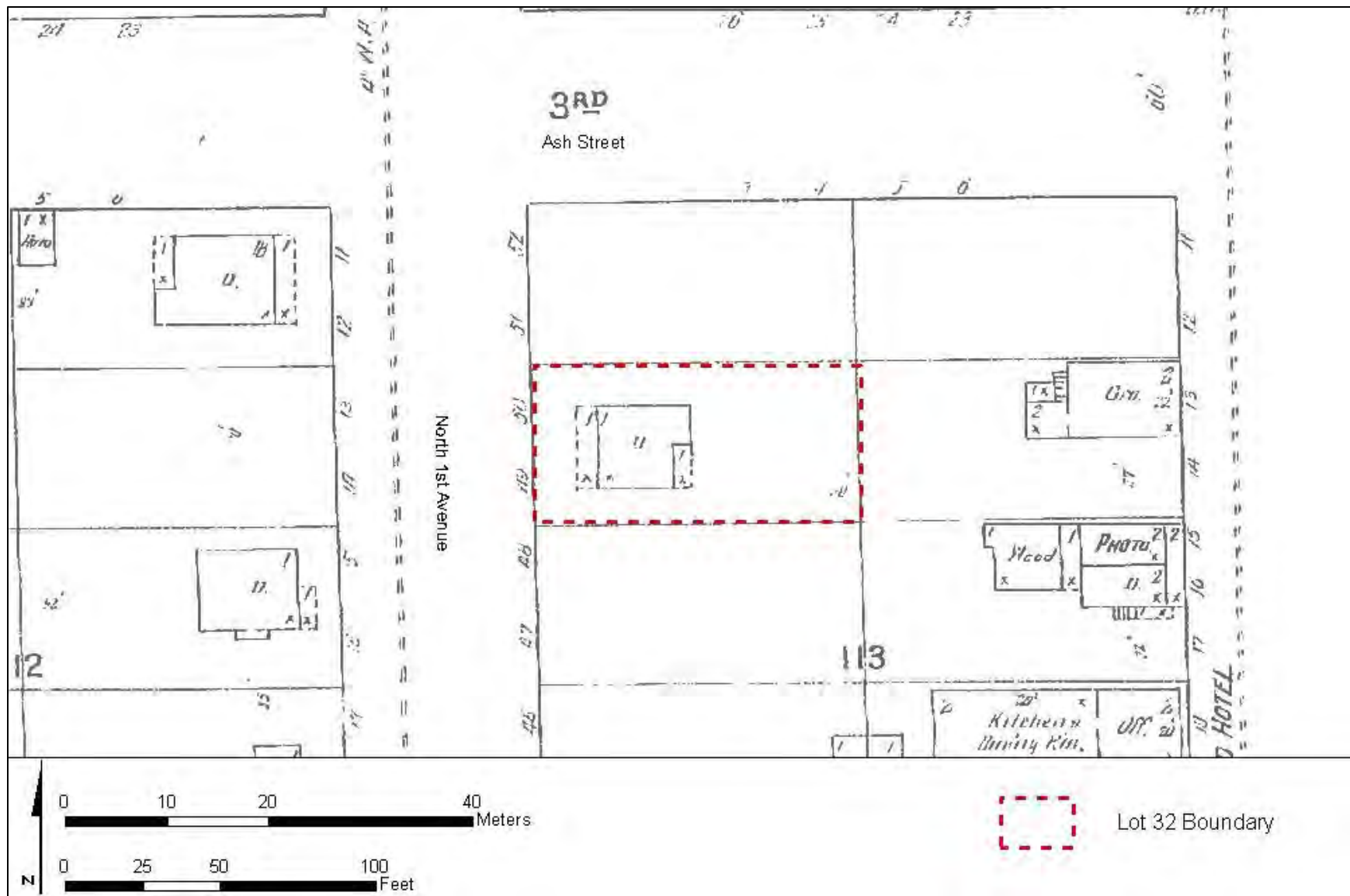


Figure 4. Lot 032 depicted on 1920 Sanborn map.





Figure 5. Overview of Lot 032, with crew at location of SP-1, facing northeast.



Figure 6. Overview of Lot 032 residence/backyard, facing west.

# CULTURAL RESOURCES REPORT COVER SHEET

DAHP Project Number: 2023-05-02904

Author: Mike Shime!

Title of Report: Archaeological survey for the Port of Ridgefield Cleanup Project, Ridgefield, Washington

Date of Report: March 6, 2024

County(ies): Clark Section: 38 and 48 Township: 4N Range: 1W

Quad: Ridgefield, WA Acres: ~1.72

PDF of report submitted (REQUIRED)  Yes

Historic Property Inventory Forms to be Approved Online?  Yes  No

Archaeological Site(s)/Isolate(s) Found or Amended?  Yes  No

TCP(s) found?  Yes  No

Replace a draft?  Yes  No

Satisfy a DAHP Archaeological Excavation Permit requirement?  Yes #  No

Were Human Remains Found?  Yes DAHP Case #  No

DAHP Archaeological Site #:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_

- Submission of PDFs is required.
- Please be sure that any PDF submitted to DAHP has its cover sheet, figures, graphics, appendices, attachments, correspondence, etc., compiled into one single PDF file.
- Please check that the PDF displays correctly when opened.





**WILLAMETTE**  
CULTURAL RESOURCES ASSOCIATES, LTD.



## **Archaeological Survey for the Port of Ridgefield Cleanup Project, Ridgefield, Washington**

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**Archaeological Survey for the  
Port of Ridgefield Cleanup Project,  
Ridgefield, Washington**

Prepared by  
Mike Shimel

March 6, 2024

WillametteCRA Report No. 23-159  
Portland, Oregon

Prepared for  
Maul Foster & Alongi, Inc.  
Portland, Oregon



**WILLAMETTE**  
CULTURAL RESOURCES ASSOCIATES, LTD.

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## Report Details

<b>Project Name:</b>	Archaeological Survey for the Port of Ridgefield Cleanup
<b>DAHP Number:</b>	2023-05-02904
<b>Client:</b>	Maul Foster & Alongi, Inc.
<b>Project Undertaking:</b>	Contaminated soil removal
<b>Regulatory Framework:</b>	SEPA
<b>County(ies):</b>	Clark
<b>Legal Description:</b>	Township 4N, Range 1W, Sections 38 and 48
<b>USGS Quad(s):</b>	<i>Ridgefield, WA</i>
<b>Project Acreage:</b>	~1.72
<b>Survey Acreage:</b>	~1.72
<b>Permit Number(s):</b>	None
<b>Field Note Location:</b>	WillametteCRA, Portland Office
<b>Fieldwork Type:</b>	Pedestrian Survey, Shovel Probes
<b>Fieldwork Dates:</b>	January 23–25, 2024
<b>Field Personnel:</b>	Mike Shimel and Alexis Crow
<b>Findings:</b>	1 isolate (23-159-1)
<b>Recommendations:</b>	Inadvertent Discovery Plan be in place for construction.

---

## **Executive Summary**

Willamette Cultural Resources Associates, Ltd. (WillametteCRA) has conducted an archaeological survey for the proposed Ridgefield Cleanup Project, in Ridgefield, Washington. The investigation conducted by WillametteCRA consisted of a pedestrian survey and excavation of 35 shovel probes on 10 privately owned parcels in a residential neighborhood. Archaeologists identified one new archaeological resource (temporary isolate 23-159-1) as a result of this work.

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## Introduction

On behalf of the Port of Ridgefield (Port) Maul Foster & Alongi, Inc. (MFA) contracted Willamette Cultural Resources, Ltd, (WillametteCRA) to conduct an archaeological survey in advance of the proposed Ridgefield Cleanup Project. The project is located within Donation Land Claims 38 and 48 of Township 4 North, Range 1 West, Willamette Meridian in Ridgefield, Washington (Figures 1 and 2).

In 2016, the Port completed a portion of Phase 1 of the of the Ridgefield Cleanup Project to remediate dioxin contamination from a former wood treatment facility in public rights-of-way (ROW) and on residential properties in the city of Ridgefield, Washington (Gilmour et al. 2016). Since the completion of this work, additional contaminated lots have been identified, necessitating further remediation. The project requires a permit under the state of Washington's State Environmental Policy Act (SEPA). SEPA requires a project proponent to consider potential impacts to archaeological, historic, and cultural resources. MFA contracted WillametteCRA to assist in addressing the provisions of SEPA.

The proposed project includes removal and replacement of contaminated soil from the affected properties. The maximum depth of excavation is not anticipated to exceed 2 feet (ft.; ~60 centimeter [cm]; Meaghan Pollock, personal communication 2024). Eleven residential lots were initially identified as contamination cleanup locations for this phase of work (see Figure 3). MFA obtained access to 10 of the 11 properties in advance of archaeological investigations. Property 082 was excluded from the archaeological survey due to lack of access permission. Additional lots, and the ROW are scheduled for cleanup in a later phase and were also excluded (Figure 3).

The current survey area is north of the Ridgefield business center. It is bounded to the north and south by Hall and Ash Street, while North Railroad Avenue and North 3rd Street form the western and eastern boundaries respectively (see Figure 2 and 3). All properties surveyed are residential in nature and privately owned. Most areas where the removal of soil is proposed are landscaped lawns or gardens.

The broader project vicinity overlooks the Columbia River floodplain to the west. The general landform on which the project is located is a ridge between the deeply incised Gee Creek drainage to the east and the Columbia lowlands to the west. The bulk of our survey area (8 of 10 properties) is located west of North First Avenue. The ground surface between those streets slopes steeply down to the west from approximately 78 ft. above mean sea level (amsl) to approximately 50 ft. amsl with grades within yards varying due to a patchwork of residential construction projects. The eastern portion of the project area consists of only two residential properties on opposite sides of Division Street just east of North Main Avenue. The ground surface within these properties is relatively flat at approximately 82 ft. amsl.

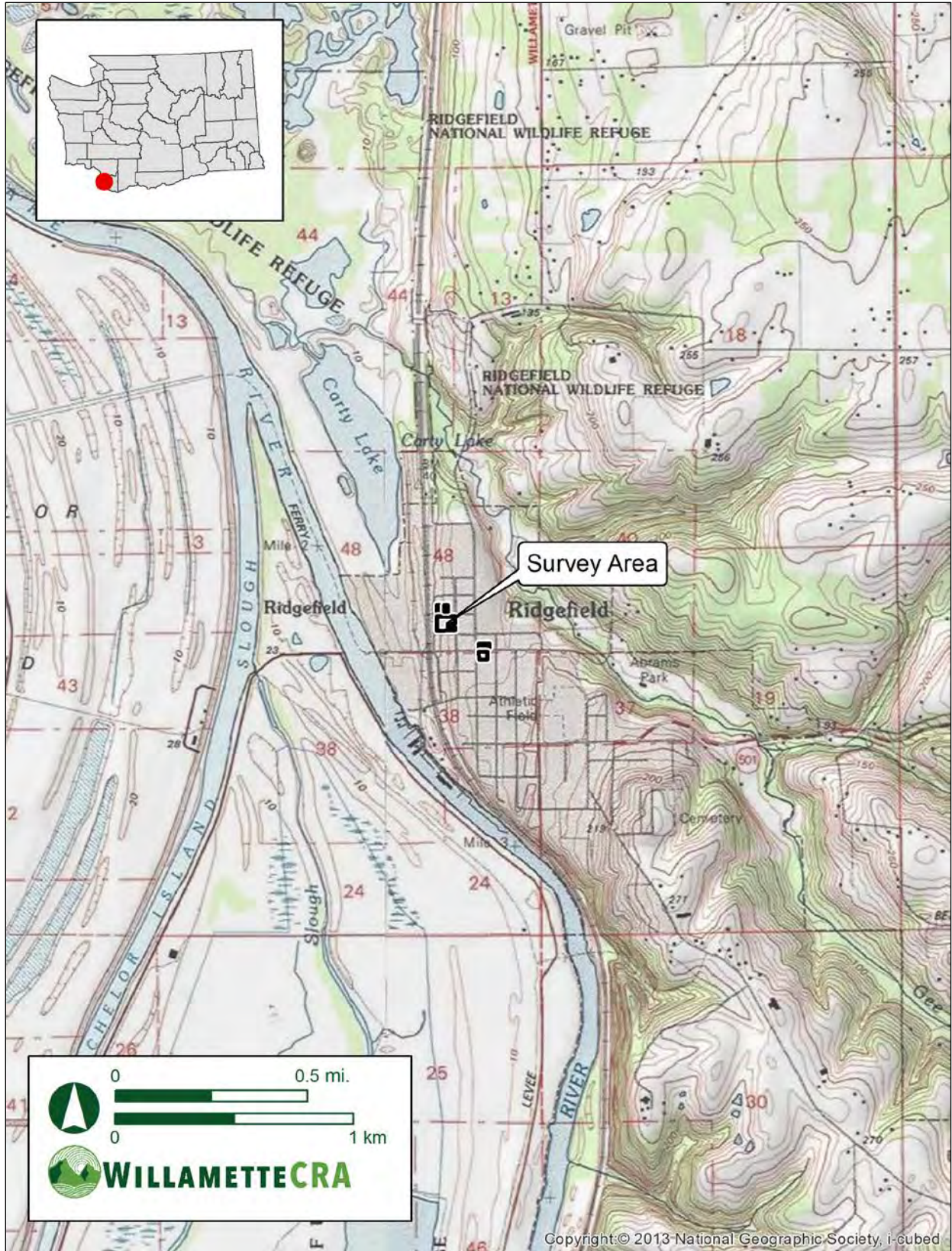


Figure 1. Port of Ridgefield Cleanup project area location.





Figure 2. Project area on modern aerial, Ridgefield, Washington.





Figure 3. Overview of project area; current project parcels in orange. Plan provided by Maul Foster & Alongi, Inc.

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## Natural and Cultural Background

### Environmental Setting

The project area is within the Portland Basin, a broad lowland located where the Columbia River bisects the north-south Puget Trough. The Puget Trough extends from the southern end of the Willamette Valley to southeastern Alaska in the north. Ames et al. (1999) refers to the area of low topography in which the project is located as Wapato Valley. The dominant hydrological features of the Wapato Valley are the Columbia and Willamette rivers. Two topographic areas exist in the Wapato Valley: the alluvial lowlands along the shores of the Columbia River and the highlands. Three factors account for the surficial geomorphology of the area: eustatic sea level rise, late Pleistocene glacial outburst floods, and Holocene alluvial deposition.

The Wapato Valley fits into Franklin and Dyrness' "*Pinus-Quercus-Pseudotsuga*" zone. Riparian forests of black cottonwood (*Populus trichocarpa*), Oregon ash (*Fraxinus latifolia*), Oregon white oak (*Quercus garryana*), bigleaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), and ponderosa pine (*Pinus ponderosa*) are generally located along the rivers. Oak woodlands dominate the zone's forests and savannas. A variety of minor hardwood species can generally be found within riparian environments and poorly drained areas (Franklin and Dyrness 1988:124–126). In addition, the Wapato Valley was home to a rich array of fish and bird species as well as terrestrial and aquatic mammals (Ames et al. 1999).

The project area is located within a currently developed residential neighborhood, however, prior to European American settlement of this area it would have been part of a closed canopy forest. A variety of small lakes, wetlands, and marshes dotted the landscape from the Cascade foothills to the Columbia River floodplain immediately west of the project area (General Land Office [GLO] 1853, 1854; United States Geological Survey [USGS] 1940). The morphology of some drainages has been altered for commercial, industrial, and residential use of the area during the historic period.

### Precontact Archaeological Context

Archaeological survey and excavation projects have been relatively widespread in the Portland Basin, however, coherent narratives composed of collected data are rare. Research topics have not been widely agreed upon. Most local archaeological work has been geared towards detailed material description and site age. Exceptions occur (Ames 1994), but for the vast amount of data available, models of hunter gatherer adaptive strategies, settlement patterns or land-use are very uncommon.

The last 2,500 years of Portland Basin prehistory are accounted for within a chronological context (Pettigrew 1981), which has been integrated into a longer, broader regional archaeological framework for the Northwest coast (Ames 1994; Ames and Maschner 1999). Many dramatic changes in Native lifeways occurred over the last 6,000 years of Northwest

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Coast prehistory, including increased population densities and the appearance of different mobility and settlement patterns. Many changes were enabled by development of resource diversification and intensification, higher quality food storage technology, and increased social complexity (Ames 1994; Ames and Maschner 1999).

The Early Pacific Period (ca. 5,500–3,500 before present [BP]) was characterized by a cooler and wetter climate. Sea level was lower along the Washington and Oregon coasts (Ames and Maschner 1999). Lowland early Pacific sites are relatively rare in the Portland Basin. More common are upland sites, particularly in Clark County. Assemblages commonly contained broad-necked, large stemmed and side-notched projectile points. Regionally, bone and antler tool use increased, and ground stone tools appeared. A more diversified diet was suggested by broadened resource use. Few special purpose camps are evident. Some storage was likely practiced throughout the Early Pacific; however, it did not become important until the end of the period (Ames and Maschner 1999). No evidence for plankhouses dating to the Early Pacific has been found in the Portland area.

By the beginning of the Middle Pacific Period (ca. 3,500–1,500 BP) current climatic conditions were becoming the norm and the sea level was near current levels. The basic technological and economic traits observed at historic contact were present, if not common (Wessen 1983:25). Square or rectangular plankhouses and villages appeared elsewhere on the coast after about 3,500 BP, although the earliest houses in the Portland Basin are about 2,000 years old (Ames 1994). Site types were diverse and site frequency increased. After about 3,000 years ago, site frequency on the Columbia floodplain increased.

Most investigated sites within the region generally, and the Portland Basin specifically, date to the Late Pacific Period (ca. 1,500 to 100 BP). Site frequency increased dramatically, particularly on the lowlands (Ames 1994; Wessen 1983). Assemblages are thought to have been diverse and contain small, triangular-shaped, narrow-stemmed projectile points. Several Late Pacific period sites in the Portland Basin have been investigated in some manner, with the most well-known dating to the past 800 years, including the Meier and Cathlapotle sites. Resource use intensified and diversified.

## **Native Peoples**

The modern Ridgefield area lies within the traditional homeland of the Chinookan and Cowlitz peoples. The Chinookans occupied the lower Columbia River from the Pacific Ocean to The Dalles while the Cowlitz peoples occupied inland areas without direct access to the ocean (Hajda 1990; Irwin 1994; Ray 1966). Cowlitz peoples typically occupied settlements along the Cowlitz and Lewis rivers. Upper Chinookans in the Portland area consisted of two groups, the Multnomah and the Clackamas. Multnomah villages were concentrated on Sauvie Island, along the Multnomah Channel, and along the northern bank of the Columbia River downstream of the mouth of the Willamette (French and French 1998:360–363; Silverstein 1990:533–535).



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Prior to European American contact, the geographical boundary between Cowlitz and Chinookan peoples was generally permeable due to intermarriage and trade arrangements (Ray 1996; Silverstein 1990). Ties of kinship through “blood” and marriage usually defined where individuals lived and rights of access to resource locations. As individuals often married outside their home villages, most families had networks of relationships that crossed both linguistic and cultural boundaries. These kin networks were crucial for the survival of families and households as they often provided access to a diverse array of resource locations.

Lower Columbia Chinookans were traditionally a river-oriented people, focused on the resources of the river and the adjacent river floodplains. These resources included fish such as salmonids, sturgeon, eulachon, and lamprey, but also included sea mammals (seals and sea lions) that followed the fish runs up the Columbia River as far as The Dalles and up the Willamette River to Willamette Falls. Fishing was possible throughout the year with the exception of early to mid-winter and employed a variety of methods—seining, scoop and funnel nets, spearing/ harpooning, hook-and-line, and “raking” (the last used for taking eulachon; Martin 2006). Chinookans were primarily dependent on the resources that the Columbia River offered, however they would have accessed upland resources directly or through trade with interior groups such as the Cowlitz. The Cowlitz peoples were dependent on tributaries of the Columbia River for fishing and participated in more game-hunting due to their proximity to the prairies and grasslands of the Cowlitz River drainage system.

Anthropologists have divided the Cowlitz people into two groups, the Lower and Upper Cowlitz. The upper Cowlitz spoke a Sahaptin language and generally occupied the upper regions of the Lewis and Cowlitz rivers, while the lower Cowlitz spoke a Salishan language, like those spoken around the Puget Sound and generally occupied lower regions of the Cowlitz River (Hajda 1990; Schuster 1998). The Cowlitz typically spent winters in large villages around the Cowlitz River, with smaller seasonal camps situated on upper drainages. The Cowlitz diet centered around salmon, with other resources like deer, elk, bear, beaver, and rabbit, as well as berries and roots (Hajda 1990).

Devastating changes struck Native peoples of the lower Columbia in the early 1830s. Epidemics of introduced European diseases had already affected Native populations as early as the late 1700s. A smallpox epidemic is known to have struck the lower Columbia region in the 1770s and is estimated to have killed about a third of the Native population. Native peoples experienced periodic outbreaks of smallpox and possibly other introduced diseases such as measles through the 1860s. For the people of the lower Columbia, the most devastating epidemic was an outbreak of malaria in the 1830s. This epidemic devastated the Indian people of the lower Columbia region, eventually spreading east of the Cascade Range and south to northern California (Boyd 1990:146–147, 1999:233–238). The malaria epidemic of the early 1830s destroyed entire villages in a matter of days or weeks. The Indian population of the Willamette Valley and the lower Columbia River valley was reduced by 75 to 90% or higher

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Boyd (1999:Table 3) has estimated that lower Columbia Chinookan populations declined precipitously from about 12,000 in about 1800 to 300 by the 1850s (a population loss of almost 98%).

The population vacuum created by the epidemics also provided an opportunity for more interior groups to resettle along the river. More interior groups gained access to the river. There are accounts of interactions between Chinookans and Cowlitz people, the villages of the latter extending along the Cowlitz River from just upriver of its confluence with the Columbia (Boyd 2011:54, 67, 82; Hajda 1990:505). What other groups were involved remains unclear because of the tendency of those interior groups to simply be termed “Klickitats” in the historic records. These interior groups included what are recognized today as the Xwalxwaipam and Taidnapam. A large number of Klickitats settled around Fort Vancouver and some may have also resided at Wakanasisi (Boxberger 2012; Boyd 2011:171–173). Further confusion regarding the possible presence of “Klickitats” at the former Cathlapotle location comes from the Lewis River having been known as the Cathlapoodle River. However, Indian agent William Tappan noted “Tai tin a pams” (Taidnapams) “at the mouth of the Cathlapoodle” in 1854 (Tappan 1854).

The first major expansion of European American settlements began in the 1840s, as thousands of American settlers flooded into western Oregon and Washington. They met with minimal resistance from the Native groups that had been devastated by the epidemics described above. There was a brief period through the 1840s when the new settlers and the Native populations lived uneasily side by side. By 1850, however, the need to clear Indian title to the land to provide a legal basis for the land claims of American settlers led to a series of treaty negotiations beginning in 1851.

The first treaties were signed with the surviving tribes on the lower Columbia River and the Willamette Valley, but none included lands in the Lewis River drainage. All these treaties would have established reservations in western Oregon and southwestern Washington. None of these treaties were ratified by Congress. Treaties signed during a second round of negotiations in 1854 and 1855 were ratified. One of these treaties included the Kalapuyan peoples of the Willamette Valley and Chinookan groups of the Clackamas and lower Willamette River drainages (Beckham 1990; Kappler 1904: II:665). The Willamette Valley Treaty was signed by representatives of the Watlala, who occupied lands along the south shore of the Columbia River above the Willamette River. The treaty referenced Watlalas on the north side of the river, but the treaty applied only to those living in Oregon Territory. Washington Territorial Governor Isaac Stevens attempted to negotiate a treaty with Native groups in southwestern Washington. The negotiations were unsuccessful, and no treaty was ever signed with those groups. However, the residents of Wakanasisi were reportedly relocated to the Grand Ronde Reservation in 1856. Other Chinookans of the lower Columbia and Cowlitz peoples relocated to Chehalis and Yakama Reservations (Beckham 1990:180–181; Boxberger 2012:22–25; Coan 1921; Marino 1990:171).

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## European American Settlement Period and Historic Map Review

British Royal Navy Lieutenant William Broughton was the first European American visitor to the area in 1792. During his expedition along the Columbia, he noted a “large indian village” (Cathlapotle). On November 4, 1805, and March 29, 1806, the Lewis and Clark Expedition camped just south of present-day Ridgefield, meeting with the Chinook Indians and exchanging goods (Kirk and Alexander 1990). The European American presence grew after 1811, with fur trappers employed by the Northwest Fur Company, Hudson’s Bay Company (HBC), and Pacific Fur Company moving through the general project vicinity as part of mobile trading and trapping expeditions.

In 1839, the first European American settler in the Ridgefield area built a home between what is now Carty Lake and Lake River. Irish immigrant James Carty, who was an employee of the HBC at Fort Vancouver, built a homestead in the southwest quarter of Section 13, approximately 0.5-mile (mi.) northwest of the current project area. His residence would have been located near the remaining Cathlapotle plank houses. Carty received a permit in 1851 to operate a ferry which traversed Lake River. In turn, early residents such as Arthur Quigley and Frederick Shobert constructed rudimentary landings on their properties to accommodate the influx of vessels on the river (Caldbick 2010).

The 1850s saw an increase of European American settlement with passage of the Donation Land Act in 1850, which allowed a single man or a married couple who settled in Oregon Territory by December 1, 1850, up to 320 acres for an unmarried man and 640 acres for a couple. Most of the project area, north of Division Street, would have been a part of James Carty’s 322-acre Donation Land Claim (DLC; depicted as claim no. 48 on GLO maps; BLM 2024; GLO 1863a, 1863b). The southeastern corner of the current project area (parcel 056) would have been within the 319-acre DLC of Arthur and Jane Quigley (BLM 2024; GLO 1863a, 1863b; Figure 4). The Quigleys arrived in Ridgefield by 1852. Arthur Quigley established a residence that would have been a quarter mile southwest of the current project area. Additionally, Quigley constructed a mud landing on his property, adjacent to Lake River, approximately 0.15 mi. northwest of the current project area (GLO 1854).

The earliest depictions of structural developments within the current project area come from Sanborn Insurance Maps from 1920. The 1920 Sanborn map of the project area depicts several individual developments within proposed cleanup areas, consisting of: 9 dwellings, 3 auto garages, 3 outbuildings, 1 privy, and 1 woodshed. Most dwellings currently within the project area are depicted on this map except for those within lots 056 and 087 (Sanborn Map and Publishing Company 1920).

Published a decade later, the 1920–1930 Sanborn Insurance Map depicts one major change within the project area, which is the construction of the Brown House (lot 056), which was built in 1921 (O’Skea 1999; Sanborn Map and Publishing Company 1920–1930; Figures 5 and 6).

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From the 1910s to 1950s, much of Ridgefield's population was employed by grist mills. Unfortunately, this industry was not solely beneficial to the town as mill fires became semi-regular nuisances over the years. The town witnessed major fires in 1916, 1923, 1927, 1934, and 1943. The 1916 fire destroyed most of the Ridgefield business district (Caldbick 2010).

A review of Metsker maps from the mid-twentieth century shows that the project area would have been within the "Railroad Addition." No information about individual owners in the project area is decipherable from these maps (Metsker 1956, 1961). By 1957, a total of 10 structures are depicted in the current project area (USGS 1957; Figure 7). Historical aerial photographs were compared to assess when building configurations may have changed within the current project area. Unfortunately, resolution remained poor into the 1990s, making accurate differentiation between structures nearly impossible. Special attention was paid to parcel 046 due to a privy depicted on historic Sanborn maps (NETR 1951, 1960, 1970, 1981, 1990).

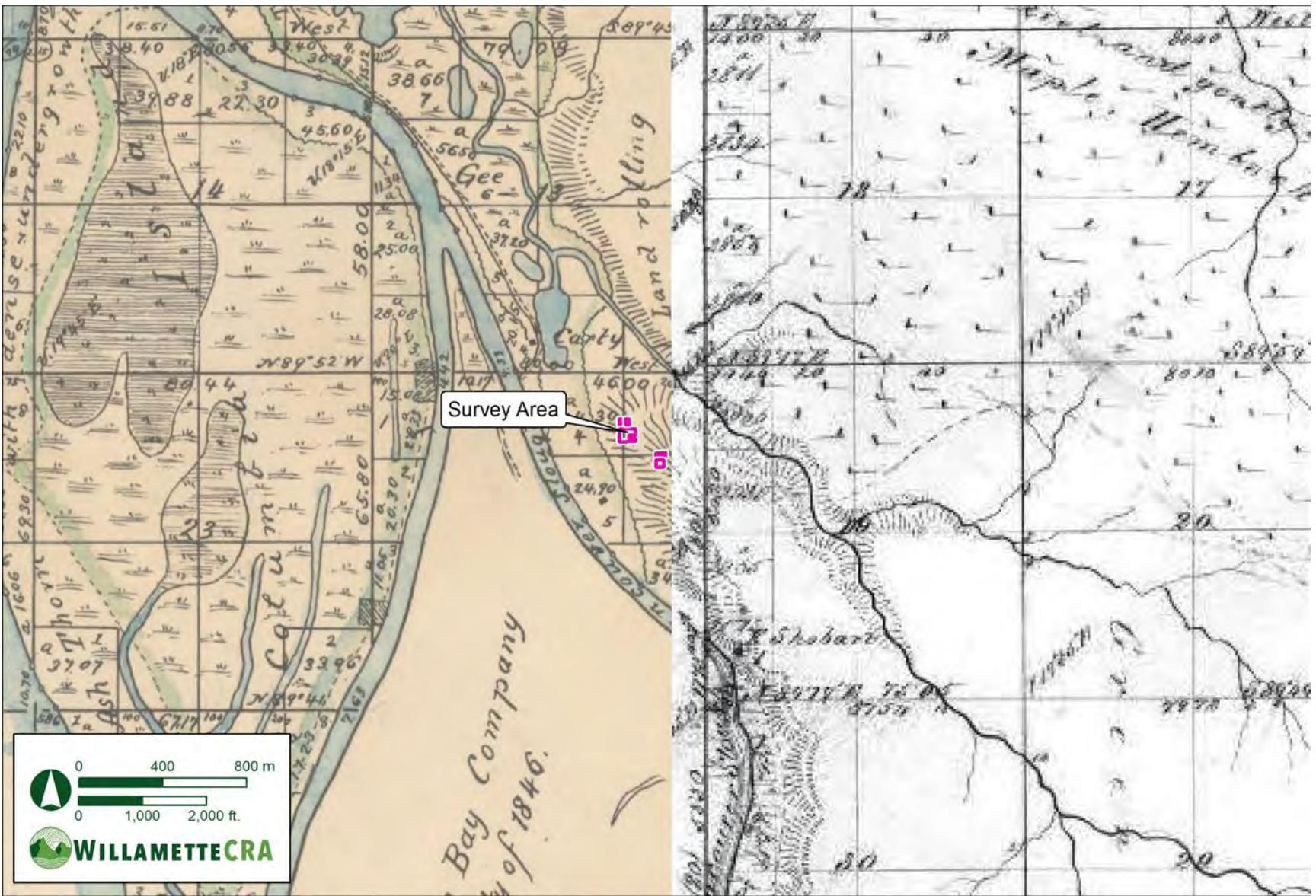


Figure 4. Project area depicted on 1863b GLO.



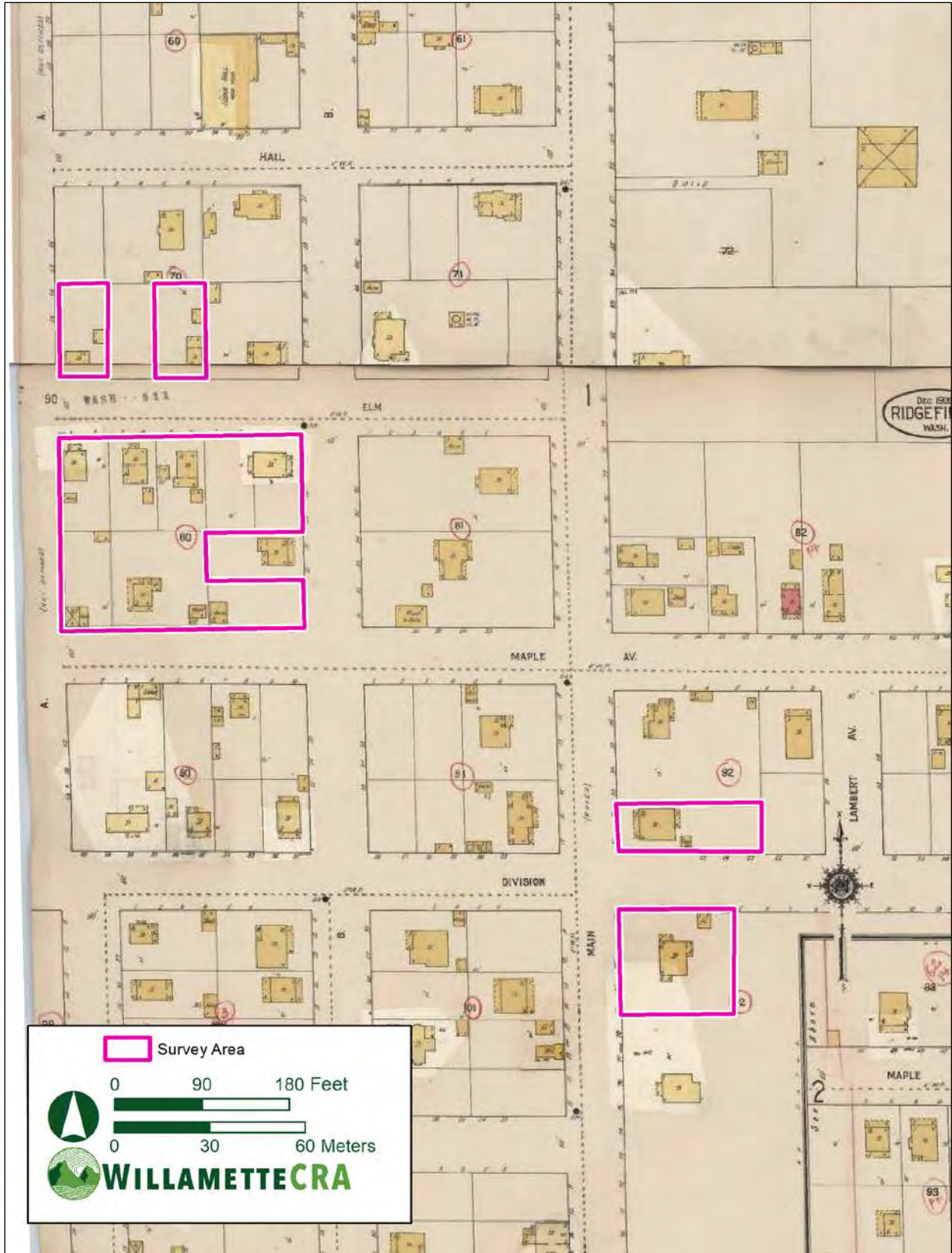


Figure 5. Project depicted on Sanborn fire insurance map 1920–1930.



Figure 6. A southeastern view of the Brown House within parcel 056 with SP 28 location to the right.



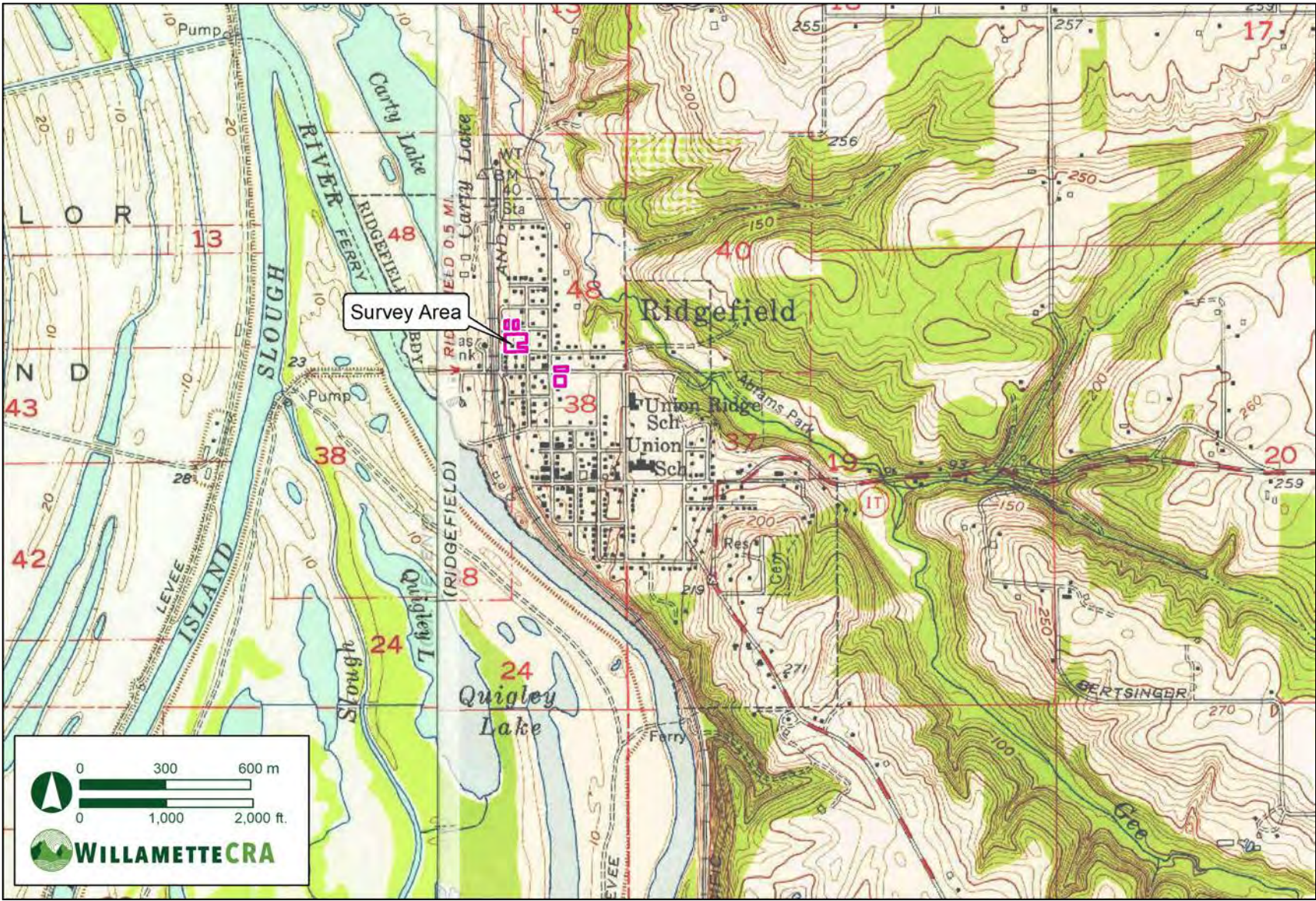


Figure 7. Project area on a 1957 USGS topographic map.

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## Previous Archaeological Investigations

A review of the WISAARD database has identified 35 previous cultural resource studies within a 1-mile search radius of the project area (Table 1). None of these previous archaeological studies overlapped with the project area; however, three are immediately adjacent (Gilmour et al. 2016; Freed 2008; Smits 2006). Investigations incorporated both surface and subsurface methods during 25 studies. Of the 35 previous investigations, 3 of those have occurred within the last 5 years (see Table 1).

The nearest investigation to the project area consisted of a pedestrian survey and excavation of 13 shovel probes for a proposed sewer line between South Gee Creek Loop and the Ridgefield Wastewater Treatment Plant (Smits 2006). A portion of Smits' project area is located underneath the pavement of Maple Street, which is the southern boundary of our current project area. None of their shovel probes were excavated within the general vicinity of the current project area. No archaeological resources were identified during their investigation.

The next nearest investigation, located approximately 30 ft. south of the current project area, was completed in 2016 (Gilmour et al. 2016). The current investigation is an extension of Gilmour's work, which was performed in anticipation of contamination cleanup. Gilmour's work used the residential lots on the southern side of Maple Street as its northern boundary. Pedestrian survey and shovel probing were used during this investigation. A total of 49 shovel probes were excavated across 17 residential properties. No cultural resources were identified (Gilmour et al. 2016). This project was not in DAHP's database at the time this report was written.

Another close-proximity investigation, located approximately 120 ft. west of the current project area, was completed by Freed in 2008. The floodplain west of the Burlington Northern and Santa Fe railroad line and east of Lake River was investigated in anticipation of future development, although no clear plans had been outlined. The project area had also been contaminated by dioxin during past lumber processing activities. Cleanup crews were actively steam-cleaning the ground surface within the project area at the time of the survey. Archaeological survey crews walked over the project area at 30-meter (m) intervals. No subsurface investigations took place. No cultural resources were identified during this investigation, however, Freed suggested further investigation during projects where undisturbed deposits may be uncovered (Freed 2008).

Our research identified 26 previously recorded archaeological resources within approximately 1 mi. of the project area (Table 2), none of which are within the current project area. Of these resources, 19 are sites, 4 are isolates, 2 are neither (mis-labeled standing historic-era structures), and 1 is currently unknown. Resource ages are more even, with 11 precontact resources, 10 historic-era, 4 multicomponent, and 1 currently unknown.



Table 1. Previous Cultural Resource Studies Within 1 Mi. of Project Area.

SHPO Report No.	Reference	Type of Work	Result	Within 100 ft. of Current Project Area
1344315	Gall 2003	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1344599	Wilson 1997	Shovel probes	Positive	No
1344696	DeLyria 1997	Literature review	Negative	No
1344729	Roulette 1998	Pedestrian survey, Shovel probes	Positive	No
1345365	Bourdeau 2004	Literature review	Negative	No
1346819	Stutte 2003	Pedestrian survey, Shovel probes	Positive	No
1346854	Smits 2006	Pedestrian survey, Shovel probes	Negative	Yes
1347394	Solimano 2006	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1350520	Oetting 2007	Pedestrian survey, Shovel probes	Negative	No
1351545	Buchanan and Reese 2008	Pedestrian survey, Shovel probes	Negative	No
1353604	Stipe 2009	Pedestrian survey	Negative	No
1354230	Daehnke 2010	Auger survey	Positive	No
1354276	Freed 2008	Pedestrian survey	Negative	No
1681993	Jenkins et al. 2012	Pedestrian survey, Shovel probes	Positive	No
1682908	Smith and Gall 2012a	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1682973	Smith and Gall 2012b	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1683305	Solimano 2013	Geotech monitoring	Positive	No
1684113	Reese et al. 2013	Trenching/Monitoring	Positive	No
1685007	Gilmour et al. 2013	Pedestrian survey, Shovel probes	Positive	No
1685738	Jenkins and Reese 2014	Construction monitoring	Positive	No
1687563	Holschuh and Wilt 2015	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1689087	Neuzil 2016	Pedestrian survey, Shovel probes	Positive	No
1689624	Windler 2017	Pedestrian survey, Shovel probes	Positive	No

Table 1. Previous Cultural Resource Studies Within 1 Mi. of Project Area. (Cont.)

SHPO Report No.	Reference	Type of Work	Result	Within 100 ft. of Current Project Area
1691134	Becker and Roulette 2018	Pedestrian survey, Shovel probes	Positive	No
1691247	Colón 2018	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1691341	McCurdy and Wilt 2018	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1691397	Haddad and Gall 2018	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1691446	Colón and Gall 2017b	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1691452	Colón and Gall 2017a	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1692139	Lynch and Roulette 2018	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1692490	Pattee and Roulette 2019a	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1692492	Pattee and Roulette 2019b	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1695614	Clark and Gall 2021	Predetermination; Pedestrian survey, Shovel probes	Negative	No
1696569	Lorain and Williams-Larson 2022	Pedestrian survey, Shovel probes	Positive	No
N/A	Gilmour et al. 2016	Pedestrian survey, Shovel probes	Negative	Yes

*Note:* All reports can be found at the Washington SHPO. Only those reports referenced in text are included in the **References** section.



Table 2. Previously Recorded Archaeological Resources Within 1 Mi. of Project Area.

Resource No.	General Age	Resource Type	Description	Approx. Distance From Project (mi.)	NRHP Eligibility
45DT101	Precontact	Site	Vancouver Lake/Lake River Archaeological District	0.02 W	Eligible
45CL252	Historic	Historic-era architecture	Occupied House (not an archaeological resource)	0.04 E	Unevaluated
45CL253	Historic	Historic-era architecture	Occupied House (not an archaeological resource)	0.12 E	Unevaluated
45CL1093	Historic	Site	Refuse	0.15 NW	Potentially Eligible
45CL1095	Historic	Isolate	Refuse	0.16 NW	Unevaluated
45CL1094	Precontact	Site	Fire-cracked rock	0.16 NW	Unevaluated
45CL4	Multicomponent; Mainly Precontact	Site	Possible Site of Cathlapotie; Village	0.18 W	Eligible
45CL1064	Precontact	Isolate	Lithic debitage	0.19 NW	Unevaluated
45CL1092	Historic	Site	Refuse scatter	0.20 NW	Potentially Eligible
45CL981	Multicomponent; Equal	Site	Lithic scatter, Fire-cracked rock, Historic demolition debris, and Historic refuse	0.22 S	Unevaluated
45CL1423	Multicomponent; Mainly Historic	Site	Historic refuse scatter and a Lithic tool	0.23 S	Not Eligible
45CL108	Precontact	Site	Lithic scatter and Features	0.25 W	Unevaluated
45CL1489	Historic	Isolate	Refuse	0.28 E	Not Eligible
45CL286	Historic	Site	Refuse dump	0.28 NW	Potentially Eligible
45CL467	Historic	Site	Refuse scatter and Demolition debris	0.31 NE	Potentially Eligible
45CL1488	Multicomponent; Equal	Site	Historic refuse scatter and Lithic scatter	0.31 SE	Not Eligible
45CL1183	Historic	Isolate	Refuse scatter	0.40 N	Unevaluated
45CL111	Precontact	Site	Fire-cracked rock and Possible features	0.47 W	Unevaluated
45CL431	Precontact	Site	Cains, Lithic scatter, and Possible burials	0.49 NE	Unevaluated
45CL466	Precontact	Site	Lithic scatter and Fire-cracked rock	0.56 E	Unevaluated
45CL432	Precontact	Site	Cairns, Fire-cracked rock, and Lithic scatter	0.56 NE	Not Eligible
45CL107	Precontact	Site	Fire-cracked rock	0.60 S	Unevaluated
45CL110	Precontact	Site	Fire-cracked rock and Possible features	0.66 SW	Unevaluated
45CL1491	Unknown	Unknown	Information not available at the time of reporting	0.70 E	Potentially Eligible
45CL285	Historic	Site	Refuse scatter	0.70 N	Potentially Eligible
45CL470	Precontact	Site	Lithic scatter	0.95 SE	Unevaluated

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Precontact resources within a mile of the current project area are generally larger and denser, consisting mainly of habitation sites or cultural features in the lowlands near natural hydrological features. Precontact sites east of the current project area appeared less likely to be occupied for extended periods of time. Many of these eastern, upland resources contain rock cairns.

Historic-era resources within a mile of the current project area are predominantly refuse scatters with occasional associated demolition debris. The closest historic-era resource (45CL1093) is approximately 0.15 mi. northwest of the current project area. This resource consists exclusively of refuse. It has been determined to be potentially eligible for the National Register of Historic Places (NRHP).

The Shoto Villages/Vancouver Island Archaeological District (45DT101) is located just west of the project area on the west side of the Burlington Northern and Santa Fe railroad line. The district consists of 170 historic and precontact resources, including lithic scatters and village sites (Gall 2017).

### **Historic Built Environment**

Our records search indicates that one of the structures within the current project area is within DAHP's database as a potential historical property, although the status of the property has yet to be determined at the time of this report.

The two-story house located at 414 North Main Avenue (the Brown House) was built in 1921. As of its recording in 1999, the only extensive work had involved updating the windows (O'Skea 1999).

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## Field Methods

### Contaminant of Concern, PPE, and Decontamination Procedures

Ground-disturbing activities associated with archaeological excavations could potentially expose workers to a hazardous substance, particularly dioxin (Tetrachlorodibenzo-p-dioxin or TCDD), resulting from the former wood treatment facility. The primary routes of entry for the contaminant of concern while working included inhalation, skin absorption, ingestion, skin and/or eye contact. To minimize these exposure pathways mandatory personal protective equipment (PPE) was worn at all times when there was the potential for contact with contaminated soils. Dust suppression techniques were not necessary as the sediment was damp from rainfall.

Soil contaminant levels were tested prior to the commencement of fieldwork. The measured concentration of dioxin required the use of modified level D PPE, which was worn during all survey procedures. Mandatory PPE included long pants, long sleeves, safety glasses, nitrile gloves, safety toed boots, and high visibility clothing. Polycoated Tyvek® boot covers and N95 face masks were provided for optional use. All PPE was inspected prior to donning. Doffing procedures included washing, rinsing, or dry brushing excess mud or dirt from outer boots and clothing; removing nitrile gloves; placing disposable and reusable PPE in designated separate containers; washing face and hands thoroughly prior to eating, drinking, or smoking; and ultimately disposing of PPE in a sanitary landfill.

Decontamination procedures were required for reusable field equipment that was not discarded following use. Field equipment, such as shovels and screens, were decontaminated before vacating each property. The procedure included: shaking or dry brushing excess mud or dirt from equipment; cleaning equipment using paper towels and a deionized water→liquinox soap→deionized water rinse procedure; placing electronics such as cell phones and cameras in plastic bags; completing field forms on-site, and ultimately disposing cleaning supplies (e.g., paper towels), plastic bags, and tarps in a sanitary landfill.

All members of our field crew (Mike Shimel and Alexis Crow) received the 40-hour HAZWOPER training and are current in their certification.

### Pedestrian Survey Methods

WillametteCRA conducted a systematic pedestrian survey of the project area. Archaeologists walked transects at no greater than 1.5 m (5 ft.) intervals across each of the 10 parcels (see Figures 2 and 3). The field crew examined one entire parcel before moving to the next property. Property lines were clear; the area is a developed residential neighborhood with fenced yards. During the survey, archaeologists examined the ground surface for artifacts or features.



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## Shovel Probe Methods

The pedestrian survey was supplemented by a shovel probe survey. After completing the pedestrian survey of a parcel, WillametteCRA archaeologists excavated subsurface shovel probes. The field crew placed between 2 and 7 shovel probes in each of the 10 parcels. The specific number of probes was based upon the size of the lot (i.e., more probes were excavated in larger yards). The field director selected locations for probing with the goal of covering the area with shovel probes placed at approximately 20 m intervals. We excavated a total of 35 shovel probes in the 10 parcels (Table 3).

Shovel probes measured at least 40 cm in diameter. Field crews excavated round probes in 10-cm arbitrary levels within natural strata. The field crew excavated probes to a depth of at least 60 cm below surface (cmbs) unless met with impasses (Appendix A). Field crews screened all excavated sediments through ¼-inch mesh. Staff documented all probes in the field and mapped each location using a Global Positioning System (GPS) capable of sub-meter accuracy. The data collected for each shovel probe included the maximum depth of the probe, soil stratigraphy, depth of stratigraphic changes, sediment descriptions, extent of disturbance, depth to impenetrable layer, and presence/absence of cultural material. The field crew backfilled shovel probes following documentation.

Research indicated that some lots (e.g., lots 056, 079, 081, 080, and 083) housed outbuildings (see Figure 5), though only one of these outbuildings was labeled as a privy (in Lot 046). In these lots, archaeologists supplemented the shovel probes with the use of a 4-foot-long metal rod to explore for subsurface deposits. Archaeologists attempted to locate anomalies of soil consistency while estimating where outbuildings were depicted on historic maps. They pushed the rod into the ground in an attempt to find dense deposits of historic materials or especially soft deposits. Extra attention was paid during the investigation of [REDACTED] where a privy had been historically mapped (Sanborn Map and Publishing Company 1920; Figure 5).

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## Results and Discussion

WillametteCRA conducted archaeological surveys between January 23 and 25, 2024. We examined 10 parcels and excavated 35 shovel probes. Ground surface visibility was limited as most areas were landscaped. Archaeologists identified one archaeological resource during the pedestrian survey. One shovel probe (██████) contained historic-era refuse (temporary isolate 23-159-1; Figure 8). Tabular results of the shovel-probe program are presented in Appendix A.

Soils observed across the project area were generally consistent with local mapped soils, which are labeled as Hillsboro silt loam, 3–5% slopes. This well-drained soil type is typically found on terraces. A typical soil profile is more than 60 inches thick (NRCS 2024). Slight color changes were common, although not always observed. Dark yellowish-brown silt loam often lightened to yellowish-brown within 40 cm of the ground surface. Angular and subangular very small to small pebbles were often observed and normally increased slightly with depth.

Most parcels within the current project area were investigated without notable finds or observations (Figures 9–11). After pedestrian survey and soil prodding for anomalies, shovel probe locations were designated. Factors such as lot size, utility markings, landscaping, extremely dense vegetation, and unexpected hazards such as potentially dangerous refuse including lumber with extensive protruding hardware and ample animal droppings were all considered in the field while choosing probe locations. Observed ground disturbance was variable, although generally high across the project area. Modern refuse and/or waste construction materials from initial construction and outbuilding demolition activities were common within most yards. Unnoteworthy lots include 043, 056, 078, 081, 083, 087, and 089.

One notable anomaly encountered during this investigation is a series of concrete sections protruding slightly from the ground in the blackberry covered southeastern corner of lot (079) and just south of the residence within parcel 080 (Figures 12 and 13). The collected GPS data did not synchronize with any structures observed on any historical maps or aerials (NETR 1951, 1960, 1970, 1981, 1990; Sanborn Map and Publishing Company 1920, 1920–1930). One shovel probe (SP 14) was excavated approximately 3 feet east of the main concrete slab. Ample contemporary refuse including plastic, vessel glass (colorless, amber, and green), wire nails, ferrous metal, and highly degraded large mammal bone were noted throughout and to the base of excavation at 60 cmbs. A short conversation with the current landowner provided no clarity, as he mentioned he never noticed it (Christopher Beitey, personal communication 2024). Multiple dilapidated classic vehicles obscure the ground surface within this portion of the yard as they have been parked on top of this location. No evidence indicating a historic-era origin was encountered in the field or during our research; therefore, the concrete was not recorded as an archaeological resource. No further work is recommended within parcels 079 and 080.

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## Archaeological Resources

### *Archaeological Isolate 23-159-1*

One historic-era archaeological resource, temporary isolate 23-159-1, was documented while investigating [REDACTED]. On February 24, 2024, just before our pedestrian survey of the lot, the property owners, Fred and Tanya Crippen, informed us of likely artifacts found during past small construction projects and yardwork tasks [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] It was not possible to investigate below their paved driveway, however, the driveway will not be disturbed during the proposed cleanup (Figure 14).

The entire ground surface with [REDACTED] was inspected, although visibility was low. Utility paint was present across much of lawn (Figure 15). Between built structures and utility paint, there was no room to excavate shovel probes in the western half of the lot. Three shovel probe locations (SP 20–22) were initially placed where space allowed within the eastern half of the lot. The only available space was within the property's back and side yards, which are separated by a narrow privacy fence.

Shovel probe [REDACTED], next to an ornamental garden (see Figure 8). Shovel probe 20 contained one historic-era artifact within the sod cap. One corroded machine cut and headed square nail (n=1) was located within the top 10 cm of the probe (Figure 16). This probe also contained small to medium sized dark gray angular fine-grained volcanic rock, which had the potential to be lithic debitage. A variety of materials were observed from within the top 20 cm of SP 20, some of which had characteristics often found on lithic debitage. Initially, four pieces of dark gray fine-grained volcanic material found within SP 20 were set aside as potential lithic debitage, while most were discarded due to lack of identifiable flake characteristics. These potential artifacts were later deemed non-cultural and discarded after decorative, imported rock of the same material was observed within highly landscaped portions of the lot.

Shovel probe 21 was excavated on the eastern bound [REDACTED]. Modern refuse, including non-temporally diagnostic colorless window glass, wire nails, and a single small fragment of large mammal bone, were observed within the top 30 cm; no identifiable historic-era material was observed. Disturbance was high within this probe due to landscaping practices.

Shovel probe 22 was excavated near the southern bound [REDACTED], on the southern side of the property's privacy fence. One small piece of dark gray angular fine-grained volcanic material with potential bulb of percussion was found from within the top 10 cm of SP 22. This small

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rock was set aside to document as a possible precontact lithic artifact. Photos were taken of the probe and potential lithic. Based on further investigation the rock was determined to be non-cultural and SP 22 was designated as negative (Figure 17).

After shovel probes 20-22 were completed, four radial shovel probe locations were chosen. These radial probes filled out the remainder of the available space to survey within [REDACTED]. With the assumption that SP 22 was positive, radial shovel probes were placed around this probe as well.

While excavating radial shovel probes within [REDACTED] the crew noticed that the decorative imported, crushed gravels used for landscaping around the privacy fence were indistinguishable from lithic material documented from within shovel probes 20 and 22. The process of crushing gravel can produce many of the same characteristics exhibited on lithic debitage. By the time this observation was made, radial shovel probes 25 and 26 had already been excavated, although we could no longer say that those probes were necessary. The remainder of the radial shovel probes (SP 23 and 24) were excavated around positive probe 20, neither of which contained cultural material of definite historic-era origin, although three non-temporally diagnostic undecorated whiteware fragments were found from between 10 and 30 cmbs within SP 24.

By the end of our field investigation within [REDACTED] only SP 20 contained a definitive artifact. Temporary isolate 23-159-1 consists of one historic-era artifact, a single corroded machine cut and square headed nail (n=1), within the top 10 cm of a 60 deep shovel probe. The artifact was photographed and documented before being reburied within SP 20. The western, southern, and eastern boundaries have been defined by negative shovel probes; however, we did not have access to the northern adjacent parcel. The resource could possibly extend into said adjacent property to the north.

Machine-cut nails were predominantly manufactured between the 1830s and 1900, but use of these nails continued into the twentieth century for various construction tasks, such as floor construction (Horn 2005; Wells 1998). Machine-cut nails are commonly identified in later temporal contexts due to this continued use.

## **Discussion**

While the presence of a machine cut and headed square nail warrants archaeological documentation, its proximity to the residence at 502 N Main Street is not surprising. This property is not within DAHP's database; however, the residence is depicted on the earliest available Sanborn map (Sanborn Map and Publishing Company 1920). Excess construction materials discarded during initial construction or renovation tasks could easily explain the presence of machine-cut nails.

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The yard in which temporary isolate 23-159-1 is located has been extensively landscaped and hence disturbed. The sod cap of positive SP 20 was manicured lawn. An ornamental garden with a shallow encompassing drainage channel was located approximately two feet northeast, so localized disturbance was obvious. The top stratigraphic layer within SP 20 was 25 cm thick, which is likely the depth of disturbance. This surficial layer contained temporary isolate 23-159-1 as well as modern wire-nails and discarded plastic packaging. Contemporary refuse was common within the adjacent shovel probes, as well.

While our investigation did not include the parcel north of temporary isolate 23-159-1, it is our opinion that the potential for information-bearing archaeological deposits within the project area is very low. We observed no evidence of intact cultural features, including the privy depicted on the Sanborn maps, within areas that will be impacted by the proposed project.



Figure 9. An eastward view of SP 1 (left) and SP 2 (right) locations within parcel 043.





Figure 10. A northeastward view of parcel 087 during pedestrian survey; SP 9 location behind blackberries.



Figure 11. A northeastward view of parcel 089 with SP 17 location just past the raised garden beds.





Figure 12. A northward view of the concrete protruding from the ground within the back yard of parcel 080.



Figure 13. A southward view of the concrete slab in the southeastern corner of lot 079.





Figure 14. [REDACTED]



Figure 15. A northwestward view of utility markings adjacent to temporary isolate 23-159-1 within parcel 046.



Figure 16. The material contents from 0 to 10 cmbs in SP 20, [REDACTED]. The machine cut and headed square nail is the sole artifact from temporary isolate 23-159-1.



Figure 17. SP 22 base of excavation at 60 cmbs; mixed imported decorative fine-grained volcanic gravels in the background.



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## Conclusions and Recommendations

WillametteCRA excavated 35 exploratory shovel probes and conducted pedestrian survey of the MFA Port of Ridgefield Cleanup project area. One historic-era resource (temporary isolate 23-159-1) was identified, which consists of a single corroded machine cut and headed square nail within a shovel probe. This resource was thoroughly delineated within the project boundary. It is our opinion that the proposed work will not affect intact archaeological deposits.

### NRHP Eligibility Recommendations

There are three basic requirements for a property to be eligible for listing on the NRHP. First, a property usually must be over 50 years old. Second, the property must meet at least one of the four National Register Criteria for significance. Third, the property must possess integrity or the ability to convey its significance (Hardesty and Little 2000; National Park Service [NPS] 1997). Significance is the threshold of importance for listing historic properties on the NRHP (Hardesty and Little 2000; NPS 1997). Significance is judged against four Criteria, any one or combination of which is sufficient for listing the property (NPS 1997). The four Criteria against which an historic property's significance is judged are:

- Criterion A: Important events;
- Criterion B: Important people;
- Criterion C: Design or construction; and
- Criterion D: Information potential.

Integrity is the ability of a property to convey its significance. Integrity is not a part of significance, but an independent element of the evaluation process that is assessed only after a property's significance is determined (NPS 1997). There are seven aspects of integrity. They are: location, design, setting, materials, workmanship, feeling, and association (NPS 1997). A property should possess several of these aspects.

Based on the results of our fieldwork and following analysis we have made NRHP eligibility recommendations for the archaeological resource recorded during this work. Our recommendations are described below.

#### ***Archaeological Isolate 23-159-1***

We recommend that the portion of archaeological isolate 23-159-1 within our project area is not eligible for listing in the NRHP. Based on the results of the fieldwork and following analysis, we find that the resource is not significant under Criteria A, B, or C. This isolate does not contain information related to important events (Criterion A), important people (Criterion B), or design or construction (Criterion C).

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Temporary isolate 23-159-1 is not significant under Criterion D. The resource comprises a single corroded machine cut and headed square nail within the top 10 cm of a shovel probe in the back yard of a residence in Ridgefield, Washington. The artifact cannot be definitively tied to a specific person or event and is consistent with generalized refuse that would have been sporadically discarded. The documentation of the isolate has exhausted its data potential within the current project area.

## **Management Recommendations**

Based on the information presented above we recommend:

- That the project proceeds as planned within the surveyed area, and that no additional archaeological investigations are necessary prior to the start of project activities.
- That an Inadvertent Discovery Plan (IDP) be developed and kept on site at all times during ground-disturbing work, and that the contractor receive training on the purpose and use of the IDP prior to the start of work.
- Should unanticipated archaeological or historical resources be encountered during project activities, all ground-disturbing activity in the vicinity of the find should be halted and the Washington DAHP should be notified immediately.

Should the proposed work or project area change, these recommendations may not apply, and additional work may be necessary.

In the unlikely event that human remains are encountered at any time, state law (RCW 27.44.055) requires all activity to cease that may cause further disturbance to those remains, and the area of the find secured and protected from further disturbance. The finding of human skeletal remains will be reported to the Clark County coroner and local law enforcement in the most expeditious manner possible. The remains will not be touched, moved, or further disturbed. The coroner will assume jurisdiction over the human skeletal remains and determine whether those remains are forensic or non-forensic. If the coroner determines the remains are non-forensic, they will report that finding to the DAHP, who will take jurisdiction over the remains. The DAHP will notify any appropriate cemeteries and all affected Tribes of the find. The State Physical Anthropologist will determine whether the remains are Native American or non-Native American, and report that finding to any appropriate cemeteries and the affected Tribes. The DAHP will then manage all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.

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**Appendix A:  
Tabulated Summary of Shovel Probes**

Table. Summary of Shovel Probe Results.

Shovel Probe	Lot	Max depth (cmbs)	Findings	Comments
1	43	60	Negative	-
2	43	60	Negative	-
3	43	60	Negative	-
4	43	60	Negative	-
5	43	70	Negative	-
6	43	70	Negative	-
7	43	60	Negative	-
8	87	60	Negative	-
9	87	15	Negative	Concrete demo debris at 15 cmbs
10	78	60	Negative	-
11	78	40	Negative	Root impasse at 40 cmbs
12	79	60	Negative	-
13	79	60	Negative	-
14	80	60	Negative	-
15	80	60	Negative	-
16	89	55	Negative	PVC utility line at 55 cmbs
17	89	60	Negative	-
18	89	60	Negative	-
19	89	60	Negative	-
20	46	60	Positive	Square cut nail; n=1
21	46	60	Negative	-
22	46	60	Negative	-
23	46	60	Negative	-
24	46	60	Negative	-
25	46	60	Negative	-
26	46	60	Negative	-
27	56	60	Negative	-
28	56	60	Negative	-
29	56	60	Negative	-
30	56	70	Negative	-
31	56	60	Negative	-
32	81	60	Negative	-
33	81	60	Negative	-
34	83	60	Negative	-
35	83	60	Negative	-