PHASE IB ENVIRONMENTAL INVESTIGATION REPORT

ST. HELENS PHASE I LAGOON REPURPOSING

Prepared for
CITY OF ST. HELENS
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MAUL FOSTER ALONGI

Prepared by
Maul Foster & Alongi, Inc.
3140 NE Broadway Street, Portland, OR 97232

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

MAUL FOSTER & ALONGI, INC.

REGISTERED
OREGON
DAVID GLENN WEATHERBY
G1880
GEOLOGIST

EXPIRES: 6/1/2024
This digital seal certifies the signatory and document content.

David Weatherby, RG
Principal Geologist

Cody Schweitzer
Project Environmental Scientist

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
Apex	Apex Laboratories LLC
the City	City of St. Helens
COC	chain of custody
CRBG	Columbia River Basalt Group
DEQ	Oregon Department of Environmental Quality
DO	dissolved oxygen
DU	decision unit
EPA	U.S. Environmental Protection Agency
FSDS	field sampling data sheet
GPS	global positioning satellite
HCSM	hydrogeologic conceptual site model
ISM	incremental sampling methodology
m/s	meters per second
MFA	Maul Foster & Alongi, Inc.
OAR	Oregon Administrative Rules
ORP	oxidation-reduction potential
PCB	polychlorinated biphenyl
PFAS	polyfluorinated substances
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RBC	risked-based concentrations
SB	Sentinel Bluffs
the site	451 Plymouth Street, St. Helens, Oregon
Sonic	rotosonic
SVOC	semivolatile organic compound
TEQ	toxicity equivalence quotient
TOC	top of casing
TPH	total petroleum hydrocarbons
VOC	volatile organic compound
WW	Winter Water

1 INTRODUCTION

Maul Foster & Alongi, Inc. (MFA) has prepared this report for the City of St. Helens (the City) documenting the results of an environmental investigation conducted at the wastewater treatment lagoon located at 451 Plymouth Street, St. Helens, Oregon (the site; see Figure 1-1). The investigation generated additional information about the site geology, hydrogeology, and chemistry necessary for the repurposing of the lagoon.

1.1 Regulatory Framework

The site currently serves as the St. Helens wastewater treatment lagoon. The City is exploring repurposing the lagoon into a nonmunicipal-waste facility for receiving sediment, soil, and wastewater treatment sludge. The first phase of the lagoon repurposing project, referred to as Phase I, includes initial site characterization, conceptual design, and permitting. These activities are necessary for progress toward conditional permit approval from the Oregon Department of Environmental Quality (DEQ) under Oregon Administrative Rules (OAR) 340-093 for the conversion of the St. Helens wastewater treatment lagoon. In addition, OAR 340-94-0080, OAR 340-0040, and 40 Code of Federal Regulations Part 258 address groundwater hydrology, quality, and groundwater monitoring.

The environmental investigation described in this report is a continuation of the Phase I activities initiated by the City in 2019. In July through September 2019, MFA completed various Phase I site investigation activities to understand baseline conditions at and in the vicinity of the lagoon, including the site geology and hydrogeology. That investigation included drilling six exploratory borings completed as monitoring wells (MW-1 through MW-6): two on the basalt bluff west of the lagoon and four on the lagoon dike; water level monitoring; groundwater sampling; and aquifer testing.

The results of the Phase I investigation were provided in the Phase I Site Characterization Report (MFA 2020). The DEQ responded to the Phase I report, identifying certain data gaps it believed had not been sufficiently addressed after the initial Phase I investigation (DEQ 2020a, 2020b). The environmental investigation documented in this report, referred to as Phase IB, was conducted to address data gaps identified by the DEQ. The scope of work for Phase IB, including field procedures, sample locations, analytical methods, and quality assurance and quality control (QA/QC) procedures, is described in the Phase IB environmental investigation work plan (MFA 2022).

The Phase IB work was conducted, and this report was prepared, under the Community Wastewater Treatment Resiliency grant 5327-11-R awarded to the City by the Federal Emergency Management Agency.

1.2 Investigation Objective

The objective of the Phase IB investigation was to collect data to further advance the initial understanding of the geologic and hydrogeologic characteristics of the site while addressing data gaps

identified by the DEQ after the completion of the previous Phase I, consistent with the requirements of OAR 340-093-0130(4)(a-d). Data to support this objective were collected to assess subsurface soil conditions in and beneath the lagoon and groundwater conditions beneath and adjacent to the lagoon.

In addition to the Phase IB investigation conducted by MFA, Geotechnical Resources, Inc. (GRI) conducted a second phase of geotechnical investigation to supplement the initial phase completed in 2019 and presented in the Phase I report. A brief summary of the 2023 geotechnical investigation findings is provided in Section 5.

2 BACKGROUND

2.1 Site Description

The site is located in Columbia County, in sections 3 and 10 of township 4 north, range 1 west of the Willamette Meridian, and along the west bank of the Multnomah Channel just south of its confluence with the Columbia River (Figure 1-1). The site is occupied by the City's sewage treatment plant and its associated wastewater treatment lagoon. The lagoon encompasses approximately 40 acres and is 21 feet deep. Wastewater treatment lagoon design drawings indicate that the bottom of the lagoon lies at an elevation of about 7 feet. The north and west margins of the lagoon perimeter are defined by a basalt bedrock bluff rising steeply to elevations of 40 to 80 feet. The northeast, east, and south margins of the lagoon consist of a constructed dike. The top of the dike lies at an elevation of 31 feet.

The lagoon is bordered on the east by the Multnomah Channel, a distributary channel of the Willamette River; on the west by a residential neighborhood; to the north by the former Boise Cascade Veneer site, the Nob Hill Nature Park, and a National Guard Armory; and to the south by the former Boise Cascade pulp and paper mill.

2.2 Site History

The sewage treatment plant and wastewater treatment lagoon were constructed in 1969, per an agreement between the City and Boise Cascade (the operator of the paper mill south of the site at that time). The site facilities were used for treatment of both municipal and paper mill effluent wastes. Historically, mill effluent comprised the majority of wastewater treated at the site. In 2009, wood pulping at the mill ceased, resulting in a reduction of mill effluent, which now comprises about 70 percent of wastewater treated at the site. The City's sewage treatment plant effluent comprises the remainder.

3 PHASE IB SCOPE OF WORK

This section provides a brief summary of the objectives, followed by a description of each field investigation activity completed. The objectives; scope of work; and field, laboratory, and QC methodologies are described in detail in the Phase IB work plan. As described below, field conditions, drilling rig access, and direction from the City necessitated deviations from the scope of work described in the Phase IB work plan.

3.1 Site Investigation Objectives

The Phase IB environmental investigation was completed to address the following objectives:

1. Assess baseline conditions for metals and anthropogenic organic chemicals potentially present in sludges currently present in the lagoon.

2. Develop a better understanding of the geology and hydrogeology beneath the lagoon and the hydraulic connectivity between interflow zones in basalt bedrock to the west of the lagoon and alluvium to the east of the lagoon.

3. Assess baseline conditions for metals and anthropogenic organic chemicals potentially present in groundwater.

3.2 Deviations from the Phase IB Scope of Work

The following is a summary of deviations from the Phase IB work plan.

3.2.1 Drilling Methods and Boring Locations

The Phase IB work plan scope of work included advancement of two borings in the lagoon, using a rotosonic (sonic) drill rig operated from a barge. Doing so would have required moving the City's water-quality baffles in the lagoon to allow the barge to access the proposed boring locations while also avoiding shallow areas in the lagoon. The City later determined that the baffles could not be moved due to their physical condition. Navigating the barge around the baffles in shallow water was not possible due to the deep draft of the barge required for the sonic drilling rig.

Instead, six borings were advanced using a direct-push drilling rig operated from a barge as described in Section 3.3.2 below. Owing to its small size and lighter weight compared to a sonic drilling rig, the depth requirement for the barge was less, and the barge could be navigated through shallow-water areas around the ends of the baffles.

Owing to this deviation, the following activities proposed in the Phase IB work plan were not completed:

- Because the direct-push drilling rig cannot drill into rock, the physical and hydrogeologic properties in the basalt underlying the lagoon were not observed or assessed.
- Standard penetration tests and collection of undisturbed Shelby tube samples were not completed in the soil under the lagoon.
- Specific capacity tests were not completed in the basalt.
- Aquifer testing (pneumatic slug tests) was not completed in the basalt.

3.2.2 Deep Sludge Sample Collection

The Phase IB work plan scope of work included collection of a lagoon sludge sample from the bottom of the sludge interval at each of the two proposed sonic borings for laboratory analysis. Instead, five sludge samples were collected from the bottom of the sludge interval at each of the five direct-push borings MFA B-1 through MFA B-5 (no sample was collected from boring MFA B-3A). Rather than analyzing each individual sample as proposed in the Phase IB work plan, the five samples were composited into a single sample for laboratory analysis, as described further in Section 3.3.2 below.

3.2.3 Reconnaissance Groundwater Sample Collection

The Phase IB work plan scope of work included collection of a reconnaissance groundwater sample from the basalt in each of the two proposed sonic borings for laboratory analysis. Because the direct-push drilling rig cannot drill in rock, reconnaissance groundwater samples were not collected in the basalt.

Instead, as described in Section 3.3.3 below, a reconnaissance groundwater sample was collected from a sandy water-bearing zone within the alluvium directly underlying the lagoon at boring MFA-B3A. At the other four direct-push boring locations, a reconnaissance groundwater sample was not collected because at two boring locations, basalt was present immediately under the lagoon, and at the other two locations, the alluvium under the lagoon consisted of soft, moist silt; no sandy water-bearing zones with sufficient groundwater for sample collection were encountered within the depth drilled.

3.2.4 Analysis for Per- and Polyfluorinated Substances

At the request of the City, analysis for per- and polyfluorinated substances (PFAS) was added to the analytical program for all samples collected, including the lagoon sludge samples, the reconnaissance groundwater sample, and the groundwater samples collected from monitoring wells. The analytical methods for the Phase IB investigation are described in Section 3.5 below.

3.3 Phase IB Scope of Work

3.3.1 Shallow Lagoon Sludge Sample Collection

To address the first investigation objective above, an incremental sampling methodology (ISM) approach (DEQ 2020c) was used to collect a representative sample of the lagoon sludge. ISM is a

structured composite sampling and processing protocol that reduces data variability, thereby increasing data representativeness. ISM is appropriate when attempting to establish average chemical concentrations in a single medium over a large area, as was the objective for the lagoon sludge sampling. ISM provides a single sample for analysis with a concentration representative of the mean concentration in a predefined area termed a decision unit (DU). For this project, the entire lagoon is defined as a single DU, referred to in this work plan as DU1.

The lagoon sludge ISM sampling was completed on August 10, 2022. Fifty incremental samples were collected at the approximate locations shown on Figure 3-1, using a clam shell sampling device, from the upper portion of the sludge column. The 50 locations were placed along ten east-west-oriented transects spanning the width and length of DU1. Global positioning satellite (GPS) coordinates were generated for each location and input into a GPS handheld device with a horizontal accuracy of less than 10 feet. The locations were accessed from a powered barge operated by the City. MFA directed the barge to each location, using the GPS device. A few locations were moved a few feet to avoid baffles and aerators in the lagoon, or because of poor sample recovery in the initial sample collected.

Upon retrieval, each sludge sample was inspected to ensure the sampling device was completely closed and retained all material. Fifty 4-ounce increments were collected from DU1. Each 4-ounce increment was collected from the sampling device, using a 1/2-cup stainless steel measuring cup, which resulted in approximately 4 ounces of sludge. Each 4-ounce increment was then placed into a total of two 1-gallon glass jars provided by the laboratory and stored in an iced cooler until sample collection was complete.

In addition, for volatile organic compound (VOC) analysis, a 5-gram sample was collected from the sampling device at each ISM location, using U.S. Environmental Protection Agency (EPA) Method 5035, and placed in a single 500-milliliter methanol-preserved glass jar provided by the laboratory and stored in an iced cooler until sample collection was complete.

An additional 50 1-ounce increments were collected and placed into a single 1-gallon glass jar for percent moisture determination. To best represent the field condition of the material, which was very wet, the percent moisture container was not decanted. The 4-ounce increment sample containers were decanted by pouring off the separated liquid from the top of the container.

At the completion of the ISM sample collection, the iced cooler containing the three 1-gallon glass jars and 500-milliliter glass jar were submitted under chain of custody (COC) to Apex Laboratories LLC (Apex) in Tigard, Oregon, for analysis. Apex subcontracted a portion of the sample to both Weck Laboratories, Inc., in California and Bureau Veritas in Ontario, Canada.

Apex air dried, sieved, ground, and homogenized the entire sample and collected a single aliquot for analysis, following industry-standard methods for ISM sample processing. The final ID for the ISM sludge sample analyzed is DU1-20220810-ISM-COMP. Sludge sample analytical methods are listed in Section 3.5.

3.3.2 Drilling and Deeper Lagoon Sludge Sample Collection

From January 30 through February 7, 2023, six borings identified as MFA B-1 through MFAB-5 and MFA B-3A, were advanced in the lagoon at the locations shown on Figure 3-1. MFA B-3A was drilled adjacent to MFA B-3 due to poor recovery in the initial boring in the alluvium directly under the lagoon. Once all other borings were completed and the core recovery method had become more effective, MFA B-3A was drilled to recover soil from the missing interval at MFA B-3 from a depth of 3 to 14.5 feet. All borings were advanced using a direct-push drilling rig operated by Cascade Drilling of Clackamas, Oregon, a well constructor licensed in Oregon. The drilling rig was a Geoprobe 7822DT direct-push drill rig equipped with 2.25-inch-diameter, 5-foot-long macrocore soil sampling device.

Changes in the lithology of the core were recorded on the boring logs provided in Appendix A. Lagoon sludge was encountered at all borings. At borings MFA B-1 and MFA B-2, the boring terminated on basalt directly under the lagoon sludge. At borings MFA B-3 through MFA B-5 and MFA B-3A, alluvium was present under the sludge and described in accordance with the Unified Soil Classification System. Borings MFA B-3 and MFA B-4 terminated in alluvium at 110 feet below the lagoon bottom (defined as the top of the sludge), MFA B-3A terminated in alluvium at 21.5 feet below the lagoon bottom, and MFA B-5 terminated on basalt at 30.25 feet below the lagoon bottom.

Lagoon sludge was observed at each boring with a distinct lower boundary under which either basalt or alluvium was encountered. MFA collected a sludge sample from the bottom of the sludge interval at each boring for laboratory analysis. The samples were collected in one unpreserved 1-gallon glass jar, two methanol-preserved 500-milliliter glass jars, and one 250-milliliter unpreserved high-density polyethylene container and submitted under COC to Apex for analysis.

Apex air dried, sieved, ground, and homogenized the entire sample and collected a single aliquot for analysis, following the same industry-standard methods used for the ISM sample processing described in Section 3.3.1 above. The final ID for the deeper sludge sample analyzed is MFA-B1-B5-COMP-SL. Sludge sample analytical methods are listed in Section 3.5.

3.3.3 Reconnaissance Groundwater Sample Collection

As described above, a reconnaissance groundwater sample was not collected from the basalt due to the change in drilling method. At borings MFA B-3 through MFA B-5, where alluvium was encountered under the lagoon, a soft silt was encountered below the lagoon at MFA B-3, MFA B-4, and MFA B-5. Since no obvious water-bearing zone was encountered below the lagoon at these three borings, MFA did not attempt to collect a reconnaissance groundwater sample.

At MFA B-3A, multiple sand layers were encountered between 3.3 and 9.0 feet under the lagoon bottom. The remainder of the boring to the final depth of 21.5 feet consisted of soft silt with no water-bearing zones. A reconnaissance groundwater sample was collected from a temporary polyvinyl chloride (PVC) well screen placed at a depth of 6 to 10 feet below the bottom of the lagoon, and across the sandy intervals. On the afternoon before the groundwater sample was collected, 2 to 3 gallons of water were purged from the well until it was dry. Then the water level in the borehole was

allowed to recover and stabilize overnight to a static level. The next morning, the depth to water was measured and recorded on the field sampling data sheet (FSDS) provided in Appendix B. Due to the water volume needed for the analytical methods, and the anticipation of poor groundwater recharge to the temporary well, no additional groundwater was purged from the well prior to sample collection. The groundwater sample was collected using a peristaltic pump, with new, PFAS-free disposable tubing. Prior to sampling and directly afterward, a single water quality parameter measurement was collected using a water quality meter to measure temperature, pH, specific conductance, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity. These parameters were recorded on the FSDS.

The reconnaissance groundwater sample was collected directly into laboratory-supplied containers, placed in iced coolers, and submitted under COC to Apex for analysis. The reconnaissance groundwater sample analytical methods are listed in Section 3.5.

3.3.4 Groundwater Sampling from Monitoring Wells

Groundwater samples were collected from the six existing monitoring wells MW-1 through MW-6. Prior to groundwater sample collection, the depth to groundwater was measured and recorded on the FSDS. The wells were purged with low-flow sampling methods (EPA 1996), using a peristaltic pump or submersible pump when required based on the depth to groundwater. The groundwater parameters temperature, pH, specific conductance, DO, ORP, and turbidity were measured periodically during purging and recorded on the FSDS. Groundwater samples were collected after three consecutive readings indicated that the groundwater parameters had stabilized in accordance with the stabilization criteria described in the Phase IB work plan. The samples were collected directly into laboratory-supplied containers, placed in iced coolers, and submitted under COC to Apex for analysis. Monitoring well groundwater sample analytical methods are listed in Section 3.5.

3.3.5 Groundwater Level Measurements

Water levels from boring MFA B-3A and monitoring wells MW-1 through MW-6 were measured using an electronic water level meter to the nearest 0.01 foot. The static water level was measured in the alluvium at lagoon boring MFA B-3A, where the reconnaissance groundwater sample was collected. The depth to groundwater in the boring was measured from the top of the temporary outer casing. At the same time, the outer casing height above the barge deck and the barge deck height above the surface water level of the lagoon were measured and the measurements recorded. The surface water elevation of the lagoon is measured continuously at an electronic gauge at the City's wastewater treatment plant; the elevation was 28 feet during the groundwater level measuring event. That surface water elevation measurement was added to the deck height above the lagoon water level plus the casing height above the deck to establish the top of casing (TOC) elevation. The depth to groundwater below the TOC elevation was subtracted from the TOC elevation to calculate a groundwater elevation of 15.3 feet in the boring. This calculation is explained in detail on the MFA B-3A boring log in Appendix A.

The depths to water in the monitoring wells were measured from the top of the PVC well casing at the surveyed elevation point, which was marked so that readings are consistently taken from the same

reference point. Water levels were measured and recorded on the water FSDS (Appendix B) at each well location before purging or sample collection activities. The water level meter was decontaminated between wells.

3.4 Sample Handling Procedures

MFA staff collected, labeled, described, handled, and documented the samples collected in general accordance with the Phase IB work plan. Samples and sample documentation were maintained in the physical possession of MFA field personnel until custody of the samples was signed over to the analytical laboratory. All samples collected were documented on the COCs included with the laboratory reports in Appendix C.

3.5 Analytical Methods

The shallow and deep lagoon sludge samples were analyzed for the following:

- Priority pollutant metals antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc, plus barium and manganese, by EPA Method 6020B.
- Hexavalent chromium by EPA Method 7196A.
- Gasoline-range hydrocarbons by Method NWTPH-Gx.
- VOCs by Method SW8260D.
- Low-level VOCs (analyzed together with the full list of EPA Method 8260D VOCs) by Method SW8260D-SIM.
- Diesel- and motor-oil-range hydrocarbons by Method NWTPH-Dx.
- Semivolatile organic compounds (SVOCs) by Method SW8270E.
- Polychlorinated biphenyl (PCB) congeners by EPA Method 1668C.
- Dioxins/furans by EPA Method 1613B, with confirmation by EPA Method 8290A.
- Chlorinated herbicides by Method SW8151A in the shallow sludge sample only. The deeper sludge sample had insufficient volume for all analytical methods. Since chlorinated herbicides were not detected in the shallow sludge sample, the deeper sludge sample was not analyzed for chlorinated herbicides.
- Organophosphorus pesticides by Method SW8270E.
- PFAS by ASTM D7968-17A.
- Low-level organochlorine pesticides by EPA Method SW8270E.

The reconnaissance groundwater sample and six monitoring well groundwater samples were analyzed for the following:

- Priority pollutant metals antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc, plus barium and manganese, by EPA Method 6020B.
- Hexavalent chromium by EPA Method 218.6.
- Gasoline-range hydrocarbons by Method NWTPH-Gx.
- VOCs by EPA Method SW8260D.
- Low-level VOCs (analyzed together with the full list of Method 8260D VOCs) by Method SW8260D-SIM.
- Diesel- and motor-oil-range hydrocarbons by Method NWTPH-Dx.
- SVOCs by EPA Method 8270E.
- PCB congeners by EPA Method 1668C.
- Dioxins/furans by EPA Method 1613B, with confirmation by EPA Method 8290A.
- Chlorinated herbicides by EPA Method 8151A.
- Organophosphorus pesticides by EPA Method 8270E.
- PFAS by EPA 537.1 Modified.
- Low-level organochlorine pesticides by EPA Method 1699

3.6 Decontamination Procedures

Nondedicated sampling equipment (the submersible pump and water level meter) were decontaminated using the following procedures:

- Rinse with water.
- Wash with nonphosphate detergent.
- Rinse with distilled water.
- Air dry.

For ISM sampling, decontamination was not required for nondedicated sampling equipment used in the same DU, since all incremental samples were composited.

To mitigate PFAS cross-contamination, the following procedures were followed during sampling:

- Field staff wore synthetic or 100 percent cotton clothing that had been well-laundered without fabric softener.
- Waterproof clothing was made with polyurethane, PVC, wax-coated fabric, rubber, or neoprene.
- Boots were made of polyurethane.

- Powderless nitrile gloves were worn.
- High-density polyethylene and silicone tubing was used for sample collection.
- Powderless nitrile gloves were worn during and changed between sample locations or when handling sample equipment.
- Sample container(s) remained sealed at all times and opened only during sample collection.
- Sample container caps and lids were never placed directly on the ground or facing downward.
- Method-specific sample preservation, thermal storage, and holding time requirements were followed.

3.7 Investigation-Derived Wastes

Excess sludge from the shallow sludge sampling event and sludge and soil from the five lagoon borings were returned to the lagoon, adjacent to each sample location. Purge water generated during reconnaissance groundwater sampling and groundwater sampling at monitoring wells MW-3 through MW-6 was discharged to the wastewater treatment lagoon. Purge water generated during groundwater sampling at monitoring wells MW-1 and MW-2 was discharged to the ground adjacent to each well and allowed to infiltrate.

3.8 Field Quality Control Samples

Field quality control samples collected included the following:

- **Field Duplicate:** During groundwater sample collection from the monitoring wells, a duplicate sample with the ID MW3-20230214-GW-35-DUP was collected from MW-3.
- **Temperature Blank:** A temperature blank provided by the laboratory was included in each cooler. All samples were placed into coolers with ice after sample collection to maintain a sample temperature of 4°C or less until receipt at the laboratory.
- **Trip Blank:** Trip blanks were used with all groundwater VOC sample delivery groups.

3.9 Data Quality Assurance and Quality Control Review

MFA evaluated the laboratory data for precision, completeness, accuracy, and compliance with the analytical method. MFA performed a Stage 2A validation, consistent with EPA's Superfund risk assessment guide (EPA 1989), and assigned data qualifiers to sample results, following applicable sections of the EPA procedures for data review (EPA 1986, 2014, 2020a, 2020b, 2020c).

The results of the data evaluation review for each data package are summarized in the data validation memoranda in Appendix D. Based on the validation results, the data, with the appropriate data qualifiers assigned, are considered acceptable for their intended use.

4 RESULTS

This section presents the results of the Phase IB investigation, which include the following:

- A description of the lagoon sludge encountered and shallow and deep sludge sample analytical results
- The results of the reconnaissance groundwater sample analysis
- The results of the monitoring well groundwater sample analysis
- A revised hydrogeologic conceptual site model (HCSM) based on a geologic literature review, and the results of the Phase I and Phase IB subsurface investigations

The sludge sample analytical results are summarized on Table 4-1 and compared to the DEQ human health risk-based concentrations (RBCs) for (1) construction and excavation worker soil ingestion, dermal contact, and inhalation, and (2) soil leaching to groundwater for residential tap water exposure.

The reconnaissance groundwater and monitoring well groundwater results are summarized on Table 4-2 and compared to DEQ human health RBCs for residential ingestion and inhalation of tap water and the following ecological RBCs:

- Freshwater RBC for protection of aquatic life, chronic
- Freshwater RBC for protection of aquatic life, acute
- Surface water RBC for wildlife ingestion of surface water, birds
- Surface water RBC for wildlife ingestion of surface water, mammals

Representative photographs of shallow sludge encountered during sampling and deeper sludge and soils encountered at the borings are included in Appendix E.

4.1 Shallow and Deep Lagoon Sludge Results

The lagoon sludge consisted of dark gray to black, very fine-grained and wet decomposed organic material. It was very loose with trace sheen, organic-like odor, and trace woody debris. By weight, the solids content in the shallow sludge material was 6.71 percent and increased to 19.2 percent in the deeper sludge.

As shown on Table 4-1, chlorinated herbicides, organophosphorus pesticides, and VOCs were not detected in the shallow sludge sample (sample ID DU1-20220810-ISM-COMP on Table 4-1). The following analytical groups were detected in the shallow sludge sample:

- Dioxins/furans: all but one congener were detected, and the dioxin/furan toxicity equivalence quotient (TEQ) exceeded the RBC for leaching to groundwater.
- Metals: 14 of 16 metals were detected. No metals concentrations exceeded RBCs.

- Organochlorine pesticides: four of 28 pesticides were detected. No organochlorine pesticide concentrations exceeded RBCs.
- PCB congeners: 80 of 164 congeners were detected. The total PCB congener concentration did not exceed the RBCs.
- PFAS: 18 of 32 compounds were detected; there are no RBCs to which the data can be compared.
- SVOCs: five SVOCs were detected. No SVOC concentrations exceeded RBCs.
- Total petroleum hydrocarbons (TPH): Only diesel-range hydrocarbons were detected at a concentration that exceeded the leaching to groundwater and construction worker RBCs. Gasoline- and lube-oil-range petroleum hydrocarbons were not detected.

As shown on Table 4-1, organophosphorus pesticides were not detected in the deeper sludge sample (sample ID MFA-B1-B5-COMP-SL on Table 4-1). The following analytical groups were detected in the deeper sludge sample:

- Dioxins/furans: all but one congener were detected, and the dioxin/furan TEQ exceeded the leaching to groundwater and construction worker RBCs.
- Metals: 14 of 16 metals were detected. Only lead was detected at a concentration that exceeded the leaching to groundwater RBC, but both the concentration and the RBC were less than the natural background concentration.
- Organochlorine pesticides: one of 28 pesticides was detected. No organochlorine pesticide concentrations exceeded RBCs.
- PCB congeners: 49 of 164 congeners were detected, and the total PCB congener concentration exceeded the leaching to groundwater RBC.
- PFAS: 14 of 32 compounds were detected; there are no RBCs to which the data can be compared.
- SVOCs: three of 77 SVOCs were detected. No SVOC concentrations exceeded RBCs.
- TPH: Only diesel-range hydrocarbons were detected at a concentration that exceeded the leaching to groundwater and construction worker RBCs. Gasoline- and lube-oil-range petroleum hydrocarbons were not detected.
- VOCs: Only toluene was detected, and it did not exceed the RBC.

In general, concentrations of dioxins/furans and PCBs were higher in the deeper sludge. Metals concentrations showed no consistent trend; seven metals had higher concentrations in the shallow sludge, and eight metals had higher concentrations in the deeper sludge. PFAS compounds were detected at somewhat higher concentrations in the shallow sludge. The remaining chemical groups had no detections or no obvious trend in concentration between the shallow and deeper sludge.

4.2 Reconnaissance Groundwater Results

The reconnaissance groundwater sample results from boring MFA B-3A are summarized on Table 4-2. Chlorinated herbicides, organophosphorus pesticides, and TPH were not detected in the sample. PCB congeners were also not detected, but the detection limits for the sample were elevated about an order of magnitude above the detection limits and the concentrations of PCB congeners detected in the groundwater samples from the monitoring wells. Therefore, PCB congeners may be present in the reconnaissance groundwater sample at concentrations less than the detection limits. The following analytical groups were detected:

- Total metals: all 16 metals were detected, of which 12 had concentrations that exceeded the residential tap water and/or the ecological RBCs.
- Dioxins/furans: 15 of 25 congeners were detected, of which the 2,3,7,8-TCDD concentration and the dioxin/furan TEQ exceeded the residential tap water and ecological RBCs. No RBCs are available for other dioxin/furan congeners.
- Organochlorine pesticides: 19 of 28 pesticides were detected, of which the 4,4'-DDT and total DDx concentrations exceeded the ecological RBCs.
- PFAS: seven of 32 compounds were detected; there are no RBCs to which the data can be compared.
- SVOCs: five of 77 SVOCs were detected at concentrations less than the RBCs.
- VOCs: four of 66 VOCs were detected at concentrations less than the RBCs.

Since the reconnaissance groundwater sample was collected at only 5 to 9 feet below the bottom of the lagoon sludge, MFA compared the sludge and reconnaissance groundwater results to assess whether chemicals detected in the reconnaissance groundwater are similar to those detected in the sludge. In general, chemical groups that had very few detections or no detections in the sludge (chlorinated herbicides, organophosphorus pesticides, SVOCs, and VOCs) were similarly not detected or had few detections in the reconnaissance groundwater sample.

Fewer dioxins/furans were detected in the reconnaissance groundwater sample compared to the sludge samples, consistent with the fact that dioxins/furans generally have a low solubility in water and tend to partition to organic carbon.

A greater number of organochlorine pesticides were detected in the reconnaissance groundwater sample compared to the sludge samples, but this may be due to detection limits for the water analysis, which were two to four orders of magnitude lower than the sludge samples analyses.

Fewer PFAS compounds were detected in the reconnaissance groundwater sample than the sludge samples. PFAS have a high solubility in water, but studies of the partitioning of PFAS to solid-phase materials such as organic carbon indicate that PFAS can partition to organic carbon, including in sewage solids. This may explain the fewer detections in the water analysis compared to the sludge samples.

As noted above, PCB congeners were detected in the sludge samples but not the reconnaissance groundwater sample, likely due to the elevated detection limits for the water analysis.

Diesel-range hydrocarbons were detected at a high concentration in the sludge but not detected in the reconnaissance groundwater sample. In general, diesel has a low solubility in water and may partition to organic carbon, which may explain its presence in the sludge but not the water.

Numerous metals were detected in both the sludge and the reconnaissance groundwater samples. Because metals occur naturally in soil, such as the silt and sand at the sample collection depth for the reconnaissance groundwater samples (see the MFA B-3A boring log in Appendix A), and because the reconnaissance groundwater sample was turbid (see the FSDS in Appendix B), the detection of metals in the groundwater sample may reflect the entrainment of soil particles into the sample, and may be unrelated to the metals content in the sludge.

4.3 Monitoring Well Groundwater Results

The monitoring well groundwater sample results are summarized on Table 4-2. Chlorinated herbicides, organophosphorus pesticides, and dioxins/furans were not detected in the sample. The following analytical groups were detected:

- Total metals: eight of 16 metals were detected, of which five had concentrations that exceeded the residential tap water and/or ecological RBCs.
- Organochlorine pesticides: 19 of 28 pesticides were detected at concentrations less than the RBC.
- PFAS: 11 of 32 compounds were detected; there are no RBCs to which the data can be compared.
- PCB congeners: ten of 164 congeners were detected, of which only the total PCB congener concentration at MW-1 exceeded an ecological RBC.
- SVOCs: 30 of 77 SVOCs were detected, three of them at concentrations that exceeded the residential tap water and ecological RBCs. Pentachlorophenol, a common wood-treating chemical, was detected at upgradient well MW-2. It was not detected in the lagoon sludge, the reconnaissance groundwater sample from MFA B-3A, or groundwater samples from the other monitoring wells. Its detection at MW-2 suggests a possible source of pentachlorophenol unrelated to the lagoon.
- TPH: Diesel- and lube-oil range hydrocarbons were detected at MW-4 through MW-6 at concentrations that exceeded the residential tap water RBCs.
- VOCs: three of 66 VOCs were detected. No VOC concentrations exceeded RBCs.

As described in the Phase I Site Characterization Report (MFA 2020), the groundwater flow direction at the site is east toward the Multnomah Channel based on groundwater elevations measured at MW-1 through MW-6. The Phase IB investigation confirmed the groundwater flow direction, as described further in Section 4.4.3 below. Since MW-1 and MW-2 are upgradient of the lagoon, MFA B-3A is

under the lagoon, and MW-3 through MW-6 are downgradient of the lagoon, MFA compared the groundwater sample data from these locations to assess whether the analytical results and distribution of chemicals in groundwater are consistent with groundwater flow to the east. The objective of this comparison is to assess whether chemicals possibly sourced from the lagoon are more frequently detected or detected at higher concentrations in downgradient wells versus upgradient wells. This comparison assumes that the aquifers in which the upgradient wells are screened are in direct hydraulic connection with the aquifers in which the downgradient wells are screened. As described further in Section 4.4.2, this may not be the case. The following is a summary of this comparison.

Metals

- Two metals, chromium and nickel, were detected at MFA B-3A and the downgradient wells, but not the upgradient wells.
- Arsenic, barium, manganese, and zinc were detected at MFA B-3A, and at higher concentrations at the downgradient wells compared to the upgradient wells.
- Only copper and lead were detected at slightly higher concentrations at upgradient well MW-2 compared to downgradient wells.
- In general, the metals data appear to confirm that the groundwater flow direction is to the east.

Organochlorine pesticides

- Three to seven pesticides were detected in the upgradient wells, 19 were detected at MFA B-3A, and four to 13 were detected at the downgradient wells.
- Some pesticide concentrations were slightly higher in the downgradient wells compared to the upgradient wells.
- The organochlorine pesticide data appear consistent with a groundwater flow direction to the east.

PFAS

- Seven PFAS were detected at MFA B-3A, and eight to 11 PFAS were detected at the downgradient wells, compared to no or two PFAS detections at the upgradient wells.
- Six of the seven PFAS detected at MFA B-3A were also detected at one or more downgradient wells.
- Only one of seven PFAS detected at MFA B-3A was also detected at one upgradient well.
- The PFAS data are consistent with a groundwater flow direction to the east.

PCB Congeners

- Due to the elevated detection limits in the reconnaissance groundwater sample from MFA B3A, PCB congeners were not detected.
- Eighty PCB congeners were detected in the lagoon sludge sample compared to only two to five congeners in the monitoring wells.

- Due to the lack of PCB congener detections in the reconnaissance groundwater sample, general low solubility of PCBs in water, and few detections in the monitoring wells, the PCB congener data are not useful for assessing the groundwater flow direction.
- The highest PCB congener concentrations were from upgradient well MW-1. The source of this is unknown.

SVOCs

- Five SVOCs were detected at MFA B-3A, one or two SVOCs were detected at the upgradient wells, and one to 21 SVOCs were detected at the downgradient wells.
- Except for MW-3 and MW-6, where 21 and 14 SVOCs were detected, respectively, the number of SVOC detections at downgradient wells MW-4 and MW-5 were few and similar in number to MFA B-3A and the upgradient wells MW-1 and MW-2.
- Only two of five SVOCs detected at MFA B-3A were detected in the downgradient wells. Conversely, many SVOCs detected at MW-3 and MW-6 were not detected at MFA B3-A or the upgradient wells.
- In general, the SVOC data are not useful for assessing the groundwater flow direction.

TPH

- Diesel and oil were detected only at the downgradient wells MW-4 through MW-6.
- Since TPH were not detected in the reconnaissance groundwater sample from MFA B-3A, it is unclear whether the diesel and oil detections are associated with the lagoon and present at MW-4 through MW-6 due to the groundwater flow direction.

VOCs

- The four VOCs detected at MFA B-3A were not detected at the downgradient wells.
- The two VOCs detected at the downgradient wells were not detected at MFA B-3A or the upgradient wells.
- The VOC data are not useful for assessing the groundwater flow direction.

In summary, the data for metals, organochlorine pesticides, and PFAS are consistent with a groundwater flow direction to the east. The data for the other chemical groups show no consistent spatial pattern and are not useful for assessing the groundwater flow direction.

4.4 Geology and Hydrogeologic Conceptual Site Model

A preliminary HCSM was presented in the Phase I report and Phase IB work plan. The preliminary HCSM was prepared based on the review of public documents providing information on the geology and hydrogeology of the site vicinity and on the results of the 2019 Phase I work. This section presents the updated HCSM, which now incorporates the results of the Phase IB site investigation.

4.4.1 Regional Geology

The geology of the site vicinity is shown in plan view on Figure 4-1, and in cross section on Figures 4-2, 4-3, and 4-4. A basalt bluff is west-adjacent to, and higher in elevation than, the lagoon. The basalt has been identified as the Sentinel Bluffs (SB) member of the Columbia River Basalt Group (CRBG) (Evarts 2004), which is a regionally significant water-bearing formation. In the area surrounding St. Helens, the SB member is the most widespread CRBG unit, and the unit with the highest average groundwater yield (Ahern 2017). Groundwater in the CRBG is largely confined to interflow zones associated with structures present at the tops and bottoms of individual basalt flows. These interflow structures include vesicular flow tops, flow-top and flow-bottom breccias, and pillow lava/hyaloclastite complexes, and typically have hydraulic conductivities on the order of 10^{-2} to 10^{-15} meters per second (m/s), which is substantially higher than dense flow interiors, which typically have maximum hydraulic conductivity values on the order of 10^{-9} m/s. The highest values for hydraulic conductivity and porosity are typically observed in brecciated flow tops and bottoms (Tolan, Lindsey, and Porcello 2009). During the Phase I investigation in 2019, interflow zones were observed at the two borings advanced on the basalt bluff (MW-1 and MW-2). These were composed of highly weathered in situ basalt bedrock between nonvesicular unweathered bedrock above and highly vesicular unweathered bedrock below. The observed K-values at these interflow zones in the basalt dike borings had geometric means of 0.073 and 0.081 feet/day ($2.58x10^{-7}$ to $2.86x10^{-7}$ m/s). These were calculated using pneumatic slug testing at intervals of 12, 24, and 36 inches of water pressure.

The SB member of the CRBG is underlain by the Winter Water (WW) member of the CRBG at the site. Both members dip slightly to the east toward the Multnomah Channel. The contact between the two members is mapped at the base of the basalt bluff on the west side of the lagoon (Evarts 2004). The WW member extends east beneath the lagoon and the Multnomah Channel. The presence of the contact between the two members, together with the eastward dip, suggests that an interflow zone may be present between the two units and across the top of the WW member where it extends east beneath the lagoon.

East of the lagoon, the WW is overlain by fill along the dike alignment and by Holocene Columbia River alluvium (Evarts 2004). The fill is localized and is not laterally extensive outside the site vicinity, but the alluvium extends east onto Sauvie Island and south along the floodplain. The alluvium, together with a potential interflow zone at the top of the WW member, may provide a pathway for groundwater flow beneath the wastewater treatment lagoon.

4.4.2 Lagoon Geology

Based on the combined results of the Phase I and Phase IB investigations, the prior geologic cross sections have been updated and a new geologic cross section created. The cross section locations are shown on Figure 4-1 and include the following:

- Cross Section A-A' (Figure 4-2): based on geologic data provided by private water well COLU55412, MFA monitoring wells and borings MW-2, MFA B-1, MFA B-2, MFA B-3, MW-4, and GRI boring B-3.

- Cross Section B-B' (Figure 4-3): based on geologic data provided by MFA monitoring wells and boring MW-1, MFA B-5, and MW-5.
- Cross Section C-C' (Figure 4-4): based on geologic data provided by MFA monitoring wells MW-3, MW-5, MW-4, MW-6, and GRI cone penetrometer test location CPT-21.

Boring logs for MFA borings and monitoring wells and the private water well COLU55412 are provided in Appendix A. The logs for GRI locations B-3 and CPT-1 are provided in Appendix F.

The lagoon is located at the interface between shallow basalt bedrock to the west and deep alluvium to the east. This is depicted on Figure 4-2 where the western portion of the lagoon near its north end is directly underlain by a thin layer of sediment then basalt bedrock at locations MFA B-1 and MFA B2. The eastern portion of the lagoon is underlain by sand and silty sand followed by silt. Bedrock was not encountered at locations MFA B-3, MW-4, and B-3. Farther east across the Multnomah Channel, basalt bedrock crops out at the north end of Sauvie Island. This deep structural feature in the basalt that is filled by more than 280 feet of alluvium is interpreted as a former channel of the Columbia River.

At the south end of the lagoon, the former channel feature is not present, or is shallower and more subdued, as shown on Figure 4-3. Here the lagoon is underlain by 30 to 80 feet of alluvium then basalt bedrock at locations MFA B-5 and MW-5.

Figure 4-4 depicts the subsurface geology in a line parallel to the lagoon dike. Consistent with Figures 4-2 and 4-3, the depth to basalt is shallower in the southern portion of the lagoon at locations MW-3 and MW-5. Basalt was not encountered farther north at locations MW4 and MW-6, where it occurs at a greater depth. Basalt was encountered at a shallow depth at location CPT-1 at the north end of the lagoon. Again, this structural feature in the basalt filled with alluvium is interpreted as a former channel of the Columbia River.

Interflow zones were encountered in the basalt at locations MW-1 and MW-2 and are interpreted to be present at COLU55412, as shown on Figures 4-2 and 4-3. The horizontal extent of these interflow zones is not known, and therefore Figures 4-2 and 4-3 do not show these zones as being laterally extensive. However, since these interflow zones are associated with the flow tops and flow bottoms of the CRBG, and the CRBG flows are known to be regionally extensive units, it is possible that the zones are laterally continuous, extend horizontally to the east, and are in contact with the alluvium underlying the lagoon.

The interpretation that the interflow zones are laterally extensive would indicate that groundwater in the interflow zones is in direct hydraulic connection with groundwater in the alluvium. However, significant water-bearing zones in the alluvium underlying the lagoon were limited to a shallow unit of sand at locations MFA B-3 and MW-3 through MW-6. This water-bearing zone does not appear to be in direct contact with the basalt, as shown on Figures 4-2 through 4-4. Rather, silt is in direct contact with the basalt at the locations on Figures 4-2 and 4-3 where the interflows would potentially be in contact with the alluvium if they were laterally extensive. The presence of the thick unit of silt between the basalt and the sand and silty sand water-bearing zone suggests that the hydraulic

connectivity between the basalt interflow zones and the water-bearing zone in the alluvium may be suppressed by the presence of the silt.

4.4.3 Groundwater Flow Direction

Based on the site topography, surface hydrology, and regional groundwater elevations (Ahern 2017), the expected direction of groundwater flow is toward the Multnomah Channel. Groundwater elevation data collected from the monitoring wells during the August 2019 Phase I investigation were used to prepare a water level elevation contour map (see Figure 8-1 of the 2020 Phase I Report). The elevation contours indicated that the groundwater flow is toward the Multnomah Channel.

Groundwater elevations were measured again at MW-1 through MW-6 and at MFA B-3A in February 2023, and are summarized on Table 4-3. The elevation data were used to prepare the updated water level elevation contour map (Figure 4-5). Consistent with the 2019 data, the 2023 groundwater elevation data indicate that the groundwater flow direction is east, toward the Multnomah Channel. As noted in Section 4.3 above, the groundwater data for metals, organochlorine pesticides, and PFAS are consistent with a groundwater flow direction to the east.

Figure 4-5 presents a single potentiometric surface generated using data from two aquifers—the interflow zones in basalt at MW-1 and MW-2, and the sand and silty sand water-bearing zones at MW-3 through MW-6 and MFA B-3. Presenting the single potentiometric surface in this way assumes that the basalt interflow zones and alluvial water-bearing zones are in direct contact and there is no hydraulic separation between the two. As noted in Section 4.4.2 above, it is unknown whether the interflow zones at COLU55412 and MW-1 and MW-2 extend east to the lagoon, and if they do, it appears they are separated from the alluvial water-bearing zones by a thick layer of silt.

Based on the groundwater elevation data from just the single alluvial water-bearing zone under the lagoon (at MFA B-3 and MW-3 through MW-6), it does appear that the groundwater flow direction in this single aquifer is east, toward the Multnomah Channel.

5 GEOTECHNICAL INVESTIGATION

GRI completed a preliminary Phase I Geotechnical Investigation for the proposed repurposing of the wastewater treatment plant lagoon as a nonmunicipal-waste facility. The project would include draining and partially to fully filling the lagoon with sediment, soil, and the City's wastewater sludge. A Geosynthetic Clay liner (GCL) and 60-mil High-Density Polyethylene (HDPE) liner would be installed near the base of the facility and filled with up to 56 feet of fill. The following is a brief overview of the geotechnical engineering evaluation for the project and is not intended to replace more detailed information contained within the report in Appendix F. A summary of GRI's findings, opinion, and recommendations is provided below.

- The borings and geotechnical data collected for this investigation and review of available existing subsurface information indicates the site is underlain by variable thickness of sand, underlain by a significant thickness of highly compressible alluvial silt. The silt is underlain by basalt. The depth to basalt varies significantly across the project site from at or near the ground surface to depths of over 350 feet over relatively short horizontal distances. This variability has significant static and seismic design implications as discussed further below.
- The sand and silt soils below the groundwater surface are susceptible to liquefaction and cyclic softening during a design level earthquake. Significant lateral soil movements are estimated, and ground improvement will likely be required to improve seismic slope stability.
- Preliminary geotechnical modeling of ground improvement was completed to increase seismic slope stability and limit slope movements to about 2 feet. The results indicated the largest ground improvement cross sections are typically required where the basalt depths are the greatest. Additional explorations, lab testing, and more robust modeling, such as finite difference or finite element numerical modeling will be required to better evaluate ground improvement assumptions as part of the Phase II geotechnical investigation.
- Up to 9 feet of total settlement are estimated following site filling. Due to significant variation in depth of basalt over relatively short distances across the site, we estimate total settlements may approach differential settlements.
- Differential settlement tolerances of GCL, HDPE liners, and geotube containment berms need to be further evaluated during the Phase II geotechnical investigation. Initial team review indicates the differential settlements estimated will be difficult to tolerate and will require additional measures to reduce.
- The GCL and HDPE liners are currently proposed below the 100-year flood elevation and the risks associated with floating the HDPE liner when river levels exceed fill levels within the lagoon will be a design consideration.
- Final uses for the site have not been finalized but may include new buildings. Due to settlement implications, the buildings will likely require special foundation considerations such as deep foundation systems.
- Due to the significant variability observed at the site, additional geotechnical explorations, laboratory testing, slope stability modeling and engineering analysis will be required as part of the Phase II geotechnical investigation.

LIMITATIONS

The services undertaken in completing this work plan 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 work plan is solely for the use and information of our client unless otherwise noted. Any reliance on this work plan by a third party is at such party's sole risk.

Opinions and recommendations contained in this work plan 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 work plan.

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TABLES

Table 4-1
Summary of Wastewater Lagoon Sludge Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Soil, Ingestion, Dermal Contact, and Inhalation[1]		RBC, Soil, Leaching to Groundwater[1]	Background Metals, Portland Basin[2]	DU1	MFA-B1-B5-COMP
Sample Name:					DU1-20220810-ISM-COMP	MFA-B1-B5-COMP-SL
Collection Date:	Construction Worker	Excavation Worker	Residential		08/10/2022	1/30/2023
Collection Depth (ft bml):					Surface	0.5-2.0[a]
Chlorinated Herbicides (mg/kg)						
2,4,5-T	NV	NV	NV	NV	0.15 UJ	--
2,4-D	2,700	74,000	2.3	NV	0.33 UJ	--
2,4-DB	NV	NV	NV	NV	0.58 UJ	--
Dalapon	NV	NV	NV	NV	0.26 UJ	--
Dicamba	NV	NV	NV	NV	0.24 UJ	--
Dichlorprop	NV	NV	NV	NV	0.24 UJ	--
Dinoseb	NV	NV	NV	NV	0.083 UJ	--
MCPA	130	3,700	0.097	NV	54 UJ	--
MCPP	NV	NV	NV	NV	140 UJ	--
Pentachlorophenol	34	960	0.066	NV	0.23 UJ	--
Picloram	NV	NV	NV	NV	0.22 UJ	--
Silvex	NV	NV	NV	NV	0.18 UJ	--
Conventional Parameters (%)						
Percent solids	NV	NV	NV	NV	6.71	19.2
Dioxins/Furans (pg/g)						
1,2,3,4,6,7,8-HpCDD	NV	NV	NV	NV	**259**	**474**
1,2,3,4,6,7,8-HpCDF	NV	NV	NV	NV	**56.5**	**50.9**
1,2,3,4,7,8,9-HpCDF	NV	NV	NV	NV	**2.94 J**	**3.56 J**
1,2,3,4,7,8-HxCDD	NV	NV	NV	NV	**2.77 J**	**7.73**
1,2,3,4,7,8-HxCDF	NV	NV	NV	NV	**4.87 J**	**6.77**
1,2,3,6,7,8-HxCDD	NV	NV	NV	NV	**43.8**	**610**
1,2,3,6,7,8-HxCDF	NV	NV	NV	NV	**2.71 J**	**2.64 J**
1,2,3,7,8,9-HxCDD	NV	NV	NV	NV	**30.2**	**312**
1,2,3,7,8,9-HxCDF	NV	NV	NV	NV	0.386 U	0.453 UK
1,2,3,7,8-PeCDD	NV	NV	NV	NV	**5.59**	**37.8**
1,2,3,7,8-PeCDF	NV	NV	NV	NV	**4.38 J**	**11**
2,3,4,6,7,8-HxCDF	NV	NV	NV	NV	**1.86 J**	**2.96 J**
2,3,4,7,8-PeCDF	NV	NV	NV	NV	**3.01 J**	**8.2**
2,3,7,8-TCDD	NV	NV	NV	NV	**10.2**	**77.1**
2,3,7,8-TCDF	NV	NV	NV	NV	**59.5**	**440**
OCDD	NV	NV	NV	NV	**2,460**	**2,230**
OCDF	NV	NV	NV	NV	**100**	**108**
Total HpCDDs	NV	NV	NV	NV	**492**	**820**
Total HpCDFs	NV	NV	NV	NV	**124**	**137**
Total HxCDDs	NV	NV	NV	NV	**281**	**3,910**
Total HxCDFs	NV	NV	NV	NV	**51.1**	**67.4**
Total PeCDDs	NV	NV	NV	NV	**38.7**	**251**
Total PeCDFs	NV	NV	NV	NV	**54.1**	**130**
Total TCDDs	NV	NV	NV	NV	**135**	**144**
Total TCDFs	NV	NV	NV	NV	**191**	**1,110**
Dioxin/Furan TEQ[b][3]	170	4,800	6.8	NV	**35.4 J**	**262 J**
Metals (mg/kg)						
Antimony	NV	NV	NV	0.56	**2.62**	**0.944 J-**
Arsenic	15	420	NV	8.8	**4.21**	**3.48**
Barium	69,000	NV	NV	790	**339**	**174**

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City of St. Helens

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Sample Name:					DU1-20220810-ISM-COMP	MFA-B1-B5-COMP-SL
Collection Date:	Construction Worker	Excavation Worker	Residential		08/10/2022	1/30/2023
Collection Depth (ft bml):					Surface	0.5-2.0[a]
Beryllium	700	19,000	NV	2	**0.327**	**0.316**
Cadmium	350	9,700	NV	0.63	**2.97**	**3.24**
Chromium	NV	NV	NV	76	**70.1**	**191**
Chromium, Hexavalent	49	1,400	NV	NV	10.7 UJ	11.4 U
Copper	14,000	390,000	NV	34	**259**	**142**
Lead	800	800	30	79	**27.1**	**40.2**
Manganese	8,200	230,000	NV	1,800	**711**	**763**
Mercury	110	2,900	NV	0.23	**0.485**	**0.881**
Nickel	7,000	190,000	NV	47	**37.8**	**46.8**
Selenium	NV	NV	NV	0.71	**2.46**	**0.813**
Silver	1,800	49,000	NV	0.82	**2.27**	**2.5**
Thallium	NV	NV	NV	5.2	0.286 U	0.265 U
Zinc	NV	NV	NV	180	**817**	**531**
Organochlorine Pesticides (mg/kg)						
2,4'-DDD	NV	NV	NV	NV	0.00106 U	0.00395 UJ
2,4'-DDE	NV	NV	NV	NV	0.00053 U	0.00124 UJ
2,4'-DDT	NV	NV	NV	NV	0.00053 U	0.00124 UJ
4,4'-DDD	9.7	270	1.1	NV	0.00106 U	0.00124 UJ
4,4'-DDE	66	1,800	1.6	NV	**0.00548**	**0.00305 J**
4,4'-DDT	66	1,800	12	NV	0.00053 U	0.00124 UJ
Aldrin	1.1	30	0.023	NV	0.00053 U	0.00124 UJ
alpha-BHC	3	83	0.0063	NV	0.00053 U	0.00272 UJ
alpha-Chlordane	NV	NV	NV	NV	**0.00146**	0.00124 UJ
beta-BHC	NV	NV	NV	NV	0.00053 U	0.00321 UJ
beta-Chlordane	NV	NV	NV	NV	**0.00199**	0.00124 UJ
cis-Nonachlor	NV	NV	NV	NV	0.00053 U	0.00124 UJ
delta-BHC	NV	NV	NV	NV	0.00053 U	0.00124 UJ
Dieldrin	1.2	33	0.01	NV	0.00117 U	0.242 UJ
Endosulfan I	1,600	45,000	NV	NV	0.0107 U	0.0124 UJ
Endosulfan II	1,600	45,000	NV	NV	0.00371 U	0.0124 UJ
Endosulfan sulfate	NV	NV	NV	NV	0.00053 U	0.00124 UJ
Endrin	80	2,200	11	NV	0.00053 U	0.00124 UJ
Endrin aldehyde	NV	NV	NV	NV	0.00053 U	--
Endrin ketone	NV	NV	NV	NV	0.00053 U	0.00124 UJ
Heptachlor	4	110	0.017	NV	0.00053 U	0.0042 UJ
Heptachlor epoxide	2	56	0.0042	NV	0.00053 U	0.00124 UJ
Hexachlorobutadiene	NV	NV	NV	NV	0.00053 U	0.00124 UJ
Lindane	17	470	0.036	NV	0.00053 U	0.00124 UJ
Methoxychlor	NV	NV	NV	NV	0.00053 U	0.00124 UJ
Mirex	NV	NV	NV	NV	0.00053 U	0.00124 UJ
Oxychlordane	NV	NV	NV	NV	0.00053 U	0.00124 UJ
trans-Nonachlor	NV	NV	NV	NV	**0.00108**	0.00124 UJ
Organophosphorus Pesticides (mg/kg)						
Coumaphos	NV	NV	NV	NV	4.23 U	2.94 UJ
Demeton-O	NV	NV	NV	NV	2.11 U	1.01 UJ
Demeton-S	NV	NV	NV	NV	2.11 U	1.01 UJ

Table 4-1
Summary of Wastewater Lagoon Sludge Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Soil, Ingestion, Dermal Contact, and Inhalation[1]		RBC, Soil, Leaching to Groundwater[1]	Background Metals, Portland Basin[2]	DU1	MFA-B1-B5-COMP
Sample Name:					DU1-20220810-ISM-COMP	MFA-B1-B5-COMP-SL
Collection Date:	Construction Worker	Excavation Worker	Residential		08/10/2022	1/30/2023
Collection Depth (ft bml):					Surface	0.5-2.0[a]
Diazinon	NV	NV	NV	NV	2.11 U	1.01 UJ
Dichlorvos	NV	NV	NV	NV	2.11 U	1.01 UJ
Dimethoate	NV	NV	NV	NV	2.11 U	1.01 UJ
Disulfoton	NV	NV	NV	NV	2.11 U	1.01 UJ
Dursban (Chloropyrifos)	NV	NV	NV	NV	2.11 U	1.01 UJ
Ethoprop	NV	NV	NV	NV	2.11 U	1.01 UJ
Fensulfothion	NV	NV	NV	NV	2.11 U	1.01 UJ
Fenthion	NV	NV	NV	NV	2.11 U	1.01 UJ
Guthion (Azinphos-Methyl)	NV	NV	NV	NV	2.11 U	1.01 UJ
Merphos	NV	NV	NV	NV	18.2 U	30 UJ
Methyl parathion	NV	NV	NV	NV	4.23 U	2.01 UJ
Mevinphos	NV	NV	NV	NV	2.11 U	1.01 UJ
Monocrotophos	NV	NV	NV	NV	4.23 U	2.01 UJ
Naled	NV	NV	NV	NV	2.11 U	1.01 UJ
Parathion	NV	NV	NV	NV	6.17 U	9.5 UJ
Phorate	NV	NV	NV	NV	2.11 U	1.01 UJ
Pyridine	NV	NV	NV	NV	2.11 U	1.01 UJ
Santox (EPN)	NV	NV	NV	NV	2.11 U	1.01 UJ
Stirofos	NV	NV	NV	NV	9.64 U	11 UJ
Sulfotepp	NV	NV	NV	NV	2.11 U	1.01 UJ
Sulprofos (Bolstar)	NV	NV	NV	NV	2.11 U	2.01 UJ
Sumitox (Malathion)	NV	NV	NV	NV	2.11 U	2.01 UJ
Tetraethylpyrophosphate	NV	NV	NV	NV	8.46 U	4.03 UJ
Tokuthion	NV	NV	NV	NV	2.11 U	2.01 UJ
Trichloronate	NV	NV	NV	NV	6.09 U	13.2 UJ
PCB Congeners (pg/g)						
2-MonoCB-(1)	NV	NV	NV	NV	**163**	--
3-MonoCB-(2)	NV	NV	NV	NV	**92 J**	--
4-MonoCB-(3)	NV	NV	NV	NV	**179 J**	--
2,2'-DiCB-(4)	NV	NV	NV	NV	**360**	--
2,3-DiCB-(5)	NV	NV	NV	NV	82 U	--
2,3'-DiCB-(6)	NV	NV	NV	NV	**267**	--
2,4-DiCB-(7)	NV	NV	NV	NV	83 U	--
2,4'-DiCB-(8)	NV	NV	NV	NV	**455**	--
2,5-DiCB-(9)	NV	NV	NV	NV	**93 J**	--
2,6-DiCB-(10)	NV	NV	NV	NV	140 U	--
3,3'-DiCB-(11)	NV	NV	NV	NV	**7,100**	--
PCBs 12 + 13	NV	NV	NV	NV	**221 J**	--
3,5-DiCB-(14)	NV	NV	NV	NV	85 U	--
4,4'-DiCB-(15)	NV	NV	NV	NV	**810**	**5,160 J-**
2,2',3-TriCB-(16)	NV	NV	NV	NV	**510**	-- R
2,2',4-TriCB-(17)	NV	NV	NV	NV	**690**	-- R
PCBs 18 + 30	NV	NV	NV	NV	**1,100**	**1,100 J-**
2,2',6-TriCB-(19)	NV	NV	NV	NV	**410**	-- R
PCBs 20 + 28	NV	NV	NV	NV	**2,300**	**3,240 J-**
PCBs 21 + 33	NV	NV	NV	NV	**610**	**693 J-**

Table 4-1
Summary of Wastewater Lagoon Sludge Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Soil, Ingestion, Dermal Contact, and Inhalation[1]		RBC, Soil, Leaching to Groundwater[1]	Background Metals, Portland Basin[2]	DU1	MFA-B1-B5-COMP
Sample Name:					DU1-20220810-ISM-COMP	MFA-B1-B5-COMP-SL
Collection Date:	Construction Worker	Excavation Worker	Residential		08/10/2022	1/30/2023
Collection Depth (ft bml):					Surface	0.5-2.0[a]
2,3,4'-TriCB-(22)	NV	NV	NV	NV	**840**	**1,000 J-**
2,3,5-TriCB-(23)	NV	NV	NV	NV	120 U	-- R
2,3,6-TriCB-(24)	NV	NV	NV	NV	140 U	-- R
2,3',4-TriCB-(25)	NV	NV	NV	NV	**530**	-- R
PCBs 26 + 29	NV	NV	NV	NV	**580**	**480 J-**
2,3',6-TriCB-(27)	NV	NV	NV	NV	140 U	-- R
2,4',5-TriCB-(31)	NV	NV	NV	NV	**2,200**	**2,730 J-**
2,4',6-TriCB-(32)	NV	NV	NV	NV	**440**	-- R
2,3',5'-TriCB-(34)	NV	NV	NV	NV	130 U	-- R
3,3',4,-TriCB-(35)	NV	NV	NV	NV	**260**	**562 J-**
3,3',5-TriCB-(36)	NV	NV	NV	NV	110 U	-- R
3,4,4'-TriCB-(37)	NV	NV	NV	NV	**790**	**374 J-**
3,4,5-TriCB-(38)	NV	NV	NV	NV	120 U	-- R
3,4',5-TriCB-(39)	NV	NV	NV	NV	110 U	-- R
PCBs 40 + 41 + 71	NV	NV	NV	NV	**1,450**	-- R
2,2',3,4'-TetraCB-(42)	NV	NV	NV	NV	**910**	-- R
2,2',3,5-TetraCB-(43)	NV	NV	NV	NV	380 U	-- R
PCBs 44/47/65	NV	NV	NV	NV	**3,770**	**7,840 J-**
PCBs 45 + 51	NV	NV	NV	NV	**520**	-- R
2,2',3,6'-TetraCB-(46)	NV	NV	NV	NV	320 U	-- R
2,2',4,5-TetraCB-(48)	NV	NV	NV	NV	**600**	-- R
PCBs 49 + 69	NV	NV	NV	NV	**2,560**	**6,530 J-**
PCBs 50 + 53	NV	NV	NV	NV	**480 J**	-- R
2,2',5,5'-TetraCB-(52)	NV	NV	NV	NV	**7,650**	**19,200 J-**
2,2',6,6'-TetraCB-(54)	NV	NV	NV	NV	220 U	-- R
2,3,3',4-TetraCB-(55)	NV	NV	NV	NV	270 U	-- R
2,3,3',4'-Tetra CB-(56)	NV	NV	NV	NV	**1,250**	**1,110 J-**
2,3,3',5-TetraCB-(57)	NV	NV	NV	NV	240 U	-- R
2,3,3',5'-TetraCB-(58)	NV	NV	NV	NV	260 U	-- R
PCBs 59/62/75	NV	NV	NV	NV	**220 J**	-- R
2,3,4,4'-TetraCB-(60)	NV	NV	NV	NV	**540**	-- R
PCBs 61/70/74/76	NV	NV	NV	NV	**6,910**	**17,900 J-**
2,3,4',5-TetraCB-(63)	NV	NV	NV	NV	230 U	-- R
2,3,4',6-TetraCB-(64)	NV	NV	NV	NV	**1,400**	**3,110 J-**
2,3',4,4'-TetraCB-(66)	NV	NV	NV	NV	**2,530**	**6,600 J-**
2,3',4,5-TetraCB-(67)	NV	NV	NV	NV	**230 J**	-- R
2,3',4,5'-TetraCB-(68)	NV	NV	NV	NV	230 U	-- R
2,3',5,5'-TetraCB-(72)	NV	NV	NV	NV	230 U	-- R
2,3',5',6-TetraCB-(73)	NV	NV	NV	NV	200 U	-- R
3,3',4,4'-TetraCB-(77)	NV	NV	NV	NV	**570**	-- R
3,3',4,5-TetraCB-(78)	NV	NV	NV	NV	240 U	-- R
3,3',4,5'-TetraCB-(79)	NV	NV	NV	NV	210 U	-- R
3,3',5,5'-TetraCB-(80)	NV	NV	NV	NV	210 U	-- R
3,4,4',5-TetraCB-(81)	NV	NV	NV	NV	260 U	-- R
2,2',3,3',4-PentaCB-(82)	NV	NV	NV	NV	**1,000**	-- R
PCBs 83 + 99	NV	NV	NV	NV	**5,070**	**15,800 J-**

Table 4-1
Summary of Wastewater Lagoon Sludge Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Soil, Ingestion, Dermal Contact, and Inhalation[1]		RBC, Soil, Leaching to Groundwater[1]	Background Metals, Portland Basin[2]	DU1	MFA-B1-B5-COMP
Sample Name:					DU1-20220810-ISM-COMP	MFA-B1-B5-COMP-SL
Collection Date:	Construction Worker	Excavation Worker	Residential		08/10/2022	1/30/2023
Collection Depth (ft bml):					Surface	0.5-2.0[a]
2,2',3,3',6-PentaCB-(84)	NV	NV	NV	NV	**2,260**	**5,860 J-**
PCBs 85/116/117	NV	NV	NV	NV	**1,230**	**4,020 J-**
PCBs 86/87/97/109/119/125	NV	NV	NV	NV	**6,080**	**20,300 J-**
PCBs 88 + 91	NV	NV	NV	NV	**1,210**	**1,840 J-**
2,2',3,4,6'-PentaCB-(89)	NV	NV	NV	NV	310 U	-- R
PCBs 90 + 101 + 113	NV	NV	NV	NV	**9,380**	**32,800 J-**
2,2',3,5,5'-PentaCB-(92)	NV	NV	NV	NV	**1,760**	**3,270 J-**
PCBs 93 + 98 + 100 + 102	NV	NV	NV	NV	290 U	-- R
2,2',3,5,6'-PentaCB-(94)	NV	NV	NV	NV	300 U	-- R
2,2',3,5',6-PentaCB-(95)	NV	NV	NV	NV	**6,310**	**23,200 J-**
2,2',3,6,6'-PentaCB-(96)	NV	NV	NV	NV	140 U	-- R
2,2',4,5',6-PentaCB-(103)	NV	NV	NV	NV	270 U	-- R
2,2',4,6,6'-PentaCB-(104)	NV	NV	NV	NV	160 U	-- R
2,3,3',4,4'-PentaCB-(105)	NV	NV	NV	NV	**3,880**	**6,490 J-**
2,3,3',4,5-PentaCB-(106)	NV	NV	NV	NV	210 U	-- R
2,3,3',4',5-PentaCB-(107)	NV	NV	NV	NV	**580**	**2,290 J-**
PCBs 108 + 124	NV	NV	NV	NV	**370 J**	**1,280 J-**
PCBs 110 + 115	NV	NV	NV	NV	**12,500**	**37,200 J-**
2,3,3',5,5'-PentaCB-(111)	NV	NV	NV	NV	210 U	-- R
2,3,3',5,6-PentaCB-(112)	NV	NV	NV	NV	190 U	-- R
2,3,4,4',5-PentaCB-(114)	NV	NV	NV	NV	**380**	-- R
2,3',4,4',5-PentaCB-(118)	NV	NV	NV	NV	**10,100**	**17,800 J-**
2,3',4,5,5'-PentaCB-(120)	NV	NV	NV	NV	200 U	-- R
2,3',4,5',6-PentaCB-(121)	NV	NV	NV	NV	210 U	-- R
2,3,3',4',5'-PentaCB-(122)	NV	NV	NV	NV	240 U	-- R
2,3',4,4',5'-PentaCB-(123)	NV	NV	NV	NV	**280**	-- R
3,3',4,4',5-PentaCB-(126)	NV	NV	NV	NV	230 U	-- R
3,3',4,5,5'-PentaCB-(127)	NV	NV	NV	NV	240 U	-- R
PCBs 128 + 166	NV	NV	NV	NV	**1,840**	**3,640 J-**
PCBs 129/138/163	NV	NV	NV	NV	**11,000**	**25,300 J-**
2,2',3,3',4,5'-HexaCB-(130)	NV	NV	NV	NV	**680**	**1,520 J-**
2,2',3,3',4,6-HexaCB-(131)	NV	NV	NV	NV	470 U	-- R
2,2',3,3',4,6'-HexaCB-(132)	NV	NV	NV	NV	**3,150**	**7,640 J-**
2,2',3,3',5,5'-HexaCB-(133)	NV	NV	NV	NV	430 U	-- R
PCBs 134 + 143	NV	NV	NV	NV	**530**	**1,360 J-**
PCBs 135 + 151	NV	NV	NV	NV	**1,980**	**6,220 J-**
2,2',3,3',6,6'-HexaCB-(136)	NV	NV	NV	NV	**930**	**2,760 J-**
2,2',3,4,4',5-HexaCB-(137)	NV	NV	NV	NV	**490 J**	-- R
PCBs 139 + 140	NV	NV	NV	NV	370 U	-- R
2,2',3,4,5,5'-HexaCB-(141)	NV	NV	NV	NV	**1,500**	**3,200 J-**
2,2',3,4,5,6-HexaCB-(142)	NV	NV	NV	NV	420 U	-- R
2,2',3,4,5',6-HexaCB-(144)	NV	NV	NV	NV	210 U	-- R
2,2',3,4,6,6'-HexaCB-(145)	NV	NV	NV	NV	150 U	-- R
2,2',3,4',5,5'-HexaCB-(146)	NV	NV	NV	NV	**1,090**	**2,460 J-**
PCBs 147 + 149	NV	NV	NV	NV	**5,830**	**11,900 J-**
2,2',3,4',5,6'-HexaCB-(148)	NV	NV	NV	NV	190 U	-- R

Table 4-1
Summary of Wastewater Lagoon Sludge Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Soil, Ingestion, Dermal Contact, and Inhalation[1]		RBC, Soil, Leaching to Groundwater[1]	Background Metals, Portland Basin[2]	DU1	MFA-B1-B5-COMP
Sample Name:					DU1-20220810-ISM-COMP	MFA-B1-B5-COMP-SL
Collection Date:	Construction Worker	Excavation Worker	Residential		08/10/2022	1/30/2023
Collection Depth (ft bml):					Surface	0.5-2.0[a]
2,2',3,4',6,6'-HexaCB-(150)	NV	NV	NV	NV	130 U	-- R
2,2',3,5,6,6'-HexaCB-(152)	NV	NV	NV	NV	150 U	-- R
PCBs 153 + 168	NV	NV	NV	NV	**6,590**	**15,400 J-**
2,2',4,4',5,6'-HexaCB-(154)	NV	NV	NV	NV	150 U	-- R
2,2',4,4',6,6'-HexaCB-(155)	NV	NV	NV	NV	**220 J**	-- R
PCBs 156 + 157	NV	NV	NV	NV	**1,990**	**3,360 J-**
2,3,3',4,4',6-HexaCB-(158)	NV	NV	NV	NV	**1,040**	**2,470 J-**
2,3,3',4,5,5'-HexaCB-(159)	NV	NV	NV	NV	430 U	-- R
2,3,3',4,5,6-HexaCB-(160)	NV	NV	NV	NV	350 U	-- R
2,3,3',4,5',6-HexaCB-(161)	NV	NV	NV	NV	300 U	-- R
2,3,3',4',5,5'-HexaCB-(162)	NV	NV	NV	NV	390 U	-- R
2,3,3',4',5',6-HexaCB-(164)	NV	NV	NV	NV	**860**	-- R
2,3,3',5,5',6-HexaCB-(165)	NV	NV	NV	NV	340 U	-- R
2,3',4,4',5,5'-HexaCB-(167)	NV	NV	NV	NV	**730**	**1,060 J-**
3,3',4,4',5,5'-HexaCB-(169)	NV	NV	NV	NV	360 U	-- R
2,2',3,3',4,4',5-HeptaCB-(170)	NV	NV	NV	NV	**1,850**	**2,230 J-**
PCBs 171 + 173	NV	NV	NV	NV	570 U	-- R
2,2',3,3',4,5,5'-HeptaCB-(172)	NV	NV	NV	NV	600 U	-- R
2,2',3,3',4,5,6'-HeptaCB-(174)	NV	NV	NV	NV	**1,470**	**3,000 J-**
2,2',3,3',4,5',6-HeptaCB-(175)	NV	NV	NV	NV	310 U	-- R
2,2',3,3',4,6,6'-HeptaCB-(176)	NV	NV	NV	NV	190 U	-- R
2,2',3,3',4,5',6'-HeptaCB-(177)	NV	NV	NV	NV	**920**	**1,570 J-**
2,2',3,3',5,5',6-HeptaCB-(178)	NV	NV	NV	NV	300 U	-- R
2,2',3,3',5,6,6'-HeptaCB-(179)	NV	NV	NV	NV	**480**	-- R
PCBs 180 + 193	NV	NV	NV	NV	**3,270**	**8,670 J-**
2,2',3,4,4',5,6-HeptaCB-(181)	NV	NV	NV	NV	560 U	-- R
2,2',3,4,4',5,6'-HeptaCB-(182)	NV	NV	NV	NV	340 U	-- R
2,2',3,4,4',5',6-HeptaCB-(183)	NV	NV	NV	NV	**1,000**	**1,840 J-**
2,2',3,4,4',6,6'-HeptaCB-(184)	NV	NV	NV	NV	180 U	-- R
2,2',3,4,5,5',6-HeptaCB-(185)	NV	NV	NV	NV	600 U	-- R
2,2',3,4,5,6,6'-HeptaCB-(186)	NV	NV	NV	NV	200 U	-- R
2,2',3,4',5,5',6-HeptaCB-(187)	NV	NV	NV	NV	**1,950**	**3,190 J-**
2,2',3,4',5,6,6'-HeptaCB-(188)	NV	NV	NV	NV	300 U	-- R
2,3,3',4,4',5,5'-HeptaCB-(189)	NV	NV	NV	NV	620 U	-- R
2,3,3',4,4',5,6-HeptaCB-(190)	NV	NV	NV	NV	430 U	-- R
2,3,3',4,4',5',6-HeptaCB-(191)	NV	NV	NV	NV	420 U	-- R
2,3,3',4,5,5',6-HeptaCB-(192)	NV	NV	NV	NV	460 U	-- R
2,2',3,3',4,4',5,5'-OctaCB-(194)	NV	NV	NV	NV	660 U	-- R
2,2',3,3',4,4',5,6-OctaCB-(195)	NV	NV	NV	NV	750 U	-- R
2,2',3,3',4,4',5,6'-OctaCB-(196)	NV	NV	NV	NV	550 U	-- R
2,2',3,3',4,4',6,6'-OctaCB-(197)	NV	NV	NV	NV	430 U	-- R
PCBs 198 + 199	NV	NV	NV	NV	**830**	-- R
2,2',3,3',4,5,6,6'-OctaCB-(200)	NV	NV	NV	NV	370 U	-- R
2,2',3,3',4,5',6,6'-OctaCB-(201)	NV	NV	NV	NV	380 U	-- R
2,2',3,3',5,5',6,6'-OctaCB-(202)	NV	NV	NV	NV	470 U	-- R
2,2',3,4,4',5,5',6-OctaCB-(203)	NV	NV	NV	NV	500 U	-- R

Table 4-1
Summary of Wastewater Lagoon Sludge Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Soil, Ingestion, Dermal Contact, and Inhalation[1]		RBC, Soil, Leaching to Groundwater[1]	Background Metals, Portland Basin[2]	DU1	MFA-B1-B5-COMP
Sample Name:					DU1-20220810-ISM-COMP	MFA-B1-B5-COMP-SL
Collection Date:	Construction Worker	Excavation Worker	Residential		08/10/2022	1/30/2023
Collection Depth (ft bml):					Surface	0.5-2.0[a]
2,2',3,4,4',5,6,6'-OctaCB-(204)	NV	NV	NV	NV	410 U	-- R
2,3,3',4,4',5,5',6-OctaCB-(205)	NV	NV	NV	NV	530 U	-- R
2,2',3,3',4,4',5,5',6-NonaCB-(206)	NV	NV	NV	NV	710 U	-- R
2,2',3,3',4,4',5,6,6'-NonaCB-(207)	NV	NV	NV	NV	630 U	-- R
2,2',3,3',4,5,5',6,6'-NonaCB-(208)	NV	NV	NV	NV	730 U	-- R
DecaCB-(209)	NV	NV	NV	NV	720 U	-- R
Total PCBs[c]	4,900,000	140,000,000	240,000	NV	**181,000 J**	**359,000 J-[d]**
PFAS (mg/kg)						
9Cl-PF3ONS (F-53B Major)	NV	NV	NV	NV	0.00021 U	0.0001 U
11Cl-PF3OUdS (F-53B Minor)	NV	NV	NV	NV	0.00022 U	0.00028 U
4:2 FTSA	NV	NV	NV	NV	0.00025 U	0.0001 U
6:2 FTSA	NV	NV	NV	NV	**0.00046 J**	0.00024 U
8:2 FTSA	NV	NV	NV	NV	**0.0015**	0.00026 U
ADONA	NV	NV	NV	NV	0.00028 U	0.00015 U
EtFOSA	NV	NV	NV	NV	0.00031 UJ	0.00038 U
EtFOSAA	NV	NV	NV	NV	**0.0088**	**0.007**
EtFOSE	NV	NV	NV	NV	**0.0017 J**	0.00037 U
HFPO-DA (GenX)	NV	NV	NV	NV	0.00019 U	0.00016 U
MeFOSA	NV	NV	NV	NV	0.00039 UJ	0.00045 U
MeFOSAA	NV	NV	NV	NV	**0.01**	**0.0043**
MeFOSE	NV	NV	NV	NV	**0.0036 J**	0.00034 U
PFBA	NV	NV	NV	NV	0.00024 U	0.00014 U
PFBS	NV	NV	NV	NV	0.00017 U	0.00015 U
PFDA	NV	NV	NV	NV	**0.0039**	**0.0015 J**
PFDoA	NV	NV	NV	NV	**0.0055**	**0.0012**
PFDS	NV	NV	NV	NV	**0.0018**	**0.00092 J**
PFHpA	NV	NV	NV	NV	**0.0012**	**0.00051 J**
PFHpS	NV	NV	NV	NV	0.00017 U	0.00021 U
PFHxA	NV	NV	NV	NV	**0.0023**	**0.00072 J**
PFHxS	NV	NV	NV	NV	**0.0035 J**	**0.0022 J**
PFNA	NV	NV	NV	NV	**0.0029**	**0.00076 J**
PFNS	NV	NV	NV	NV	0.00024 U	0.00018 U
PFOA	NV	NV	NV	NV	**0.0022**	**0.00095 J**
PFOS	NV	NV	NV	NV	**0.0024**	**0.00057 J**
PFOSA	NV	NV	NV	NV	0.0002 UJ	0.0001 U
PFPeA	NV	NV	NV	NV	0.00023 U	0.00017 U
PFPeS	NV	NV	NV	NV	0.00026 U	0.00034 U
PFTeDA	NV	NV	NV	NV	**0.0022 J**	**0.00046 J**
PFTrDA	NV	NV	NV	NV	**0.0039 J**	**0.00061 J**
PFUnA	NV	NV	NV	NV	**0.0068**	**0.0013**
SVOCs (mg/kg)						
1,2,4-Trichlorobenzene	NV	NV	NV	NV	0.353 U	0.494 UJ
1,2-Dichlorobenzene	20,000	560,000	36	NV	0.353 U	0.494 UJ
1,2-Dinitrobenzene	NV	NV	NV	NV	3.53 U	4.94 UJ
1,2-Diphenylhydrazine	NV	NV	NV	NV	0.353 U	0.494 UJ
1,3-Dichlorobenzene	NV	NV	NV	NV	0.353 U	0.494 UJ

Table 4-1
Summary of Wastewater Lagoon Sludge Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Soil, Ingestion, Dermal Contact, and Inhalation[1]		RBC, Soil, Leaching to Groundwater[1]	Background Metals, Portland Basin[2]	DU1	MFA-B1-B5-COMP
Sample Name:					DU1-20220810-ISM-COMP	MFA-B1-B5-COMP-SL
Collection Date:	Construction Worker	Excavation Worker	Residential		08/10/2022	1/30/2023
Collection Depth (ft bml):					Surface	0.5-2.0[a]
1,3-Dinitrobenzene	NV	NV	NV	NV	3.53 U	4.94 UJ
1,4-Dichlorobenzene	1,300	36,000	0.057	NV	0.353 U	0.494 UJ
1,4-Dinitrobenzene	NV	NV	NV	NV	3.53 U	4.94 UJ
1-Methylnaphthalene	NV	NV	NV	NV	0.283 U	0.396 UJ
2,2'-oxybis(1-Chloropropane)	NV	NV	NV	NV	0.353 U	0.494 UJ
2,3,4,6-Tetrachlorophenol	NV	NV	NV	NV	0.707 U	0.99 UJ
2,3,5,6-Tetrachlorophenol	NV	NV	NV	NV	0.707 U	0.99 UJ
2,4,5-Trichlorophenol	NV	NV	NV	NV	0.707 U	0.99 UJ
2,4,6-Trichlorophenol	270	7,400	2.4	NV	0.707 U	0.99 UJ
2,4-Dichlorophenol	NV	NV	NV	NV	0.707 U	0.99 UJ
2,4-Dimethylphenol	NV	NV	NV	NV	0.707 U	0.99 UJ
2,4-Dinitrophenol	NV	NV	NV	NV	3.53 U	4.94 UJ
2,4-Dinitrotoluene	NV	NV	NV	NV	1.41 U	1.97 UJ
2,6-Dinitrotoluene	13	350	0.0089	NV	1.41 U	1.97 UJ
2-Chloronaphthalene	NV	NV	NV	NV	0.141 U	0.197 UJ
2-Chlorophenol	NV	NV	NV	NV	0.707 U	0.99 UJ
2-Methylnaphthalene	NV	NV	NV	NV	0.283 U	0.396 UJ
2-Methylphenol	NV	NV	NV	NV	0.353 U	0.494 UJ
2-Nitroaniline	NV	NV	NV	NV	2.83 U	3.96 UJ
2-Nitrophenol	NV	NV	NV	NV	1.41 U	1.97 UJ
3- & 4-Methylphenol (m,p-Cresol)	NV	NV	NV	NV	0.353 U	0.494 UJ
3,3-Dichlorobenzidine	42	1,200	0.17	NV	2.83 R	3.96 UJ
3-Nitroaniline	NV	NV	NV	NV	2.83 U	3.96 UJ
4,6-Dinitro-2-methylphenol	NV	NV	NV	NV	3.53 U	4.94 UJ
4-Bromophenylphenyl ether	NV	NV	NV	NV	0.353 U	0.494 UJ
4-Chloro-3-methylphenol	NV	NV	NV	NV	1.41 U	1.97 UJ
4-Chloroaniline	NV	NV	NV	NV	0.353 U	0.494 UJ
4-Chlorophenylphenyl ether	NV	NV	NV	NV	0.353 U	0.494 UJ
4-Nitroaniline	NV	NV	NV	NV	2.83 U	3.96 UJ
4-Nitrophenol	NV	NV	NV	NV	1.41 U	1.97 UJ
Acenaphthene	21,000	590,000	NV	NV	0.141 U	0.197 UJ
Acenaphthylene	NV	NV	NV	NV	0.141 U	0.197 UJ
Aniline	NV	NV	NV	NV	0.707 U	0.99 UJ
Anthracene	110,000	NV	NV	NV	**0.211 J**	0.197 UJ
Benzo(a)anthracene	170	4,800	1.6	NV	0.141 U	0.197 UJ
Benzo(a)pyrene	NV	NV	NV	NV	0.212 U	0.297 UJ
Benzo(b)fluoranthene	170	4,900	NV	NV	0.212 U	0.297 UJ
Benzo(ghi)perylene	NV	NV	NV	NV	0.141 U	0.197 UJ
Benzo(k)fluoranthene	1,700	49,000	NV	NV	0.212 U	0.297 UJ
Benzoic acid	NV	NV	NV	NV	17.7 U	49.4 UJ
Benzyl alcohol	NV	NV	NV	NV	0.707 U	0.99 UJ
Bis(2-chloroethoxy)methane	NV	NV	NV	NV	0.353 U	0.494 UJ
Bis(2-chloroethyl)ether	16	450	0.00019	NV	0.353 U	0.494 UJ
Bis(2-ethylhexyl)phthalate	1,300	37,000	NV	NV	**11.8**	**4.08 J**
Butylbenzylphthalate	NV	NV	NV	NV	0.707 U	1.97 UJ
Carbazole	NV	NV	NV	NV	0.212 U	0.297 UJ

Table 4-1
Summary of Wastewater Lagoon Sludge Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Soil, Ingestion, Dermal Contact, and Inhalation[1]		RBC, Soil, Leaching to Groundwater[1]	Background Metals, Portland Basin[2]	DU1	MFA-B1-B5-COMP
Sample Name:					DU1-20220810-ISM-COMP	MFA-B1-B5-COMP-SL
Collection Date:	Construction Worker	Excavation Worker	Residential		08/10/2022	1/30/2023
Collection Depth (ft bml):					Surface	0.5-2.0[a]
Chrysene	17,000	490,000	NV	NV	0.141 U	0.197 UJ
Di(2-ethylhexyl)adipate	NV	NV	NV	NV	3.53 U	4.94 UJ
Dibenzo(a,h)anthracene	17	490	NV	NV	0.141 U	0.197 UJ
Dibenzofuran	NV	NV	NV	NV	0.141 U	0.197 UJ
Diethyl phthalate	NV	NV	NV	NV	0.707 U	0.99 UJ
Dimethyl phthalate	NV	NV	NV	NV	0.707 U	0.99 UJ
Di-n-butyl phthalate	NV	NV	NV	NV	0.707 U	0.99 UJ
Di-n-octyl phthalate	NV	NV	NV	NV	1.13 U	1.72 UJ
Fluoranthene	10,000	280,000	NV	NV	**0.179 J**	0.197 UJ
Fluorene	14,000	390,000	NV	NV	0.141 U	0.197 UJ
Hexachlorobenzene	11	320	0.018	NV	0.141 U	0.197 UJ
Hexachlorobutadiene	NV	NV	NV	NV	0.353 U	0.494 UJ
Hexachlorocyclopentadiene	NV	NV	NV	NV	0.707 U	0.99 UJ
Hexachloroethane	180	5,100	0.022	NV	0.353 U	0.494 UJ
Indeno(1,2,3-cd)pyrene	170	4,900	NV	NV	0.141 U	0.197 UJ
Isophorone	NV	NV	NV	NV	0.353 U	0.494 UJ
Naphthalene	580	16,000	0.077	NV	0.283 U	0.396 UJ
Nitrobenzene	NV	NV	NV	NV	1.41 U	1.97 UJ
N-Nitrosodimethylamine	NV	NV	NV	NV	0.353 U	0.494 UJ
N-Nitrosodiphenylamine	3,800	110,000	10	NV	0.353 U	0.99 UJ
N-Nitrosodipropylamine	2.7	74	0.00094	NV	0.353 U	0.494 UJ
Pentachlorophenol	34	960	0.066	NV	1.41 U	1.97 UJ
Phenanthrene	NV	NV	NV	NV	**0.366**	**0.582 J**
Phenol	NV	NV	NV	NV	0.283 U	0.396 UJ
Pyrene	7,500	210,000	NV	NV	**0.189 J**	**0.304 J**
Pyridine	NV	NV	NV	NV	0.707 U	0.99 UJ
cPAH TEQ[e][4]	17	490	4.4	NV	0.212 U	0.297 UJ
TPH (mg/kg)						
Gasoline-range hydrocarbons	9,700	NV	31	NV	182 U	26.7 U
Diesel-range hydrocarbons	4,600	NV	9,500	NV	**20,500**	**26,100 J+**
Lube-oil-range hydrocarbons	NV	NV	NV	NV	4,230 U	2,070 UJ
VOCs (mg/kg)						
1,1,1,2-Tetrachloroethane	NV	NV	NV	NV	0.456 U	0.133 U
1,1,1-Trichloroethane	470,000	NV	190	NV	0.456 U	0.133 U
1,1,2,2-Tetrachloroethane	NV	NV	NV	NV	0.911 U	0.0533 U
1,1,2-Trichloroethane	54	1,500	0.0063	NV	0.456 U	0.0267 U
1,1-Dichloroethane	3,200	89,000	0.044	NV	0.456 U	0.0107 U
1,1-Dichloroethene	13,000	370,000	6.7	NV	0.456 U	0.0107 U
1,1-Dichloropropene	NV	NV	NV	NV	0.911 U	0.267 U
1,2,3-Trichlorobenzene	NV	NV	NV	NV	4.56 U	1.33 U
1,2,3-Trichloropropane	NV	NV	NV	NV	0.911 U	0.0267 U
1,2,4-Trichlorobenzene	NV	NV	NV	NV	4.56 U	1.33 U
1,2,4-Trimethylbenzene	2,900	81,000	10	NV	0.911 U	0.0533 U
1,2-Dibromo-3-chloropropane	NV	NV	NV	NV	4.56 U	0.0267 U
1,2-Dibromoethane	9	250	0.00012	NV	0.911 U	0.0107 U
1,2-Dichlorobenzene	20,000	560,000	36	NV	0.456 U	0.133 U

Table 4-1
Summary of Wastewater Lagoon Sludge Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Soil, Ingestion, Dermal Contact, and Inhalation[1]		RBC, Soil, Leaching to Groundwater[1]	Background Metals, Portland Basin[2]	DU1	MFA-B1-B5-COMP
Sample Name:					DU1-20220810-ISM-COMP	MFA-B1-B5-COMP-SL
Collection Date:	Construction Worker	Excavation Worker	Residential		08/10/2022	1/30/2023
Collection Depth (ft bml):					Surface	0.5-2.0[a]
1,2-Dichloroethane	200	5,600	0.0028	NV	0.456 U	0.0107 U
1,2-Dichloropropane	NV	NV	NV	NV	0.456 U	0.0107 U
1,3,5-Trimethylbenzene	2,900	81,000	11	NV	0.911 U	0.0533 U
1,3-Dichlorobenzene	NV	NV	NV	NV	0.456 U	0.133 U
1,3-Dichloropropane	NV	NV	NV	NV	0.911 U	0.267 U
1,4-Dichlorobenzene	1,300	36,000	0.057	NV	0.456 U	0.133 U
2,2-Dichloropropane	NV	NV	NV	NV	0.911 U	0.267 U
2-Butanone	NV	NV	NV	NV	9.11 U	2.67 U
2-Chlorotoluene	NV	NV	NV	NV	0.911 U	0.267 U
2-Hexanone	NV	NV	NV	NV	18.2 UJ	2.67 U
4-Chlorotoluene	NV	NV	NV	NV	0.911 U	0.267 U
4-Isopropyltoluene	NV	NV	NV	NV	0.911 U	0.267 U
4-Methyl-2-pentanone	NV	NV	NV	NV	9.11 U	2.67 U
Acetone	NV	NV	NV	NV	18.2 U	5.33 U
Acrylonitrile	40	1,100	0.00036	NV	1.82 U	0.533 U
Benzene	380	11,000	0.023	NV	0.182 U	0.0107 U
Bromobenzene	NV	NV	NV	NV	0.456 U	0.133 U
Bromodichloromethane	230	6,300	0.002	NV	0.911 U	0.267 U
Bromoform	2,700	74,000	0.046	NV	1.82 U	0.533 U
Bromomethane	370	10,000	0.083	NV	18.2 U	5.33 U
Carbon disulfide	NV	NV	NV	NV	9.11 U	2.67 U
Carbon tetrachloride	320	8,900	0.013	NV	0.911 U	0.267 U
Chlorobenzene	4,700	130,000	5.8	NV	0.456 U	0.133 U
Chlorobromomethane	NV	NV	NV	NV	0.911 U	0.267 U
Chloroethane	NV	NV	310	NV	9.11 U	5.33 UJ
Chloroform	410	11,000	0.0034	NV	0.911 U	0.0533 U
Chloromethane	25,000	700,000	2.2	NV	4.56 U	1.33 U
cis-1,2-Dichloroethene	710	20,000	0.63	NV	0.456 U	0.0107 U
cis-1,3-Dichloropropene	NV	NV	NV	NV	0.911 U	0.0107 U
Dibromochloromethane	210	5,800	0.0024	NV	1.82 U	0.533 U
Dibromomethane	NV	NV	NV	NV	0.911 U	0.267 U
Dichlorodifluoromethane (Freon 12)	NV	NV	NV	NV	1.82 U	0.533 U
Ethylbenzene	1,700	49,000	0.22	NV	0.456 U	0.0267 U
Hexachlorobutadiene	NV	NV	NV	NV	1.82 U	0.533 U
Isopropylbenzene	27,000	750,000	96	NV	0.911 U	0.267 U
m,p-Xylene	NV	NV	NV	NV	0.911 U	0.0533 U
Methyl tert-butyl ether	12,000	320,000	0.11	NV	0.911 U	0.0213 U
Methylene chloride	2,100	58,000	0.14	NV	9.11 U	2.67 U
Naphthalene	580	16,000	0.077	NV	3.65 UJ	0.533 U
n-Butylbenzene	NV	NV	NV	NV	0.911 U	0.267 U
n-Propylbenzene	NV	NV	NV	NV	0.456 U	0.133 U
o-Xylene	NV	NV	NV	NV	0.456 U	0.0267 U
sec-Butylbenzene	NV	NV	NV	NV	0.911 U	0.267 U
Styrene	56,000	NV	170	NV	0.911 U	0.267 U
tert-Butylbenzene	NV	NV	NV	NV	0.911 U	0.267 U
Tetrachloroethene	1,800	50,000	0.46	NV	0.456 U	0.0107 U

Table 4-1
Summary of Wastewater Lagoon Sludge Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Soil, Ingestion, Dermal Contact, and Inhalation[1]		RBC, Soil, Leaching to Groundwater[1]	Background Metals, Portland Basin[2]	DU1	MFA-B1-B5-COMP
Sample Name:					DU1-20220810-ISM-COMP	MFA-B1-B5-COMP-SL
Collection Date:	Construction Worker	Excavation Worker	Residential		08/10/2022	1/30/2023
Collection Depth (ft bml):					Surface	0.5-2.0[a]
Toluene	28,000	770,000	84	NV	0.911 U	**0.0297 J**
trans-1,2-Dichloroethene	7,100	200,000	7	NV	0.456 U	0.0107 U
trans-1,3-Dichloropropene	NV	NV	NV	NV	0.911 U	0.0107 U
Trichloroethene	130	3,700	0.013	NV	0.456 U	0.0107 U
Trichlorofluoromethane (Freon 11)	69,000	NV	61	NV	1.82 U	0.533 U
Vinyl chloride	34	950	0.00057	NV	0.456 U	0.0533 U
Xylenes, total[f]	20,000	560,000	23	NV	0.911 U	0.0533 U

Table 4-1
Summary of Wastewater Lagoon Sludge Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Notes

Detected results are shown in **bold** font.

Shading (color key below) indicates values that exceed screening criteria; non-detects (U and UJ) and rejected data (R) were not compared with screening criteria. When multiple screening criteria are exceeded, the result is shaded based on the highest criterion. When multiple screening criteria with the same value are exceeded, the result is shaded based on the criterion presented to the right.

DEQ RBC, soil, ingestion, dermal contact, and inhalation, construction worker

DEQ RBC, soil, soil leaching to groundwater, residential

-- = not analyzed or result qualified as rejected.

cPAH TEQ = carcinogenic polycyclic aromatic hydrocarbon.

DEQ = Oregon Department of Environmental Quality.

EPA = U.S. Environmental Protection Agency.

ft bml = feet below mudline.

J = result is estimated.

J+ = result is estimated but may be biased high.

J- = result is estimated but may be biased low.

mg/kg = milligrams per kilogram.

NV = no value.

PCB = polychlorinated biphenyl.

pg/g = picograms per gram.

R = result is rejected. The analyte may or may not be present in the sample.

RBC = risk-based concentration.

SVOC = semivolatile organic compound.

TEF = toxic equivalency factor.

TEQ = toxicity equivalence.

TPH = total petroleum hydrocarbon.

U = result is non-detect at the detection limit.

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

UK = result is non-detect at the estimated maximum potential concentration.

VOC = volatile organic compound.

[a]At time of collection, discrete sample IDs were assigned based on collection depth from barge deck.

[b]Dioxin/furan TEQs are calculated as the sum of each detected congener concentration multiplied by the corresponding TEF value. Non-detect congeners are multiplied by one-half as well as the corresponding TEF value.

[c]Total PCBs is the sum of all detected PCB congeners. Non-detect PCB congeners are not included in the sum.

[d]PCB congener numbers 001 through 014, and PCB-077 could not be reported by the laboratory because the sample matrix interfered with analyte recovery. The total PCB congener result should be considered an estimated value with a low bias.

[e]cPAH TEQ calculated as the sum of each cPAH multiplied by the corresponding TEF with non-detect results also multiplied by one-half. When all cPAHs are non-detect, the highest detection limit is provided.

[f]Total xylenes is the sum of m,p-xylene and o-xylene. When both results are non-detect, the higher detection limit is used.

References

[1]DEQ. 2023. Table: Risk-Based Concentrations for Individual Chemicals. Oregon Department of Environmental Quality. June.

[2]DEQ. 2013. Development of Oregon Background Metals Concentrations in Soil. Oregon Department of Environmental Quality, Land Quality Division Cleanup Program, Portland, Oregon. March.

[3]Van den Berg, M. et al. 1998. "Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife." Environmental Health Perspectives. 106 (12):775–792.

[4]EPA. 1993. Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons. 600/R-93/089. U.S. Environmental Protection Agency. July.

Table 4-2
Summary of Groundwater Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Groundwater, Ingestion and Inhalation from Tapwater, Residential[1]	Ecological RBC, Freshwater[a][b][2]				Ecological RBC for Wildlife Ingestion of Surface Water[3]				MFA-B3A	MW-1	MW-2	MW-3		MW-4	MW-5	MW-6
Sample Name:										MFA-B3A-20230207-GW-36.0	MW1-20230220-GW-70	MW2-20230220-GW-60	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW4-20230214-GW-40	MW5-20230214-GW-40	MW6-20230214-GW-40.25
Collection Date:		Aquatic Life		Aquatic-Dependent Wildlife		Birds		Mammals		2/7/2023	2/20/2023	2/20/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023
Collection Depth (ft)[c]:		Chronic	Acute	Chronic	Acute	TE	Non-TE	TE	Non-TE	36	70	60	35	35	40	40	40.25
Total Metals (ug/L)																	
Antimony	NV	190	900	NV	NV	21,000	52,000	690	2,300	**0.697 J**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Arsenic	0.052	150	340	NV	NV	380,000	760,000	560	5,600	**29.1**	**0.519 J**	**4.59**	**0.773 J**	**0.722 J**	**25.8**	**11.2**	**27.7**
Barium	4,000	220	2,000	NV	NV	220,000	770,000	6,100	8,800	**1,080**	**64.9**	**19.6**	**70.1**	**70.9**	**856**	**760**	**617**
Beryllium	40	11	93	NV	NV	5,900	82,000	2,900	29,000	**6.44**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	20	0.094	0.49	NV	NV	7,100	71,000	4,800	17,000	**1.5**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	NV	NV	NV	NV	NV	82	2000	160,000	630,000	**339**	1 U	1 U	1 U	1 U	**2.26**	1 U	**1.2 J**
Chromium, hexavalent	0.05	11	16	NV	NV	12,000	130,000	160,000	630,000	**0.057**	0.0079 U	0.0079 U	0.0079 U	0.0079 U	0.04 U	0.04 U	0.04 U
Copper	800	1.4	2.3	NV	NV	50,000	500,000	22,000	33,000	**210**	1 U	**3.12**	1 U	1 U	**1.18 J**	1 U	1 U
Lead	15	0.54	14	NV	NV	78	780	4,300	16,000	**66.8**	**0.122 J**	**0.619**	0.11 U	0.11 U	**0.375**	0.11 U	0.11 U
Manganese	480	93	1,700	NV	NV	110,000	160,000	6,300	63,000	**2,350**	**55.1**	**19**	826	826	**4,080**	**6,640**	**2,860**
Mercury	6	0.012	1.4	0.0013	0.012	1,000,000	10,000,000	140	710	**0.328**	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
Nickel	400	16	140	NV	NV	1,400	14,000	890	1400	**285**	1 U	1 U	**1.21 J**	1 U	**4.04**	**2.46**	**2.49**
Selenium	NV	4.6	20	NV	NV	4,500	45,000	110,000	1,100,000	**4.48**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Silver	100	0.1	0.3	NV	NV	490,000	4,900,000	31	310	**0.776**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Thallium	NV	6	54	NV	NV	1,400	14,000	31	310	**0.711**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Zinc	NV	36	36	NV	NV	490,000	4,900,000	560,000	4,400,000	**802**	**2.21 J**	**2.5 J**	2 U	2 U	**3.58 J**	2 U	**5.18**
Chlorinated Herbicides (ug/L)																	
2,4,5-T	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.14 U	0.14 U	0.14 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
2,4-D	170	79	130	NV	NV	NV	NV	NV	NV	0.34 U	0.34 U	0.34 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
2,4-DB	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.99 U	0.99 U	0.99 U	5 U	5 U	5 U	5 U	5 U
3,5-Dichlorobenzoic acid	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.28 U	0.28 U	0.28 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
4-Nitrophenol	NV	58	530	NV	NV	NV	NV	NV	NV	0.5 U	0.5 U	0.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Acifluorfen	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.24 U	0.24 U	0.24 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Bentazon	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.55 U	0.55 U	0.55 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U
Dacthal	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.2 U	0.2 U	0.2 U	1 U	1 U	1 U	1 U	1 U
Dalapon	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.16 U	0.16 U	0.16 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Dicamba	NV	15	61	NV	NV	NV	NV	NV	NV	0.19 U	0.19 U	0.19 U	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U
Dichlorprop	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.24 U	0.24 U	0.24 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Dinoseb	NV	0.48	4.8	NV	NV	NV	NV	NV	NV	0.09 U	0.09 U	0.09 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
MCPA	7.4	2.6	90	NV	NV	NV	NV	NV	NV	40 U	40 U	40 U	200 U	200 U	200 U	200 U	200 U
Mecoprop	NV	NV	NV	NV	NV	NV	NV	NV	NV	27 U	27 U	27 U	140 U	140 U	140 U	140 U	140 U
Pentachlorophenol	0.044	6.7	8.7	NV	NV	13,000	130,000	1,000	10,000	0.18 U	0.18 U	0.18 U	0.9 U	0.9 U	0.9 U	0.9 U	0.9 U
Picloram	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.13 U	0.13 U	0.13 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U
Silvex	NV	30	270	NV	NV	NV	NV	NV	NV	0.14 U	0.14 U	0.14 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Dioxins/Furans (pg/L)																	
1,2,3,4,6,7,8-HpCDD	NV	NV	NV	NV	NV	NV	NV	NV	NV	**79**	1.06 U	1.01 U	1 U	1.03 U	1.06 U	1.01 U	1.39 U
1,2,3,4,6,7,8-HpCDF	NV	NV	NV	NV	NV	NV	NV	NV	NV	7.9 U	0.87 U	0.844 U	0.815 U	0.893 U	0.88 U	0.893 U	0.975 U
1,2,3,4,7,8,9-HpCDF	NV	NV	NV	NV	NV	NV	NV	NV	NV	1.37 U	0.962 U	0.897 U	0.888 U	0.955 U	0.954 U	0.975 U	1.05 U
1,2,3,4,7,8-HxCDD	NV	NV	NV	NV	NV	NV	NV	NV	NV	1.55 U	1.1 U	1.02 U	0.979 U	1.04 U	1.05 U	1.05 U	1.25 U
1,2,3,4,7,8-HxCDF	NV	NV	NV	NV	NV	NV	NV	NV	NV	1.05 U	0.904 U	0.891 U	0.815 U	0.879 U	0.937 U	0.944 U	0.994 U
1,2,3,6,7,8-HxCDD	NV	NV	NV	NV	NV	NV	NV	NV	NV	**69.9**	1.08 U	1.07 U	1.01 U	1.03 U	1.01 U	1.04 U	1.21 U
1,2,3,6,7,8-HxCDF	NV	NV	NV	NV	NV	NV	NV	NV	NV	1.27 U	0.911 U	0.884 U	0.817 U	0.908 U	0.922 U	0.944 U	0.986 U
1,2,3,7,8,9-HxCDD	NV	NV	NV	NV	NV	NV	NV	NV	NV	**40.4 J**	1.02 U	0.971 U	0.924 U	0.964 U	0.959 U	0.972 U	1.14 U
1,2,3,7,8,9-HxCDF	NV	NV	NV	NV	NV	NV	NV	NV	NV	1.15 U	0.979 U	0.955 U	0.894 U	0.973 U	0.995 U	1.03 U	1.12 U
1,2,3,7,8-PeCDD	NV	NV	NV	NV	NV	NV	NV	NV	NV	**4.31 J**	1.07 U	1.06 U	0.983 U	1.1 U	1.15 U	1.08 U	1.34 U
1,2,3,7,8-PeCDF	NV	NV	NV	NV	NV	NV	NV	NV	NV	1.76 U	1.31 U	1.33 U	1.19 U	1.29 U	1.33 U	1.3 U	1.43 U

Table 4-2
Summary of Groundwater Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Groundwater, Ingestion and Inhalation from Tapwater, Residential[1]	Ecological RBC, Freshwater[a][b][2]				Ecological RBC for Wildlife Ingestion of Surface Water[3]				MFA-B3A	MW-1	MW-2	MW-3		MW-4	MW-5	MW-6
Sample Name:										MFA-B3A-20230207-GW-36.0	MW1-20230220-GW-70	MW2-20230220-GW-60	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW4-20230214-GW-40	MW5-20230214-GW-40	MW6-20230214-GW-40.25
Collection Date:		Aquatic Life		Aquatic-Dependent Wildlife		Birds		Mammals		2/7/2023	2/20/2023	2/20/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023
Collection Depth (ft)[c]:		Chronic	Acute	Chronic	Acute	TE	Non-TE	TE	Non-TE	36	70	60	35	35	40	40	40.25
2,3,4,6,7,8-HxCDF	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.948 U	0.811 U	0.8 U	0.738 U	0.805 U	0.827 U	0.83 U	0.898 U
2,3,4,7,8-PeCDF	NV	NV	NV	NV	NV	NV	NV	NV	NV	1.49 U	1.11 U	1.14 U	1.02 U	1.08 U	1.1 U	1.11 U	1.23 U
2,3,7,8-TCDD	NV	0.0031	10,000	0.0031	NV	NV	NV	NV	NV	**7.79 J**	1.45 U	1.53 U	1.37 U	1.42 U	1.5 U	1.47 U	1.54 U
2,3,7,8-TCDF	NV	NV	NV	NV	NV	NV	NV	NV	NV	**51.5**	1.07 U	1.12 U	0.994 U	1.02 U	1.07 U	1.02 U	1.03 U
OCDD	NV	NV	NV	NV	NV	NV	NV	NV	NV	**545**	1.07 U	3.63 UJ	2.11 UJ	3.24 UJ	4.17 UK	1.44 U	7.62 UJ
OCDF	NV	NV	NV	NV	NV	NV	NV	NV	NV	**17.7 J**	0.954 U	0.958 U	0.84 U	0.989 U	1.03 U	0.959 U	1.21 U
Total HpCDDs	NV	NV	NV	NV	NV	NV	NV	NV	NV	**142**	1.06 U	1.01 U	1 U	1.43 U	1.06 U	1.01 U	1.45 U
Total HpCDFs	NV	NV	NV	NV	NV	NV	NV	NV	NV	**11.7 J**	0.913 U	0.869 U	0.849 U	0.923 U	0.915 U	0.932 U	1.01 U
Total HxCDDs	NV	NV	NV	NV	NV	NV	NV	NV	NV	**436**	1.15 U	1.39 U	0.969 U	1.06 U	1.01 U	1.02 U	1.2 U
Total HxCDFs	NV	NV	NV	NV	NV	NV	NV	NV	NV	**3.98 J**	0.898 U	0.88 U	0.813 U	0.888 U	0.917 U	0.933 U	0.995 U
Total PeCDDs	NV	NV	NV	NV	NV	NV	NV	NV	NV	**31 J**	1.07 U	1.06 U	0.983 U	1.1 U	1.15 U	1.08 U	1.34 U
Total PeCDFs	NV	NV	NV	NV	NV	NV	NV	NV	NV	**9.86 J**	1.2 U	1.23 U	1.1 U	1.18 U	1.21 U	1.2 U	1.32 U
Total TCDDs	NV	NV	NV	NV	NV	NV	NV	NV	NV	**11.9**	1.45 U	1.53 U	1.37 U	1.42 U	1.5 U	1.47 U	1.54 U
Total TCDFs	NV	NV	NV	NV	NV	NV	NV	NV	NV	**98.3**	1.07 U	1.12 U	0.994 U	1.02 U	1.07 U	1.02 U	1.03 U
Dioxin/Furan TEQ[d][4]	0.091	0.0031	10,000	0.0031	NV	NV	NV	4,400	44,000	**29.8**	1.45 U	3.63 U	2.11 U	3.24 U	4.17 U	1.47 U	7.62 U
Organochlorine Pesticides (ug/L)																	
2,4'-DDD	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.00077**	0.00002 U	0.00002 U	0.00002 U	0.00002 U	**4.3E-05 J**	0.00002 U	**8.9E-05 J**
2,4'-DDE	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.0002 J**	0.000016 U	0.000016 U	0.000016 U	0.000016 U	0.000016 U	0.000016 U	0.000016 U
2,4'-DDT	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.00156**	0.00004 U	**0.000041 J**	0.00004 U	0.00004 U	**0.00012 J**	0.00004 U	**9.5E-05 J**
4,4'-DDD	0.031	0.01	0.19	NV	NV	NV	NV	NV	NV	**0.00196**	0.000014 U	**0.000015 J**	**0.00002 J**	**0.00006 J**	**6.4E-05 J**	**3.9E-05 J**	**7.1E-05 J**
4,4'-DDE	0.046	0.3	1.3	NV	NV	NV	NV	NV	NV	**0.00108**	0.000012 U	**0.000026 J**	0.000012 U	0.000012 U	**1.2E-05 UJ**	0.000012 UJ	0.000019 UJ
4,4'-DDT	0.23	0.001	1.1	0.001	1.1	NV	NV	NV	NV	**0.00571**	0.00005 U	0.00005 U	0.00005 U	0.00005 U	**0.0001 J**	**8.4E-05 J**	0.00005 U
Aldrin	0.00092	0.04	3	NV	NV	NV	NV	NV	NV	0.00019 UK	0.000021 U	**0.000052 J**	0.000021 U	0.000021 U	0.000021 U	0.000021 U	**3.4E-05 J**
alpha-BHC	0.0075	0.01	NV	NV	NV	NV	NV	NV	NV	**7.3E-05 J**	0.000024 U	0.000024 U	0.000024 U	0.000024 U	**3.8E-05 J**	0.000024 U	**3.9E-05 J**
alpha-Chlordane	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.0001 J**	0.000029 U	0.000029 U	0.000029 U	0.000029 U	0.000029 U	0.000029 U	0.000029 U
beta-BHC	NV	0.01	NV	NV	NV	NV	NV	NV	NV	0.00013 UK	**2.4E-05 J**	0.00002 UK	**2.9E-05 J**	**2.1E-05 J**	**0.00012 J**	**9.5E-05 J**	0.000014 U
beta-Chlordane	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.00012 J**	0.000029 U	0.000029 U	0.000029 U	0.000029 U	0.000029 U	0.000029 U	**7.9E-05 J**
cis-Nonachlor	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.000037 U	0.000037 U	0.000037 U	0.000037 U	0.000037 U	0.000037 U	0.000037 U	0.000037 U
delta-BHC	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.00015 J**	0.000029 U	0.000029 U	0.000029 U	0.000029 U	**0.00011 J**	**0.00011 J**	0.000029 U
Dieldrin	0.0017	0.056	0.24	0.06	0.24	310	3,100	89	890	0.00009 UK	0.00005 U	0.00005 U	0.00005 U	0.00005 U	0.00005 U	**6.1E-05 J**	0.00005 U
Endosulfan I	98	0.056	0.22	NV	NV	41,000	410,000	670	6,700	**0.00244**	0.000067 U	0.000067 U	**7.1E-05 J**	**0.00012 J**	**7.5E-05 J**	0.000067 U	**0.00012 J**
Endosulfan II	98	0.056	0.22	NV	NV	41,000	410,000	670	6,700	**0.0003 J**	0.000074 U	**0.000089 J**	0.000074 U	0.000074 U	**0.00017 J**	**8.9E-05 J**	0.000074 U
Endosulfan sulfate	NV	0.06	1.9	NV	NV	NV	NV	NV	NV	0.000091 UK	0.00007 U	0.00007 U	0.00007 U	0.00007 U	0.00007 U	0.00007 U	0.00007 U
Endrin	1.9	0.036	0.086	NV	NV	41	4,100	410	4,100	**0.00193**	0.000093 UJ	0.000045 U	0.000048 UJ	0.000045 U	**0.0001 UJ**	0.000189 UJ	0.000133 UJ
Endrin aldehyde	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.00016 J**	0.000071 U	0.000071 U	0.000071 U	0.000071 U	0.000071 U	0.000071 U	0.000071 U
Endrin ketone	NV	NV	NV	NV	NV	NV	NV	NV	NV	**4.1E-05 J**	0.000034 U	0.000034 U	0.000034 U	0.000034 U	0.000034 U	0.000034 U	0.000034 U
Heptachlor	0.0014	0.0038	0.52	NV	NV	3,800	37,000	440	4,400	0.000029 U	0.000029 U	0.000029 U	0.000029 U	0.000029 U	**3.6E-05 J**	**3.6E-05 J**	**4.1E-05 J**
Heptachlor epoxide	0.0014	0.0038	0.52	NV	NV	NV	NV	NV	NV	**1.9E-05 J**	0.000015 U	**0.000092 J**	0.000015 U	0.000015 U	0.000015 U	0.000015 U	0.000015 U
Hexachlorobenzene	0.0098	0.15	2.8	0.0003	NV	NV	NV	NV	NV	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Lindane	0.043	0.08	0.95	0.11	0.95	NV	NV	NV	NV	**0.0002**	**6.7E-05 J**	**0.000058 J**	0.000033 U	0.000033 U	0.000033 U	0.000033 U	**8.4E-05 J**
Methoxychlor	NV	0.03	0.7	NV	NV	100,000	1,000,000	17,000	35,000	0.0018 UK	0.00004 U	0.00004 U	**8.5E-05 J+**	**6.5E-05 J+**	**0.00012 J**	**7.9E-05 J**	**7.5E-05 J**
Mirex	NV	0.001	0.001	0.001	0.001	NV	NV	NV	NV	**5.6E-05 J**	0.000021 U	0.000021 U	0.000021 U	0.000021 U	0.000021 U	**3.2E-05 J**	0.000021 U
Oxychlordane	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.000028 U	0.000028 U	0.000028 U	0.000028 U	0.000028 U	0.000028 U	0.000028 U	0.000028 U
trans-Nonachlor	NV	NV	NV	NV	NV	NV	NV	NV	NV	**5.5E-05 J**	0.000044 U	0.000044 U	0.000044 U	0.000044 U	0.000044 U	0.000044 U	0.000044 U
Total chlordane[e]	NV	0.0043	2.4	NV	NV	8,800	44,000	5,200	52,000	**0.00029 J**	0.000044 U	0.000044 U	0.000044 U	0.000044 U	**8.7E-05 J**	**8.7E-05 J**	**0.00016 J**
Total DDx[f]	NV	0.001	1.1	0.001	1.1	530	5,300	7,100	71,000	**0.0113 J**	0.00005 U	**0.000125 J**	0.00005 UJ	**0.00013 J**	**0.00035 J**	**0.00017 J**	**0.00031 J**

Table 4-2
Summary of Groundwater Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Groundwater, Ingestion and Inhalation from Tapwater, Residential[1]	Ecological RBC, Freshwater[a][b][2]				Ecological RBC for Wildlife Ingestion of Surface Water[3]				MFA-B3A	MW-1	MW-2	MW-3		MW-4	MW-5	MW-6
Sample Name:										MFA-B3A-20230207-GW-36.0	MW1-20230220-GW-70	MW2-20230220-GW-60	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW4-20230214-GW-40	MW5-20230214-GW-40	MW6-20230214-GW-40.25
Collection Date:		Aquatic Life		Aquatic-Dependent Wildlife		Birds		Mammals		2/7/2023	2/20/2023	2/20/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023
Collection Depth (ft)[c]:		Chronic	Acute	Chronic	Acute	TE	Non-TE	TE	Non-TE	36	70	60	35	35	40	40	40.25
Total endosulfans[g]	NV	0.056	0.22	NV	NV	NV	NV	NV	NV	**0.00278 J**	0.000074 U	**0.000158 J**	**0.00014 J**	**0.00019 J**	**0.00028 J**	**0.00016 J**	**0.0002 J**
Total hexachlorocyclohexanes[h]	NV	0.08	0.95	0.11	0.95	2,300	9,200	62	620	**0.00049 J**	**0.00012 J**	**9.45E-05 J**	**7.2E-05 J**	**6.4E-05 J**	**0.00028 J**	**0.00024 J**	**0.00014 J**
Organophosphorus Pesticides (ug/L)																	
Coumaphos	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.532 U
Demeton-O	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Demeton-S	NV	0.1	5.2	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Diazinon	NV	0.17	0.17	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Dichlorvos	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Dimethoate	NV	0.5	22	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Disulfoton	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Dursban (Chloropyrifos)	NV	0.041	0.083	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Ethoprop	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Fensulfothion	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Fenthion	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Guthion (Azinphos-Methyl)	NV	0.01	0.08	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Merphos	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.658 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Methyl parathion	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Mevinphos	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Monocrotophos	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Naled	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Parathion	NV	0.013	0.065	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Phorate	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Pyridine	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Santox (EPN)	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Stirofos	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Sulfotepp	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Sulprofos (Bolstar)	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Sumitox (Malathion)	NV	0.1	0.3	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Tetraethylpyrophosphate	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.538 U	0.549 U	0.532 U
Tokuthion	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
Trichloronate	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.329 U	0.26 U	0.26 U	0.248 U	0.248 U	0.269 U	0.275 U	0.266 U
PFAS (ug/L)																	
9Cl-PF3ONS (F-53B Major)	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0043 U	0.0043 U	0.0043 U	0.0043 U	0.0043 U
11Cl-PF3OUdS (F-53B Minor)	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U
4:2 FTSA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U
6:2 FTSA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	**0.0021 J**
8:2 FTSA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0031 U	0.0031 U	0.0031 U	0.0031 U	**0.0059 J**
ADONA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0027 U	0.0027 U	0.0027 U	0.0027 U	0.0027 U
EtFOSA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0095 U	0.0095 U	0.0095 UJ	0.0095 UJ	0.0095 U
EtFOSAA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0046 U	0.0046 U	0.0046 U	0.0046 U	0.0046 U
EtFOSE	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U
HFPO-DA (GenX)	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U
MeFOSA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0084 U	0.0084 U	0.0084 UJ	0.0084 UJ	0.0084 U
MeFOSAA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0045 U	0.0045 U	0.0045 U	0.0045 U	0.0045 U
MeFOSE	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.0073 U	0.0073 U	0.0073 U	0.0073 U	0.0073 U
PFBA	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.017 J**	0.02 U	0.02 U	**0.023**	**0.022**	0.02 U	**0.015 J**	**0.0098 J**
PFBS	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.0037 J**	0.02 U	**0.0028 J**

Table 4-2
Summary of Groundwater Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Groundwater, Ingestion and Inhalation from Tapwater, Residential[1]	Ecological RBC, Freshwater[a][b][2]				Ecological RBC for Wildlife Ingestion of Surface Water[3]				MFA-B3A	MW-1	MW-2	MW-3		MW-4	MW-5	MW-6
Sample Name:										MFA-B3A-20230207-GW-36.0	MW1-20230220-GW-70	MW2-20230220-GW-60	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW4-20230214-GW-40	MW5-20230214-GW-40	MW6-20230214-GW-40.25
Collection Date:		Aquatic Life		Aquatic-Dependent Wildlife		Birds		Mammals		2/7/2023	2/20/2023	2/20/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023
Collection Depth (ft)[c]:		Chronic	Acute	Chronic	Acute	TE	Non-TE	TE	Non-TE	36	70	60	35	35	40	40	40.25
PFDA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	**0.021**	**0.018 J**	0.02 U	**0.0057 J**	**0.012 J**
PFDoA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PFDS	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PFHpA	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.0036 J**	0.02 U	0.02 U	**0.068**	**0.067**	**0.0087 J**	**0.042**	**0.049**
PFHpS	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PFHxA	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.0086 J**	0.02 U	0.02 U	**0.046**	**0.044**	**0.16**	**0.13**	**0.076**
PFHxS	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.0022 J**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PFNA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	**0.007 J**	0.02 U	**0.056**	**0.053**	**0.003 J**	**0.017 J**	**0.038**
PFNS	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PFOA	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.0082 J**	**0.011 J**	0.02 U	**0.1**	**0.096**	**0.025**	**0.06**	**0.083**
PFOS	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.0066 J**	0.02 U	0.02 U	**0.0076 J**	**0.007 J**	0.02 U	0.02 U	**0.012 J**
PFOSA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PFPeA	NV	NV	NV	NV	NV	NV	NV	NV	NV	**0.0061 J**	0.02 U	0.02 U	**0.033**	**0.031**	**0.012 J**	**0.026**	**0.022**
PFPeS	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PFTeDA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 UJ	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PFTrDA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 UJ	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PFUnA	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB Congeners (pg/L)																	
2-MonoCB-(1)	NV	NV	NV	NV	NV	NV	NV	NV	NV	120 U	**28**	23 U	**13 J**	17 U	**24**	**18 J**	**42**
3-MonoCB-(2)	NV	NV	NV	NV	NV	NV	NV	NV	NV	260 U	**55**	21 U	11 U	17 U	19 U	16 U	13 U
4-MonoCB-(3)	NV	NV	NV	NV	NV	NV	NV	NV	NV	94 U	**100**	18 U	9.5 U	14 U	17 U	14 U	11 U
2,2'-DiCB-(4)	NV	NV	NV	NV	NV	NV	NV	NV	NV	210 U	20 U	25 U	**10 J**	20 U	22 U	22 U	**17 J**
2,3-DiCB-(5)	NV	NV	NV	NV	NV	NV	NV	NV	NV	130 U	5.3 U	8.3 U	3.2 U	8.4 U	9.8 U	9 U	6.3 U
2,4-DiCB-(7)	NV	NV	NV	NV	NV	NV	NV	NV	NV	130 U	5.3 U	8.4 U	3.1 U	8.3 U	9.7 U	8.9 U	6.2 U
2,4'-DiCB-(8)	NV	NV	NV	NV	NV	NV	NV	NV	NV	380 U	9.1 UJ	8.2 U	3 U	8 U	9.3 U	8.6 UJ	20.3 UJ
Total octaCB	NV	NV	NV	NV	NV	NV	NV	NV	NV	250 U	5.5 U	8.6 U	3.1 U	8.2 U	9.6 U	8.9 U	6.2 U
2,5-DiCB-(9)	NV	NV	NV	NV	NV	NV	NV	NV	NV	130 U	5.2 U	8.2 U	3.1 U	8.1 U	9.5 U	8.7 U	6.1 U
2,6-DiCB-(10)	NV	NV	NV	NV	NV	NV	NV	NV	NV	180 U	7.3 U	11 U	3.9 U	10 U	12 U	11 U	7.8 U
3,3'-DiCB-(11)	NV	NV	NV	NV	NV	NV	NV	NV	NV	780 UJ	**365 J+**	102 UJ	3.2 UJ	118 UJ	73.8 UJ	117 UJ	139 UJ
PCBs 12 + 13	NV	NV	NV	NV	NV	NV	NV	NV	NV	230 U	**5.7 J**	7.9 U	2.9 U	7.6 U	9 U	8.2 U	5.8 U
3,5-DiCB-(14)	NV	NV	NV	NV	NV	NV	NV	NV	NV	130 U	5.4 U	8.5 U	3.2 U	8.3 U	9.8 U	9 U	6.3 U
4,4'-DiCB-(15)	NV	NV	NV	NV	NV	NV	NV	NV	NV	250 U	13.8 UJ	7.5 U	2.7 U	7 U	8.4 U	7.5 U	9.2 UJ
2,2',3-TriCB-(16)	NV	NV	NV	NV	NV	NV	NV	NV	NV	82 U	13 U	13 U	7.1 U	12 U	15 U	13 U	10 U
2,2',4-TriCB-(17)	NV	NV	NV	NV	NV	NV	NV	NV	NV	190 U	11 U	10 U	5.7 U	9.4 U	12 U	11 U	8.4 U
PCBs 18 + 30	NV	NV	NV	NV	NV	NV	NV	NV	NV	170 U	12.3 UJ	8.5 U	4.9 U	8.1 U	10 U	9.1 U	13.1 UJ
2,2',6-TriCB-(19)	NV	NV	NV	NV	NV	NV	NV	NV	NV	270 U	12 U	18 U	9 U	17 U	19 U	17 U	14 U
PCBs 20 + 28	NV	NV	NV	NV	NV	NV	NV	NV	NV	100 U	5.9 UJ	7.7 UJ	3.3 UJ	12.5 UJ	9.5 UJ	8.4 UJ	4.8 U
PCBs 21 + 33	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	3.8 UJ	4.7 UJ	3.6 U	7.8 UJ	7.6 U	6.7 U	16.8 UJ
2,3,4'-TriCB-(22)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	6.4 U	7 UJ	3.7 U	6 U	7.6 U	6.8 U	5.4 U
2,3,5-TriCB-(23)	NV	NV	NV	NV	NV	NV	NV	NV	NV	37 U	6.3 U	5.9 U	3.7 U	6.1 U	7.7 U	6.8 U	5.4 U
2,3,6-TriCB-(24)	NV	NV	NV	NV	NV	NV	NV	NV	NV	52 U	8 U	7.5 U	4.5 U	7.4 U	9.4 U	8.3 U	6.6 U
2,3',4-TriCB-(25)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	6.4 U	6 U	3.7 U	6.1 U	7.8 U	6.9 U	5.5 U
PCBs 26 + 29	NV	NV	NV	NV	NV	NV	NV	NV	NV	100 U	5.8 U	5.4 U	3.4 U	5.6 U	7.1 U	6.3 U	5 U
2,3',6-TriCB-(27)	NV	NV	NV	NV	NV	NV	NV	NV	NV	140 U	7.6 U	7.1 U	4.2 U	6.9 U	8.8 U	7.8 U	6.2 U
2,4',5-TriCB-(31)	NV	NV	NV	NV	NV	NV	NV	NV	NV	98 U	11.4 UJ	14.8 UJ	3.2 UJ	12 UJ	7.6 UJ	6 U	4.8 U
2,4',6-TriCB-(32)	NV	NV	NV	NV	NV	NV	NV	NV	NV	140 U	7.4 U	7 U	4 U	6.6 U	8.4 U	7.4 U	5.9 U
2,3',5'-TriCB-(34)	NV	NV	NV	NV	NV	NV	NV	NV	NV	37 U	6.2 U	5.8 U	3.6 U	6 U	7.6 U	6.7 U	5.3 U

Table 4-2
Summary of Groundwater Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Groundwater, Ingestion and Inhalation from Tapwater, Residential[1]	Ecological RBC, Freshwater[a][b][2]				Ecological RBC for Wildlife Ingestion of Surface Water[3]				MFA-B3A	MW-1	MW-2	MW-3		MW-4	MW-5	MW-6
Sample Name:										MFA-B3A-20230207-GW-36.0	MW1-20230220-GW-70	MW2-20230220-GW-60	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW4-20230214-GW-40	MW5-20230214-GW-40	MW6-20230214-GW-40.25
Collection Date:		Aquatic Life		Aquatic-Dependent Wildlife		Birds		Mammals		2/7/2023	2/20/2023	2/20/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023
Collection Depth (ft)[c]:		Chronic	Acute	Chronic	Acute	TE	Non-TE	TE	Non-TE	36	70	60	35	35	40	40	40.25
3,3',4,-TriCB-(35)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	6.4 U	6 U	3.5 U	5.8 U	7.4 U	6.5 U	5.2 U
3,3',5-TriCB-(36)	NV	NV	NV	NV	NV	NV	NV	NV	NV	31 U	5.7 U	5.3 U	3.2 U	5.3 U	6.8 U	6 U	4.8 U
3,4,4'-TriCB-(37)	NV	NV	NV	NV	NV	NV	NV	NV	NV	42 U	6.6 U	7.7 UJ	3.2 U	5.1 U	6.7 U	5.8 U	10.1 UJ
3,4,5-TriCB-(38)	NV	NV	NV	NV	NV	NV	NV	NV	NV	35 U	5.9 U	5.5 U	3.4 U	5.6 U	7.1 U	6.3 U	5 U
3,4',5-TriCB-(39)	NV	NV	NV	NV	NV	NV	NV	NV	NV	73 U	6.3 U	5.9 U	3.6 U	5.9 U	7.5 U	6.7 U	5.3 U
PCBs 40 + 41 + 71	NV	NV	NV	NV	NV	NV	NV	NV	NV	330 U	19 U	16 U	11 U	14 U	19 U	19 U	14 U
2,2',3,4'-TetraCB-(42)	NV	NV	NV	NV	NV	NV	NV	NV	NV	660 U	26 U	22 U	15 U	19 U	26 U	26 U	20 U
2,2',3,5-TetraCB-(43)	NV	NV	NV	NV	NV	NV	NV	NV	NV	460 U	25 U	21 U	14 U	18 U	25 U	25 U	19 U
PCBs 44/47/65	NV	NV	NV	NV	NV	NV	NV	NV	NV	320 U	18 U	**28 J**	**19 J**	29 UJ	18 U	**20 J**	**37 J**
PCBs 45 + 51	NV	NV	NV	NV	NV	NV	NV	NV	NV	350 U	20 UK	17 U	11 U	15 U	20 U	20 U	15 U
2,2',3,6'-TetraCB-(46)	NV	NV	NV	NV	NV	NV	NV	NV	NV	590 U	22 U	19 U	12 U	16 U	22 U	22 U	17 U
2,2',4,5-TetraCB-(48)	NV	NV	NV	NV	NV	NV	NV	NV	NV	510 U	19 U	16 U	11 U	14 U	19 U	19 U	15 U
PCBs 49 + 69	NV	NV	NV	NV	NV	NV	NV	NV	NV	300 U	17 U	15 U	9.7 U	12 U	17 U	17 U	17 UJ
PCBs 50 + 53	NV	NV	NV	NV	NV	NV	NV	NV	NV	520 U	19 U	17 U	11 U	14 U	20 U	20 U	15 U
2,2',5,5'-TetraCB-(52)	NV	NV	NV	NV	NV	NV	NV	NV	NV	510 U	31 UJ	49 UJ	11 U	20 UJ	19 U	19 U	38 UJ
2,2',6,6'-TetraCB-(54)	NV	NV	NV	NV	NV	NV	NV	NV	NV	300 U	21 U	28 U	18 U	26 U	34 U	29 U	23 U
2,3,3',4-TetraCB-(55)	NV	NV	NV	NV	NV	NV	NV	NV	NV	120 U	15 U	12 U	7.7 U	9.9 U	14 U	14 U	10 U
2,3,3',4'-Tetra CB-(56)	NV	NV	NV	NV	NV	NV	NV	NV	NV	350 U	14 U	12 U	7.5 U	9.5 U	13 U	13 U	10 U
2,3,3',5-TetraCB-(57)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	14 U	12 U	7.4 U	9.4 U	13 U	13 U	10 U
2,3,3',5'-TetraCB-(58)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	13 U	11 U	7.3 U	9.3 U	13 U	13 U	9.9 U
PCBs 59/62/75	NV	NV	NV	NV	NV	NV	NV	NV	NV	370 U	14 U	12 U	7.7 U	9.8 U	14 U	14 U	10 U
2,3,4,4'-TetraCB-(60)	NV	NV	NV	NV	NV	NV	NV	NV	NV	340 U	14 U	12 U	7.2 U	9.3 U	13 U	13 U	9.8 U
PCBs 61/70/74/76	NV	NV	NV	NV	NV	NV	NV	NV	NV	350 U	32 UJ	58 UJ	7.4 UJ	26 UJ	13 U	13 U	47 UJ
2,3,4',5-TetraCB-(63)	NV	NV	NV	NV	NV	NV	NV	NV	NV	330 U	13 U	11 U	7.1 U	9.1 U	13 U	13 U	9.6 U
2,3,4',6-TetraCB-(64)	NV	NV	NV	NV	NV	NV	NV	NV	NV	290 U	16 U	14 U	9 U	11 U	16 U	16 U	12 U
2,3',4,4'-TetraCB-(66)	NV	NV	NV	NV	NV	NV	NV	NV	NV	330 U	13 U	11 UK	7 U	9.3 UJ	12 U	12 U	20.4 UJ
2,3',4,5-TetraCB-(67)	NV	NV	NV	NV	NV	NV	NV	NV	NV	190 U	11 U	9.5 U	6.1 U	7.8 U	11 U	11 U	8.3 U
2,3',4,5'-TetraCB-(68)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	12 U	11 U	6.6 U	8.5 U	12 U	12 U	9 U
2,3',5,5'-TetraCB-(72)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	13 U	11 U	7.1 U	9.1 U	13 U	13 U	9.7 U
2,3',5',6-TetraCB-(73)	NV	NV	NV	NV	NV	NV	NV	NV	NV	120 U	13 U	11 U	7.5 U	9.6 U	13 U	13 U	10 U
3,3',4,4'-TetraCB-(77)	NV	NV	NV	NV	NV	NV	NV	NV	NV	130 U	11 U	8.6 U	5.5 U	6.8 U	9.7 U	9.8 U	**9 J**
3,3',4,5-TetraCB-(78)	NV	NV	NV	NV	NV	NV	NV	NV	NV	120 U	15 U	12 U	7.7 U	9.8 U	14 U	14 U	10 U
3,3',4,5'-TetraCB-(79)	NV	NV	NV	NV	NV	NV	NV	NV	NV	200 U	11 U	9.5 U	6.1 U	7.8 U	11 U	11 U	8.3 U
3,3',5,5'-TetraCB-(80)	NV	NV	NV	NV	NV	NV	NV	NV	NV	190 U	11 U	9.7 U	6 U	7.7 U	11 U	11 U	8.1 U
3,4,4',5-TetraCB-(81)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	12 U	9.3 U	6 U	7.6 U	11 U	11 U	8.3 U
2,2',3,3',4-PentaCB-(82)	NV	NV	NV	NV	NV	NV	NV	NV	NV	310 U	25 U	18 U	11 U	13 U	18 U	18 U	14 U
PCBs 83 + 99	NV	NV	NV	NV	NV	NV	NV	NV	NV	380 U	20 U	15 U	8.7 U	11 U	15 U	15 U	12 U
2,2',3,3',6-PentaCB-(84)	NV	NV	NV	NV	NV	NV	NV	NV	NV	410 U	21 U	19 UJ	9.6 U	12 U	16 U	17 U	13 U
PCBs 85/116/117	NV	NV	NV	NV	NV	NV	NV	NV	NV	300 U	26 U	**26 J**	6.8 U	8.4 U	12 U	12 U	9.1 U
PCBs 86/87/97/109/119/125	NV	NV	NV	NV	NV	NV	NV	NV	NV	310 U	26 UJ	50 UJ	7.3 U	15.2 UJ	12 U	13 U	9.8 U
PCBs 88 + 91	NV	NV	NV	NV	NV	NV	NV	NV	NV	400 U	20 U	15 U	9.3 U	12 U	16 U	16 U	12 U
2,2',3,4,6'-PentaCB-(89)	NV	NV	NV	NV	NV	NV	NV	NV	NV	310 U	24 U	18 U	11 U	14 U	19 U	19 U	15 U
PCBs 90 + 101 + 113	NV	NV	NV	NV	NV	NV	NV	NV	NV	430 UJ	16 UK	120 UJ	7.4 UJ	36.1 UJ	18 UJ	13 UJ	69.2 UJ
2,2',3,5,5'-PentaCB-(92)	NV	NV	NV	NV	NV	NV	NV	NV	NV	430 U	22 U	16 U	10 U	12 U	17 U	17 U	13 U
PCBs 93 + 98 + 100 + 102	NV	NV	NV	NV	NV	NV	NV	NV	NV	380 U	19 U	14 U	9.1 U	11 U	16 U	16 U	12 U
2,2',3,5,6'-PentaCB-(94)	NV	NV	NV	NV	NV	NV	NV	NV	NV	280 U	20 U	15 U	9.5 U	12 U	16 U	16 U	13 U
2,2',3,5',6-PentaCB-(95)	NV	NV	NV	NV	NV	NV	NV	NV	NV	420 U	52 U	104 U	9.9 UJ	33 UJ	17 U	17 U	58 U

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Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Groundwater, Ingestion and Inhalation from Tapwater, Residential[1]	Ecological RBC, Freshwater[a][b][2]				Ecological RBC for Wildlife Ingestion of Surface Water[3]				MFA-B3A	MW-1	MW-2	MW-3		MW-4	MW-5	MW-6
Sample Name:										MFA-B3A-20230207-GW-36.0	MW1-20230220-GW-70	MW2-20230220-GW-60	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW4-20230214-GW-40	MW5-20230214-GW-40	MW6-20230214-GW-40.25
Collection Date:		Aquatic Life		Aquatic-Dependent Wildlife		Birds		Mammals		2/7/2023	2/20/2023	2/20/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023
Collection Depth (ft)[c]:		Chronic	Acute	Chronic	Acute	TE	Non-TE	TE	Non-TE	36	70	60	35	35	40	40	40.25
2,2',3,6,6'-PentaCB-(96)	NV	NV	NV	NV	NV	NV	NV	NV	NV	220 U	16 U	12 U	8 U	10 U	14 U	14 U	11 U
2,2',4,5',6-PentaCB-(103)	NV	NV	NV	NV	NV	NV	NV	NV	NV	380 U	20 U	14 U	8.9 U	11 U	15 U	15 U	12 U
2,2',4,6,6'-PentaCB-(104)	NV	NV	NV	NV	NV	NV	NV	NV	NV	89 U	16 UK	13 U	8.7 U	11 U	16 U	15 U	11 U
2,3,3',4,4'-PentaCB-(105)	NV	NV	NV	NV	NV	NV	NV	NV	NV	93 U	10 UJ	19.6 UJ	4.5 U	5.6 U	7.7 U	7.6 U	17.8 UJ
2,3,3',4,5-PentaCB-(106)	NV	NV	NV	NV	NV	NV	NV	NV	NV	77 U	12 U	8.4 U	5.9 U	7.3 U	10 U	10 U	7.9 U
2,3,3',4',5-PentaCB-(107)	NV	NV	NV	NV	NV	NV	NV	NV	NV	190 U	9.1 U	6.6 U	4.5 U	5.6 U	7.7 U	7.7 U	6 U
PCBs 108 + 124	NV	NV	NV	NV	NV	NV	NV	NV	NV	150 U	11 U	8.3 U	5.6 U	6.9 U	9.5 U	9.6 U	7.5 U
PCBs 110 + 115	NV	NV	NV	NV	NV	NV	NV	NV	NV	490 UJ	46 UJ	102 U	6.7 UJ	24.1 UJ	15 UJ	12 U	52.1 UJ
2,3,3',5,5'-PentaCB-(111)	NV	NV	NV	NV	NV	NV	NV	NV	NV	85 U	13 U	9.5 U	6 U	7.4 U	10 U	10 U	8 U
2,3,3',5,6-PentaCB-(112)	NV	NV	NV	NV	NV	NV	NV	NV	NV	83 U	13 U	**24.3 J**	5.7 U	7.1 U	9.8 U	9.8 U	7.6 U
2,3,4,4',5-PentaCB-(114)	NV	NV	NV	NV	NV	NV	NV	NV	NV	100 U	11 U	7.5 U	5.2 U	6.3 U	8.5 U	8.9 U	7 U
2,3',4,4',5-PentaCB-(118)	NV	NV	NV	NV	NV	NV	NV	NV	NV	127 UJ	31 UJ	61.7 UJ	4.8 UJ	14.4 UJ	8.2 U	8.4 U	31.4 UJ
2,3',4,5,5'-PentaCB-(120)	NV	NV	NV	NV	NV	NV	NV	NV	NV	90 U	14 U	10 U	6.1 U	7.6 U	10 U	10 U	8.2 U
2,3',4,5',6-PentaCB-(121)	NV	NV	NV	NV	NV	NV	NV	NV	NV	88 U	14 U	10 U	6.3 U	7.8 U	11 U	11 U	8.4 U
2,3,3',4',5'-PentaCB-(122)	NV	NV	NV	NV	NV	NV	NV	NV	NV	290 U	15 U	11 U	7.3 U	9.1 U	12 U	13 U	9.8 U
2,3',4,4',5'-PentaCB-(123)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	11 U	8.2 U	5.4 U	6.7 U	9.1 U	9.3 U	7.3 U
3,3',4,4',5-PentaCB-(126)	NV	NV	NV	NV	NV	NV	NV	NV	NV	78 U	10 U	7.5 U	4.7 U	6 U	8.3 U	8.4 U	6.7 U
3,3',4,5,5'-PentaCB-(127)	NV	NV	NV	NV	NV	NV	NV	NV	NV	72 U	11 U	8.1 U	5.5 U	6.8 U	9.4 U	9.4 U	7.3 U
PCBs 128 + 166	NV	NV	NV	NV	NV	NV	NV	NV	NV	330 U	16 U	11 UK	6.6 U	9 U	9.9 U	11 U	9.9 U
PCBs 129/138/163	NV	NV	NV	NV	NV	NV	NV	NV	NV	520 UJ	61 UJ	139 UJ	7.5 UJ	25 UJ	11 U	12 U	56 UJ
2,2',3,3',4,5'-HexaCB-(130)	NV	NV	NV	NV	NV	NV	NV	NV	NV	420 U	18 U	13 U	8.2 U	11 U	12 U	14 U	12 U
2,2',3,3',4,6-HexaCB-(131)	NV	NV	NV	NV	NV	NV	NV	NV	NV	530 U	23 U	17 U	10 U	14 U	15 U	17 U	15 U
2,2',3,3',4,6'-HexaCB-(132)	NV	NV	NV	NV	NV	NV	NV	NV	NV	440 U	20 U	44 UJ	8.9 U	12 U	13 U	15 U	19 UJ
2,2',3,3',5,5'-HexaCB-(133)	NV	NV	NV	NV	NV	NV	NV	NV	NV	440 U	20 U	14 U	8.8 U	12 U	13 U	15 U	13 U
PCBs 134 + 143	NV	NV	NV	NV	NV	NV	NV	NV	NV	330 U	22 U	16 U	9.4 U	13 U	14 U	16 U	14 U
PCBs 135 + 151	NV	NV	NV	NV	NV	NV	NV	NV	NV	510 U	37 UJ	76 UJ	10 U	14 U	15 U	17 U	38 UJ
2,2',3,3',6,6'-HexaCB-(136)	NV	NV	NV	NV	NV	NV	NV	NV	NV	370 U	16 U	23 UJ	7.4 U	10 U	11 U	12 U	11 U
2,2',3,4,4',5-HexaCB-(137)	NV	NV	NV	NV	NV	NV	NV	NV	NV	410 U	19 U	13 U	7.8 U	10 U	12 U	13 U	12 U
PCBs 139 + 140	NV	NV	NV	NV	NV	NV	NV	NV	NV	370 U	17 U	12 U	7.2 U	9.6 U	11 U	12 U	11 U
2,2',3,4,5,5'-HexaCB-(141)	NV	NV	NV	NV	NV	NV	NV	NV	NV	380 U	16 U	29 UJ	7.4 U	10 U	11 U	12 U	14 UJ
2,2',3,4,5,6-HexaCB-(142)	NV	NV	NV	NV	NV	NV	NV	NV	NV	160 U	21 U	15 U	9.2 U	12 U	14 U	15 U	14 U
2,2',3,4,5',6-HexaCB-(144)	NV	NV	NV	NV	NV	NV	NV	NV	NV	500 U	22 U	16 U	9.9 U	13 U	15 U	16 U	15 U
2,2',3,4,6,6'-HexaCB-(145)	NV	NV	NV	NV	NV	NV	NV	NV	NV	120 U	15 U	11 U	7.2 U	9.7 U	11 U	12 U	11 U
2,2',3,4',5,5'-HexaCB-(146)	NV	NV	NV	NV	NV	NV	NV	NV	NV	340 U	16 U	18 UJ	6.8 U	9.2 U	10 U	11 U	10 U
PCBs 147 + 149	NV	NV	NV	NV	NV	NV	NV	NV	NV	360 U	72 UJ	134 U	7.1 UJ	32.3 UJ	13 UJ	12 U	63 UJ
2,2',3,4',5,6'-HexaCB-(148)	NV	NV	NV	NV	NV	NV	NV	NV	NV	170 U	23 U	16 U	10 U	14 U	15 U	17 U	15 U
2,2',3,4',6,6'-HexaCB-(150)	NV	NV	NV	NV	NV	NV	NV	NV	NV	120 U	16 U	11 U	7.1 U	9.6 U	11 U	12 U	11 U
2,2',3,5,6,6'-HexaCB-(152)	NV	NV	NV	NV	NV	NV	NV	NV	NV	120 U	17 U	12 U	7.4 U	9.9 U	11 U	12 U	11 U
PCBs 153 + 168	NV	NV	NV	NV	NV	NV	NV	NV	NV	320 UJ	62 UJ	125 U	6 UJ	25.3 UJ	12.8 UJ	9.9 U	59.4 UJ
2,2',4,4',5,6'-HexaCB-(154)	NV	NV	NV	NV	NV	NV	NV	NV	NV	390 U	18 U	13 U	7.8 U	11 U	12 U	13 U	12 U
2,2',4,4',6,6'-HexaCB-(155)	NV	NV	NV	NV	NV	NV	NV	NV	NV	93 U	18 U	11 U	7.7 U	9.8 U	14 U	14 U	11 U
PCBs 156 + 157	NV	NV	NV	NV	NV	NV	NV	NV	NV	100 U	10 U	9.8 UJ	4.9 U	6.2 U	6.3 U	7.8 U	7.1 U
2,3,3',4,4',6-HexaCB-(158)	NV	NV	NV	NV	NV	NV	NV	NV	NV	250 U	11 U	11.3 UJ	4.9 U	6.6 U	7.3 U	8.1 U	7.3 U
2,3,3',4,5,5'-HexaCB-(159)	NV	NV	NV	NV	NV	NV	NV	NV	NV	140 U	9.6 U	6.8 U	4.7 U	6.3 U	7 U	7.7 U	6.9 U
2,3,3',4,5,6-HexaCB-(160)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	14 U	10 U	6.2 U	8.3 U	9.2 U	10 U	9.2 U
2,3,3',4',5,6-HexaCB-(161)	NV	NV	NV	NV	NV	NV	NV	NV	NV	100 U	14 U	9.6 U	5.7 U	7.7 U	8.6 U	9.5 U	8.5 U
2,3,3',4',5,5'-HexaCB-(162)	NV	NV	NV	NV	NV	NV	NV	NV	NV	140 U	9.5 U	6.8 U	4.6 U	6.2 U	6.8 U	7.5 U	6.8 U

Table 4-2
Summary of Groundwater Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Groundwater, Ingestion and Inhalation from Tapwater, Residential[1]	Ecological RBC, Freshwater[a][b][2]				Ecological RBC for Wildlife Ingestion of Surface Water[3]				MFA-B3A	MW-1	MW-2	MW-3		MW-4	MW-5	MW-6
Sample Name:										MFA-B3A-20230207-GW-36.0	MW1-20230220-GW-70	MW2-20230220-GW-60	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW4-20230214-GW-40	MW5-20230214-GW-40	MW6-20230214-GW-40.25
Collection Date:		Aquatic Life		Aquatic-Dependent Wildlife		Birds		Mammals		2/7/2023	2/20/2023	2/20/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023
Collection Depth (ft)[c]:		Chronic	Acute	Chronic	Acute	TE	Non-TE	TE	Non-TE	36	70	60	35	35	40	40	40.25
2,3,3',4',5',6-HexaCB-(164)	NV	NV	NV	NV	NV	NV	NV	NV	NV	270 U	12 U	8.4 U	5.3 U	7.2 U	8 U	8.8 U	7.9 U
2,3,3',5,5',6-HexaCB-(165)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	15 U	10 U	6.3 U	8.4 U	9.4 U	10 U	9.3 U
2,3',4,4',5,5'-HexaCB-(167)	NV	NV	NV	NV	NV	NV	NV	NV	NV	95 U	10 U	7.4 U	4.9 U	6.4 U	7.1 U	8 U	7.2 U
3,3',4,4',5,5'-HexaCB-(169)	NV	NV	NV	NV	NV	NV	NV	NV	NV	70 U	11 U	8.1 U	5.1 U	8.2 U	9.8 U	8.3 U	8.3 U
2,2',3,3',4,4',5-HeptaCB-(170)	NV	NV	NV	NV	NV	NV	NV	NV	NV	95 U	12 U	16.3 UJ	5.1 U	6.8 U	9.2 U	8.9 U	7.8 U
PCBs 171 + 173	NV	NV	NV	NV	NV	NV	NV	NV	NV	200 U	15 U	10 U	6.3 U	8.3 U	11 U	11 U	9.5 U
2,2',3,3',4,5,5'-HeptaCB-(172)	NV	NV	NV	NV	NV	NV	NV	NV	NV	240 U	15 U	11 U	6.2 U	8.2 U	11 U	11 U	9.3 U
2,2',3,3',4,5,6'-HeptaCB-(174)	NV	NV	NV	NV	NV	NV	NV	NV	NV	220 U	14 U	29.8 UJ	5.9 U	7.7 U	10 U	10 U	10.1 UJ
2,2',3,3',4,5',6-HeptaCB-(175)	NV	NV	NV	NV	NV	NV	NV	NV	NV	290 U	18 U	12 U	7.2 U	9.4 U	13 U	12 U	11 U
2,2',3,3',4,6,6'-HeptaCB-(176)	NV	NV	NV	NV	NV	NV	NV	NV	NV	210 U	13 U	8.7 U	5.2 U	6.8 U	9.3 U	9 U	7.8 U
2,2',3,3',4,5',6'-HeptaCB-(177)	NV	NV	NV	NV	NV	NV	NV	NV	NV	240 U	15 U	19 UJ	6.4 U	8.5 U	12 U	11 U	9.7 U
2,2',3,3',5,5',6-HeptaCB-(178)	NV	NV	NV	NV	NV	NV	NV	NV	NV	300 U	18 U	12 U	7.3 U	9.6 U	13 U	13 U	11 U
2,2',3,3',5,6,6'-HeptaCB-(179)	NV	NV	NV	NV	NV	NV	NV	NV	NV	210 U	13 UK	20.4 UJ	5.2 U	6.8 U	9.2 U	9 U	9 UJ
PCBs 180 + 193	NV	NV	NV	NV	NV	NV	NV	NV	NV	120 U	23 UJ	49.8 UJ	4.8 U	8.9 UJ	8.5 U	8.3 U	18 UJ
2,2',3,4,4',5,6-HeptaCB-(181)	NV	NV	NV	NV	NV	NV	NV	NV	NV	130 U	14 U	9.9 U	6.1 U	8 U	11 U	11 U	9.1 U
2,2',3,4,4',5,6'-HeptaCB-(182)	NV	NV	NV	NV	NV	NV	NV	NV	NV	88 U	16 U	11 U	6.5 U	8.5 U	12 U	11 U	9.7 U
2,2',3,4,4',5',6-HeptaCB-(183)	NV	NV	NV	NV	NV	NV	NV	NV	NV	200 U	13 U	19.3 UJ	5.5 U	7.3 U	9.9 U	9.6 U	9 UJ
2,2',3,4,4',6,6'-HeptaCB-(184)	NV	NV	NV	NV	NV	NV	NV	NV	NV	67 U	12 U	8.4 U	5 U	6.5 U	8.8 U	8.6 U	7.4 U
2,2',3,4,5,5',6-HeptaCB-(185)	NV	NV	NV	NV	NV	NV	NV	NV	NV	89 U	13 U	9.3 U	6.6 U	8.7 U	12 U	11 U	9.9 U
2,2',3,4,5,6,6'-HeptaCB-(186)	NV	NV	NV	NV	NV	NV	NV	NV	NV	73 U	13 U	8.9 U	5.4 U	7.1 U	9.6 U	9.4 U	8.1 U
2,2',3,4',5,5',6-HeptaCB-(187)	NV	NV	NV	NV	NV	NV	NV	NV	NV	270 U	22 UJ	38 UJ	6.5 U	8.5 U	12 U	11 U	19.1 UJ
2,2',3,4',5,6,6'-HeptaCB-(188)	NV	NV	NV	NV	NV	NV	NV	NV	NV	66 U	13 U	8.3 U	5.6 U	6.9 U	9.8 U	11 U	8 U
2,3,3',4,4',5,5'-HeptaCB-(189)	NV	NV	NV	NV	NV	NV	NV	NV	NV	79 U	9.3 U	6.6 U	4.2 U	5.8 U	7.6 U	6.7 U	6.3 U
2,3,3',4,4',5,6-HeptaCB-(190)	NV	NV	NV	NV	NV	NV	NV	NV	NV	170 U	10 U	7.1 U	4.4 U	5.7 U	7.8 U	7.6 U	6.5 U
2,3,3',4,4',5',6-HeptaCB-(191)	NV	NV	NV	NV	NV	NV	NV	NV	NV	110 U	10 U	7 U	4.4 U	5.7 U	7.8 U	7.6 U	6.5 U
2,3,3',4,5,5',6-HeptaCB-(192)	NV	NV	NV	NV	NV	NV	NV	NV	NV	63 U	12 U	8.2 U	4.8 U	6.3 U	8.6 U	8.4 U	7.2 U
2,2',3,3',4,4',5,5'-OctaCB-(194)	NV	NV	NV	NV	NV	NV	NV	NV	NV	210 U	9.5 U	9.2 U	11 U	15 U	19 U	6.3 U	11 U
2,2',3,3',4,4',5,6-OctaCB-(195)	NV	NV	NV	NV	NV	NV	NV	NV	NV	230 U	11 U	11 U	12 U	17 U	22 U	7.1 U	12 U
2,2',3,3',4,4',5,6'-OctaCB-(196)	NV	NV	NV	NV	NV	NV	NV	NV	NV	250 U	11 U	11 U	12 U	17 U	22 U	7.2 U	12 U
2,2',3,3',4,4',6,6'-OctaCB-(197)	NV	NV	NV	NV	NV	NV	NV	NV	NV	54 U	8 U	7.9 U	8.6 U	12 U	15 U	5 U	8.5 U
PCBs 198 + 199	NV	NV	NV	NV	NV	NV	NV	NV	NV	260 U	12 U	12 U	13 U	18 U	23 U	7.7 U	13 U
2,2',3,3',4,5,6,6'-OctaCB-(200)	NV	NV	NV	NV	NV	NV	NV	NV	NV	120 U	9.1 U	8.9 U	10 U	14 U	18 U	6 U	10 U
2,2',3,3',4,5',6,6'-OctaCB-(201)	NV	NV	NV	NV	NV	NV	NV	NV	NV	130 U	8.1 U	7.9 U	8.8 U	12 U	15 U	5.1 U	8.8 U
2,2',3,3',5,5',6,6'-OctaCB-(202)	NV	NV	NV	NV	NV	NV	NV	NV	NV	76 U	9 U	8.4 U	9.7 U	13 U	15 U	5.9 U	9.4 U
2,2',3,4,4',5,5',6-OctaCB-(203)	NV	NV	NV	NV	NV	NV	NV	NV	NV	240 U	11 U	11 U	12 U	17 U	22 U	7.2 U	12 U
2,2',3,4,4',5,6,6'-OctaCB-(204)	NV	NV	NV	NV	NV	NV	NV	NV	NV	45 U	5.6 U	5.5 U	7.6 U	10 U	13 U	4.4 U	7.6 U
2,3,3',4,4',5,5',6-OctaCB-(205)	NV	NV	NV	NV	NV	NV	NV	NV	NV	53 U	6.9 U	7 U	7.7 U	11 U	15 U	4.3 U	7.8 U
2,2',3,3',4,4',5,5',6-NonaCB-(206)	NV	NV	NV	NV	NV	NV	NV	NV	NV	75 U	14 U	14 U	14 U	20 U	29 U	7.8 U	26 U
2,2',3,3',4,4',5,6,6'-NonaCB-(207)	NV	NV	NV	NV	NV	NV	NV	NV	NV	44 U	12 U	12 U	13 U	18 U	25 U	7.1 U	23 U
2,2',3,3',4,5,5',6,6'-NonaCB-(208)	NV	NV	NV	NV	NV	NV	NV	NV	NV	42 U	11 U	11 U	12 U	16 U	23 U	6.8 U	21 U
DecaCB-(209)	NV	NV	NV	NV	NV	NV	NV	NV	NV	47 U	11 U	10 U	18 U	24 U	27 U	6.3 U	25 U
Total PCBs[f]	6,000	14,000	2,000,000	120	NV	99,000,000	990,000,000	44,000,000	440,000,000	780 UJ	**554 J**	**78 J**	**42 J**	118 UJ	**24 J**	**38 J**	**105 J**
SVOCs (ug/L)																	
1,2,4-Trichlorobenzene	NV	130	420	NV	NV	NV	NV	6,600	66,000	0.0641 UJ	-- R	-- R	-- R	-- R	-- R	-- R	-- R
1,2-Dichlorobenzene	300	23	130	NV	NV	NV	NV	NV	NV	0.0641 UJ	-- R	-- R	-- R	-- R	-- R	-- R	-- R
1,2-Dinitrobenzene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.321 U	0.253 U	0.266 U	0.24 UJ	0.236 UJ	0.309 U	0.294 U	0.278 U
1,2-Diphenylhydrazine	NV	1.1	10	NV	NV	NV	NV	NV	NV	0.0641 U	0.0253 U	0.0266 U	0.024 UJ	0.0236 UJ	0.0617 U	0.0588 U	0.0278 U

Table 4-2
Summary of Groundwater Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Groundwater, Ingestion and Inhalation from Tapwater, Residential[1]	Ecological RBC, Freshwater[a][b][2]				Ecological RBC for Wildlife Ingestion of Surface Water[3]				MFA-B3A	MW-1	MW-2	MW-3		MW-4	MW-5	MW-6
Sample Name:										MFA-B3A-20230207-GW-36.0	MW1-20230220-GW-70	MW2-20230220-GW-60	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW4-20230214-GW-40	MW5-20230214-GW-40	MW6-20230214-GW-40.25
Collection Date:		Aquatic Life		Aquatic-Dependent Wildlife		Birds		Mammals		2/7/2023	2/20/2023	2/20/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023
Collection Depth (ft)[c]:		Chronic	Acute	Chronic	Acute	TE	Non-TE	TE	Non-TE	36	70	60	35	35	40	40	40.25
1,3-Dichlorobenzene	NV	22	79	NV	NV	NV	NV	NV	NV	**0.0432 J-**	-- R	-- R	**0.095 J-**	**0.0939 J-**	**0.122 J-**	**0.108 J-**	**0.0919 J-**
1,3-Dinitrobenzene	NV	22	100	NV	NV	NV	NV	NV	NV	0.321 U	0.253 U	0.266 U	0.24 U	0.236 U	0.309 U	0.294 U	0.278 U
1,4-Dichlorobenzene	0.48	9.4	57	NV	NV	NV	NV	11,000	44,000	0.0641 UJ	-- R	-- R	-- R	-- R	-- R	-- R	-- R
1,4-Dinitrobenzene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.321 U	0.253 U	0.266 U	0.24 U	0.236 U	0.309 U	0.294 U	0.278 U
1-Methylnaphthalene	NV	6.1	110	NV	NV	NV	NV	NV	NV	0.0513 UJ	0.0202 U	0.0213 U	**0.0239 J-**	-- R	-- R	-- R	-- R
2,2'-oxybis(1-Chloropropane)	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.0321 U	0.0253 U	0.0266 U	**0.0264 J-**	0.0236 UJ	0.0309 U	0.0294 U	0.0278 U
2,3,4,6-Tetrachlorophenol	NV	1	11	NV	NV	NV	NV	NV	NV	0.0641 U	0.0505 U	0.0532 U	0.0481 U	0.0472 U	0.0617 U	0.0588 U	0.0556 U
2,3,5,6-Tetrachlorophenol	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.0641 U	0.0505 U	0.0532 U	0.0481 U	0.0472 U	0.0617 U	0.0588 U	0.0556 U
2,4,5-Trichlorophenol	NV	1.9	17	NV	NV	NV	NV	NV	NV	0.0641 U	0.0505 U	0.0532 U	0.0481 U	0.0472 U	0.0617 U	0.0588 U	0.0556 U
2,4,6-Trichlorophenol	4.4	4.9	39	NV	NV	NV	NV	NV	NV	**0.0665 J**	0.0505 U	0.0532 U	0.0481 U	0.0472 U	0.0617 U	0.0588 U	0.0556 U
2,4-Dichlorophenol	NV	11	92	NV	NV	NV	NV	NV	NV	0.0641 U	0.0505 U	0.0532 U	0.0481 U	0.0472 U	0.0617 U	0.0588 U	0.0556 U
2,4-Dimethylphenol	NV	15	140	NV	NV	NV	NV	NV	NV	0.0641 U	0.0505 U	0.0532 U	0.0481 U	0.0472 U	0.0617 U	0.0588 U	0.0556 U
2,4-Dinitrophenol	NV	71	380	NV	NV	NV	NV	NV	NV	0.321 U	0.253 U	0.266 U	0.24 U	0.236 U	0.309 U	0.294 U	0.278 U
2,4-Dinitrotoluene	NV	44	390	NV	NV	NV	NV	NV	NV	0.128 U	0.101 U	0.106 U	0.0962 UJ	0.0943 UJ	0.123 U	0.118 U	0.111 U
2,6-Dinitrotoluene	0.049	81	730	NV	NV	NV	NV	NV	NV	0.256 U	0.101 U	0.106 U	0.0962 UJ	0.0943 UJ	0.123 U	0.118 U	0.111 U
2-Chloronaphthalene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.0256 UJ	0.0101 U	0.0106 U	**0.0513 J-**	**0.0206 J-**	-- R	-- R	**0.0255 J-**
2-Chlorophenol	NV	18	160	NV	NV	4,600	46,000	2,200	22,000	0.0641 U	0.0505 U	0.0532 U	0.0481 U	0.0472 U	0.0617 U	0.0588 U	0.0556 U
2-Methylnaphthalene	NV	4.7	42	NV	NV	NV	NV	71,000	710,000	0.0513 UJ	0.0202 U	0.0213 U	-- R	-- R	-- R	-- R	-- R
2-Methylphenol	NV	67	600	NV	NV	NV	NV	NV	NV	0.0321 U	0.0253 U	0.0266 U	0.024 U	0.0236 U	0.0309 U	0.0294 U	0.0278 U
2-Nitroaniline	NV	17	490	NV	NV	NV	NV	NV	NV	0.256 U	0.202 U	0.213 U	0.192 UJ	0.189 UJ	0.247 U	0.235 U	0.222 U
2-Nitrophenol	NV	73	650	NV	NV	NV	NV	NV	NV	0.128 U	0.101 U	0.106 U	0.0962 U	0.0943 U	0.123 U	0.118 U	0.111 U
3- & 4-Methylphenol (m,p-Cresol)	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.0321 U	0.0253 U	0.0266 U	0.024 U	0.0236 U	0.0617 U	0.0294 U	0.0278 U
3,3-Dichlorobenzidine	0.17	4.5	41	NV	NV	NV	NV	NV	NV	0.641 UJ	0.505 UJ	0.532 UJ	0.481 UJ	0.472 UJ	0.617 UJ	0.588 UJ	0.556 UJ
3-Nitroaniline	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.256 U	0.202 U	0.213 U	0.192 UJ	0.189 UJ	0.247 U	0.235 U	0.222 U
4,6-Dinitro-2-methylphenol	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.321 U	0.253 U	0.266 U	0.24 U	0.236 U	0.309 U	0.294 U	0.278 U
4-Bromophenylphenyl ether	NV	1.5	12	NV	NV	NV	NV	NV	NV	0.0641 UJ	0.0253 U	0.0266 U	**0.0493 J-**	0.0236 UJ	0.0309 U	0.0294 U	0.0278 U
4-Chloro-3-methylphenol	NV	1	67	NV	NV	NV	NV	NV	NV	0.128 U	0.101 U	0.106 U	0.0962 U	0.0943 U	0.247 U	0.235 U	0.222 U
4-Chloroaniline	NV	0.8	24	NV	NV	NV	NV	NV	NV	0.0321 U	0.0253 U	0.0266 U	0.024 UJ	0.0236 UJ	0.0309 U	0.0294 U	0.0278 U
4-Chlorophenylphenyl ether	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.0641 UJ	0.0253 U	0.0266 U	**0.0507 J-**	0.0236 UJ	0.0309 U	0.0294 U	0.0278 U
4-Nitroaniline	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.256 U	0.202 U	0.213 U	0.192 UJ	0.189 UJ	0.247 U	0.235 U	0.222 U
4-Nitrophenol	NV	58	530	NV	NV	NV	NV	NV	NV	0.256 U	0.101 U	0.106 U	0.0962 U	0.0943 U	0.123 U	0.118 U	0.222 U
Acenaphthene	510	15	19	NV	NV	NV	NV	310,000	3,100,000	0.0256 UJ	0.0101 U	0.0106 U	**0.0419 J-**	**0.0167 J-**	0.0123 U	**0.0296**	**0.0378**
Acenaphthylene	NV	13	120	NV	NV	NV	NV	310,000	3,100,000	0.0128 U	0.0101 U	0.0106 U	**0.034 J-**	**0.0129 J-**	0.0123 U	0.0118 U	**0.023**
Aniline	NV	4.1	30	NV	NV	NV	NV	NV	NV	0.0641 U	0.0505 U	0.0532 U	0.0481 UJ	0.0472 UJ	0.0617 U	0.0588 U	0.0556 U
Anthracene	NV	0.02	0.18	NV	NV	NV	NV	440,000	4,400,000	0.0128 U	0.0101 U	0.0106 U	**0.0165 J-**	0.00943 UJ	0.0247 U	0.0235 U	0.0111 U
Benzo(a)anthracene	0.03	4.7	42	NV	NV	NV	NV	760	7,600	0.0128 U	0.0101 U	0.0106 U	0.00962 UJ	0.00943 UJ	0.0123 U	0.0118 U	0.0111 U
Benzo(a)pyrene	0.025	0.06	0.54	NV	NV	NV	NV	4,400	44,000	0.0192 U	0.0152 U	0.016 U	0.0144 UJ	0.0142 UJ	0.0185 U	0.0176 U	**0.0211**
Benzo(b)fluoranthene	0.25	2.6	23	NV	NV	NV	NV	17,000	170,000	0.0192 U	0.0152 U	0.016 U	0.0144 UJ	0.0142 UJ	0.0185 U	0.0176 U	**0.0182**
Benzo(ghi)perylene	NV	0.012	0.19	NV	NV	NV	NV	32,000	320,000	0.0128 U	0.0101 U	0.0106 U	0.00962 UJ	0.00943 UJ	0.0123 U	0.0118 U	0.0111 U
Benzo(k)fluoranthene	NV	0.06	1.3	NV	NV	NV	NV	32,000	320,000	0.0192 U	0.0152 U	0.016 U	0.0144 UJ	0.0142 UJ	0.0185 U	0.0176 U	**0.0232**
Benzoic acid	NV	42	740	NV	NV	NV	NV	17,000	170,000	**1.83 J**	**1.28 J**	1.33 U	2.4 U	2.36 U	1.54 U	2.94 U	2.78 U
Benzyl alcohol	NV	8.6	150	NV	NV	NV	NV	NV	NV	**0.212 J**	**0.264**	0.106 U	0.0962 U	0.0943 U	0.123 U	0.118 U	0.111 U
Bis(2-chloroethoxy)methane	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.0321 U	0.0253 U	0.0266 U	**0.0623 J-**	**0.0257 J-**	0.0309 U	0.0294 U	**0.0519**
Bis(2-chloroethyl)ether	0.014	NV	NV	NV	NV	NV	NV	NV	NV	0.0321 U	0.0253 U	0.0266 U	**0.0407 J-**	0.0236 UJ	0.0309 U	0.0294 U	0.0278 U
Bis(2-ethylhexyl)phthalate	5.6	8	1,100	NV	NV	4,500	45,000	82,000	820,000	0.256 U	0.202 U	0.213 U	0.192 UJ	0.189 UJ	0.247 U	0.235 U	0.222 U
Butylbenzylphthalate	NV	23	130	NV	NV	NV	NV	710,000	7,100,000	0.256 U	0.202 U	0.213 U	0.192 UJ	0.189 UJ	0.247 U	0.235 U	0.222 U
Carbazole	NV	4	36	NV	NV	NV	NV	NV	NV	0.0192 U	0.0152 U	0.016 U	**0.0178 J-**	0.0142 UJ	0.0185 U	0.0176 U	0.0333 U

Table 4-2
Summary of Groundwater Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Groundwater, Ingestion and Inhalation from Tapwater, Residential[1]	Ecological RBC, Freshwater[a][b][2]				Ecological RBC for Wildlife Ingestion of Surface Water[3]				MFA-B3A	MW-1	MW-2	MW-3		MW-4	MW-5	MW-6
Sample Name:										MFA-B3A-20230207-GW-36.0	MW1-20230220-GW-70	MW2-20230220-GW-60	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW4-20230214-GW-40	MW5-20230214-GW-40	MW6-20230214-GW-40.25
Collection Date:		Aquatic Life		Aquatic-Dependent Wildlife		Birds		Mammals		2/7/2023	2/20/2023	2/20/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023
Collection Depth (ft)[c]:		Chronic	Acute	Chronic	Acute	TE	Non-TE	TE	Non-TE	36	70	60	35	35	40	40	40.25
Chrysene	NV	4.7	42	NV	NV	NV	NV	760	7,600	0.0128 U	0.0101 U	0.0106 U	0.00962 UJ	0.00943 UJ	0.0123 U	0.0118 U	**0.0146**
Di(2-ethylhexyl)adipate	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.321 U	0.253 U	0.266 U	0.24 UJ	0.236 UJ	0.309 U	0.294 U	0.278 U
Dibenzo(a,h)anthracene	0.025	0.012	0.28	NV	NV	NV	NV	5,900	59,000	0.0128 U	0.0101 U	0.0106 U	0.00962 UJ	0.00943 UJ	0.0123 U	0.0118 U	0.0111 U
Dibenzofuran	NV	4	36	NV	NV	NV	NV	NV	NV	0.0256 UJ	0.0101 U	0.0106 U	**0.0174 J-**	0.00943 UJ	0.0123 U	0.0118 U	0.0222 U
Diethyl phthalate	NV	220	980	NV	NV	NV	NV	NV	NV	0.256 U	0.202 U	0.213 U	0.192 UJ	0.189 UJ	0.247 U	0.235 U	0.222 U
Dimethyl phthalate	NV	1,100	3,200	NV	NV	NV	NV	300,000	3,000,000	0.256 U	0.202 U	0.213 U	0.192 UJ	0.189 UJ	0.247 U	0.235 U	0.222 U
Di-n-butyl phthalate	NV	19	34	NV	NV	570	5,700	2,600,000	8,900,000	0.256 U	0.202 U	0.213 U	0.192 UJ	0.189 UJ	0.247 U	0.235 U	**0.347**
Di-n-octyl phthalate	NV	220	890	NV	NV	NV	NV	290,000	2,900,000	0.256 U	0.202 U	0.213 U	0.192 UJ	0.189 UJ	0.247 U	0.235 U	0.222 U
Fluoranthene	NV	0.8	3.7	NV	NV	NV	NV	56,000	560,000	0.0128 U	0.0101 U	0.0106 U	**0.024 J-**	**0.0106 J-**	0.0123 U	0.0118 U	**0.0185**
Fluorene	280	19	110	NV	NV	NV	NV	560,000	1,100,000	0.0128 U	0.0101 U	0.0106 U	**0.0586 J-**	**0.0201 J-**	0.0123 U	0.0118 U	**0.0301**
Hexachlorobenzene	0.0098	0.15	2.8	0.0003	NV	NV	NV	NV	NV	0.0128 U	0.0101 U	0.0106 U	**0.0179 J-**	0.00943 UJ	0.0123 U	0.0118 U	0.0111 U
Hexachlorobutadiene	NV	1	10	1	10	NV	NV	NV	NV	0.0321 U	-- R	-- R	**0.0358 J-**	-- R	-- R	-- R	-- R
Hexachlorocyclopentadiene	NV	0.45	4.5	NV	NV	NV	NV	NV	NV	0.0641 U	0.0505 U	0.0532 U	-- R	-- R	-- R	-- R	-- R
Hexachloroethane	0.34	NV	NV	NV	NV	NV	NV	NV	NV	0.0321 U	-- R	-- R	**0.0378 J-**	-- R	-- R	-- R	-- R
Indeno(1,2,3-cd)pyrene	NV	0.012	0.27	NV	NV	NV	NV	32,000	320,000	0.0128 U	0.0101 U	0.0106 U	0.00962 UJ	0.00943 UJ	0.0123 U	0.0118 U	0.0111 U
Isophorone	NV	920	7,500	NV	NV	NV	NV	NV	NV	**0.0541 J**	0.0253 U	0.0266 U	**0.0272 J-**	0.0236 UJ	0.0309 U	0.0294 U	**0.0398**
Naphthalene	0.17	21	170	NV	NV	57	570	2,200	22,000	0.0513 UJ	0.0202 U	0.0213 U	**0.0722 J-**	**0.0362 J-**	-- R	-- R	-- R
Nitrobenzene	NV	230	1,000	NV	NV	NV	NV	26,000	260,000	0.128 U	0.101 U	0.106 U	0.0962 UJ	0.0943 UJ	0.123 U	0.118 U	0.111 U
N-Nitrosodimethylamine	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.0321 U	0.0253 U	0.0266 U	0.024 UJ	0.0236 UJ	0.0309 U	0.0588 U	0.0278 U
N-Nitrosodiphenylamine	13	25	220	NV	NV	NV	NV	NV	NV	0.0321 U	0.0253 U	0.0266 U	**0.0257 J-**	0.0236 UJ	0.0309 U	0.0294 U	0.0278 U
N-Nitrosodipropylamine	0.011	NV	NV	NV	NV	NV	NV	NV	NV	0.0641 U	0.0253 U	0.0266 U	0.024 UJ	0.0236 UJ	0.0617 U	0.0588 U	0.0278 U
Pentachlorophenol	0.044	6.7	8.7	NV	NV	13,000	130,000	1,000	10,000	0.128 U	0.101 U	**0.107 J**	0.0962 U	0.0943 U	0.123 U	0.118 U	0.111 U
Phenanthrene	NV	2.3	31	NV	NV	NV	NV	23,000	230,000	0.0128 U	0.0101 U	0.0106 U	0.00962 UJ	0.00943 UJ	0.0247 U	0.0235 U	**0.0239**
Phenol	NV	160	4,700	NV	NV	NV	NV	NV	NV	0.256 U	0.202 U	0.213 U	0.192 U	0.189 U	0.247 U	0.235 U	0.222 U
Pyrene	110	4.6	42	NV	NV	NV	NV	33,000	330,000	0.0128 U	0.0101 U	0.0106 U	0.00962 UJ	0.00943 UJ	0.0123 U	0.0118 U	0.0111 U
Pyridine	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.128 U	0.101 U	0.106 U	0.0962 UJ	0.0943 UJ	0.123 U	0.118 U	0.111 U
cPAH TEQ[j][5]	0.025	NV	NV	NV	NV	NV	NV	NV	NV	0.0192 U	0.0152 U	0.016 U	0.0144 UJ	0.0142 UJ	0.0185 U	0.0176 U	0.0298
TPH (ug/L)																	
Gasoline-range hydrocarbons	110	440	NV	NV	NV	NV	NV	NV	NV	50 UJ	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Diesel-range hydrocarbons	100	640	NV	NV	NV	NV	NV	NV	NV	112 U	98 U	111 U	103 U	108 U	**148 J**	**139**	**180 J**
Lube-oil-range hydrocarbons	100[k]	NV	NV	NV	NV	NV	NV	NV	NV	225 U	196 U	222 U	206 U	215 U	213 U	206 U	**316 J**
VOCs (ug/L)																	
1,1,1,2-Tetrachloroethane	NV	85	770	NV	NV	NV	NV	NV	NV	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	8,000	76	690	NV	NV	NV	NV	4,400,000	44,000,000	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane	NV	200	910	NV	NV	NV	NV	NV	NV	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1,2-Trichloroethane	0.28	730	3,200	NV	NV	NV	NV	NV	NV	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 UJ
1,1-Dichloroethane	2.8	410	3,700	NV	NV	NV	NV	1,700,000	17,000,000	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,1-Dichloroethene	280	130	1,200	NV	NV	NV	NV	130,000	1,300,000	0.02 UJ	0.01 U	0.02 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
1,1-Dichloropropene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	NV	8	130	NV	NV	NV	NV	NV	NV	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2,4-Trichlorobenzene	NV	130	420	NV	NV	NV	NV	6,600	66,000	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	54	NV	NV	NV	NV	NV	NV	NV	NV	**0.0578 J**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.1 UJ
1,2-Dibromo-3-chloropropane	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-Dibromoethane	0.0075	NV	NV	NV	NV	NV	NV	NV	NV	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 UJ
1,2-Dichlorobenzene	300	23	130	NV	NV	NV	NV	NV	NV	0.25 UJ	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,2-Dichloroethane	0.17	2,000	8,200	NV	NV	19,000	37,000	220,000	2,200,000	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U

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City of St. Helens

Location:	RBC, Groundwater, Ingestion and Inhalation from Tapwater, Residential[1]	Ecological RBC, Freshwater[a][b][2]				Ecological RBC for Wildlife Ingestion of Surface Water[3]				MFA-B3A	MW-1	MW-2	MW-3		MW-4	MW-5	MW-6
Sample Name:										MFA-B3A-20230207-GW-36.0	MW1-20230220-GW-70	MW2-20230220-GW-60	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW4-20230214-GW-40	MW5-20230214-GW-40	MW6-20230214-GW-40.25
Collection Date:		Aquatic Life		Aquatic-Dependent Wildlife		Birds		Mammals		2/7/2023	2/20/2023	2/20/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023
Collection Depth (ft)[c]:		Chronic	Acute	Chronic	Acute	TE	Non-TE	TE	Non-TE	36	70	60	35	35	40	40	40.25
1,2-Dichloropropane	NV	520	3300	NV	NV	NV	NV	NV	NV	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,3,5-Trimethylbenzene	59	NV	NV	NV	NV	NV	NV	NV	NV	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.1 UJ
1,3-Dichlorobenzene	NV	22	79	NV	NV	NV	NV	NV	NV	0.25 UJ	0.25 U	0.25 U	**0.35 J**	**0.44 J**	**0.33 J**	**0.26 J**	**0.25 J**
1,3-Dichloropropane	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.48	9.4	57	NV	NV	NV	NV	11,000	44,000	0.25 UJ	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2,2-Dichloropropane	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	NV	22,000	200,000	NV	NV	NV	NV	7,900,000	20,000,000	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorotoluene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone	NV	NV	NV	NV	NV	NV	NV	NV	NV	5 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
4-Chlorotoluene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Isopropyltoluene	NV	16	150	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	NV	NV	NV	NV	NV	NV	NV	NV	NV	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	NV	1,700	15,000	NV	NV	830,000	8,300,000	44,000	220,000	20 UJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acrylonitrile	0.052	78	650	NV	NV	NV	NV	NV	NV	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	0.46	160	700	NV	NV	NV	NV	110,000	1,100,000	**0.0754 J**	0.05 U	**0.176 J**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromobenzene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.25 UJ	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromodichloromethane	0.13	340	3,100	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	3.3	230	1,100	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	7.5	16	38	NV	NV	NV	NV	NV	NV	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon disulfide	NV	15	130	NV	NV	NV	NV	NV	NV	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon tetrachloride	0.46	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	77	25	220	NV	NV	NV	NV	260,000	2,600,000	0.25 UJ	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chlorobromomethane	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	21,000	NV	NV	NV	NV	NV	NV	NV	NV	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	0.22	140	1,300	NV	NV	NV	NV	67,000	180,000	**0.122 J+**	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloromethane	190	NV	NV	NV	NV	NV	NV	NV	NV	2.5 UJ	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	36	620	5,500	NV	NV	NV	NV	200,000	2,000,000	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	**0.0291**	**0.0212**
cis-1,3-Dichloropropene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibromochloromethane	0.17	320	2,900	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromomethane	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane (Freon 12)	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	1.5	61	550	NV	NV	NV	NV	NV	NV	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.1 UJ
Hexachlorobutadiene	NV	1	10	1	10	NV	NV	NV	NV	2.5 UJ	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Isopropylbenzene	440	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m,p-Xylene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 UJ
Methyl tert-butyl ether	14	NV	NV	NV	NV	NV	NV	NV	NV	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methylene chloride	11	1,500	8,500	NV	NV	NV	NV	26,000	220,000	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	0.17	21	170	NV	NV	57	570	2,200	22,000	1 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
n-Butylbenzene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.25 UJ	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
o-Xylene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.1 UJ
sec-Butylbenzene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	1,200	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	12	NV	NV	NV	NV	NV	NV	8,900	44,000	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Toluene	1,100	NV	NV	NV	NV	NV	NV	110,000	1,100,000	**0.0904 J**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
trans-1,2-Dichloroethene	360	560	10,000	NV	NV	NV	NV	200,000	2,000,000	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U

Table 4-2
Summary of Groundwater Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Location:	RBC, Groundwater, Ingestion and Inhalation from Tapwater, Residential[1]	Ecological RBC, Freshwater[a][b][2]				Ecological RBC for Wildlife Ingestion of Surface Water[3]				MFA-B3A	MW-1	MW-2	MW-3		MW-4	MW-5	MW-6
Sample Name:										MFA-B3A-20230207-GW-36.0	MW1-20230220-GW-70	MW2-20230220-GW-60	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW4-20230214-GW-40	MW5-20230214-GW-40	MW6-20230214-GW-40.25
Collection Date:		Aquatic Life		Aquatic-Dependent Wildlife		Birds		Mammals		2/7/2023	2/20/2023	2/20/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023	2/14/2023
Collection Depth (ft)[c]:		Chronic	Acute	Chronic	Acute	TE	Non-TE	TE	Non-TE	36	70	60	35	35	40	40	40.25
trans-1,3-Dichloropropene	NV	NV	NV	NV	NV	NV	NV	NV	NV	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichloroethene	0.49	NV	NV	NV	NV	NV	NV	440,000	4,400,000	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Trichlorofluoromethane (Freon 11)	1,100	NV	NV	NV	NV	NV	NV	NV	NV	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	0.027	930	8,400	NV	NV	NV	NV	NV	NV	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total xylenes[l]	190	27	240	NV	NV	440,000	4,400,000	9,400	1,100,000	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 UJ

Table 4-2
Summary of Groundwater Analytical Results
Phase 1B Lagoon Repurposing
City of St. Helens

Notes

Detected results are shown in **bold** font.

Shading (color key below) indicates values that exceed screening criteria; non-detects (U and UJ) and rejected data (R) were not compared with screening criteria. When multiple screening criteria are exceeded, the result is shaded based on the highest criterion. When multiple screening criteria with the same value are exceeded, the result is shaded based on the criterion presented to the right.

DEQ RBC, groundwater, ingestion, and inhalation from tapwater, residential
DEQ freshwater RBC for aquatic life, chronic exposure
DEQ freshwater RBC for aquatic life, acute exposure
DEQ freshwater RBC for aquatic-dependent wildlife, chronic exposure
DEQ freshwater RBC for aquatic-dependent wildlife, acute exposure
DEQ ecological surface water RBC for wildlife ingestion of surface water, birds, TE
DEQ ecological surface water RBC for wildlife Ingestion of surface water, mammals, TE

-- = result qualified as rejected.
cPAH TEQ = carcinogenic polycyclic aromatic hydrocarbon.
DEQ = Oregon Department of Environmental Quality.
EPA = U.S. Environmental Protection Agency.
ft bgs = feet below ground surface.
J = result is estimated.
J+ = result is estimated but may be biased high.
J- = result is estimated but may be biased low.
NV = no value.
PCB = polychlorinated biphenyl.
pg/L = picograms per liter.
R = result is rejected. The analyte may or may not be present in the sample.
RBC = risk-based concentration.
SVOC = semivolatile organic compound.
TE = threatened and endangered.
TEF = toxic equivalency factor.
TEQ = toxicity equivalence.
TPH = total petroleum hydrocarbon.
U = result is non-detect at the detection limit.
ug/L = micrograms per liter.
UJ = result is non-detect with an estimated detection limit.
UK = result is non-detect at the estimated maximum potential concentration.
VOC = volatile organic compound.

[b]Screening levels for arsenic, cadmium, hexavalent chromium, lead, nickel, selenium, silver, and zinc are expressed in terms of the dissolved concentration in the water column. Total metals concentrations are screened against criteria to evaluate the risk of the mobile colloidal transport of metals for particles 0.01 to 10 um in both the unsaturated and saturated zones of the subsurface.

[b]Metals screening levels are based on Willamette Valley default values for hardness (25 mg/L), DOC (1.25 mg/L), and pH (7.0).

[a]The reconnaissance groundwater sample (MFA-B3A-20230207-GW-36.0) collection depth is measured from the barge deck to the center point of the well screen, the remaining monitoring well sample collection depths are measured from top of well casing to center point of the well screen.

[d]Dioxin/furan TEQs are calculated as the sum of each detected congener concentration multiplied by the corresponding TEF value. Non-detect congeners are multiplied by one-half as well as the corresponding TEF value. When all of the congeners are non-detect in a given sample, the reported TEQ value is the highest congener detection limit.

[e]Total chlordane is the sum of alpha-chlordane, gamma-chlordane, heptachlor, and trans-nonachlor.

[f]Total DDx is the sum of 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT. Non-detect results are summed at one-half the detection limit. When all results are non-detect the highest detection limit is used.

[g]Total endosulfans is the sum of endosulfan I, endosulfan II, and endosulfan sulfate. Non-detect results are summed at one-half the detection limit. When all results are non-detect the highest detection limit is used.

[h]Total hexacyclohexanes is the sum of alpha-, beta-, gamma-, and delta-BHC (lindane). Non-detect results are summed at one-half the detection limit. When all results are non-detect the highest detection limit is used.

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

[j]cPAH TEQ calculated as the sum of each cPAH multiplied by the corresponding TEF with non-detect results also multiplied by one-half. When all cPAHs are non-detect, the highest detection limit is provided.

[k]Value is for generic diesel/heating oil, since generic residual-range hydrocarbon values are not available.

[l]Total xylenes is the sum of m,p-xylene and o-xylene. When both results are non-detect, the higher detection limit is used.

References

[1]DEQ. 2018. Table: Risk-Based Concentrations for Individual Chemicals. Oregon Department of Environmental Quality. May.

[2]DEQ. 2021. Conducting Ecological Risk Assessments. Table 2: Risk Based Concentrations for Water. Oregon Department of Environmental Quality, Land Quality Division. April.

[3]DEQ. 2020. Conducting Ecological Risk Assessments. Table 1b: Risk Based Concentrations for Wildlife Ingestion of Surface Water. Oregon Department of Environmental Quality, Land Quality Division. September.

[4]Van den Berg, M., Linda S. Birnbaum, Michael Denison, Mike De Vito, William Farland, Mark Feeley, Heidelore Fiedler, Helen Hakansson, Annika Hanberg, Laurie Haws, Martin Rose, Stephen Safe, Dieter Schrenk, Chiharu Tohyama, Angelika Tritscher, Jouko Tuomisto, Mats Tysklind, Nigel Walker, and Richard E. Peterson. 2006. "The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds." Toxicological Sciences, 93(2): 223–241. [doi:10.1093/toxsci/kfl055]

[5]EPA. 1993. Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons. 600/R-93/089. U.S. Environmental Protection Agency. July.

Table 4-3
Groundwater Elevation Data
City of St. Helens
Wastewater Treatment Lagoon

Location	Well Depth (feet bgs)	Casing Diameter (inches)	Screen Interval (feet bgs)	Measuring Point Elevation (feet NGVD)	Water Level Measurement Date	Depth to Water (feet below TOC)	Water Level Elevation (feet NGVD)
MW-1	80	2	60-80	56.07	08/06/2019	29.80	26.27
					03/11/2020	29.51	26.56
					02/20/2023	28.98	27.09
MW-2	70	2	50-70	68.94	08/07/2019	39.77	29.17
					03/11/2020	40.17	28.77
					02/20/2023	40.40	28.54
MW-3	45	2	25-45	31.18	08/06/2019	17.36	13.82
					03/11/2020	15.53	15.65
					02/14/2023	15.60	15.58
MW-4	50	2	30-50	31.14	08/07/2019	22.63	8.51
					03/11/2020	20.15	10.99
					02/14/2023	19.99	11.15
MW-5	50	2	30-50	30.89	08/06/2019	20.42	10.47
					03/11/2020	18.90	11.99
					02/14/2023	18.80	12.09
MW-6	50.5	2	30.5-50.5	30.86	08/07/2019	22.29	8.57
					03/11/2020	19.90	10.96
					02/14/2023	19.75	11.11
MFA B-3A	10	2	6-10	--	02/07/2023	--	15.30

NOTES:

-- = See report Section 3.3.5 and the boring log for MFA B-3A in Appendix A for a description of how the groundwater elevation was calculated.

bgs = below ground surface.

NAVD = North American vertical datum.

TOC = top of casing.

FIGURES

Figure 1-1
Site Location

City of St. Helens
Wastewater Treatment
Lagoon St. Helens, Oregon

Legend

Property Boundary

0 1
Miles

Source: U.S .Geological Survey (1990) 7.5-minute topographic quadrangle: St. Helens
Section 3 and 10, township 4 north, range 1 west

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Approved By:
Produced By: agause
Project: 0830.03

Figure 3-1
Boring, Monitoring Well, and ISM Sample Locations

City of St. Helens
Wastewater Treatment Lagoon
St. Helens, OR

Legend

- Monitoring Well Location
- Boring Location
- Borings Completed by GRI, 2019, 2023
- ISM Sample Location
- Property Boundary

0 300
Feet

Data Source
Aerial photograph obtained from the State of Oregon (2022).

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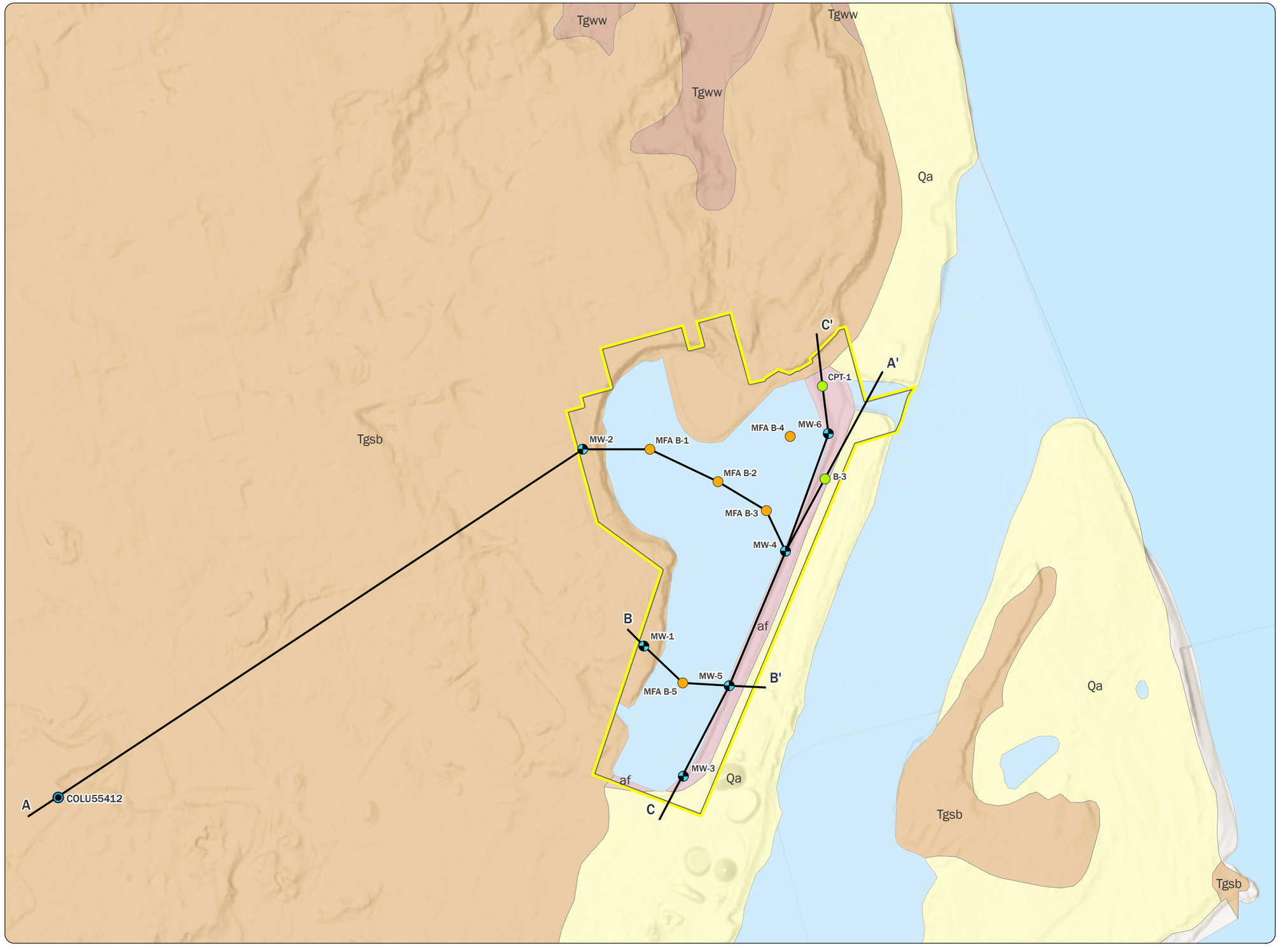
Path: X:\0830.03 City of St. Helens\06\Pro\M0830_03_006_002_00D.aprx\Fig 3.1 Sample Locations
Project: M0830.03.006 Produced By: jroberts Reviewed By: dweatherby Print Date: 9/8/2023

Figure 4-1
Site Geology

City of St. Helens
Wastewater Treatment Lagoon
St. Helens, OR



Legend

- Water Well
- Monitoring Well Location
- Boring Location
- Boring and Cone Penetrometer Test Completed by GRI, 2019, 2023
- A A' Cross Section
- Property Boundary

Geologic Map Unit, Group Member

- Qa (Alluvium), Columbia River alluvium
- Tgsb, Sentinel Bluffs Member of the Columbia River Basalt Group
- Tgww, Winter Water Member of the Columbia River Basalt Group
- af, Artificial fill
- Water

0 500
Feet

Data Sources
Geologic map units obtained from the Oregon Department of Geology and Mineral Industries; water well obtained from the Oregon Water Resources Department.

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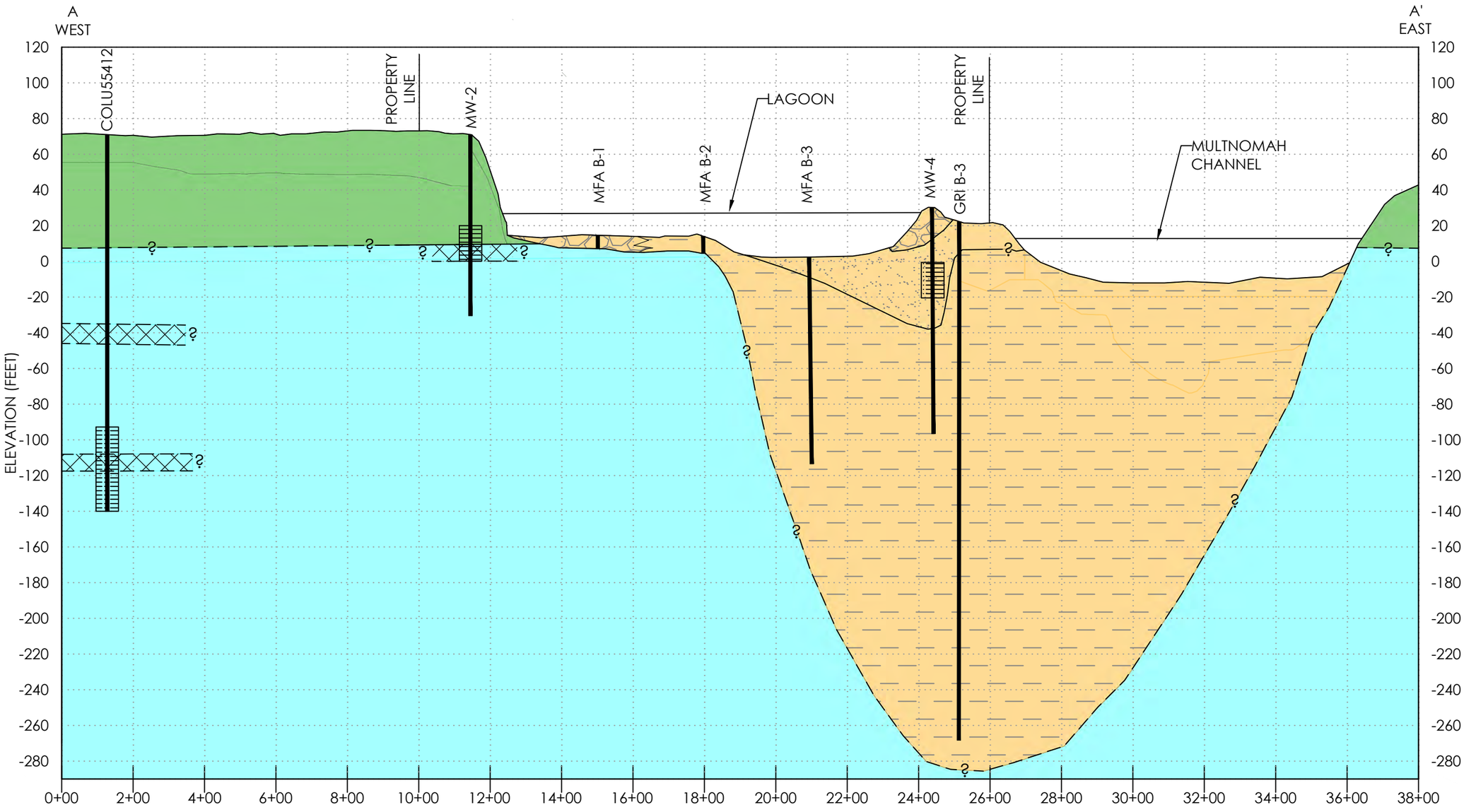

LEGEND

- SAND AND SILTY SAND
- GRAVELLY FILL WITH VARIABLE AMOUNTS OF SAND, SILT AND CLAY
- SILT WITH OCCASIONAL SAND AND SILTY SAND INTERBEDS (NOT SHOWN)
- SENTINEL BLUFFS BASALT
- WINTER WATER BASALT
- INTERFLOW ZONE
- LITHOLOGIC CONTACT
- INFERRED LITHOLOGIC CONTACT
- WELL SCREEN INTERVAL

HORIZONTAL SCALE: 1' = 300'
VERTICAL SCALE: 1' = 60'
VERTICAL EXAGGERATION: 5

NOTE:
CONTACTS SHOWN OUTSIDE OF AREAS PENETRATED BY A BORING OR WELL ARE BASED ON SURFICIAL MAPPING AND CROSS-SECTIONS PRESENTED IN EVARTS, R. C. 2004. GEOLOGIC MAP OF THE SAINT HELENS QUADRANGLE, COLUMBIA COUNTY, OREGON, AND COWILTZ AND CLARK COUNTIES, WASHINGTON, U.S. GEOLOGICAL SURVEY INVESTIGATIONS MAP 2834.

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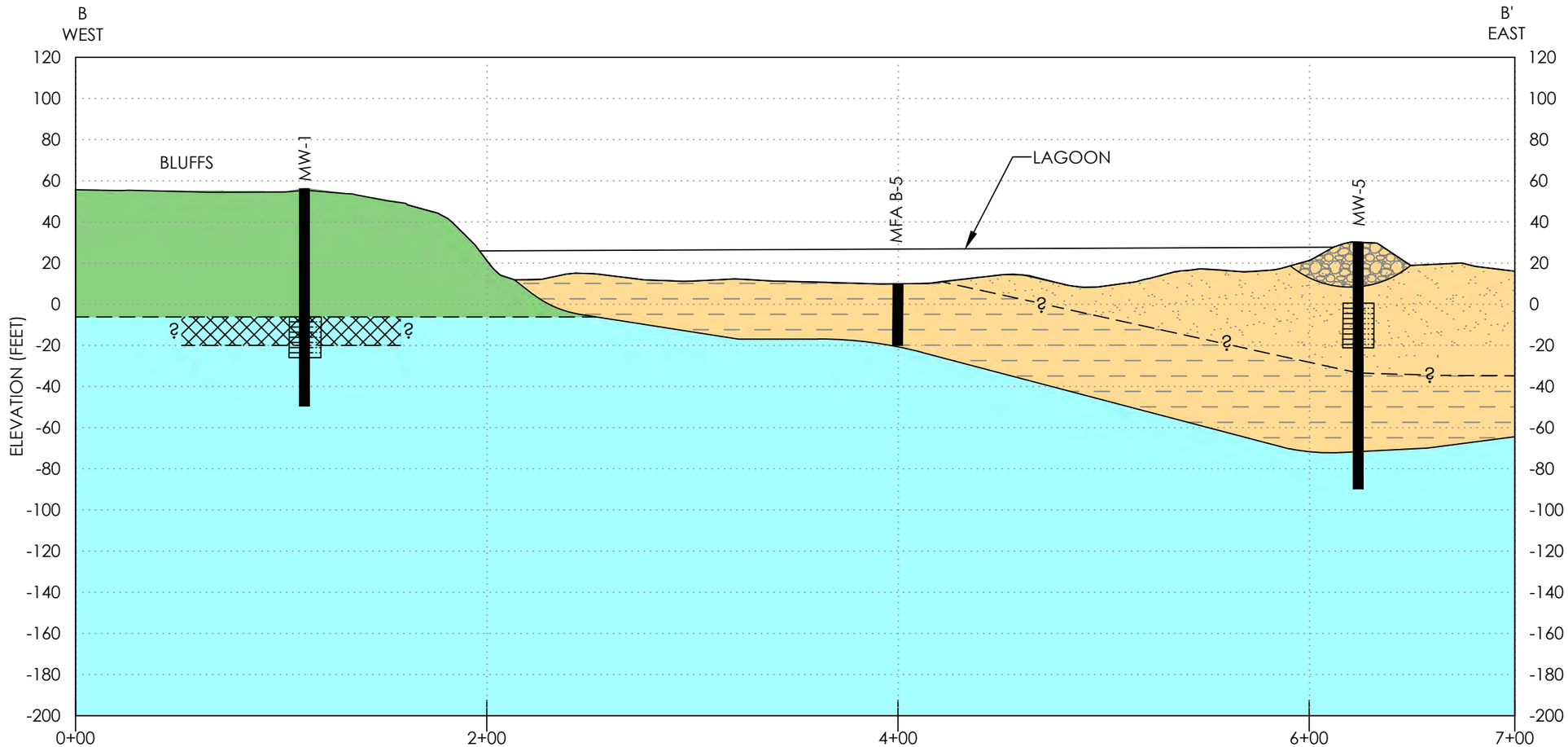
SCALE AS NOTED

NOTE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Figure 4-2
Generalized Geologic Cross Section A-A'
Phase 1 Lagoon Repurposing
St. Helens, Oregon

PLOTTED ON: 2023-09-08 12:48 PM PLOTTED BY: Loraine Daniel FILENAME: L:\Projects\0830.03 City of St. Helens\06_Scope 1B\Draft Documents\Phase 1B Report\Figures\FIG-GEO SECTION-6-27-23.dwg



LEGEND

- SAND AND SILTY SAND
- GRAVELLY FILL WITH VARIABLE AMOUNTS OF SAND, SILT AND CLAY
- SILT WITH OCCASIONAL SAND AND SILTY SAND INTERBEDS (NOT SHOWN)
- SENTINEL BLUFFS BASALT
- WINTER WATER BASALT
- INTERFLOW ZONE
- LITHOLOGIC CONTACT
- INFERRED LITHOLOGIC CONTACT
- WELL SCREEN INTERVAL

HORIZONTAL SCALE: 1' =60'
VERTICAL SCALE: 1' = 60'
VERTICAL EXAGGERATION: 1

NOTE:
CONTACTS SHOWN OUTSIDE OF AREAS PENETRATED BY A BORING OR WELL ARE BASED ON SURFICIAL MAPPING AND CROSS-SECTIONS PRESENTED IN EVARTS, R. C. 2004. GEOLOGIC MAP OF THE SAINT HELENS QUADRANGLE, COLUMBIA COUNTY, OREGON, AND COWILTZ AND CLARK COUNTIES, WASHINGTON, U.S. GEOLOGICAL SURVEY INVESTIGATIONS MAP 2834.

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Figure 4-3
Generalized Geologic Cross Section B-B'
Phase 1 Lagoon Repurposing
St. Helens, Oregon

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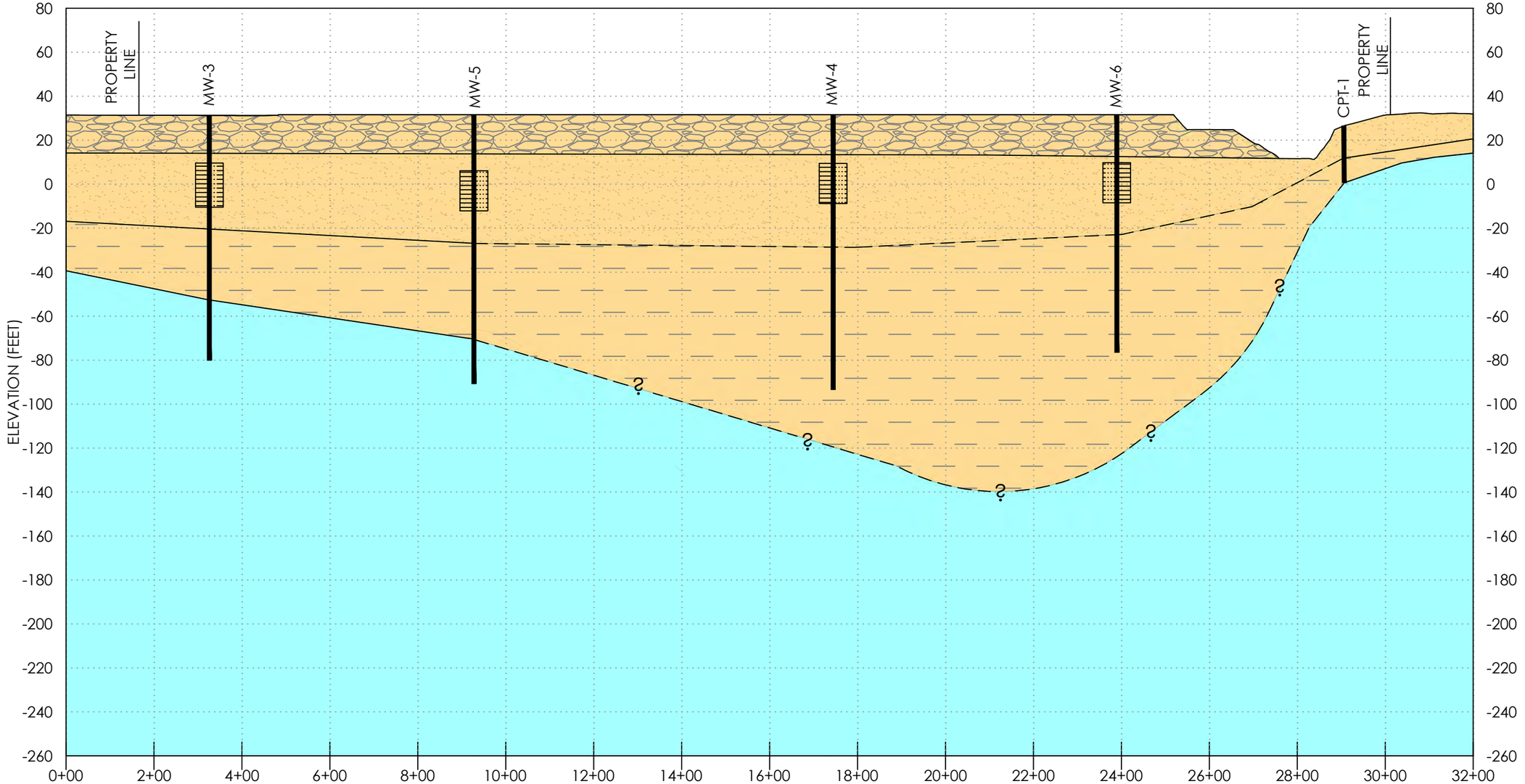
C
SOUTH

C'
NORTH



LEGEND

- SAND AND SILTY SAND
- GRAVELLY FILL WITH VARIABLE AMOUNTS OF SAND, SILT AND CLAY
- SILT WITH OCCASIONAL SAND AND SILTY SAND INTERBEDS (NOT SHOWN)
- SENTINEL BLUFFS BASALT
- WINTER WATER BASALT
- LITHOLOGIC CONTACT
- INFERRED LITHOLOGIC CONTACT
- WELL SCREEN INTERVAL

HORIZONTAL SCALE: 1' =250'
VERTICAL SCALE: 1' = 50'
VERTICAL EXAGGERATION: 5

NOTE:
CONTACTS SHOWN OUTSIDE OF AREAS PENETRATED BY A BORING OR WELL ARE BASED ON SURFICIAL MAPPING AND CROSS-SECTIONS PRESENTED IN EVARTS, R. C. 2004. GEOLOGIC MAP OF THE SAINT HELENS QUADRANGLE, COLUMBIA COUNTY, OREGON, AND COWILTZ AND CLARK COUNTIES, WASHINGTON, U.S. GEOLOGICAL SURVEY INVESTIGATIONS MAP 2834.

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SCALE AS NOTED

NOTE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Figure 4-4
Generalized Geologic Cross Section C-C'
Phase 1 Lagoon Repurposing
St. Helens, Oregon

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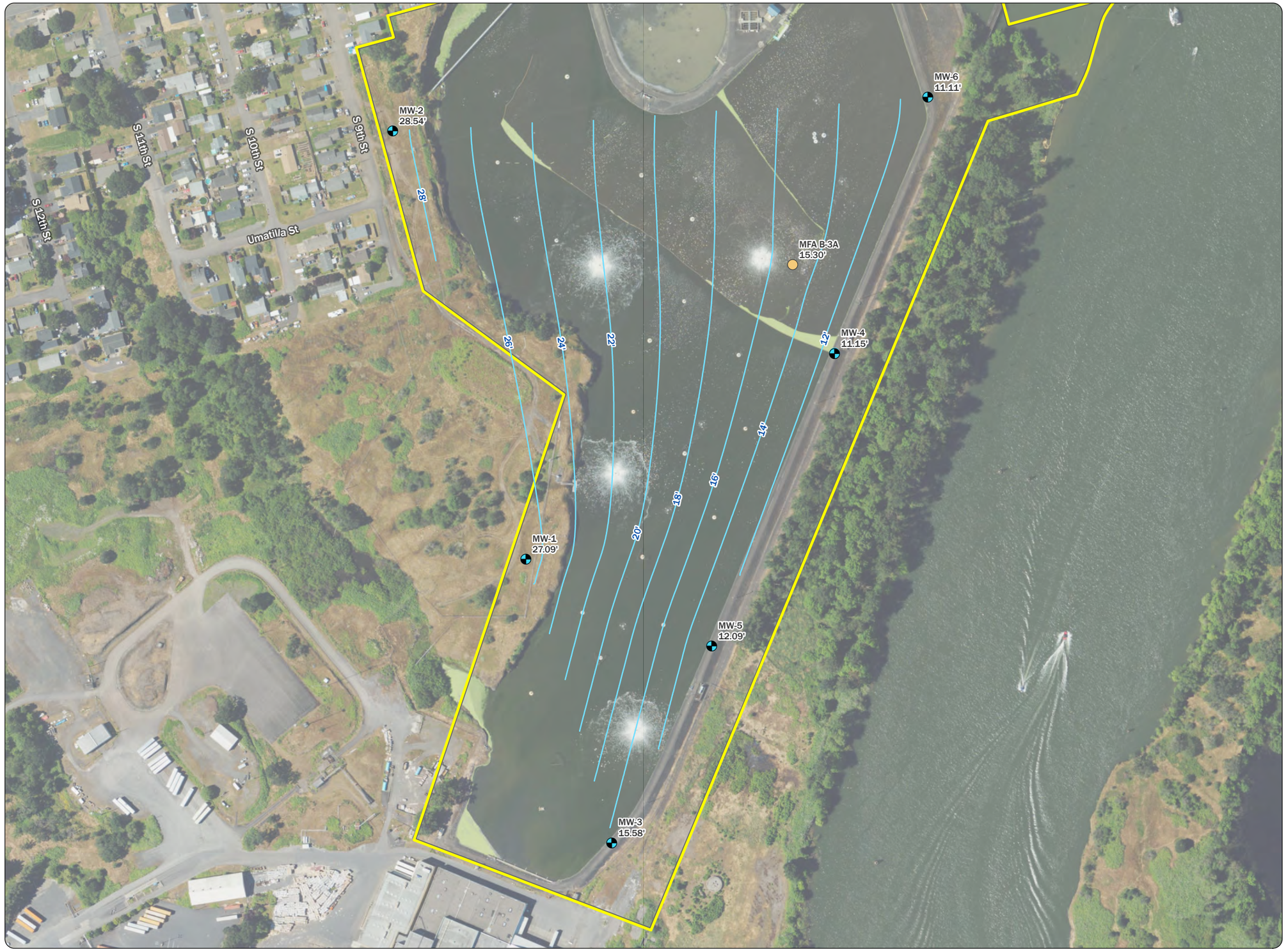

Figure 4-5
February 2023
Groundwater Elevations

City of St. Helens
Wastewater Treatment Lagoon
St. Helens, OR

Legend

- Boring and Monitoring Well Location
- Reconnaissance Groundwater Boring
- Groundwater Elevation Contour (2-feet)
- Property Boundary

Notes

Groundwater levels measured on February 7, 14, and 20, 2023.
Vertical reference is the North American Vertical Datum of 1988.

0 200
Feet

Data Source

Aerial photograph obtained from the State of Oregon (2022).

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Project: M0830.03.006 Produced By: jroberts Reviewed By: dweatherby Print Date: 8/16/2023

APPENDIX A

BORING LOGS

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-1**	**1 of 1**

Project Name	**St. Helens Lagoon**		
Project Location	**St. Helens, OR**	Surface Elevation (feet)	**Approx. 9.0**
Start/End Date	**01/30/2023 to 01/30/2023**	Northing	
Driller/Equipment	**Cascade Environmental/Geoprobe 7822 DT**	Easting	
Geologist/Engineer	**C. Schweitzer**	Total Depth of Borehole	**5.0 feet**
Sample Method	**Macro-core**	Outer Hole Diam	**2.25 inch**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
1			**MFA-B1-20230130-21.9**		0.0 to 1.0 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2		**100**			1.0 to 3.0 feet: GRAVEL WITH SAND (GW); dark gray to black; 5% fines; 15% sand, fine to coarse; 80% gravel, fine to coarse; compact; wet.
3					At 2.2 feet: Color change to dark gray to black with slight greenish tint.
4					3.0 to 5.0 feet: BEDROCK; weathered basalt with reddish brown mottles; refusal at 5.0 feet.
5					

Total Depth = 5.0 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 21.5 feet. 5. Top of sludge surface elevation of 9.0 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (21.5 feet). 6. ID = identification. 7. bgs = below ground surface.

Borehole Completion Details
0.0 to 5.0 feet below lagoon bottom: 2.25-inch borehole.

Borehole Abandonment Details
0.0 to 5.0 feet below lagoon bottom: Bentonite chips hydrated with potable water.

Geologic Borehole Log

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Project Number	Boring Number	Sheet
M0830.03.006	MFA B-2	1 of 1

Project Name	St. Helens Lagoon		
Project Location	St. Helens, OR	Surface Elevation (feet)	Approx. 8.5
Start/End Date	01/31/2023 to 01/31/2023	Northing	
Driller/Equipment	Cascade Environmental/Geoprobe 7822 DT	Easting	
Geologist/Engineer	C. Schweitzer	Total Depth of Borehole	5.0 feet
Sample Method	Macro-core	Outer Hole Diam	2.25 inch

Depth (feet, bgs)	Water Levels	Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
1			MFA-B2-20230131-23.0		0.0 to 2.0 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2		100			2.0 to 4.8 feet: SILT (ML); dark gray to black; 100% fines, low plasticity; soft; moist. At 2.3 feet: Color change to gray with some iron oxide/orange mottling.
3					
4					
5					At 4.5 feet: Color change to dark gray. 4.8 to 5.0 feet: GRAVEL WITH SILT (GW-GM); dark gray; 15% fines; 85% gravel, fine to coarse, subangular; loose; refusal on vesicular basalt bedrock at 5.0 feet.

Total Depth = 5.0 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 22.0 feet. 5. Top of sludge surface elevation of 8.5 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (22.0 feet). 6. ID = identification. 7. bgs = below ground surface.

Borehole Completion Details
0.0 to 5.0 feet below lagoon bottom: 2.25-inch borehole.

Borehole Abandonment Details
0.0 to 5.0 feet below lagoon bottom: Bentonite chips hydrated with potable water.

Geologic Borehole Log

MAUL FOSTER ALONG

Project Number	Boring Number	Sheet
M0830.03.006	MFA B-3	1 of 6

Project Name	St. Helens Lagoon		
Project Location	St. Helens, OR	Surface Elevation (feet)	Approx. 0.5
Start/End Date	01/31/2023 to 02/01/2023	Northing	
Driller/Equipment	Cascade Environmental/Geoprobe 7822 DT	Easting	
Geologist/Engineer	C. Schweitzer	Total Depth of Borehole	110.0 feet
Sample Method	Macro-core	Outer Hole Diam	2.25 inch

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
1		100	MFA-B3-20230131-31.0		0.0 to 2.5 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2					
3					2.5 to 3.0 feet: SAND (SP); dark gray; 100% sand, fine to medium; loose; faint sheen; wet.
4		0			3.0 to 14.5 feet: No recovery.
5					
6					
7		0			
8					
9					
10					
11					
12		0			
13					
14					
15					14.5 to 17.5 feet: SILT (ML); gray; 100% fines, low plasticity; soft; trace organics, plant matter, and rootlets; moist.
16					
17		60			
18					17.5 to 19.5 feet: No recovery.
19					
20		80			19.5 to 23.5 feet: Same as above from 14.5 to 17.5 feet.

MFA BOREHOLE W/RECON SCREEN W:\GINT\GINTW\PROJECTS\M0830.03.006 ST. HELENS.GPJ 8/31/23

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3**	**2 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
21					
22		**80**			
23					
24					*23.5 to 24.5 feet: No recovery.*
25					*24.5 to 27.5 feet: Same as above from 14.5 to 17.5 feet.*
26					
27		**60**			
28					*27.5 to 29.5 feet: No recovery.*
29					
30					*29.5 to 39.0 feet: Same as above from 14.5 to 17.5 feet.*
31					
32		**100**			
33					
34					
35					
36					
37		**90**			
38					
39					*39.0 to 39.5 feet: No recovery.*
40					*39.5 to 54.0 feet: Same as above from 14.5 to 17.5 feet.*
41		**100**			
42					

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3**	**3 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
43					
44		**100**			
45					
46					
47		**100**			
48					
49					
50					
51					
52		**90**			
53					
54					*54.0 to 54.5 feet: No recovery.*
55					*54.5 to 68.5 feet: Same as above from 14.5 to 17.5 feet.*
56					
57		**100**			
58					
59					
60					
61					
62		**100**			
63					
64					

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3**	**4 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
65					
66					
67		100			
68					
69					68.5 to 68.7 feet: SAND (SP); dark gray; 100% sand, fine to medium; loose; moist. 68.7 to 74.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, fine; loose; trace organics and rootlets, trace medium gravels; moist to wet.
70					
71					
72		90			
73					
74					74.0 to 74.5 feet: No recovery.
75					74.5 to 77.5 feet: Same as above from 68.7 to 74.0 feet.
76					
77		100			
78					77.5 to 79.5 feet: Same as above from 14.5 to 17.5 feet with trace sand.
79					
80					79.5 to 94.5 feet: No recovery. Pushed drill point without collecting soil in order to speed up drilling process.
81					
82		0			
83					
84					
85		0			
86					

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3**	**5 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
87					
88		0			
89					
90					
91					
92		0			
93					
94					
95					94.5 to 95.0 feet: Same as above from 14.5 to 17.5 feet with trace sand.
					95.0 to 97.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, fine; loose; moist.
96					
97		90			97.0 to 98.5 feet: Same as above from 14.5 to 17.5 feet.
98					
99					98.5 to 108.5 feet: No recovery. Pushed drill point without collecting soil in order to speed up drilling process.
100					
101					
102		0			
103					
104					
105					
106		0			
107					
108					
		100			108.5 to 110.0 feet: Same as above from 14.5 to 17.5 feet.

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3**	**6 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
110		**100**			

Total Depth = 110.0 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 30.0 feet. 5. Top of sludge surface elevation of 0.5 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (30.0 feet). 6. ID = identification. 7. bgs = below ground surface.

Borehole Completion Details
0.0 to 110.0 feet below lagoon bottom: 2.25-inch borehole.

Borehole Abandonment Details
0.0 to 110.0 feet below lagoon bottom: Bentonite chips hydrated with potable water.

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3A**	**1 of 2**

Project Name	**St. Helens Lagoon**		
Project Location	**St. Helens, OR**	Surface Elevation (feet)	**Approx. 2.5**
Start/End Date	**02/06/2023 to 02/06/2023**	Northing	
Driller/Equipment	**Cascade Environmental/Geoprobe 7822 DT**	Easting	
Geologist/Engineer	**C. Schweitzer**	Total Depth of Borehole	**21.5 feet**
Sample Method	**Macro-core**	Outer Hole Diam	**2.25 inch**

Depth (feet, bgs)	Water Levels	Percent Recovery	Screen Int.	Sample Data: Sample ID	Lithologic Column	Soil Description
1						0.0 to 1.0 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2		100				1.0 to 3.3 feet: SILT (ML); gray; 100% fines, low plasticity; soft; moist.
3						
4						3.3 to 5.5 feet: SAND (SP); gray; 100% sand, fine to medium; loose; moist.
5		60				
6						5.5 to 6.5 feet: No recovery.
7						6.5 to 6.8 feet: SILT (ML); gray; 100% fines, low plasticity; trace organics and rootlets; soft; moist.
8						6.8 to 9.0 feet: SAND (SP); gray; 100% sand, fine to medium; loose; moist.
9		80		MFA-B3A-20230207-GW-36.0		
10						9.0 to 10.5 feet: SILT (ML); gray; 100% fines, low plasticity; trace organics and rootlets; soft; moist.
11						10.5 to 11.5 feet: No recovery.
12						11.5 to 15.0 feet: Same as above from 9.0 to 10.5 feet.
13						
14		70				
15						15.0 to 16.5 feet: No recovery.
16						
17						16.5 to 20.5 feet: Same as above from 9.0 to 10.5 feet.
18		80				
19						
20						

MFA BOREHOLE W/RECON SCREEN W:\GINT\GINTW\PROJECTS\M0830.03.006 ST. HELENS.GPJ 8/31/23

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3A**	**2 of 2**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Screen Int.	Sample Data: Sample ID	Lithologic Column	Soil Description
21		**80**				20.5 to 21.5 feet: No recovery.

Total Depth = 21.5 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 28.0 feet. 5. Top of sludge surface elevation of 2.5 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (28.0 feet). 6. ID = identification. 7. bgs = below ground surface.

8. Water level measured inside casing with an electric water level meter after sitting overnight to equilibrate. Lagoon water level elevation (28 feet); Casing height above lagoon water (4.9 feet); Depth of water level below casing (17.60 feet); Groundwater elevation = lagoon level (28 feet) plus PVC casing height above lagoon water level (4.9 feet) minus depth to water from top of casing (17.60 feet) = 15.3 feet

Borehole Completion Details
0.0 to 21.5 feet below lagoon bottom: 2.25-inch borehole.

Reconnaissance Well Completion Details
Temporary polyvinyl chloride well screen set from 6.0 to 10.0 feet below lagoon bottom.

Borehole Abandonment Details
0.0 to 21.5 feet below lagoon bottom: Bentonite chips hydrated with potable water.

Geologic Borehole Log

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Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**1 of 6**

Project Name	**St. Helens Lagoon**		
Project Location	**St. Helens, OR**	Surface Elevation (feet)	**Approx. 6.0**
Start/End Date	**02/02/2023 to 02/03/2023**	Northing	
Driller/Equipment	**Cascade Environmental/Geoprobe 7822 DT**	Easting	
Geologist/Engineer	**C. Schweitzer**	Total Depth of Borehole	**110.0 feet**
Sample Method	**Macro-core**	Outer Hole Diam	**2.25 inch**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
1–2					0.0 to 2.0 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2–3		**80**	**MFA-B4-20230202-SL-26.5**		2.0 to 3.5 feet: SILT (ML); dark gray to black; 100% fines, low plasticity; soft; trace organics, plant matter and rootlets; wet.
3–4					3.5 to 4.5 feet: SAND (SP); dark gray; 100% sand, fine to mediuml; loose; wet.
4–5					4.0 to 5.0 feet: No recovery.
5–6					5.0 to 6.5 feet: Same as above from 3.5 to 4.5 feet.
6–7					6.5 to 10.0 feet: SILT (ML); gray; 100% fines, low plasticity; soft; trace organics, plant matter, and rootlets; moist.
7–8		**100**			
8–9					
9–10					
10–11					10.0 to 11.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, fine; loose; moist to wet.
11–12					11.0 to 18.5 feet: Same as above from 6.5 to 10.0 feet.
12–13		**100**			
13–14					
14–15					
15–16					
16–17					
17–18		**70**			
18–19					
19–20					18.5 to 20.0 feet: No recovery.

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**2 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
21					20.0 to 23.5 feet: Same as above from 6.5 to 10.0 feet.
22					
23		**70**			
24					23.5 to 25.0 feet: No recovery.
25					25.0 to 29.0 feet: Same as above from 6.5 to 10.0 feet.
26					
27					
28		**80**			
29					29.0 to 30.0 feet: No recovery.
30					30.0 to 34.5 feet: Same as above from 6.5 to 10.0 feet.
31					
32					
33		**90**			
34					
35					34.5 to 35.0 feet: No recovery.
36					35.0 to 39.5 feet: Same as above from 6.5 to 10.0 feet.
37					
38		**90**			
39					
40					39.5 to 40.0 feet: No recovery.
41					40.0 to 44.5 feet: Same as above from 6.5 to 10.0 feet.
42		**90**			

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**3 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
43					
44		**90**			
45					*44.5 to 45.0 feet: No recovery.*
					45.0 to 64.5 feet: Same as above from 6.5 to 10.0 feet.
46					
47					
48		**100**			
49					
50					
51					
52					
53		**100**			
54					
55					
56					
57					
58		**100**			
59					
60					
61					
62					
63		**90**			
64					

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**4 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
65		90			64.5 to 65.0 feet: No recovery.
					65.0 to 69.5 feet: Same as above from 6.5 to 10.0 feet.
66					
67					
68		90			
69					
70					69.5 to 70.0 feet: No recovery.
					70.0 to 74.5 feet: Same as above from 6.5 to 10.0 feet.
71					
72					
73		100			
74					At 73.5 to 74.5 feet: Multiple thin sand lenses.
75					74.5 to 75.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, fine to medium; loose; moist.
					75.0 to 76.5 feet: Same as above from 6.5 to 10.0 feet.
76					
					76.5 to 76.8 feet: Same as above from 74.5 to 75.0 feet.
77					76.8 to 83.5 feet: SILT (ML); gray; 100% fines, low plasticity; soft; moist.
78		100			
79					
80					
81					
82					
83		70			
84					83.5 to 100.0 feet: No recovery. Pushed drill point without collecting soil in order to speed up drilling process.
85					
86		0			

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**5 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
87					
88		0			
89					
90					
91		0			
92					
93					
94					
95		0			
96					
97					
98					
99					
100		90			100.0 to 104.0 feet: Same as above from 76.8 to 83.5 feet.
101					
102					
103					
104					
105					104.5 to 105.0 feet: No recovery. 105.0 to 109.5 feet: Same as above from 76.8 to 83.5 feet.
106					
107		90			
108					

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**6 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
110		**90**			109.5 to 110.0 feet: No recovery.

Total Depth = 110.0 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 24.5 feet. 5. Top of sludge surface elevation of 6.0 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (24.5 feet). 6. ID = identification. 7. bgs = below ground surface.

Borehole Completion Details
0.0 to 110.0 feet below lagoon bottom: 2.25-inch borehole.

Borehole Abandonment Details
0.0 to 110.0 feet below lagoon bottom: Bentonite chips hydrated with potable water.

Geologic Borehole Log

MAUL FOSTER ALONG

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-5**	**1 of 2**

Project Name	**St. Helens Lagoon**		
Project Location	**St. Helens, OR**	Surface Elevation (feet)	**Approx. 5.0**
Start/End Date	**02/03/2023 to 02/06/2023**	Northing	
Driller/Equipment	**Cascade Environmental/Geoprobe 7822 DT**	Easting	
Geologist/Engineer	**C. Schweitzer**	Total Depth of Borehole	**30.25 feet**
Sample Method	**Macro-core**	Outer Hole Diam	**2.25 inch**

Depth (feet, bgs)	Water Levels	Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
1					0.0 to 1.5 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2			**MFA-B5-20230203-SL-27.0**		1.5 to 12.0 feet: SILT (ML); dark gray to black; 100% fines, low plasticity; soft; moist.
3					At 2.5 feet: Color change to gray.
4					
5					
6					
7		**100**			
8					
9					
10					
11					At 11.0 feet: Color change to brownish gray.
12		**60**			12.0 to 14.0 feet: No recovery.
13					
14					14.0 to 20.5 feet: SILT (ML); brownish gray; 100% fines, low plasticity; soft; moist.
15					
16					
17		**100**			
18					
19					At 19.0 feet: Color change to gray.
20		**30**			

MFA BOREHOLE W/RECON SCREEN W:\GINT\GINTW\PROJECTS\M0830.03.006 ST. HELENS.GPJ 8/31/23

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-5**	**2 of 2**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
21					20.5 to 24.0 feet: No recovery.
22		30			
23					
24					24.0 to 27.0 feet: SILT (ML); gray; 100% fines, low plasticity; soft; moist.
25					At 25.0 feet: Wood piece.
26		60			
27					27.0 to 29.0 feet: No recovery.
28					
29					29.0 to 29.75 feet: GRAVEL WITH SAND (GW); gray; 5% fines; 15% sand, coarse; 80% gravel, fine to coarse, angular; loose; moist.
30		90			29.75 to 30.0 feet: BEDROCK; refusal on vesicular basalt pieces.
					30.0 to 30.25 feet: No recovery.

Total Depth = 30.25 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 25.5 feet. 5. Top of sludge surface elevation of 5.0 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (25.5 feet). 6. ID = identification. 7. bgs = below ground surface.

Borehole Completion Details
0.0 to 30.25 feet below lagoon bottom: 2.25-inch borehole.

Borehole Abandonment Details
0.0 to 30.25 feet below lagoon bottom: Bentonite chips hydrated with potable water.

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-1**	**1 of 5**

Project Name	**St. Helens Lagoon**	TOC Elevation (feet)	
Project Location	**St. Helens**	Surface Elevation (feet)	
Start/End Date	**7/10/19 to 7/11/19**	Northing	
Driller/Equipment	**Dan Rider/Terra Sonic Incorporated 150 CC**	Easting	
Geologist/Engineer	**C. Schweitzer**	Hole Depth	**100.0-feet**
Sample Method	**Core Barrel: Ten-foot intervals.**	Outer Hole Diam	**6" to 4"-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					*0.0 to 44.0 feet: Basalt with trace vesicles <5%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.*
2									
3									
4									
5									
6									
7									
8									
9									
10			**100**	**CB**					
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-1**	**2 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21			**100**	**CB**					
22									
23									
24									
25									
26									
27									
28									
29									
30			**100**	**CB**					
31									
32									
33									
34									
35									
36									
37									
38									
39									
40			**100**	**CB**					
41									
42									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-1**	**3 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
44									
45									44.0 to 45.5 feet: SANDY CLAY WITH GRAVEL (CL); gray; 70% fines, medium plasticity; 20% sand, coarse to very coarse; 10% gravel, very fine to coarse; soft; trace weathered bedrock; some fresh, angular bedrock.
46									45.5 to 50.0 feet: Basalt with trace vesicles <5%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.
47									
48									
49									
50			**0**	**CB**					50.0 to 60.0 feet: No recovery.
51									
52									
53									
54									
55									
56									
57									
58									
59									
60			**100**	**CB**					60.0 to 64.0 feet: Basalt with trace vesicles <5%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.
61									
62									
63									
64									
65									64.0 to 71.0 feet: SANDY CLAY WITH GRAVEL (CL); gray with brown mottling; 70% fines, medium plasticity; 20% sand, medium to very coarse, angular; 10% gravel, very fine to coarse, angular; soft; highly weathered in situ basalt bedrock in a fine matrix of weathered material with weathering rinds, slight porosity, slight

NOTES: 1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-1**	**4 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									*intact bedrock.*
67									
68									
69									
70			**100**	**CB**					
71									*71.0 to 75.0 feet: GRAVELLY CLAY WITH SAND (CL); dark gray when wet; 60% fines; 10% sand, very fine to coarse; 30% gravel, fine to very coarse, angular; soft; trace weathered bedrock; wet.*
72									
73									
74									
75									*75.0 to 80.0 feet: Highly vesicular basalt >20%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are open and filled with firm dark gray clay material that encapsulates the bedrock.*
76									
77									
78									
79									
80			**100**	**CB**					*80.0 to 100.0 feet: Highly vesicular basalt <20%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (high to low angle), joints are closed.*
81									
82									
83									
84									
85									
86									
87									
88									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

GBLWC L:\PROJECTS\0830.03 CITY OF ST. HELENS\04_IGA PHASE 1 LAGOON REPURPOSING\FIELD WORK\GINT\WELL_LOGS_A.GPJ 12/18/19

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-1**	**5 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					@ 90.0 feet: Becomes less vesicular <10%.
91									
92									
93									
94									
95									@ 95.0 feet: Becomes less vesicular <5%, and increase in jointing.
96									
97									
98									
99									
100									

Total Depth = 100.0 feet bgs.

Borehole Details:
0.0 to 80.0 feet bgs: 6-inch borehole.
80.0 to 100.0 feet bgs: 4-inch borehole.

Borehole Completion Details:
0.0 to 5.0 feet bgs: Concrete.
5.0 to 58.0 feet bgs: Bentonite chips hydrated with potable water.
58.0 to 81.5 feet bgs: 12/20 Silica Sand.
81.5 to 100.0 feet bgs: Bentonite chips hydrated with potable water.

Monitoring Well Completion
Well Tag Number: L133559
Flushmount monitoring well.
0.0 to 60.0 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
60.0 to 80.0 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
80.0 to 80.5 feet bgs: 2-inch-diameter end cap.

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-2**	**1 of 5**

Project Name	***St. Helens Lagoon***	*TOC Elevation (feet)*	
Project Location	***St. Helens***	*Surface Elevation (feet)*	
Start/End Date	***7/8/19 to 7/10/19***	*Northing*	
Driller/Equipment	***Dan Rider/Terra Sonic Incorporated 150 CC***	*Easting*	
Geologist/Engineer	***C. Schweitzer***	*Hole Depth*	***100.0-feet***
Sample Method	***Core Barrel: Ten-foot intervals.***	*Outer Hole Diam*	***6" to 4"-inch***

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					*0.0 to 62.0 feet: Basalt with trace vesicles <5%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.*
2									
3									
4									
5									
6									
7									
8									
9									
10			**100**	**CB**					
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-2**	**2 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21			**100**	**CB**					
22									
23									
24									
25									
26									
27									
28									
29									
30			**100**	**CB**					
31									
32									
33									
34									
35									
36									
37									
38									
39									
40			**100**	**CB**					
41									
42									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-2**	**3 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
44									
45									
46									
47									
48									
49									
50			**100**	**CB**					
51									
52									
53									
54									
55									
56									
57									
58									
59									
60			**100**	**CB**					
61									
62									*62.0 to 68.0 feet: SANDY CLAY WITH GRAVEL (CL); gray with brown mottling; 70% fines; 20% sand, medium to very coarse; 10% gravel, very fine to medium, angular; soft; highly weathered in situ bedrock in a fine matrix, with slight porosity; some intact bedrock with weathering rinds.*
63									
64									
65									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-2**	**4 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									@ 66.0 feet: Becomes gray with more intact rock only moderately weathered.
67									
68									68.0 to 100.0 feet: Highly vesicular basalt <20%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (high to low angle), fewer joints, joints are closed.
69									
70			**100**	**CB**					
71									
72									
73									
74									
75									
76									
77									
78									
79									
80			**100**	**CB**					@ 80.0 feet: Becomes less vesicular, <10%.
81									
82									
83									
84									
85									@ 85.0 feet: Becomes less vesicular, <5%, with an increase in joints.
86									
87									
88									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-2**	**5 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

Total Depth = 100.0 feet bgs.

Borehole Details:
0.0 to 70.0 feet bgs: 6-inch borehole.
70.0 to 100.0 feet bgs: 4-inch borehole.

Borehole Completion Details:
0.0 to 2.0 feet bgs: Concrete.
2.0 to 48.0 feet bgs: Bentonite chips hydrated with potable water.
48.0 to 71.0 feet bgs: 12/20 Silica Sand.
71.0 to 100.0 feet bgs: Bentonite chips hydrated with potable water.

Monitoring Well Completion
Well Tag Number: L133560
Flushmount monitoring well.
0.0 to 50.0 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
50.0 to 70.0 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
70.0 to 70.5 feet bgs: 2-inch-diameter end cap.

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-3**	**1 of 5**

Project Name	**St. Helens Lagoon**	TOC Elevation (feet)	
Project Location	**St. Helens**	Surface Elevation (feet)	
Start/End Date	**7/17/19 to 7/17/19**	Northing	
Driller/Equipment	**Dan Rider/Terra Sonic Incorporated 150 CC**	Easting	
Geologist/Engineer	**C. Schweitzer**	Hole Depth	**100.0-feet**
Sample Method	**Core Barrel: Ten-foot intervals.**	Outer Hole Diam	**6" to 4"-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					0.0 to 1.0 feet: SANDY GRAVEL (GW); gray; 0% fines; 20% sand; 80% gravel, fine to coarse, angular; loose; no odor; no sheen; moist.
2									1.0 to 2.0 feet: GRAVELLY CLAY (CL); brown; 80% fines, medium plasticity; 0% sand; 20% gravel, very fine to medium, angular; stiff; no odor; no sheen; moist.
3									2.0 to 5.0 feet: SAND WITH GRAVEL (SW); gray; 0% fines; 90% sand, very fine to coarse; 10% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; moist.
4									
5									
6			**100**	**CB**					5.0 to 5.5 feet: GRAVELLY CLAY (CL); brown; 80% fines, medium plasticity; 0% sand; 20% gravel, very fine to medium, angular; stiff; no odor; no sheen; moist.
7									5.5 to 8.0 feet: SANDY CLAYEY GRAVEL (GW); gray; 20% fines, medium plasticity; 30% sand, medium to coarse; 50% gravel, fine to coarse, angular; loose; trace cobbles; no odor; no sheen; moist.
8									
9									8.0 to 10.0 feet: GRAVELLY SAND (SW); brown; 0% fines; 80% sand, fine to coarse; 20% gravel, fine to very coarse, angular; loose; trace silt clasts; no odor; no sheen; moist.
10									
11									10.0 to 15.0 feet: No recovery.
12									
13									
14									
15									
16			**100**	**CB SPT**			**21, 11, 15**		15.0 to 22.0 feet: SAND WITH GRAVEL (SW); gray; 0% fines; 90% sand, fine to medium; 10% gravel, fine to very coarse, angular; loose; trace silt clasts; no odor; no sheen; moist.
17									
18									
19									
20									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-3**	**2 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21									
22									22.0 to 48.0 feet: SAND (SP); dark gray; 0% fines; 100% sand, very fine to medium; 0% gravel; very loose; no odor; no sheen; wet.
23									
24									
25			**0**	**CB**					
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40			**100**	**CB**					
41									
42									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-3**	**3 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
44									
45									
46									
47									
48									48.0 to 75.0 feet; SILT (ML); gray; 100% fines, low plasticity; 0% sand; 0% gravel; soft; trace organics, plant matter, and rootlets; no odor; no sheen; moist to wet.
49									
50			**100**	**CB**					
51									
52									
53									
54									
55									
56									
57									
58									
59									
60			**100**	**CB**					
61									
62									
63									
64									
65									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-3**	**4 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									
67									
68									
69									
70			**100**	**CB**					
71									
72									
73									
74									
75									*75.0 to 80.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, very fine to fine; 0% gravel; loose; trace organics and wood fragments; no odor; no sheen; wet.*
76									
77									
78									
79									
80			**100**	**CB**					*80.0 to 100.0 feet: Basalt with trace vesicles <5%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.*
81									
82									
83									
84									
85									
86									
87									
88									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-3**	**5 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

Total Depth = 100.0 feet bgs.

Borehole Details:
0.0 to 90.0 feet bgs: 6-inch borehole.
90.0 to 100.0 feet bgs: 4-inch borehole.

Borehole Completion Details:
0.0 to 3.0 feet bgs: Concrete.
3.0 to 5.0 feet bgs: 12/20 Silica Sand.
5.0 to 23.0 feet bgs: Bentonite chips hydrated with potable water.
23.0 to 46.5 feet bgs: 12/20 Silica Sand.
46.5.0 to 70.0 feet bgs: Bentonite chips hydrated with potable water.
70.0 to 100.0 feet bgs: Native soil heave/slough.

Monitoring Well Completion
Well Tag Number: L133572
Flushmount monitoring well.
0.0 to 25.0 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
25.0 to 45.0 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
45.0 to 45.5 feet bgs: 2-inch-diameter end cap.

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**1 of 6**

Project Name	**St. Helens Lagoon**	TOC Elevation (feet)	
Project Location	**St. Helens**	Surface Elevation (feet)	
Start/End Date	**7/15/19 to 7/15/19**	Northing	
Driller/Equipment	**Dan Rider/Terra Sonic Incorporated 150 CC**	Easting	
Geologist/Engineer	**C. Schweitzer**	Hole Depth	**120.0-feet**
Sample Method	**Core Barrel: Ten-foot intervals.**	Outer Hole Diam	**6" to 4"-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					0.0 to 2.0 feet: SANDY GRAVEL (GW); gray; 0% fines; 20% sand; 80% gravel, fine to very coarse, angular; loose; no odor; no sheen; moist.
2									@ 1.5 feet: Becomes brown.
3									2.0 to 4.0 feet: GRAVELLY CLAY (CL); brown; 80% fines, medium plasticity; 0% sand; 20% gravel, very fine to medium, angular; stiff; no odor; no sheen; moist.
4									
5									4.0 to 8.5 feet: SAND WITH GRAVEL (SW); gray; 0% fines; 90% sand, very fine to coarse; 10% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; moist.
6			**100**	**CB SH**		**Shelby tube at 5.0'**			@ 4.1 feet: Piece of black plastic.
7									
8									
9									8.5 to 11.0 feet: GRAVELLY SAND (SW); gray; 0% fines; 70% sand, very fine to coarse; 30% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; moist.
10									
11									
12									11.0 to 12.0 feet: SANDY CLAYEY GRAVEL (GW); brown; 20% fines, medium plasticity; 30% sand, medium to coarse; 50% gravel, very fine to coarse, angular; loose; trace slightly weathered vesicular basalt cobbles; no odor; no sheen; moist.
13									12.0 to 13.0 feet: SANDY GRAVELLY CLAY (CL); brown fines with gray sand; 50% fines, medium plasticity; 30% sand, very fine to medium; 20% gravel, very fine to medium, angular; very soft; no odor; no sheen; wet.
14									13.0 to 16.0 feet: GRAVELLY SAND (SW); gray; 0% fines; 80% sand, fine to coarse; 20% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; wet.
15			**100**	**CB SPT**			**25, 21, 16**		
16									16.0 to 20.0 feet: SANDY GRAVEL WITH CLAY (GW); brown; 10% fines; 40% sand, fine to very coarse; 50% gravel, fine to very coarse, angular; loose; some cobbles; no odor; no sheen; wet.
17									
18									
19									
20									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**2 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21									20.0 to 23.0 feet: SAND WITH GRAVEL (SW); brown; 0% fines; 90% sand, fine to very coarse; 10% gravel, fine to very coarse, angular; loose; no odor; no sheen; wet.
22									
23									23.0 to 65.0 feet: SAND (SP); dark gray; 0% fines; 100% sand, very fine to medium; 0% gravel; very loose; no odor; no sheen; wet.
24									
25			**0**	**CB**					
26									
27									
28									
29									
30									
31									
32									
33									
34									
35			**0**	**CB**					
36									
37									
38									
39									
40									
41									
42									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**3 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60			**100**	**CB**					
61									
62									
63									
64									
65									65.0 to 95.0 feet; SILT (ML); gray; 100% fines, low plasticity; 0% sand; 0% gravel; soft; trace organics, plant matter, and rootlets; no odor;

NOTES: 1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**4 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									no sheen; moist to wet.
67									
68									
69									
70			**100**	**CB**					
71									
72									
73									
74									
75									
76									
77									
78									
79									
80			**100**	**CB**					
81									
82									
83									
84									
85									
86									
87									
88									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**5 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					
91									
92									
93									
94									
95									
96									*95.0 to 105.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, very fine to fine; 0% gravel; loose; trace organics and rootlets; no odor; no sheen; wet.*
97									
98									
99									
100			**100**	**CB**					
101									
102									
103									
104									
105									*105.0 to 113.0 feet; SILT (ML); gray; 100% fines, low plasticity; 0% sand; 0% gravel; soft; trace organics and rootlets; no odor; no sheen; moist.*
106									
107									
108									
109									
110			**100**	**CB**					
111									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**6 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
112									
113									113.0 to 120.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, very fine to fine; 0% gravel; loose; trace organics and rootlets; no odor; no sheen; moist.
114									
115									
116									@ 116.0 feet: Becomes only 10% fines.
117									@ 117.0 feet: wood fragment.
118									
119									
120									

Total Depth = 120.0 feet bgs.

Borehole Details:
0.0 to 90.0 feet bgs: 6-inch borehole.
90.0 to 120.0 feet bgs: 4-inch borehole.

Borehole Completion Details:
0.0 to 2.0 feet bgs: Concrete.
2.0 to 27.0 feet bgs: Bentonite chips hydrated with potable water.
27.0 to 51.0 feet bgs: 12/20 Silica Sand.
51.0.0 to 75.0 feet bgs: Bentonite chips hydrated with potable water.
75.0 to 120.0 feet bgs: Native soil heave/slough.

Monitoring Well Completion
Well Tag Number: L133571
Flushmount monitoring well.
0.0 to 30.0 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
30.0 to 50.0 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
50.0 to 50.5 feet bgs: 2-inch-diameter end cap.

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**1 of 6**

Project Name	**St. Helens Lagoon**	TOC Elevation (feet)	
Project Location	**St. Helens**	Surface Elevation (feet)	
Start/End Date	**7/16/19 to 7/16/19**	Northing	
Driller/Equipment	**Dan Rider/Terra Sonic Incorporated 150 CC**	Easting	
Geologist/Engineer	**C. Schweitzer**	Hole Depth	**120.0-feet**
Sample Method	**Core Barrel: Ten-foot intervals.**	Outer Hole Diam	**6" to 4"-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					*0.0 to 2.0 feet: SANDY GRAVEL (GW); gray; 0% fines; 20% sand; 80% gravel, fine to coarse, angular; loose; no odor; no sheen; moist.*
2									
3									*2.0 to 3.0 feet: GRAVELLY CLAY (CL); brown; 80% fines, medium plasticity; 0% sand; 20% gravel, very fine to medium, angular; stiff; no odor; no sheen; moist.*
4									*3.0 to 6.0 feet: SAND WITH GRAVEL (SW); gray; 0% fines; 90% sand, very fine to coarse; 10% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; moist.*
5									
6			**100**	**CB SPT**			**10, 11, 15**		*@ 5.0 feet: Thin brown silt bed.*
7									*6.0 to 9.0 feet: SANDY CLAYEY GRAVEL (GW); gray; 20% fines, medium plasticity; 30% sand, medium to coarse; 50% gravel, very fine to coarse, angular; loose; no odor; no sheen; moist.*
8									
9									
10									*9.0 to 15.0 feet: GRAVELLY SAND (SW); gray; 0% fines; 80% sand, fine to coarse; 20% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; moist.*
11									
12									
13									
14									
15									
16			**100**	**CB**					*15.0 to 16.0 feet: SANDY GRAVELLY CLAY (CL); brown fines with gray sand and gravel; 50% fines, medium plasticity; 30% sand, very fine to medium; 20% gravel, fine to medium, angular; very soft; no odor; no sheen; wet.*
17									*16.0 to 23.0 feet: SAND WITH GRAVEL (SW); gray; 0% fines; 90% sand, fine to medium; 10% gravel, fine to very coarse, angular; loose; no odor; no sheen; wet.*
18									
19									
20									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SPT = Standard Penetration Test.*

GBLWC L:\PROJECTS\0830.03 CITY OF ST. HELENS\04_IGA PHASE 1 LAGOON REPURPOSING\FIELD WORK\GINT\WELL_LOGS_A.GPJ 12/18/19

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**2 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21									
22									
23									23.0 to 63.0 feet: SAND (SP); dark gray; 0% fines; 100% sand, very fine to medium; 0% gravel; very loose; no odor; no sheen; wet.
24									
25			**100**	**CB SPT**			**2, 3, 6**		
26									
27									
28									
29									
30									
31									
32									
33									
34									
35			**0**	**CB**					
36									
37									
38									
39									
40									
41									
42									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**3 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60			**100**	**CB**					
61									
62									
63									63.0 to 103.0 feet; SILT (ML); gray; 100% fines, low plasticity; 0% sand; 0% gravel; soft; trace organics, plant matter, and rootlets; no odor; no sheen; moist to wet.
64									
65									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**4 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									
67									
68									
69									
70			**100**	**CB**					
71									
72									
73									
74									
75									
76									
77									
78									
79									
80			**100**	**CB**					
81									
82									
83									
84									
85									
86									
87									
88									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**5 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					
91									
92									
93									
94									
95									
96									
97									
98									
99									
100			**100**	**CB**					
101									
102									
103									
104									*103.0 to 120.0 feet: Basalt with some vesicles <25%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.*
105									
106									
107									
108									
109									
110			**100**	**CB**					*@ 110.0 feet: Becomes less vesicular, <10%.*
111									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**6 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Sample Data: Percent Recovery	Sample Data: Collection Method	Sample Data: Number	Sample Data: Name (Type)	Sample Data: Blows/6"	Lithologic Column	Soil Description
112									
113									
114									
115									*@ 115.0 feet: Becomes less vesicular, <5%.*
116									
117									
118									
119									
120									

Total Depth = 120.0 feet bgs.

Borehole Details:
0.0 to 90.0 feet bgs: 6-inch borehole.
90.0 to 120.0 feet bgs: 4-inch borehole.

Borehole Completion Details:
0.0 to 5.0 feet bgs: Concrete.
5.0 to 27.0 feet bgs: Bentonite chips hydrated with potable water.
27.0 to 51.0 feet bgs: 12/20 Silica Sand.
51.0.0 to 54.0 feet bgs: Bentonite chips hydrated with potable water.
54.0 to 120.0 feet bgs: Native soil heave/slough.

Monitoring Well Completion
Well Tag Number: L133553
Flushmount monitoring well.
0.0 to 30.0 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
30.0 to 50.0 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
50.0 to 50.5 feet bgs: 2-inch-diameter end cap.

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**1 of 6**

Project Name	**St. Helens Lagoon**	TOC Elevation (feet)	
Project Location	**St. Helens**	Surface Elevation (feet)	
Start/End Date	**7/11/19 to 7/12/19**	Northing	
Driller/Equipment	**Dan Rider/Terra Sonic Incorporated 150 CC**	Easting	
Geologist/Engineer	**C. Schweitzer**	Hole Depth	**120.0-feet**
Sample Method	**Core Barrel: Ten-foot intervals.**	Outer Hole Diam	**6" to 4"-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					*0.0 to 4.0 feet: SANDY GRAVEL (GW); gray; 0% fines; 20% sand; 80% gravel, fine to very coarse, angular; loose; no odor; no sheen; moist.*
2									
3									*@ 2.5 feet: Becomes brown.*
4									
5									*4.0 to 5.0 feet: GRAVELLY CLAY (CL); brown; 60% fines, medium plasticity; 0% sand; 40% gravel, very fine to medium, angular; stiff; no odor; no sheen; moist.*
6			**100**	**CB SPT**			**6, 4, 5**		*5.0 to 6.0 feet: SANDY CLAYEY GRAVEL (GW); brown with dark gray sand and gravel; 20% fines, medium plasticity; 30% sand, medium to coarse; 50% gravel, very fine to coarse, angular; loose; fines in clumps; no odor; no sheen; moist.*
7									*6.0 to 10.0 feet: SAND WITH GRAVEL (SW); brown; 0% fines; 90% sand, very fine to coarse; 10% gravel, fine to very coarse, angular; loose; trace cobbles up to 2 inch; no odor; no sheen; moist.*
8									
9									
10									
11									*10.0 to 11.0 feet: SILTY GRAVELLY SAND (SM); dark gray; 30% fines, low plasticity; 50% sand, very fine to medium; 20% gravel, fine to medium, angular; loose; trace cobbles up to 3 inch; no odor; no sheen; moist.*
12									*11.0 to 20.0 feet: GRAVELLY SAND (SW); gray; 0% fines; 80% sand, fine to very coarse; 20% gravel, fine to very coarse, angular; loose; trace cobbles up to 2 inch; no odor; no sheen; moist.*
13									*@ 13.0 feet: Becomes brown, with a thin silt bed.*
14									
15			**100**	**CB SH**		**Shelby Tube at 15.0'**			
16									*@ 16.0 feet: Becomes gray, with a thin silt bed.*
17									
18									*@ 18.0 feet: Becomes brown.*
19									
20									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**2 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21–42			**0**	**CB SPT**			**1, 2, 5**		*20.0 to 55.0 feet: SAND (SP); dark gray; 0% fines; 100% sand, very fine to medium; 0% gravel; very loose; no odor; no sheen; wet.*

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**3 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
44									
45									
46									
47									
48									
49									
50			**100**	**CB**					
51									
52									
53									
54									
55									*55.0 to 120.0 feet; SILT (ML); gray; 100% fines, low plasticity; 0% sand; 0% gravel; soft; trace organics, plant matter, and rootlets; trace light interbedded zones of light gray sand; no odor; no sheen; moist to wet.*
56									
57									
58									
59									
60			**100**	**CB**					
61									
62									
63									
64									
65									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**4 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									
67									
68									
69									
70			**100**	**CB**					
71									
72									
73									
74									
75									
76									
77									
78									
79									
80			**100**	**CB**					
81									
82									
83									
84									
85									
86									
87									
88									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**5 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					
91									
92									
93									
94									
95									
96									
97									
98									
99									
100			**100**	**CB**					
101									
102									
103									
104									
105									
106									
107									
108									
109									
110			**100**	**CB**					
111									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

GBLWC L:\PROJECTS\0830.03 CITY OF ST. HELENS\04_IGA PHASE 1 LAGOON REPURPOSING\FIELD WORK\GINT\WELL_LOGS_A.GPJ 12/18/19

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**6 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
112									
113									
114									
115									
116									
117									
118									
119									
120									

Total Depth = 120.0 feet bgs.

Borehole Details:
0.0 to 120.0 feet bgs: 6-inch borehole.

Borehole Completion Details:
0.0 to 3.5 feet bgs: Concrete.
3.5 to 28.0 feet bgs: Bentonite chips hydrated with potable water.
28.0 to 51.0 feet bgs: 12/20 Silica Sand.
51.0 to 120.0 feet bgs: Native soil heave/slough.

Monitoring Well Completion
Well Tag Number: L133558
Flushmount monitoring well.
0.0 to 30.5 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
30.5 to 50.5 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
50.5 to 51.0 feet bgs: 2-inch-diameter end cap.

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

COLU 55412
1/22/2019

WELL I.D. LABEL# L 132783
START CARD # 1041592
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name GARY Last Name KERVIN
Company
Address PO BOX 780
City SCAPPOOSE State OR Zip 97056

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:									

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 200.00 ft.

BORE HOLE

Dia	From	To
10	0	20
6	20	200

SEAL

Material	From	To	Amt	sacks/lbs
Bentonite Chips	0	20	7	S
		Calculated	6	
		Calculated		

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other POUR
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
●	○	6	☒	1.5	20	250	●	○	☒	☐
○	●	4	☐	3	200	40	○	●	☐	☒
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☐ Inside ☒ Outside ☐ Other Location of shoe(s) 20
Temp casing ☐ Yes Dia From + ☐ To

(7) PERFORATIONS/SCREENS

Perforations Method saw cut
Screens Type Material

Perf/ Screen	Casing/ Screen Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Perf	Liner	4	160	200	.25	6	60	

(8) WELL TESTS: Minimum testing time is 1 hour

○ Pump ○ Bailer ◉ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
40		200	1

Temperature 41 °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 192 ppm

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County COLUMBIA Twp 4.00 N N/S Range 1.00 W E/W WM
Sec 9 NW 1/4 of the NE 1/4 Tax Lot 1000
Tax Map Number Lot
Lat ° ' " or 45.84953100 DMS or DD
Long ° ' " or -122.81478500 DMS or DD
○ Street address of well ◉ Nearest address
NEAR 1875 OLD PORTLAND ROAD\NST. HELENS, OREGON 97051

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			☐	
Completed Well	12/26/2018		☐	54

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 170.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
12/28/2018	170	180	40		☐	54
					☐	
					☐	
					☐	
					☐	

(11) WELL LOG

Ground Elevation

Material	From	To
basalt weatherd	0	5
tan claystone	5	14
gray basailt	14	98
gray brn sandstone	98	110
gray basailt	110	170
pours gray basalt	170	180
gray basalt	180	200

Date Started 12/26/2018 Completed 12/28/2018

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number 1975 Date 1/22/2019

Signed AARON MORLEY (E-filed)

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1480 Date 1/22/2019

Signed ARTHUR MCMULLEN (E-filed)

Contact Info (optional) 503 397 2356

WATER SUPPLY WELL REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

COLU 55412

1/22/2019

Map of Hole

STATE OF OREGON
WELL LOCATION MAP

This map is supplemental to the WATER SUPPLY WELL REPORT

Oregon Water Resources Department
725 Summer St NE, Salem OR 97301
(503)986-0900

LOCATION OF WELL

Latitude: 45.849531 Datum: WGS84
Longitude: -122.814785
Township/Range/Section/Quarter-Quarter Section:
WM 4N 1W 9 NWNE
Address of Well:
NEAR 1875 OLD PORTLAND ROAD
ST. HELENS, OREGON 97051

Well Label: 132783

Printed: January 22, 2019

DISCLAIMER: This map is intended to represent the approximate location the well. It is not intended to be construed as survey accurate in any manner.

Provided by well constructor

APPENDIX B

FIELD SAMPLING DATA SHEET

MAUL FOSTER ALONGI

Water Field Sampling Data Sheet

Client Name:	St. Helens		Sample Location:	MW-1	
Project #:	M0830.03.006		Staff:	C. Schweitzer	
Project Name:	St. Helens Lagood Phase 1B		Sampling Date:	2/20/2023	
Sampling Event:	Q1 2023		Sample Name:	MW1-20230220-GW-70	
Sub Area:			Sample Depth:	~70	
FSDS QA:	K. Crossley				
Easting:		Northing:		TOC:	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT -Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
2/20/2023	9:50			28.98			

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (L)	WLE (ft)	Flowrate (l/min)	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(1) Submersible Pump	10:10	2.0	-	0.10	7.58	14.0	562.6	1.84	145.0	3.58
	10:17	2.7	33.70	0.10	7.40	14.1	661	1.17	120.2	18.8
	10:20	3.0	-	0.10	7.41	14.1	670	1.17	114.8	19.8
	10:23	3.3	34.60	0.10	7.40	13.9	672	1.22	116.7	19.7
Final Field Parameters	10:26	3.6	34.90	0.10	7.38	14.1	685	1.19	119.5	11.0

Purge and Sample Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

clear; colorless

Sample Information

Sampling Method	Sample Type	Sampling Time
(1) Submersible Pump	Groundwater	10:26

Sample Type: Groundwater, Surfacewater, Stormwater, Process Water, Grab Sample, Field Blank, or Other (specify).

Container Code/Preservative	# of Bottles	Filtered (Yes/No)
VOA-Glass	5	No
Amber-Glass	11	No
White Poly	3	No
Yellow Poly		
Green Poly		
Red Total Poly	1	No
Red Dissolved Poly		
Total Bottles	20	

General Sampling Comments

Screened from 60.0 - 80.0 feet bgs
Final DTW: 37.30

Signature Cody Schweitzer

MAUL FOSTER ALONGI

Water Field Sampling Data Sheet

Client Name:	St. Helens		Sample Location:	MW-2	
Project #:	M0830.03.006		Staff:	C. Schweitzer	
Project Name:	St. Helens Lagood Phase 1B		Sampling Date:	2/20/2023	
Sampling Event:	Q1 2023		Sample Name:	MW2-20230220-GW-60	
Sub Area:			Sample Depth:	~60	
FSDS QA:	K. Crossley				
Easting:		Northing:		TOC:	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT -Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
2/20/2023	13:30			40.40			

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (L)	WLE (ft)	Flowrate (l/min)	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(1) Submersible Pump	13:55	2.0	41.50	0.15	8.46	14.1	605.9	0.98	283.8	73.5
	14:05	3.0	-	0.10	8.43	13.4	530.6	0.78	229.0	70.5
	14:15	4.5	43.20	0.15	8.46	14.3	524.8	0.57	182.1	56.0
	14:35	6.5	-	0.10	8.54	13.8	521.5	0.43	100.2	41.6
	14:38	6.8	-	0.10	8.55	13.7	520.8	0.42	94.9	39.8
Final Field Parameters	14:41	7.1	-	0.10	8.57	14.0	520.0	0.39	90.9	40.7

Purge and Sample Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

cloudy; colorless

Sample Information

Sampling Method	Sample Type	Sampling Time
(1) Submersible Pump	Groundwater	14:41

Sample Type: Groundwater, Surfacewater, Stormwater, Process Water, Grab Sample, Field Blank, or Other (specify).

Container Code/Preservative	# of Bottles	Filtered (Yes/No)
VOA-Glass	5	No
Amber-Glass	11	No
White Poly	3	No
Yellow Poly		
Green Poly		
Red Total Poly	1	No
Red Dissolved Poly		
Total Bottles	20	

General Sampling Comments

Gave extra purge time at beginnning due to turbidity
Screened from 50.0 to 70.0 feet
Final DTW: 46.42

Signature Cody Schweitzer

MAUL FOSTER ALONGI

Water Field Sampling Data Sheet

Client Name:	St. Helens		Sample Location:	MW-3	
Project #:	M0830.03.006		Staff:	C. Schweitzer	
Project Name:	St. Helens Lagood Phase 1B		Sampling Date:	2/14/2023	
Sampling Event:	Q1 2023		Sample Name:	MW3-20230214-GW-35	
Sub Area:			Sample Depth:	~35	
FSDS QA:	K. Crossley				
Easting:		Northing:		TOC:	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT -Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
2/14/2023	9:20			15.60			

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (L)	WLE (ft)	Flowrate (l/min)	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump	9:40	2.00	-	0.25	7.00	14.5	478.2	2.79	-87.2	7.07
	9:43	2.75	15.78	0.25	6.89	14.2	538.3	0.92	-109.4	5.81
	9:46	3.50	15.78	0.25	6.89	14.3	535.6	0.67	-117.2	0.05
	9:56	6.00	15.78	0.25	6.95	14.5	478.0	0.58	-113.7	0.02
	9:59	6.75	15.79	0.25	6.98	14.1	460.0	0.75	-115.8	0.02
	10:02	7.50	15.80	0.25	7.01	14.2	459.8	0.75	-115.9	0.02
Final Field Parameters	10:05	8.25	15.80	0.25	7.02	14.3	458.1	0.70	-125.4	0.02

Purge and Sample Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

clear; colorless; slightly effervescent

Sample Information

Sampling Method	Sample Type	Sampling Time
(2) Peristaltic Pump	Groundwater	10:05

Sample Type: Groundwater, Surfacewater, Stormwater, Process Water, Grab Sample, Field Blank, or Other (specify).

Container Code/Preservative	# of Bottles	Filtered (Yes/No)
VOA-Glass	5	No
Amber-Glass	11	No
White Poly	3	No
Yellow Poly		
Green Poly		
Red Total Poly	1	No
Red Dissolved Poly		
Total Bottles	20	

General Sampling Comments

DUP collected here: MW3-20230214-GW-35-DUP
Screened from 25.0 - 45.0 feet
Final DTW: 15.79

Signature Cody Schweitzer

MAUL FOSTER ALONGI

Water Field Sampling Data Sheet

Client Name:	St. Helens		Sample Location:	MW-4	
Project #:	M0830.03.006		Staff:	C. Schweitzer	
Project Name:	St. Helens Lagood Phase 1B		Sampling Date:	2/14/2023	
Sampling Event:	Q1 2023		Sample Name:	MW4-20230214-GW-40	
Sub Area:			Sample Depth:	~40	
FSDS QA:	K. Crossley				
Easting:		Northing:		TOC:	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT -Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
2/14/2023	13:50			19.99			

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (L)	WLE (ft)	Flowrate (l/min)	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump	14:05	2.0	19.99	0.40	6.84	16.0	2085	1.59	-139.1	>1100
	14:15	6.0	19.99	0.40	6.94	16.2	2096	0.27	-137.2	71.2
	14:25	10.0	19.99	0.40	6.92	16.2	2105	0.21	-156.5	54.8
	14:28	11.2	19.99	0.40	6.92	16.0	2107	0.22	-156.0	42.0
	14:31	12.4	19.99	0.40	6.92	15.9	2096	0.23	-155.5	38.4
	14:34	13.6	19.99	0.40	6.92	16.1	2103	0.22	-155.4	27.6
Final Field Parameters	14:37	14.8	19.99	0.40	6.93	16.0	2102	0.23	-155.0	22.3

Purge and Sample Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

slightly cloudy; slight brown tint

Sample Information

Sampling Method	Sample Type	Sampling Time
(2) Peristaltic Pump	Groundwater	14:37

Sample Type: Groundwater, Surfacewater, Stormwater, Process Water, Grab Sample, Field Blank, or Other (specify).

Container Code/Preservative	# of Bottles	Filtered (Yes/No)
VOA-Glass	5	No
Amber-Glass	11	No
White Poly	3	No
Yellow Poly		
Green Poly		
Red Total Poly	1	No
Red Dissolved Poly		
Total Bottles	20	

General Sampling Comments

Well under pressure when opened. Very turbid to start, gave it extra purge time at start to help lower turbidity, and gave it extra time after "stable" for more time to lower turbidity.
Screened from 30.0 - 50.0 feet bgs
Final DTW: 19.99

Signature

Cody Schweitzer

MAUL FOSTER ALONGI

Water Field Sampling Data Sheet

Client Name:	St. Helens		Sample Location:	MW-5	
Project #:	M0830.03.006		Staff:	C. Schweitzer	
Project Name:	St. Helens Lagood Phase 1B		Sampling Date:	2/14/2023	
Sampling Event:	Q1 2023		Sample Name:	MW5-20230214-GW-40	
Sub Area:			Sample Depth:	~40	
FSDS QA:	K. Crossley				
Easting:		Northing:		TOC:	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT -Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
2/14/2023	12:25			18.80			

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (L)	WLE (ft)	Flowrate (l/min)	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump	12:35	2.00	18.85	0.35	6.97	15.5	1725	2.45	-135.2	0.36
	12:45	5.50	18.85	0.35	6.85	15.6	1813	0.42	-151.0	0.26
	12:48	6.55	18.85	0.35	6.86	15.5	1814	0.40	-151.4	0.02
Final Field Parameters	12:51	7.60	18.85	0.35	6.87	15.5	1812	0.37	-151.3	0.71

Purge and Sample Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

clear; colorless; effervescent

Sample Information

Sampling Method	Sample Type	Sampling Time
(2) Peristaltic Pump	Groundwater	12:51

Sample Type: Groundwater, Surfacewater, Stormwater, Process Water, Grab Sample, Field Blank, or Other (specify).

Container Code/Preservative	# of Bottles	Filtered (Yes/No)
VOA-Glass	5	No
Amber-Glass	11	No
White Poly	3	No
Yellow Poly		
Green Poly		
Red Total Poly	1	No
Red Dissolved Poly		
Total Bottles	20	

General Sampling Comments

Screened from 30.0 - 50.0 feet bgs
Final DTW: 18.85

Signature Cody Schweitzer

MAUL FOSTER ALONGI

Water Field Sampling Data Sheet

Client Name:	St. Helens		Sample Location:	MW-6	
Project #:	M0830.03.006		Staff:	C. Schweitzer	
Project Name:	St. Helens Lagood Phase 1B		Sampling Date:	2/14/2023	
Sampling Event:	Q1 2023		Sample Name:	MW1-20230214-GW-40.25	
Sub Area:			Sample Depth:	~40.25	
FSDS QA:	K. Crossley				
Easting:		Northing:		TOC:	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT -Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
2/14/2023	15:50			19.75			

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (L)	WLE (ft)	Flowrate (l/min)	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump	16:01	2.0	19.75	0.40	6.92	14.8	1855	0.74	-137.7	3.12
	16:11	6.0	19.75	0.40	6.95	14.8	1858	0.32	-150.1	3.02
	16:14	7.2	19.75	0.40	6.95	14.9	1853	0.24	-150.6	0.84
Final Field Parameters	16:17	8.4	19.75	0.40	6.95	14.9	1849	0.19	-151.2	3.58

Purge and Sample Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

clear; colorless; slightly effervescent

Sample Information

Sampling Method	Sample Type	Sampling Time
(2) Peristaltic Pump	Groundwater	16:17

Sample Type: Groundwater, Surfacewater, Stormwater, Process Water, Grab Sample, Field Blank, or Other (specify).

Container Code/Preservative	# of Bottles	Filtered (Yes/No)
VOA-Glass	5	No
Amber-Glass	11	No
White Poly	3	No
Yellow Poly		
Green Poly		
Red Total Poly	1	No
Red Dissolved Poly		
Total Bottles	20	

General Sampling Comments

Screened from 30.5 - 50.5 feet bgs
Final DTW: 19.75

Signature Cody Schweitzer

MAUL FOSTER ALONGI

Water Field Sampling Data Sheet

Client Name:	St. Helens		Sample Location:	MFA-B3A	
Project #:	M0830.03.006		Staff:	C. Schweitzer	
Project Name:	St. Helens Lagood Phase 1B		Sampling Date:	2/7/2023	
Sampling Event:	Q1 2023		Sample Name:	MFA-B3A-20230207-GW-36.0	
Sub Area:			Sample Depth:	~36	
FSDS QA:	K. Crossley				
Easting:		Northing:		TOC:	

Hydrology/Level Measurements

Date	Time	DT-Bottom	DT -Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
2/7/2023	8:00			17.60			

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	Time	Purge Vol (L)	WLE (ft)	Flowrate (l/min)	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	EH	Turbidity
(2) Peristaltic Pump										
Final Field Parameters	8:30	-	17.60	-	6.97	7.6	706.2	6.51	100.0	overrange

Purge and Sample Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

cloudy; brown tint; highly turbid

Sample Information

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	# of Bottles	Filtered (Yes/No)
(2) Peristaltic Pump	Groundwater	8:30	VOA-Glass	5	No
			Amber-Glass	11	No
			White Poly	3	No
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly		
			Total Bottles	20	

Sample Type: Groundwater, Surfacewater, Stormwater, Process Water, Grab Sample, Field Blank, or Other (specify).

General Sampling Comments

Initial WL after well install: 2/6 @ 1500 = ~31.0 / WL prior to purge after setting for 45 min: 2/6 @ 1545 = ~25.70 / WL after purgin ~2-3 gallons = dry
WL the next morning: 2/7 @ 0800: 17.60 / DTB the next morning: 2/7 @ 0800: 40.0
TOD: 2.5' above water level of lagoon / TOC: 2.4' above top of deck
WL measurement point: Top of casing 4.9' above lagoon WL / Screened from 34.0 - 38.0 feet below TOD

Signature

Cody Schweitzer

APPENDIX C

LAB REPORTS

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Monday, December 12, 2022

David Weatherby
Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

RE: A2H0382 - St. Helens Lagoon - [none]

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 A2H0382, which was received by the laboratory on 8/10/2022 at 6:25:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1 3.1 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DU1-20220810-ISM-COMP	A2H0382-01	Sediment	08/10/22 09:15	08/10/22 18:25
DU1-20220810-ISM-COMP	A2H0382-02	Sediment	08/10/22 09:15	08/10/22 18:25
DU1-20220810-ISM-COMP	A2H0382-03	Sediment	08/10/22 09:15	08/10/22 18:25

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL CASE NARRATIVE

Work Order: A2H0382

Amended Report Revision 1:

8270E Organophosphorus Pesticides Data Correction

This report supersedes all previous reports.

Sample DU1-20220810-ISM-COMP (A2H0382-02): Originally reported Merphos with a positive result. Corrected result is Non-Detect at 18,200ug/kg. Reporting limit is raised due to non-target analyte matrix interference

Mark Zehr
Organics Manager
11/28/2022

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-02)				**Matrix: Sediment**		**Batch: 22H0779**		**PRO**
Diesel	**20500**	2110	4230	mg/kg dry	100	08/23/22 06:03	NWTPH-Dx	**F-13**
Oil	ND	4230	8460	mg/kg dry	100	08/23/22 06:03	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: %*		*Limits: 50-150 %*	*100*	*08/23/22 06:03*	*NWTPH-Dx*	*S-01*

Apex Laboratories

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-01)				**Matrix: Sediment**		**Batch: 22H0476**		
Gasoline Range Organics	ND	182	182	mg/kg dry	50	08/12/22 17:17	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*105 %*	*Limits: 50-150 %*	*1*	*08/12/22 17:17*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*101 %*	*50-150 %*	*1*	*08/12/22 17:17*	*NWTPH-Gx (MS)*	

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: [none]	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A2H0382 - 12 12 22 1538

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-01)				**Matrix: Sediment**		**Batch: 22H0476**		
Acetone	ND	18200	36500	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Acrylonitrile	ND	1820	3650	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Benzene	ND	182	365	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Bromobenzene	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Bromochloromethane	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Bromodichloromethane	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Bromoform	ND	1820	3650	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Bromomethane	ND	18200	18200	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
2-Butanone (MEK)	ND	9110	18200	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
n-Butylbenzene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
sec-Butylbenzene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
tert-Butylbenzene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Carbon disulfide	ND	9110	18200	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Carbon tetrachloride	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Chlorobenzene	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Chloroethane	ND	9110	18200	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Chloroform	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Chloromethane	ND	4560	9110	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
2-Chlorotoluene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
4-Chlorotoluene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Dibromochloromethane	ND	1820	3650	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,2-Dibromo-3-chloropropane	ND	4560	9110	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,2-Dibromoethane (EDB)	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Dibromomethane	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,2-Dichlorobenzene	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,3-Dichlorobenzene	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,4-Dichlorobenzene	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Dichlorodifluoromethane	ND	1820	3650	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,1-Dichloroethane	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,2-Dichloroethane (EDC)	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,1-Dichloroethene	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
cis-1,2-Dichloroethene	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
trans-1,2-Dichloroethene	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-01)				**Matrix: Sediment**		**Batch: 22H0476**		
1,2-Dichloropropane	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,3-Dichloropropane	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
2,2-Dichloropropane	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,1-Dichloropropene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
cis-1,3-Dichloropropene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
trans-1,3-Dichloropropene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Ethylbenzene	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Hexachlorobutadiene	ND	1820	3650	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
2-Hexanone	ND	18200	18200	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Isopropylbenzene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
4-Isopropyltoluene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Methylene chloride	ND	9110	18200	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
4-Methyl-2-pentanone (MiBK)	ND	9110	18200	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Methyl tert-butyl ether (MTBE)	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Naphthalene	ND	1820	3650	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
n-Propylbenzene	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Styrene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,1,1,2-Tetrachloroethane	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,1,2,2-Tetrachloroethane	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Tetrachloroethene (PCE)	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Toluene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,2,3-Trichlorobenzene	ND	4560	9110	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,2,4-Trichlorobenzene	ND	4560	9110	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,1,1-Trichloroethane	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,1,2-Trichloroethane	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Trichloroethene (TCE)	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Trichlorofluoromethane	ND	1820	3650	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,2,3-Trichloropropane	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,2,4-Trimethylbenzene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
1,3,5-Trimethylbenzene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
Vinyl chloride	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
m,p-Xylene	ND	911	1820	ug/kg dry	50	08/12/22 17:17	5035A/8260D	
o-Xylene	ND	456	911	ug/kg dry	50	08/12/22 17:17	5035A/8260D	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-01)				**Matrix: Sediment**		**Batch: 22H0476**		
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*103 %*	*Limits: 80-120 %*	*1*	*08/12/22 17:17*	*5035A/8260D*	
Toluene-d8 (Surr)			*95 %*	*80-120 %*	*1*	*08/12/22 17:17*	*5035A/8260D*	
4-Bromofluorobenzene (Surr)			*101 %*	*79-120 %*	*1*	*08/12/22 17:17*	*5035A/8260D*	

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Philip Nerenberg

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-01)				**Matrix: Sediment**		**Batch: 22H0946**		**H-01**
Benzene	ND	36.5	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
Toluene	ND	182	182	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
Ethylbenzene	ND	91.1	182	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
m,p-Xylene	ND	182	365	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
o-Xylene	ND	91.1	182	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
1,2,4-Trimethylbenzene	ND	182	365	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
1,3,5-Trimethylbenzene	ND	182	365	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
Chloroform	ND	182	365	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
1,2-Dibromo-3-chloropropane	ND	91.1	182	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
1,2-Dibromoethane (EDB)	ND	36.5	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
1,1-Dichloroethane	ND	36.5	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
1,2-Dichloroethane (EDC)	ND	36.5	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
1,1-Dichloroethene	ND	72.9	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	Q-30
cis-1,2-Dichloroethene	ND	36.5	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
trans-1,2-Dichloroethene	ND	36.5	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
1,2-Dichloropropane	ND	36.5	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
cis-1,3-Dichloropropene	ND	36.5	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
trans-1,3-Dichloropropene	ND	36.5	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	36.5	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
Tetrachloroethene (PCE)	ND	583	583	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	B-07

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-01)				**Matrix: Sediment**		**Batch: 22H0946**		**H-01**
1,1,2,2-Tetrachloroethane	ND	91.1	182	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
Trichloroethene (TCE)	ND	36.5	72.9	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
1,2,3-Trichloropropane	ND	91.1	182	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
Vinyl chloride	ND	182	365	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
1,1,2-Trichloroethane	ND	91.1	182	ug/kg dry	100	08/26/22 15:07	5035A/8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*101 %*	*Limits: 80-120 %*	*1*	*08/26/22 15:07*	*5035A/8260D SIM*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*08/26/22 15:07*	*5035A/8260D SIM*	
4-Bromofluorobenzene (Surr)			*103 %*	*79-120 %*	*1*	*08/26/22 15:07*	*5035A/8260D SIM*	

Apex Laboratories

Philip Nerenberg

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: [none]	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A2H0382 - 12 12 22 1538

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-02)				**Matrix: Sediment**		**Batch: 22H0777**		**PRO**
Acenaphthene	ND	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Acenaphthylene	ND	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Anthracene	**211**	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	**Ja**
Benz(a)anthracene	ND	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Benzo(a)pyrene	ND	212	424	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Benzo(b)fluoranthene	ND	212	424	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Benzo(k)fluoranthene	ND	212	424	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Benzo(g,h,i)perylene	ND	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Chrysene	ND	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Dibenz(a,h)anthracene	ND	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Fluoranthene	**179**	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	**Ja**
Fluorene	ND	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
1-Methylnaphthalene	ND	283	565	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2-Methylnaphthalene	ND	283	565	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Naphthalene	ND	283	565	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Phenanthrene	**366**	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Pyrene	**189**	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	**Ja**
Carbazole	ND	212	424	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Dibenzofuran	ND	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2-Chlorophenol	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
4-Chloro-3-methylphenol	ND	1410	2830	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2,4-Dichlorophenol	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2,4-Dimethylphenol	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2,4-Dinitrophenol	ND	3530	7070	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	3530	7070	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2-Methylphenol	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
3+4-Methylphenol(s)	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2-Nitrophenol	ND	1410	2830	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
4-Nitrophenol	ND	1410	2830	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Pentachlorophenol (PCP)	ND	1410	2830	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Phenol	ND	283	565	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	

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Philip Nerenberg

Philip Nerenberg, Lab Director

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503-718-2323
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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: [none]	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A2H0382 - 12 12 22 1538

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-02)				**Matrix: Sediment**		**Batch: 22H0777**		**PRO**
2,3,5,6-Tetrachlorophenol	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2,4,5-Trichlorophenol	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Nitrobenzene	ND	1410	2830	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2,4,6-Trichlorophenol	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Bis(2-ethylhexyl)phthalate	**11800**	2120	4240	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Butyl benzyl phthalate	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Diethylphthalate	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Dimethylphthalate	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Di-n-butylphthalate	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Di-n-octyl phthalate	ND	1130	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
N-Nitrosodimethylamine	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
N-Nitrosodiphenylamine	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Bis(2-Chloroethoxy) methane	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Bis(2-Chloroethyl) ether	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Hexachlorobenzene	ND	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Hexachlorobutadiene	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Hexachlorocyclopentadiene	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Hexachloroethane	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2-Chloronaphthalene	ND	141	283	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
1,2,4-Trichlorobenzene	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
4-Bromophenyl phenyl ether	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
4-Chlorophenyl phenyl ether	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Aniline	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
4-Chloroaniline	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2-Nitroaniline	ND	2830	5650	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
3-Nitroaniline	ND	2830	5650	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
4-Nitroaniline	ND	2830	5650	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2,4-Dinitrotoluene	ND	1410	2830	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
2,6-Dinitrotoluene	ND	1410	2830	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Benzoic acid	ND	17700	35300	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Benzyl alcohol	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-02)				**Matrix: Sediment**		**Batch: 22H0777**		**PRO**
Isophorone	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Azobenzene (1,2-DPH)	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	3530	7070	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
3,3'-Dichlorobenzidine	ND	2830	5650	ug/kg dry	40	08/23/22 11:47	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	3530	7070	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
1,3-Dinitrobenzene	ND	3530	7070	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
1,4-Dinitrobenzene	ND	3530	7070	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Pyridine	ND	707	1410	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
1,2-Dichlorobenzene	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
1,3-Dichlorobenzene	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
1,4-Dichlorobenzene	ND	353	707	ug/kg dry	40	08/23/22 11:47	EPA 8270E	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*46 %*	*Limits: 37-122 %*	*40*	*08/23/22 11:47*	*EPA 8270E*	*S-05*
2-Fluorobiphenyl (Surr)			*48 %*	*44-120 %*	*40*	*08/23/22 11:47*	*EPA 8270E*	*S-05*
Phenol-d6 (Surr)			*37 %*	*33-122 %*	*40*	*08/23/22 11:47*	*EPA 8270E*	*S-05*
p-Terphenyl-d14 (Surr)			*55 %*	*54-127 %*	*40*	*08/23/22 11:47*	*EPA 8270E*	*S-05*
2-Fluorophenol (Surr)			*9 %*	*35-120 %*	*40*	*08/23/22 11:47*	*EPA 8270E*	*S-05*
2,4,6-Tribromophenol (Surr)			*32 %*	*39-132 %*	*40*	*08/23/22 11:47*	*EPA 8270E*	*S-05*

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-02)				**Matrix: Sediment**		**Batch: 22H0778**		**PRO, R-04**
Azinphos methyl (Guthion)	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Chlorpyrifos	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Coumaphos	ND	4230	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Demeton O	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Demeton S	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Diazinon	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Dichlorvos	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Dimethoate	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Disulfoton	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
EPN	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Ethoprop	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Fensulfothion	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Fenthion	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Malathion	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Merphos	ND	18200	18200	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	R-02, AMEND
Methyl parathion	ND	4230	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Mevinphos (Phosdrin)	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Monocrotophos	ND	4230	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Naled (Dibrom)	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Parathion, ethyl	ND	6170	6170	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	R-02
Phorate	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Ronnel (Fenchlorphos)	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Sulfotep	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Sulprofos (Bolstar)	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
TEPP	ND	8460	16900	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Tetrachlorvinphos (Rabon)	ND	9640	9640	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	R-02
Tokuthion (Prothiofos)	ND	2110	4230	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	
Trichloronate	ND	6090	6090	ug/kg dry	40	08/23/22 10:48	EPA 8270E OPPs	R-02
Surrogate: Tributyl phosphate (Surr)		*Recovery:*	*574 %*	*Limits: 10-136 %*	*40*	*08/23/22 10:48*	*EPA 8270E OPPs*	*S-05*
Triphenyl phosphate (Surr)			*368 %*	*34-121 %*	*40*	*08/23/22 10:48*	*EPA 8270E OPPs*	*S-05*

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Organochlorine Pesticides by GC/MS/MS

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-02)				**Matrix: Sediment**		**Batch: 22I0773**		**H-08, PRO**
Aldrin	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
alpha-BHC	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
beta-BHC	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
gamma-BHC (Lindane)	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
delta-BHC	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
cis-Chlordane	**1.46**	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
cis-Nonachlor	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
2,4'-DDD	ND	1.06	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
2,4'-DDE	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
2,4'-DDT	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
4,4'-DDD	ND	1.06	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
4,4'-DDE	**5.48**	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
4,4'-DDT	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
Dieldrin	ND	1.17	1.17	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	R-02
Endosulfan I	ND	10.7	10.7	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	R-02
Endosulfan II	ND	3.71	3.71	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	R-02
Endosulfan sulfate	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
Endrin	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
Endrin Aldehyde	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
Endrin ketone	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
Heptachlor	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
Heptachlor epoxide	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
Hexachlorobutadiene	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
Methoxychlor	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
Mirex	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
Oxychlordane	ND	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
trans-Chlordane	**1.99**	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
trans-Nonachlor	**1.08**	0.530	1.06	ug/kg dry	1	09/26/22 16:15	EPA 8270E OCPs	
Surrogate: gamma-BHC-d6 (Surr)		*Recovery: 70 %*		*Limits: 50-150 %*	*1*	*09/26/22 16:15*	*EPA 8270E OCPs*	
4,4'-DDT-d8 (Surr)		*107 %*		*50-150 %*	*1*	*09/26/22 16:15*	*EPA 8270E OCPs*	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-02)				**Matrix: Sediment**				
Batch: 22H0793								
Antimony	**2.62**	0.286	0.571	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Arsenic	**4.21**	0.286	0.571	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Barium	**339**	0.286	0.571	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Beryllium	**0.327**	0.0571	0.114	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Cadmium	**2.97**	0.0571	0.114	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Chromium	**70.1**	0.286	0.571	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Copper	**259**	0.571	1.14	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Lead	**27.1**	0.0571	0.114	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Manganese	**711**	0.286	0.571	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Mercury	**0.485**	0.0228	0.0457	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Nickel	**37.8**	0.571	1.14	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Selenium	**2.46**	0.286	0.571	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Silver	**2.27**	0.0571	0.114	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**
Thallium	ND	0.286	0.571	mg/kg dry	5	08/23/22 20:31	EPA 6020B	PRO
Zinc	**817**	1.14	2.28	mg/kg dry	5	08/23/22 20:31	EPA 6020B	**PRO**

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Total Hexavalent Chromium by Colorimetric Spectrophotometry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-02)				**Matrix: Sediment**		**Batch: 22H0747**		**PRO**
Chromium (VI)	ND	10.7	21.3	mg/kg dry	50	08/23/22 14:05	EPA 7196A	Q-57

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-01)				**Matrix: Sediment**		**Batch: 22H0481**		
% Solids	**6.71**	1.00	1.00	%	1	08/26/22 08:44	EPA 8000D	
DU1-20220810-ISM-COMP (A2H0382-02)				**Matrix: Sediment**		**Batch: 22H0773**		**PRO**
% Solids	**93.7**	1.00	1.00	%	1	08/22/22 15:57	EPA 8000D	
DU1-20220810-ISM-COMP (A2H0382-03)				**Matrix: Sediment**		**Batch: 22H0481**		
% Solids	**6.71**	1.00	1.00	%	1	08/15/22 07:02	EPA 8000D	

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Chlorinated Herbicides by GC/ECD

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-02)				**Matrix: Sediment**		**Batch: W2H1928**		
Batch: W2H1928								
2,4-D	ND	330	1400	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
2,4-DB	ND	580	2900	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
2,4,5-T	ND	150	720	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
2,4,5-TP (Silvex)	ND	180	720	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
Dalapon	ND	260	1400	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
Dicamba	ND	240	1400	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
Dichloroprop	ND	240	1400	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
Dinoseb	ND	83	720	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
MCPA	ND	54000	140000	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
MCPP	ND	140000	140000	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
Pentachlorophenol	ND	230	720	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
Picloram	ND	220	720	ug/kg	10	09/01/22 10:47	EPA 8151A	M-02, M-04
Batch: W2H1928								
Surrogate: 2,4-DCAA		*Recovery: 78 %*		*Limits: 13-119 %*	*10*	*09/01/22 10:47*	*EPA 8151A*	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU1-20220810-ISM-COMP (A2H0382-02)				**Matrix: Sediment**		**Batch: W2H1882**		
Batch: W2H1882								
% Solids	**93.9**		0.100	% by Weight	1	08/24/22 16:39	EPA 160.3M	

Apex Laboratories

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0779 - EPA 3546 (Fuels)							**Sediment**					
Blank (22H0779-BLK1)			Prepared: 08/22/22 16:14		Analyzed: 08/23/22 05:23							
NWTPH-Dx												
Diesel	ND	9.09	18.2	mg/kg wet	1	---	---	---	---	---	---	
Oil	ND	18.2	36.4	mg/kg wet	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 97 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS (22H0779-BS1)			Prepared: 08/22/22 16:14		Analyzed: 08/23/22 05:43							
NWTPH-Dx												
Diesel	121	10.0	20.0	mg/kg wet	1	125	---	97	38-132%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 105 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Duplicate (22H0779-DUP1)			Prepared: 08/22/22 16:14		Analyzed: 08/23/22 06:23							**PRO**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
NWTPH-Dx												
Diesel	**23300**	2130	4250	mg/kg dry	100	---	20500	---	---	12	30%	F-13
Oil	ND	4250	8500	mg/kg dry	100	---	ND	---	---	---	30%	
Surr: o-Terphenyl (Surr)			*Recovery: %*		*Limits: 50-150 %*		*Dilution: 100x*					S-01

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0476 - EPA 5035A								Soil				
Blank (22H0476-BLK1)			Prepared: 08/12/22 08:22 Analyzed: 08/12/22 16:01									
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	1.67	3.33	mg/kg wet	50	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 101 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*			*"*					
LCS (22H0476-BS2)			Prepared: 08/12/22 08:22 Analyzed: 08/12/22 14:44									
NWTPH-Gx (MS)												
Gasoline Range Organics	23.0	2.50	5.00	mg/kg wet	50	25.0	---	92	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 96 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*100 %*	*50-150 %*			*"*					
Duplicate (22H0476-DUP1)			Prepared: 08/10/22 09:15 Analyzed: 08/12/22 17:42									
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-01)												
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	91.1	182	mg/kg dry	50	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 104 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*100 %*	*50-150 %*			*"*					

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0476 - EPA 5035A							**Soil**					
Blank (22H0476-BLK1)			Prepared: 08/12/22 08:22 Analyzed: 08/12/22 16:01									
5035A/8260D												
Acetone	ND	333	667	ug/kg wet	50	---	---	---	---	---	---	
Acrylonitrile	ND	33.3	66.7	ug/kg wet	50	---	---	---	---	---	---	
Benzene	ND	3.33	6.67	ug/kg wet	50	---	---	---	---	---	---	
Bromobenzene	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
Bromochloromethane	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Bromodichloromethane	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Bromoform	ND	33.3	66.7	ug/kg wet	50	---	---	---	---	---	---	
Bromomethane	ND	333	333	ug/kg wet	50	---	---	---	---	---	---	
2-Butanone (MEK)	ND	167	333	ug/kg wet	50	---	---	---	---	---	---	
n-Butylbenzene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
sec-Butylbenzene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
tert-Butylbenzene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Carbon disulfide	ND	167	333	ug/kg wet	50	---	---	---	---	---	---	
Carbon tetrachloride	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Chlorobenzene	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
Chloroethane	ND	167	333	ug/kg wet	50	---	---	---	---	---	---	
Chloroform	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Chloromethane	ND	83.3	167	ug/kg wet	50	---	---	---	---	---	---	
2-Chlorotoluene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
4-Chlorotoluene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Dibromochloromethane	ND	33.3	66.7	ug/kg wet	50	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	83.3	167	ug/kg wet	50	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Dibromomethane	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	33.3	66.7	ug/kg wet	50	---	---	---	---	---	---	
1,1-Dichloroethane	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
1,1-Dichloroethene	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0476 - EPA 5035A							**Soil**					
Blank (22H0476-BLK1)			Prepared: 08/12/22 08:22 Analyzed: 08/12/22 16:01									
1,2-Dichloropropane	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
1,3-Dichloropropane	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
2,2-Dichloropropane	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
1,1-Dichloropropene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Ethylbenzene	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
Hexachlorobutadiene	ND	33.3	66.7	ug/kg wet	50	---	---	---	---	---	---	
2-Hexanone	ND	333	333	ug/kg wet	50	---	---	---	---	---	---	
Isopropylbenzene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
4-Isopropyltoluene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Methylene chloride	ND	167	333	ug/kg wet	50	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	167	333	ug/kg wet	50	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Naphthalene	ND	33.3	66.7	ug/kg wet	50	---	---	---	---	---	---	
n-Propylbenzene	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
Styrene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
Toluene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	83.3	167	ug/kg wet	50	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	83.3	167	ug/kg wet	50	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
Trichlorofluoromethane	ND	33.3	66.7	ug/kg wet	50	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
Vinyl chloride	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
m,p-Xylene	ND	16.7	33.3	ug/kg wet	50	---	---	---	---	---	---	
o-Xylene	ND	8.33	16.7	ug/kg wet	50	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 105 %*	*Limits: 80-120 %*			*Dilution: 1x*					

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0476 - EPA 5035A							**Soil**					
Blank (22H0476-BLK1)				Prepared: 08/12/22 08:22 Analyzed: 08/12/22 16:01								
Surr: Toluene-d8 (Surr)			*Recovery: 98 %*	*Limits: 80-120 %*			*Dilution: 1x*					
4-Bromofluorobenzene (Surr)			*100 %*	*79-120 %*			*"*					
LCS (22H0476-BS1)				Prepared: 08/12/22 08:22 Analyzed: 08/12/22 15:10								
5035A/8260D												
Acetone	2450	500	1000	ug/kg wet	50	2000	---	**122**	**80-120%**	---	---	Q-56
Acrylonitrile	1040	50.0	100	ug/kg wet	50	1000	---	104	80-120%	---	---	
Benzene	1080	5.00	10.0	ug/kg wet	50	1000	---	108	80-120%	---	---	
Bromobenzene	966	12.5	25.0	ug/kg wet	50	1000	---	97	80-120%	---	---	
Bromochloromethane	1130	25.0	50.0	ug/kg wet	50	1000	---	113	80-120%	---	---	
Bromodichloromethane	1150	25.0	50.0	ug/kg wet	50	1000	---	115	80-120%	---	---	
Bromoform	1080	50.0	100	ug/kg wet	50	1000	---	108	80-120%	---	---	
Bromomethane	1390	500	500	ug/kg wet	50	1000	---	**139**	**80-120%**	---	---	Q-56
2-Butanone (MEK)	1920	250	500	ug/kg wet	50	2000	---	96	80-120%	---	---	
n-Butylbenzene	914	25.0	50.0	ug/kg wet	50	1000	---	91	80-120%	---	---	
sec-Butylbenzene	963	25.0	50.0	ug/kg wet	50	1000	---	96	80-120%	---	---	
tert-Butylbenzene	880	25.0	50.0	ug/kg wet	50	1000	---	88	80-120%	---	---	
Carbon disulfide	1020	250	500	ug/kg wet	50	1000	---	102	80-120%	---	---	
Carbon tetrachloride	1200	25.0	50.0	ug/kg wet	50	1000	---	120	80-120%	---	---	
Chlorobenzene	1040	12.5	25.0	ug/kg wet	50	1000	---	104	80-120%	---	---	
Chloroethane	1390	250	500	ug/kg wet	50	1000	---	**139**	**80-120%**	---	---	Q-56
Chloroform	1100	25.0	50.0	ug/kg wet	50	1000	---	110	80-120%	---	---	
Chloromethane	1090	125	250	ug/kg wet	50	1000	---	109	80-120%	---	---	
2-Chlorotoluene	977	25.0	50.0	ug/kg wet	50	1000	---	98	80-120%	---	---	
4-Chlorotoluene	916	25.0	50.0	ug/kg wet	50	1000	---	92	80-120%	---	---	
Dibromochloromethane	1040	50.0	100	ug/kg wet	50	1000	---	104	80-120%	---	---	
1,2-Dibromo-3-chloropropane	826	125	250	ug/kg wet	50	1000	---	83	80-120%	---	---	
1,2-Dibromoethane (EDB)	1040	25.0	50.0	ug/kg wet	50	1000	---	104	80-120%	---	---	
Dibromomethane	1140	25.0	50.0	ug/kg wet	50	1000	---	114	80-120%	---	---	
1,2-Dichlorobenzene	970	12.5	25.0	ug/kg wet	50	1000	---	97	80-120%	---	---	
1,3-Dichlorobenzene	988	12.5	25.0	ug/kg wet	50	1000	---	99	80-120%	---	---	
1,4-Dichlorobenzene	990	12.5	25.0	ug/kg wet	50	1000	---	99	80-120%	---	---	
Dichlorodifluoromethane	1050	50.0	100	ug/kg wet	50	1000	---	105	80-120%	---	---	
1,1-Dichloroethane	1100	12.5	25.0	ug/kg wet	50	1000	---	110	80-120%	---	---	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0476 - EPA 5035A							**Soil**					
LCS (22H0476-BS1)			Prepared: 08/12/22 08:22		Analyzed: 08/12/22 15:10							
1,2-Dichloroethane (EDC)	1140	12.5	25.0	ug/kg wet	50	1000	---	114	80-120%	---	---	
1,1-Dichloroethene	1070	12.5	25.0	ug/kg wet	50	1000	---	107	80-120%	---	---	
cis-1,2-Dichloroethene	978	12.5	25.0	ug/kg wet	50	1000	---	98	80-120%	---	---	
trans-1,2-Dichloroethene	1020	12.5	25.0	ug/kg wet	50	1000	---	102	80-120%	---	---	
1,2-Dichloropropane	1060	12.5	25.0	ug/kg wet	50	1000	---	106	80-120%	---	---	
1,3-Dichloropropane	1010	25.0	50.0	ug/kg wet	50	1000	---	101	80-120%	---	---	
2,2-Dichloropropane	1260	25.0	50.0	ug/kg wet	50	1000	---	**126**	**80-120%**	---	---	Q-56
1,1-Dichloropropene	1090	25.0	50.0	ug/kg wet	50	1000	---	109	80-120%	---	---	
cis-1,3-Dichloropropene	1050	25.0	50.0	ug/kg wet	50	1000	---	105	80-120%	---	---	
trans-1,3-Dichloropropene	1110	25.0	50.0	ug/kg wet	50	1000	---	111	80-120%	---	---	
Ethylbenzene	1010	12.5	25.0	ug/kg wet	50	1000	---	101	80-120%	---	---	
Hexachlorobutadiene	968	50.0	100	ug/kg wet	50	1000	---	97	80-120%	---	---	
2-Hexanone	1530	500	500	ug/kg wet	50	2000	---	**76**	**80-120%**	---	---	Q-55
Isopropylbenzene	986	25.0	50.0	ug/kg wet	50	1000	---	99	80-120%	---	---	
4-Isopropyltoluene	952	25.0	50.0	ug/kg wet	50	1000	---	95	80-120%	---	---	
Methylene chloride	1170	250	500	ug/kg wet	50	1000	---	117	80-120%	---	---	
4-Methyl-2-pentanone (MiBK)	1680	250	500	ug/kg wet	50	2000	---	84	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	1020	25.0	50.0	ug/kg wet	50	1000	---	102	80-120%	---	---	
Naphthalene	673	50.0	100	ug/kg wet	50	1000	---	**67**	**80-120%**	---	---	Q-55
n-Propylbenzene	956	12.5	25.0	ug/kg wet	50	1000	---	96	80-120%	---	---	
Styrene	954	25.0	50.0	ug/kg wet	50	1000	---	95	80-120%	---	---	
1,1,1,2-Tetrachloroethane	1160	12.5	25.0	ug/kg wet	50	1000	---	116	80-120%	---	---	
1,1,2,2-Tetrachloroethane	974	25.0	50.0	ug/kg wet	50	1000	---	97	80-120%	---	---	
Tetrachloroethene (PCE)	1130	12.5	25.0	ug/kg wet	50	1000	---	113	80-120%	---	---	
Toluene	980	25.0	50.0	ug/kg wet	50	1000	---	98	80-120%	---	---	
1,2,3-Trichlorobenzene	852	125	250	ug/kg wet	50	1000	---	85	80-120%	---	---	
1,2,4-Trichlorobenzene	904	125	250	ug/kg wet	50	1000	---	90	80-120%	---	---	
1,1,1-Trichloroethane	1140	12.5	25.0	ug/kg wet	50	1000	---	114	80-120%	---	---	
1,1,2-Trichloroethane	1050	12.5	25.0	ug/kg wet	50	1000	---	105	80-120%	---	---	
Trichloroethene (TCE)	1130	12.5	25.0	ug/kg wet	50	1000	---	113	80-120%	---	---	
Trichlorofluoromethane	888	50.0	100	ug/kg wet	50	1000	---	89	80-120%	---	---	
1,2,3-Trichloropropane	964	25.0	50.0	ug/kg wet	50	1000	---	96	80-120%	---	---	
1,2,4-Trimethylbenzene	980	25.0	50.0	ug/kg wet	50	1000	---	98	80-120%	---	---	
1,3,5-Trimethylbenzene	992	25.0	50.0	ug/kg wet	50	1000	---	99	80-120%	---	---	

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: [none]	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A2H0382 - 12 12 22 1538

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0476 - EPA 5035A							Soil					
LCS (22H0476-BS1)			Prepared: 08/12/22 08:22		Analyzed: 08/12/22 15:10							
Vinyl chloride	1180	12.5	25.0	ug/kg wet	50	1000	---	118	80-120%	---	---	
m,p-Xylene	2040	25.0	50.0	ug/kg wet	50	2000	---	102	80-120%	---	---	
o-Xylene	926	12.5	25.0	ug/kg wet	50	1000	---	93	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 105 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*98 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*94 %*		*79-120 %*				*"*			
Duplicate (22H0476-DUP1)			Prepared: 08/10/22 09:15		Analyzed: 08/12/22 17:42							
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-01)												
5035A/8260D												
Acetone	ND	18200	36500	ug/kg dry	50	---	ND	---	---	---	30%	
Acrylonitrile	ND	1820	3650	ug/kg dry	50	---	ND	---	---	---	30%	
Benzene	ND	182	365	ug/kg dry	50	---	ND	---	---	---	30%	
Bromobenzene	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
Bromochloromethane	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Bromodichloromethane	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Bromoform	ND	1820	3650	ug/kg dry	50	---	ND	---	---	---	30%	
Bromomethane	ND	18200	18200	ug/kg dry	50	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	9110	18200	ug/kg dry	50	---	ND	---	---	---	30%	
n-Butylbenzene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Carbon disulfide	ND	9110	18200	ug/kg dry	50	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Chlorobenzene	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
Chloroethane	ND	9110	18200	ug/kg dry	50	---	ND	---	---	---	30%	
Chloroform	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Chloromethane	ND	4560	9110	ug/kg dry	50	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Dibromochloromethane	ND	1820	3650	ug/kg dry	50	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	4560	9110	ug/kg dry	50	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Dibromomethane	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0476 - EPA 5035A							**Soil**					
Duplicate (22H0476-DUP1)				Prepared: 08/10/22 09:15 Analyzed: 08/12/22 17:42								
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-01)												
1,2-Dichlorobenzene	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	1820	3650	ug/kg dry	50	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Ethylbenzene	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	1820	3650	ug/kg dry	50	---	ND	---	---	---	30%	
2-Hexanone	ND	18200	18200	ug/kg dry	50	---	ND	---	---	---	30%	
Isopropylbenzene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Methylene chloride	ND	9110	18200	ug/kg dry	50	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	9110	18200	ug/kg dry	50	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Naphthalene	ND	1820	3650	ug/kg dry	50	---	ND	---	---	---	30%	
n-Propylbenzene	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
Styrene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
Toluene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	4560	9110	ug/kg dry	50	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	4560	9110	ug/kg dry	50	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0476 - EPA 5035A							**Soil**					
Duplicate (22H0476-DUP1)			Prepared: 08/10/22 09:15 Analyzed: 08/12/22 17:42									
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-01)												
1,1,2-Trichloroethane	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1820	3650	ug/kg dry	50	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
Vinyl chloride	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
m,p-Xylene	ND	911	1820	ug/kg dry	50	---	ND	---	---	---	30%	
o-Xylene	ND	456	911	ug/kg dry	50	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 103 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*96 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*100 %*	*79-120 %*			*"*					
Matrix Spike (22H0476-MS1)			Prepared: 08/11/22 12:00 Analyzed: 08/13/22 01:45									**A-01**
QC Source Sample: Non-SDG (A2H0414-15)												
5035A/8260D												
Acetone	36400	9100	18200	ug/kg dry	50	36300	ND	100	36-164%	---	---	Q-54b
Acrylonitrile	19600	910	1820	ug/kg dry	50	18200	ND	108	65-134%	---	---	
Benzene	20400	91.0	182	ug/kg dry	50	18200	ND	112	77-121%	---	---	
Bromobenzene	19500	227	455	ug/kg dry	50	18200	ND	107	78-121%	---	---	
Bromochloromethane	21600	455	910	ug/kg dry	50	18200	ND	119	78-125%	---	---	
Bromodichloromethane	21300	455	910	ug/kg dry	50	18200	ND	117	75-127%	---	---	
Bromoform	20200	910	1820	ug/kg dry	50	18200	ND	111	67-132%	---	---	
Bromomethane	26000	9100	9100	ug/kg dry	50	18200	ND	143	53-143%	---	---	Q-54a
2-Butanone (MEK)	26200	4550	9100	ug/kg dry	50	36300	ND	72	51-148%	---	---	
n-Butylbenzene	17700	455	910	ug/kg dry	50	18200	ND	97	70-128%	---	---	
sec-Butylbenzene	19200	455	910	ug/kg dry	50	18200	ND	106	73-126%	---	---	
tert-Butylbenzene	17500	455	910	ug/kg dry	50	18200	ND	96	73-125%	---	---	
Carbon disulfide	20100	4550	9100	ug/kg dry	50	18200	ND	110	63-132%	---	---	
Carbon tetrachloride	25900	455	910	ug/kg dry	50	18200	ND	**143**	**70-135%**	---	---	Q-01
Chlorobenzene	20000	227	455	ug/kg dry	50	18200	ND	110	79-120%	---	---	
Chloroethane	32800	4550	9100	ug/kg dry	50	18200	ND	**180**	**59-139%**	---	---	Q-54a
Chloroform	21000	455	910	ug/kg dry	50	18200	ND	116	78-123%	---	---	

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0476 - EPA 5035A							**Soil**					
Matrix Spike (22H0476-MS1)			Prepared: 08/11/22 12:00		Analyzed: 08/13/22 01:45							**A-01**
QC Source Sample: Non-SDG (A2H0414-15)												
Chloromethane	20700	2270	4550	ug/kg dry	50	18200	ND	114	50-136%	---	---	
2-Chlorotoluene	19500	455	910	ug/kg dry	50	18200	ND	107	75-122%	---	---	
4-Chlorotoluene	18100	455	910	ug/kg dry	50	18200	ND	99	72-124%	---	---	
Dibromochloromethane	19800	910	1820	ug/kg dry	50	18200	ND	109	74-126%	---	---	
1,2-Dibromo-3-chloropropane	16200	2270	4550	ug/kg dry	50	18200	ND	89	61-132%	---	---	
1,2-Dibromoethane (EDB)	20000	455	910	ug/kg dry	50	18200	ND	110	78-122%	---	---	
Dibromomethane	21500	455	910	ug/kg dry	50	18200	ND	118	78-125%	---	---	
1,2-Dichlorobenzene	19000	227	455	ug/kg dry	50	18200	ND	104	78-121%	---	---	
1,3-Dichlorobenzene	19500	227	455	ug/kg dry	50	18200	ND	107	77-121%	---	---	
1,4-Dichlorobenzene	19300	227	455	ug/kg dry	50	18200	ND	106	75-120%	---	---	
Dichlorodifluoromethane	20800	910	1820	ug/kg dry	50	18200	ND	115	29-149%	---	---	
1,1-Dichloroethane	21000	227	455	ug/kg dry	50	18200	ND	115	76-125%	---	---	
1,2-Dichloroethane (EDC)	21600	227	455	ug/kg dry	50	18200	ND	119	73-128%	---	---	
1,1-Dichloroethene	21200	227	455	ug/kg dry	50	18200	ND	117	70-131%	---	---	
cis-1,2-Dichloroethene	18300	227	455	ug/kg dry	50	18200	ND	101	77-123%	---	---	
trans-1,2-Dichloroethene	20000	227	455	ug/kg dry	50	18200	ND	110	74-125%	---	---	
1,2-Dichloropropane	20000	227	455	ug/kg dry	50	18200	ND	110	76-123%	---	---	
1,3-Dichloropropane	19100	455	910	ug/kg dry	50	18200	ND	105	77-121%	---	---	
2,2-Dichloropropane	19500	455	910	ug/kg dry	50	18200	ND	107	67-133%	---	---	Q-54c
1,1-Dichloropropene	20500	455	910	ug/kg dry	50	18200	ND	113	76-125%	---	---	
cis-1,3-Dichloropropene	19500	455	910	ug/kg dry	50	18200	ND	107	74-126%	---	---	
trans-1,3-Dichloropropene	20200	455	910	ug/kg dry	50	18200	ND	111	71-130%	---	---	
Ethylbenzene	19600	227	455	ug/kg dry	50	18200	ND	108	76-122%	---	---	
Hexachlorobutadiene	19300	910	1820	ug/kg dry	50	18200	ND	106	61-135%	---	---	
2-Hexanone	24900	9100	9100	ug/kg dry	50	36300	ND	68	53-145%	---	---	Q-54e
Isopropylbenzene	19000	455	910	ug/kg dry	50	18200	ND	105	68-134%	---	---	
4-Isopropyltoluene	18800	455	910	ug/kg dry	50	18200	ND	104	73-127%	---	---	
Methylene chloride	22600	4550	9100	ug/kg dry	50	18200	ND	124	70-128%	---	---	
4-Methyl-2-pentanone (MiBK)	31900	4550	9100	ug/kg dry	50	36300	ND	88	65-135%	---	---	
Methyl tert-butyl ether (MTBE)	19000	455	910	ug/kg dry	50	18200	ND	104	73-125%	---	---	
Naphthalene	12900	910	1820	ug/kg dry	50	18200	ND	71	62-129%	---	---	Q-54d
n-Propylbenzene	19200	227	455	ug/kg dry	50	18200	ND	105	73-125%	---	---	
Styrene	18200	455	910	ug/kg dry	50	18200	ND	100	76-124%	---	---	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0476 - EPA 5035A							**Soil**					
Matrix Spike (22H0476-MS1)			Prepared: 08/11/22 12:00 Analyzed: 08/13/22 01:45									**A-01**
QC Source Sample: Non-SDG (A2H0414-15)												
1,1,1,2-Tetrachloroethane	22300	227	455	ug/kg dry	50	18200	ND	123	78-125%	---	---	
1,1,2,2-Tetrachloroethane	19000	455	910	ug/kg dry	50	18200	ND	105	70-124%	---	---	
Tetrachloroethene (PCE)	22100	227	455	ug/kg dry	50	18200	ND	122	73-128%	---	---	
Toluene	18900	455	910	ug/kg dry	50	18200	ND	104	77-121%	---	---	
1,2,3-Trichlorobenzene	16600	2270	4550	ug/kg dry	50	18200	ND	92	66-130%	---	---	
1,2,4-Trichlorobenzene	17200	2270	4550	ug/kg dry	50	18200	ND	95	67-129%	---	---	
1,1,1-Trichloroethane	21900	227	455	ug/kg dry	50	18200	ND	121	73-130%	---	---	
1,1,2-Trichloroethane	19800	227	455	ug/kg dry	50	18200	ND	109	78-121%	---	---	
Trichloroethene (TCE)	21500	227	455	ug/kg dry	50	18200	ND	119	77-123%	---	---	
Trichlorofluoromethane	140000	910	1820	ug/kg dry	50	18200	ND	**773**	**62-140%**	---	---	Q-01
1,2,3-Trichloropropane	19200	455	910	ug/kg dry	50	18200	ND	106	73-125%	---	---	
1,2,4-Trimethylbenzene	19500	455	910	ug/kg dry	50	18200	ND	107	75-123%	---	---	
1,3,5-Trimethylbenzene	20000	455	910	ug/kg dry	50	18200	ND	110	73-124%	---	---	
Vinyl chloride	23200	227	455	ug/kg dry	50	18200	ND	128	56-135%	---	---	
m,p-Xylene	39400	455	910	ug/kg dry	50	36300	ND	108	77-124%	---	---	
o-Xylene	17800	227	455	ug/kg dry	50	18200	ND	98	77-123%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 103 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*99 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*96 %*		*79-120 %*			*"*				

Apex Laboratories

Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0946 - EPA 5035A							**Soil**					
Blank (22H0946-BLK1)			Prepared: 08/26/22 10:08 Analyzed: 08/26/22 14:40									
5035A/8260D SIM												
Benzene	ND	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	
Toluene	**2.96**	1.67	3.33	ug/kg wet	100	---	---	---	---	---	---	B-02, Ja
Ethylbenzene	ND	1.67	3.33	ug/kg wet	100	---	---	---	---	---	---	
m,p-Xylene	ND	3.33	6.67	ug/kg wet	100	---	---	---	---	---	---	
o-Xylene	ND	1.67	3.33	ug/kg wet	100	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	3.33	6.67	ug/kg wet	100	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	3.33	6.67	ug/kg wet	100	---	---	---	---	---	---	
Chloroform	ND	3.33	6.67	ug/kg wet	100	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	1.67	3.33	ug/kg wet	100	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	
1,1-Dichloroethene	ND	1.33	1.33	ug/kg wet	100	---	---	---	---	---	---	Q-30
cis-1,2-Dichloroethene	ND	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	
1,2-Dichloropropane	ND	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	
Tetrachloroethene (PCE)	**13.4**	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	B
1,1,2,2-Tetrachloroethane	ND	1.67	3.33	ug/kg wet	100	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.667	1.33	ug/kg wet	100	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	1.67	3.33	ug/kg wet	100	---	---	---	---	---	---	
Vinyl chloride	ND	3.33	6.67	ug/kg wet	100	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	1.67	3.33	ug/kg wet	100	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 100 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*101 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*103 %*		*79-120 %*				*"*			
LCS (22H0946-BS1)			Prepared: 08/26/22 10:08 Analyzed: 08/26/22 11:56									
5035A/8260D SIM												
Benzene	19.7	1.00	2.00	ug/kg wet	100	20.0	---	99	80-120%	---	---	
Toluene	21.3	2.50	5.00	ug/kg wet	100	20.0	---	107	80-120%	---	---	B-02

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Philip Nerenberg, Lab Director

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0946 - EPA 5035A							**Soil**					
LCS (22H0946-BS1)			Prepared: 08/26/22 10:08 Analyzed: 08/26/22 11:56									
Ethylbenzene	20.4	2.50	5.00	ug/kg wet	100	20.0	---	102	80-120%	---	---	
m,p-Xylene	40.9	5.00	10.0	ug/kg wet	100	40.0	---	102	80-120%	---	---	
o-Xylene	20.3	2.50	5.00	ug/kg wet	100	20.0	---	101	80-120%	---	---	
1,2,4-Trimethylbenzene	19.1	5.00	10.0	ug/kg wet	100	20.0	---	95	80-120%	---	---	
1,3,5-Trimethylbenzene	20.4	5.00	10.0	ug/kg wet	100	20.0	---	102	80-120%	---	---	
Chloroform	17.5	5.00	10.0	ug/kg wet	100	20.0	---	88	80-120%	---	---	
1,2-Dibromo-3-chloropropane	16.0	2.50	5.00	ug/kg wet	100	20.0	---	80	80-120%	---	---	
1,2-Dibromoethane (EDB)	19.9	1.00	2.00	ug/kg wet	100	20.0	---	100	80-120%	---	---	
1,1-Dichloroethane	20.2	1.00	2.00	ug/kg wet	100	20.0	---	101	80-120%	---	---	
1,2-Dichloroethane (EDC)	19.5	1.00	2.00	ug/kg wet	100	20.0	---	98	80-120%	---	---	
1,1-Dichloroethene	13.5	2.00	2.00	ug/kg wet	100	20.0	---	**67**	**80-120%**	---	---	Q-30
cis-1,2-Dichloroethene	21.2	1.00	2.00	ug/kg wet	100	20.0	---	106	80-120%	---	---	
trans-1,2-Dichloroethene	20.9	1.00	2.00	ug/kg wet	100	20.0	---	105	80-120%	---	---	
1,2-Dichloropropane	20.8	1.00	2.00	ug/kg wet	100	20.0	---	104	80-120%	---	---	
cis-1,3-Dichloropropene	20.5	1.00	2.00	ug/kg wet	100	20.0	---	103	80-120%	---	---	
trans-1,3-Dichloropropene	21.2	1.00	2.00	ug/kg wet	100	20.0	---	106	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	20.0	1.00	2.00	ug/kg wet	100	20.0	---	100	80-120%	---	---	
Tetrachloroethene (PCE)	27.2	1.00	2.00	ug/kg wet	100	20.0	---	**136**	**80-120%**	---	---	B, Q-56
1,1,2,2-Tetrachloroethane	17.6	2.50	5.00	ug/kg wet	100	20.0	---	88	80-120%	---	---	
Trichloroethene (TCE)	20.0	1.00	2.00	ug/kg wet	100	20.0	---	100	80-120%	---	---	
1,2,3-Trichloropropane	17.3	2.50	5.00	ug/kg wet	100	20.0	---	87	80-120%	---	---	
Vinyl chloride	22.6	5.00	10.0	ug/kg wet	100	20.0	---	113	80-120%	---	---	
1,1,2-Trichloroethane	18.9	2.50	5.00	ug/kg wet	100	20.0	---	94	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*	*Limits: 80-120 %*				*Dilution: 1x*				
Toluene-d8 (Surr)			*100 %*	*80-120 %*				*"*				
4-Bromofluorobenzene (Surr)			*101 %*	*79-120 %*				*"*				
Duplicate (22H0946-DUP1)			Prepared: 08/10/22 09:15 Analyzed: 08/26/22 15:34									**H-01**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-01)												
5035A/8260D SIM												
Benzene	ND	36.5	72.9	ug/kg dry	100	---	ND	---	---	---	30%	
Toluene	ND	182	182	ug/kg dry	100	---	ND	---	---	---	30%	
Ethylbenzene	ND	91.1	182	ug/kg dry	100	---	ND	---	---	---	30%	
m,p-Xylene	ND	182	365	ug/kg dry	100	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0946 - EPA 5035A							**Soil**					
Duplicate (22H0946-DUP1)			Prepared: 08/10/22 09:15 Analyzed: 08/26/22 15:34									**H-01**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-01)												
o-Xylene	ND	91.1	182	ug/kg dry	100	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	182	365	ug/kg dry	100	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	182	365	ug/kg dry	100	---	ND	---	---	---	30%	
Chloroform	ND	182	365	ug/kg dry	100	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	91.1	182	ug/kg dry	100	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	36.5	72.9	ug/kg dry	100	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	36.5	72.9	ug/kg dry	100	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	36.5	72.9	ug/kg dry	100	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	72.9	72.9	ug/kg dry	100	---	ND	---	---	---	30%	Q-30
cis-1,2-Dichloroethene	ND	36.5	72.9	ug/kg dry	100	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	36.5	72.9	ug/kg dry	100	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	36.5	72.9	ug/kg dry	100	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	36.5	72.9	ug/kg dry	100	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	36.5	72.9	ug/kg dry	100	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	36.5	72.9	ug/kg dry	100	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	583	583	ug/kg dry	100	---	ND	---	---	---	30%	B-07
1,1,2,2-Tetrachloroethane	ND	91.1	182	ug/kg dry	100	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	36.5	72.9	ug/kg dry	100	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	91.1	182	ug/kg dry	100	---	ND	---	---	---	30%	
Vinyl chloride	ND	182	365	ug/kg dry	100	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	91.1	182	ug/kg dry	100	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 100 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*100 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*102 %*		*79-120 %*				*"*			
Matrix Spike (22H0946-MS1)			Prepared: 08/10/22 09:15 Analyzed: 08/26/22 16:00									**H-01**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-01)												
5035A/8260D SIM												
Benzene	862	36.5	72.9	ug/kg dry	100	729	ND	118	77-121%	---	---	
Toluene	844	91.1	182	ug/kg dry	100	729	ND	102	77-121%	---	---	B-02
Ethylbenzene	778	91.1	182	ug/kg dry	100	729	ND	107	76-122%	---	---	
m,p-Xylene	1550	182	365	ug/kg dry	100	1460	ND	106	77-124%	---	---	
o-Xylene	786	91.1	182	ug/kg dry	100	729	ND	108	77-123%	---	---	

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: [none]	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A2H0382 - 12 12 22 1538

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0946 - EPA 5035A							Soil					
Matrix Spike (22H0946-MS1)			Prepared: 08/10/22 09:15		Analyzed: 08/26/22 16:00							H-01
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-01)												
1,2,4-Trimethylbenzene	725	182	365	ug/kg dry	100	729	ND	100	75-123%	---	---	
1,3,5-Trimethylbenzene	793	182	365	ug/kg dry	100	729	ND	109	73-124%	---	---	
Chloroform	732	182	365	ug/kg dry	100	729	ND	100	78-123%	---	---	
1,2-Dibromo-3-chloropropane	751	91.1	182	ug/kg dry	100	729	ND	103	61-132%	---	---	
1,2-Dibromoethane (EDB)	801	36.5	72.9	ug/kg dry	100	729	ND	110	78-122%	---	---	
1,1-Dichloroethane	831	36.5	72.9	ug/kg dry	100	729	ND	114	76-125%	---	---	
1,2-Dichloroethane (EDC)	805	36.5	72.9	ug/kg dry	100	729	ND	110	73-128%	---	---	
1,1-Dichloroethene	549	72.9	72.9	ug/kg dry	100	729	ND	75	70-131%	---	---	Q-30
cis-1,2-Dichloroethene	826	36.5	72.9	ug/kg dry	100	729	ND	113	77-123%	---	---	
trans-1,2-Dichloroethene	844	36.5	72.9	ug/kg dry	100	729	ND	116	74-125%	---	---	
1,2-Dichloropropane	840	36.5	72.9	ug/kg dry	100	729	ND	115	76-123%	---	---	
cis-1,3-Dichloropropene	790	36.5	72.9	ug/kg dry	100	729	ND	108	74-126%	---	---	
trans-1,3-Dichloropropene	822	36.5	72.9	ug/kg dry	100	729	ND	113	71-130%	---	---	
Methyl tert-butyl ether (MTBE)	753	36.5	72.9	ug/kg dry	100	729	ND	103	73-125%	---	---	
Tetrachloroethene (PCE)	1250	36.5	72.9	ug/kg dry	100	729	ND	95	73-128%	---	---	B, Q-54
1,1,2,2-Tetrachloroethane	743	91.1	182	ug/kg dry	100	729	ND	102	70-124%	---	---	
Trichloroethene (TCE)	792	36.5	72.9	ug/kg dry	100	729	ND	109	77-123%	---	---	
1,2,3-Trichloropropane	713	91.1	182	ug/kg dry	100	729	ND	98	73-125%	---	---	
Vinyl chloride	902	182	365	ug/kg dry	100	729	ND	124	56-135%	---	---	
1,1,2-Trichloroethane	773	91.1	182	ug/kg dry	100	729	ND	106	78-121%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 101 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*100 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*101 %*		*79-120 %*			*"*				

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0777 - EPA 3546							**Sediment**					
Blank (22H0777-BLK1)			Prepared: 08/22/22 16:07		Analyzed: 08/23/22 09:31							
EPA 8270E												
Acenaphthene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Acenaphthylene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Anthracene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	1.87	3.75	ug/kg wet	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	1.87	3.75	ug/kg wet	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	1.87	3.75	ug/kg wet	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Chrysene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Fluoranthene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Fluorene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	2.50	5.00	ug/kg wet	1	---	---	---	---	---	---	
2-Methylnaphthalene	ND	2.50	5.00	ug/kg wet	1	---	---	---	---	---	---	
Naphthalene	ND	2.50	5.00	ug/kg wet	1	---	---	---	---	---	---	
Phenanthrene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Pyrene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Carbazole	ND	1.87	3.75	ug/kg wet	1	---	---	---	---	---	---	
Dibenzofuran	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
2-Chlorophenol	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
4-Chloro-3-methylphenol	ND	12.5	25.0	ug/kg wet	1	---	---	---	---	---	---	
2,4-Dichlorophenol	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
2,4-Dimethylphenol	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrophenol	ND	31.2	62.5	ug/kg wet	1	---	---	---	---	---	---	
4,6-Dinitro-2-methylphenol	ND	31.2	62.5	ug/kg wet	1	---	---	---	---	---	---	
2-Methylphenol	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
3+4-Methylphenol(s)	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
2-Nitrophenol	ND	12.5	25.0	ug/kg wet	1	---	---	---	---	---	---	
4-Nitrophenol	ND	12.5	25.0	ug/kg wet	1	---	---	---	---	---	---	
Pentachlorophenol (PCP)	ND	12.5	25.0	ug/kg wet	1	---	---	---	---	---	---	
Phenol	ND	2.50	5.00	ug/kg wet	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0777 - EPA 3546							**Sediment**					
Blank (22H0777-BLK1)			Prepared: 08/22/22 16:07 Analyzed: 08/23/22 09:31									
2,3,5,6-Tetrachlorophenol	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
Nitrobenzene	ND	12.5	25.0	ug/kg wet	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	18.7	37.5	ug/kg wet	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
Diethylphthalate	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
Dimethylphthalate	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	10.0	12.5	ug/kg wet	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
Hexachlorocyclopentadiene	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
Hexachloroethane	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
2-Chloronaphthalene	ND	1.25	2.50	ug/kg wet	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
4-Bromophenyl phenyl ether	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
4-Chlorophenyl phenyl ether	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
Aniline	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
4-Chloroaniline	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
2-Nitroaniline	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
3-Nitroaniline	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
4-Nitroaniline	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	12.5	25.0	ug/kg wet	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	12.5	25.0	ug/kg wet	1	---	---	---	---	---	---	
Benzoic acid	ND	157	312	ug/kg wet	1	---	---	---	---	---	---	
Benzyl alcohol	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
Isophorone	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	

Apex Laboratories

Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0777 - EPA 3546							**Sediment**					
Blank (22H0777-BLK1)			Prepared: 08/22/22 16:07 Analyzed: 08/23/22 09:31									
Azobenzene (1,2-DPH)	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	31.2	62.5	ug/kg wet	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	31.2	62.5	ug/kg wet	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	31.2	62.5	ug/kg wet	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	31.2	62.5	ug/kg wet	1	---	---	---	---	---	---	
Pyridine	ND	6.25	12.5	ug/kg wet	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	3.12	6.25	ug/kg wet	1	---	---	---	---	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 86 %*	*Limits: 37-122 %*			*Dilution: 1x*					
2-Fluorobiphenyl (Surr)			*76 %*	*44-120 %*			*"*					
Phenol-d6 (Surr)			*68 %*	*33-122 %*			*"*					
p-Terphenyl-d14 (Surr)			*87 %*	*54-127 %*			*"*					
2-Fluorophenol (Surr)			*72 %*	*35-120 %*			*"*					
2,4,6-Tribromophenol (Surr)			*82 %*	*39-132 %*			*"*					
LCS (22H0777-BS1)			Prepared: 08/22/22 16:07 Analyzed: 08/23/22 10:05									**Q-18**
EPA 8270E												
Acenaphthene	502	5.32	10.7	ug/kg wet	4	533	---	94	40-123%	---	---	
Acenaphthylene	509	5.32	10.7	ug/kg wet	4	533	---	95	32-132%	---	---	
Anthracene	526	5.32	10.7	ug/kg wet	4	533	---	99	47-123%	---	---	
Benz(a)anthracene	521	5.32	10.7	ug/kg wet	4	533	---	98	49-126%	---	---	
Benzo(a)pyrene	553	8.00	16.0	ug/kg wet	4	533	---	104	45-129%	---	---	
Benzo(b)fluoranthene	546	8.00	16.0	ug/kg wet	4	533	---	102	45-132%	---	---	
Benzo(k)fluoranthene	531	8.00	16.0	ug/kg wet	4	533	---	100	47-132%	---	---	
Benzo(g,h,i)perylene	544	5.32	10.7	ug/kg wet	4	533	---	102	43-134%	---	---	
Chrysene	522	5.32	10.7	ug/kg wet	4	533	---	98	50-124%	---	---	
Dibenz(a,h)anthracene	524	5.32	10.7	ug/kg wet	4	533	---	98	45-134%	---	---	
Fluoranthene	521	5.32	10.7	ug/kg wet	4	533	---	98	50-127%	---	---	
Fluorene	486	5.32	10.7	ug/kg wet	4	533	---	91	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	535	5.32	10.7	ug/kg wet	4	533	---	100	45-133%	---	---	
1-Methylnaphthalene	501	10.7	21.3	ug/kg wet	4	533	---	94	40-120%	---	---	
2-Methylnaphthalene	517	10.7	21.3	ug/kg wet	4	533	---	97	38-122%	---	---	

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Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0777 - EPA 3546							**Sediment**					
LCS (22H0777-BS1)			Prepared: 08/22/22 16:07		Analyzed: 08/23/22 10:05							**Q-18**
Naphthalene	486	10.7	21.3	ug/kg wet	4	533	---	91	35-123%	---	---	
Phenanthrene	498	5.32	10.7	ug/kg wet	4	533	---	93	50-121%	---	---	
Pyrene	522	5.32	10.7	ug/kg wet	4	533	---	98	47-127%	---	---	
Carbazole	548	8.00	16.0	ug/kg wet	4	533	---	103	50-123%	---	---	
Dibenzofuran	500	5.32	10.7	ug/kg wet	4	533	---	94	44-120%	---	---	
2-Chlorophenol	490	26.7	53.2	ug/kg wet	4	533	---	92	34-121%	---	---	
4-Chloro-3-methylphenol	539	53.2	107	ug/kg wet	4	533	---	101	45-122%	---	---	
2,4-Dichlorophenol	487	26.7	53.2	ug/kg wet	4	533	---	91	40-122%	---	---	
2,4-Dimethylphenol	547	26.7	53.2	ug/kg wet	4	533	---	103	30-127%	---	---	
2,4-Dinitrophenol	489	133	267	ug/kg wet	4	533	---	92	10-137%	---	---	
4,6-Dinitro-2-methylphenol	491	133	267	ug/kg wet	4	533	---	92	29-132%	---	---	
2-Methylphenol	514	13.3	26.7	ug/kg wet	4	533	---	96	32-122%	---	---	
3+4-Methylphenol(s)	544	13.3	26.7	ug/kg wet	4	533	---	102	34-120%	---	---	
2-Nitrophenol	579	53.2	107	ug/kg wet	4	533	---	108	36-123%	---	---	Q-41
4-Nitrophenol	563	53.2	107	ug/kg wet	4	533	---	106	30-132%	---	---	
Pentachlorophenol (PCP)	468	53.2	107	ug/kg wet	4	533	---	88	25-133%	---	---	
Phenol	496	10.7	21.3	ug/kg wet	4	533	---	93	34-121%	---	---	
2,3,4,6-Tetrachlorophenol	504	26.7	53.2	ug/kg wet	4	533	---	94	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	503	26.7	53.2	ug/kg wet	4	533	---	94	40-120%	---	---	
2,4,5-Trichlorophenol	493	26.7	53.2	ug/kg wet	4	533	---	93	41-124%	---	---	
Nitrobenzene	515	53.2	107	ug/kg wet	4	533	---	97	34-122%	---	---	
2,4,6-Trichlorophenol	483	26.7	53.2	ug/kg wet	4	533	---	91	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	554	80.0	160	ug/kg wet	4	533	---	104	51-133%	---	---	
Butyl benzyl phthalate	544	26.7	53.2	ug/kg wet	4	533	---	102	48-132%	---	---	
Diethylphthalate	494	26.7	53.2	ug/kg wet	4	533	---	93	50-124%	---	---	
Dimethylphthalate	483	26.7	53.2	ug/kg wet	4	533	---	91	48-124%	---	---	
Di-n-butylphthalate	572	26.7	53.2	ug/kg wet	4	533	---	107	51-128%	---	---	
Di-n-octyl phthalate	582	42.8	53.2	ug/kg wet	4	533	---	109	45-140%	---	---	
N-Nitrosodimethylamine	420	13.3	26.7	ug/kg wet	4	533	---	79	23-120%	---	---	
N-Nitroso-di-n-propylamine	518	13.3	26.7	ug/kg wet	4	533	---	97	36-120%	---	---	
N-Nitrosodiphenylamine	527	13.3	26.7	ug/kg wet	4	533	---	99	38-127%	---	---	
Bis(2-Chloroethoxy) methane	515	13.3	26.7	ug/kg wet	4	533	---	97	36-121%	---	---	
Bis(2-Chloroethyl) ether	418	13.3	26.7	ug/kg wet	4	533	---	78	31-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	542	13.3	26.7	ug/kg wet	4	533	---	102	39-120%	---	---	

Apex Laboratories

Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0777 - EPA 3546							**Sediment**					
LCS (22H0777-BS1)			Prepared: 08/22/22 16:07		Analyzed: 08/23/22 10:05							**Q-18**
Hexachlorobenzene	468	5.32	10.7	ug/kg wet	4	533	---	88	45-122%	---	---	
Hexachlorobutadiene	437	13.3	26.7	ug/kg wet	4	533	---	82	32-123%	---	---	
Hexachlorocyclopentadiene	431	26.7	53.2	ug/kg wet	4	533	---	81	10-140%	---	---	
Hexachloroethane	444	13.3	26.7	ug/kg wet	4	533	---	83	28-120%	---	---	
2-Chloronaphthalene	514	5.32	10.7	ug/kg wet	4	533	---	96	41-120%	---	---	
1,2,4-Trichlorobenzene	467	13.3	26.7	ug/kg wet	4	533	---	88	34-120%	---	---	
4-Bromophenyl phenyl ether	492	13.3	26.7	ug/kg wet	4	533	---	92	46-124%	---	---	
4-Chlorophenyl phenyl ether	485	13.3	26.7	ug/kg wet	4	533	---	91	45-121%	---	---	
Aniline	343	26.7	53.2	ug/kg wet	4	533	---	64	10-120%	---	---	Q-36
4-Chloroaniline	351	13.3	26.7	ug/kg wet	4	533	---	66	17-120%	---	---	
2-Nitroaniline	560	107	213	ug/kg wet	4	533	---	105	44-127%	---	---	
3-Nitroaniline	529	107	213	ug/kg wet	4	533	---	99	33-120%	---	---	
4-Nitroaniline	564	107	213	ug/kg wet	4	533	---	106	51-125%	---	---	
2,4-Dinitrotoluene	551	53.2	107	ug/kg wet	4	533	---	103	48-126%	---	---	
2,6-Dinitrotoluene	512	53.2	107	ug/kg wet	4	533	---	96	46-124%	---	---	
Benzoic acid	974	668	1330	ug/kg wet	4	1070	---	91	10-140%	---	---	Ja
Benzyl alcohol	476	26.7	53.2	ug/kg wet	4	533	---	89	29-122%	---	---	
Isophorone	505	13.3	26.7	ug/kg wet	4	533	---	95	30-122%	---	---	
Azobenzene (1,2-DPH)	566	13.3	26.7	ug/kg wet	4	533	---	106	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	549	133	267	ug/kg wet	4	533	---	103	61-121%	---	---	
3,3'-Dichlorobenzidine	3010	107	213	ug/kg wet	4	1070	---	**282**	**22-121%**	---	---	Q-29
1,2-Dinitrobenzene	523	133	267	ug/kg wet	4	533	---	98	44-120%	---	---	
1,3-Dinitrobenzene	532	133	267	ug/kg wet	4	533	---	100	43-127%	---	---	
1,4-Dinitrobenzene	515	133	267	ug/kg wet	4	533	---	97	37-132%	---	---	
Pyridine	337	26.7	53.2	ug/kg wet	4	533	---	63	10-120%	---	---	
1,2-Dichlorobenzene	452	13.3	26.7	ug/kg wet	4	533	---	85	33-120%	---	---	
1,3-Dichlorobenzene	426	13.3	26.7	ug/kg wet	4	533	---	80	30-120%	---	---	
1,4-Dichlorobenzene	444	13.3	26.7	ug/kg wet	4	533	---	83	31-120%	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 94 %*		*Limits: 37-122 %*			*Dilution: 4x*				
2-Fluorobiphenyl (Surr)			*90 %*		*44-120 %*			*"*				
Phenol-d6 (Surr)			*90 %*		*33-122 %*			*"*				
p-Terphenyl-d14 (Surr)			*101 %*		*54-127 %*			*"*				
2-Fluorophenol (Surr)			*82 %*		*35-120 %*			*"*				
2,4,6-Tribromophenol (Surr)			*90 %*		*39-132 %*			*"*				

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0777 - EPA 3546							**Sediment**					
Duplicate (22H0777-DUP1)				Prepared: 08/22/22 16:07 Analyzed: 08/23/22 12:21								**PRO**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
EPA 8270E												
Acenaphthene	ND	141	284	ug/kg dry	40	---	ND	---	---	---	30%	
Acenaphthylene	ND	141	284	ug/kg dry	40	---	ND	---	---	---	30%	
Anthracene	**254**	141	284	ug/kg dry	40	---	211	---	---	19	30%	Ja
Benz(a)anthracene	ND	141	284	ug/kg dry	40	---	ND	---	---	---	30%	
Benzo(a)pyrene	ND	212	425	ug/kg dry	40	---	ND	---	---	---	30%	
Benzo(b)fluoranthene	ND	212	425	ug/kg dry	40	---	ND	---	---	---	30%	
Benzo(k)fluoranthene	ND	425	425	ug/kg dry	40	---	ND	---	---	---	30%	
Benzo(g,h,i)perylene	ND	141	284	ug/kg dry	40	---	ND	---	---	---	30%	
Chrysene	ND	141	284	ug/kg dry	40	---	ND	---	---	---	30%	
Dibenz(a,h)anthracene	ND	141	284	ug/kg dry	40	---	ND	---	---	---	30%	
Fluoranthene	**191**	141	284	ug/kg dry	40	---	179	---	---	6	30%	Ja
Fluorene	ND	141	284	ug/kg dry	40	---	ND	---	---	---	30%	
Indeno(1,2,3-cd)pyrene	ND	284	284	ug/kg dry	40	---	ND	---	---	---	30%	
1-Methylnaphthalene	ND	284	566	ug/kg dry	40	---	ND	---	---	---	30%	
2-Methylnaphthalene	ND	284	566	ug/kg dry	40	---	ND	---	---	---	30%	
Naphthalene	ND	284	566	ug/kg dry	40	---	ND	---	---	---	30%	
Phenanthrene	**321**	141	284	ug/kg dry	40	---	366	---	---	13	30%	
Pyrene	**178**	141	284	ug/kg dry	40	---	189	---	---	6	30%	Ja
Carbazole	ND	212	425	ug/kg dry	40	---	ND	---	---	---	30%	
Dibenzofuran	ND	141	284	ug/kg dry	40	---	ND	---	---	---	30%	
2-Chlorophenol	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
4-Chloro-3-methylphenol	ND	1410	2840	ug/kg dry	40	---	ND	---	---	---	30%	
2,4-Dichlorophenol	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
2,4-Dimethylphenol	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
2,4-Dinitrophenol	ND	3540	7080	ug/kg dry	40	---	ND	---	---	---	30%	
4,6-Dinitro-2-methylphenol	ND	3540	7080	ug/kg dry	40	---	ND	---	---	---	30%	
2-Methylphenol	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
3+4-Methylphenol(s)	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
2-Nitrophenol	ND	1410	2840	ug/kg dry	40	---	ND	---	---	---	30%	
4-Nitrophenol	ND	1410	2840	ug/kg dry	40	---	ND	---	---	---	30%	
Pentachlorophenol (PCP)	ND	2840	2840	ug/kg dry	40	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0777 - EPA 3546							**Sediment**					
Duplicate (22H0777-DUP1)			Prepared: 08/22/22 16:07		Analyzed: 08/23/22 12:21							**PRO**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
Phenol	ND	284	566	ug/kg dry	40	---	ND	---	---	---	30%	
2,3,4,6-Tetrachlorophenol	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
2,3,5,6-Tetrachlorophenol	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
2,4,5-Trichlorophenol	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
Nitrobenzene	ND	1410	2840	ug/kg dry	40	---	ND	---	---	---	30%	
2,4,6-Trichlorophenol	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
Bis(2-ethylhexyl)phthalate	**12900**	2120	4250	ug/kg dry	40	---	11800	---	---	10	30%	
Butyl benzyl phthalate	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
Diethylphthalate	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
Dimethylphthalate	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
Di-n-butylphthalate	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
Di-n-octyl phthalate	ND	1140	1410	ug/kg dry	40	---	ND	---	---	---	30%	
N-Nitrosodimethylamine	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
N-Nitroso-di-n-propylamine	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
N-Nitrosodiphenylamine	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
Bis(2-Chloroethoxy) methane	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
Bis(2-Chloroethyl) ether	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
2,2'-Oxybis(1-Chloropropane)	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
Hexachlorobenzene	ND	141	284	ug/kg dry	40	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
Hexachlorocyclopentadiene	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
Hexachloroethane	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
2-Chloronaphthalene	ND	141	284	ug/kg dry	40	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
4-Bromophenyl phenyl ether	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
4-Chlorophenyl phenyl ether	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
Aniline	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
4-Chloroaniline	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
2-Nitroaniline	ND	2840	5660	ug/kg dry	40	---	ND	---	---	---	30%	
3-Nitroaniline	ND	2840	5660	ug/kg dry	40	---	ND	---	---	---	30%	
4-Nitroaniline	ND	2840	5660	ug/kg dry	40	---	ND	---	---	---	30%	
2,4-Dinitrotoluene	ND	1410	2840	ug/kg dry	40	---	ND	---	---	---	30%	
2,6-Dinitrotoluene	ND	1410	2840	ug/kg dry	40	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0777 - EPA 3546							**Sediment**					
Duplicate (22H0777-DUP1)			Prepared: 08/22/22 16:07		Analyzed: 08/23/22 12:21							**PRO**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
Benzoic acid	ND	17700	35400	ug/kg dry	40	---	ND	---	---	---	30%	
Benzyl alcohol	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
Isophorone	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
Azobenzene (1,2-DPH)	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
Bis(2-Ethylhexyl) adipate	ND	3540	7080	ug/kg dry	40	---	ND	---	---	---	30%	
3,3'-Dichlorobenzidine	ND	2840	5660	ug/kg dry	40	---	ND	---	---	---	30%	Q-52
1,2-Dinitrobenzene	ND	3540	7080	ug/kg dry	40	---	ND	---	---	---	30%	
1,3-Dinitrobenzene	ND	3540	7080	ug/kg dry	40	---	ND	---	---	---	30%	
1,4-Dinitrobenzene	ND	3540	7080	ug/kg dry	40	---	ND	---	---	---	30%	
Pyridine	ND	708	1410	ug/kg dry	40	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	354	708	ug/kg dry	40	---	ND	---	---	---	30%	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 57 %*		*Limits: 37-122 %*		*Dilution: 40x*					S-05
2-Fluorobiphenyl (Surr)			*59 %*		*44-120 %*		*"*					S-05
Phenol-d6 (Surr)			*26 %*		*33-122 %*		*"*					S-05
p-Terphenyl-d14 (Surr)			*64 %*		*54-127 %*		*"*					S-05
2-Fluorophenol (Surr)			*17 %*		*35-120 %*		*"*					S-05
2,4,6-Tribromophenol (Surr)			*60 %*		*39-132 %*		*"*					S-05

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Philip Nerenberg, Lab Director

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0778 - EPA 3546							**Sediment**					
Blank (22H0778-BLK1)			Prepared: 08/22/22 16:11		Analyzed: 08/23/22 09:38							
EPA 8270E OPPs												
Azinphos methyl (Guthion)	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Chlorpyrifos	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Coumaphos	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Demeton O	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Demeton S	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Diazinon	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Dichlorvos	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Dimethoate	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Disulfoton	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
EPN	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Ethoprop	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Fensulfothion	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Fenthion	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Malathion	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Merphos	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Methyl parathion	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Mevinphos (Phosdrin)	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Monocrotophos	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Naled (Dibrom)	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Parathion, ethyl	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Phorate	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Ronnel (Fenchlorphos)	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Sulfotep	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Sulprofos (Bolstar)	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
TEPP	ND	90.9	182	ug/kg wet	1	---	---	---	---	---	---	
Tetrachlorvinphos (Rabon)	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Tokuthion (Prothiofos)	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Trichloronate	ND	22.7	45.5	ug/kg wet	1	---	---	---	---	---	---	
Surr: Tributyl phosphate (Surr)			*Recovery: 69 %*		*Limits: 10-136 %*			*Dilution: 1x*				
Triphenyl phosphate (Surr)			*68 %*		*34-121 %*			*"*				
LCS (22H0778-BS1)			Prepared: 08/22/22 16:11		Analyzed: 08/23/22 10:14							**Q-18**
EPA 8270E OPPs												

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0778 - EPA 3546							**Sediment**					
LCS (22H0778-BS1)			Prepared: 08/22/22 16:11		Analyzed: 08/23/22 10:14							**Q-18**
Azinphos methyl (Guthion)	268	25.0	50.0	ug/kg wet	1	400	---	67	38-156%	---	---	
Chlorpyrifos	343	25.0	50.0	ug/kg wet	1	400	---	86	47-140%	---	---	
Coumaphos	307	25.0	50.0	ug/kg wet	1	400	---	77	37-160%	---	---	
Demeton O	132	25.0	50.0	ug/kg wet	1	184	---	72	66-127%	---	---	
Demeton S	137	25.0	50.0	ug/kg wet	1	194	---	70	70-121%	---	---	
Diazinon	379	25.0	50.0	ug/kg wet	1	400	---	95	42-134%	---	---	
Dichlorvos	341	25.0	50.0	ug/kg wet	1	400	---	85	39-142%	---	---	
Dimethoate	293	25.0	50.0	ug/kg wet	1	400	---	73	16-139%	---	---	
Disulfoton	327	25.0	50.0	ug/kg wet	1	400	---	82	28-145%	---	---	
EPN	329	25.0	50.0	ug/kg wet	1	400	---	82	44-137%	---	---	
Ethoprop	357	25.0	50.0	ug/kg wet	1	400	---	89	47-128%	---	---	
Fensulfothion	352	25.0	50.0	ug/kg wet	1	400	---	88	27-147%	---	---	Q-41
Fenthion	370	25.0	50.0	ug/kg wet	1	400	---	92	44-134%	---	---	
Malathion	353	25.0	50.0	ug/kg wet	1	400	---	88	46-137%	---	---	
Merphos	292	25.0	50.0	ug/kg wet	1	400	---	73	66-131%	---	---	
Methyl parathion	300	25.0	50.0	ug/kg wet	1	400	---	75	49-138%	---	---	
Mevinphos (Phosdrin)	333	25.0	50.0	ug/kg wet	1	400	---	83	12-176%	---	---	
Monocrotophos	291	25.0	50.0	ug/kg wet	1	400	---	73	10-153%	---	---	
Naled (Dibrom)	270	25.0	50.0	ug/kg wet	1	400	---	68	10-174%	---	---	
Parathion, ethyl	330	25.0	50.0	ug/kg wet	1	400	---	82	50-139%	---	---	
Phorate	314	25.0	50.0	ug/kg wet	1	400	---	79	23-142%	---	---	
Ronnel (Fenchlorphos)	373	25.0	50.0	ug/kg wet	1	400	---	93	45-138%	---	---	
Sulfotep	372	25.0	50.0	ug/kg wet	1	400	---	93	52-126%	---	---	Q-41
Sulprofos (Bolstar)	351	25.0	50.0	ug/kg wet	1	400	---	88	48-139%	---	---	
TEPP	318	100	200	ug/kg wet	1	400	---	79	16-126%	---	---	
Tetrachlorvinphos (Rabon)	326	25.0	50.0	ug/kg wet	1	400	---	81	54-129%	---	---	
Tokuthion (Prothiofos)	343	25.0	50.0	ug/kg wet	1	400	---	86	45-136%	---	---	
Trichloronate	335	25.0	50.0	ug/kg wet	1	400	---	84	37-140%	---	---	
Surr: Tributyl phosphate (Surr)			*Recovery: 73 %*		*Limits: 10-136 %*				*Dilution: 1x*			
Triphenyl phosphate (Surr)			*73 %*		*34-121 %*				*"*			
Duplicate (22H0778-DUP1)			Prepared: 08/22/22 16:11		Analyzed: 08/23/22 11:23							**PRO, R-04**

QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)

EPA 8270E OPPs

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Tigard, OR 97223
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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0778 - EPA 3546							**Sediment**					
Duplicate (22H0778-DUP1)			Prepared: 08/22/22 16:11		Analyzed: 08/23/22 11:23							**PRO, R-04**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
Azinphos methyl (Guthion)	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Chlorpyrifos	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Coumaphos	ND	6140	6140	ug/kg dry	40	---	ND	---	---	---	30%	R-02
Demeton O	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Demeton S	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Diazinon	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Dichlorvos	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Dimethoate	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Disulfoton	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
EPN	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Ethoprop	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Fensulfothion	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Fenthion	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Malathion	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Merphos	ND	19500	19500	ug/kg dry	40	---	ND	---	---	---	30%	R-02
Methyl parathion	ND	4260	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Mevinphos (Phosdrin)	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Monocrotophos	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Naled (Dibrom)	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Parathion, ethyl	ND	5880	5880	ug/kg dry	40	---	ND	---	---	---	30%	R-02
Phorate	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Ronnel (Fenchlorphos)	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Sulfotep	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Sulprofos (Bolstar)	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
TEPP	ND	8530	17100	ug/kg dry	40	---	ND	---	---	---	30%	
Tetrachlorvinphos (Rabon)	ND	9380	9380	ug/kg dry	40	---	ND	---	---	---	30%	R-02
Tokuthion (Prothiofos)	ND	2130	4260	ug/kg dry	40	---	ND	---	---	---	30%	
Trichloronate	ND	4690	4690	ug/kg dry	40	---	ND	---	---	---	30%	R-02
Surr: Tributyl phosphate (Surr)			*Recovery: 600 %*		*Limits: 10-136 %*			*Dilution: 40x*				S-05
Triphenyl phosphate (Surr)			*310 %*		*34-121 %*			*"*				S-05

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503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by GC/MS/MS

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22I0773 - EPA 3546							**Sediment**					
Blank (22I0773-BLK1)			Prepared: 09/23/22 11:03		Analyzed: 09/26/22 11:03							
EPA 8270E OCPs												
Aldrin	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
alpha-BHC	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
beta-BHC	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
gamma-BHC (Lindane)	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
delta-BHC	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
cis-Chlordane	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
cis-Nonachlor	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
2,4'-DDD	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
2,4'-DDE	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
2,4'-DDT	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
4,4'-DDD	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
4,4'-DDE	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
4,4'-DDT	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Dieldrin	ND	0.0300	0.0300	ug/kg wet	1	---	---	---	---	---	---	
Endosulfan I	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Endosulfan II	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Endosulfan sulfate	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Endrin	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Endrin Aldehyde	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Endrin ketone	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Heptachlor	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Heptachlor epoxide	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Methoxychlor	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Mirex	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Oxychlordane	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
trans-Chlordane	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
trans-Nonachlor	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Surr: gamma-BHC-d6 (Surr)			*Recovery: 78 %*		*Limits: 50-150 %*			*Dilution: 1x*				
4,4'-DDT-d8 (Surr)			*93 %*		*50-150 %*			*"*				
LCS (22I0773-BS1)			Prepared: 09/23/22 11:03		Analyzed: 09/26/22 11:31							
EPA 8270E OCPs												

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by GC/MS/MS

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22I0773 - EPA 3546							**Sediment**					
LCS (22I0773-BS1)			Prepared: 09/23/22 11:03	Analyzed: 09/26/22 11:31								
Aldrin	2.17	0.0500	0.100	ug/kg wet	1	2.50	---	87	54-135%	---	---	
alpha-BHC	2.30	0.0500	0.100	ug/kg wet	1	2.50	---	92	58-132%	---	---	
beta-BHC	2.37	0.0500	0.100	ug/kg wet	1	2.50	---	95	63-140%	---	---	
gamma-BHC (Lindane)	2.33	0.0500	0.100	ug/kg wet	1	2.50	---	93	62-132%	---	---	
delta-BHC	2.40	0.0500	0.100	ug/kg wet	1	2.50	---	96	65-140%	---	---	
cis-Chlordane	2.26	0.0500	0.100	ug/kg wet	1	2.50	---	90	57-151%	---	---	
cis-Nonachlor	2.14	0.0500	0.100	ug/kg wet	1	2.50	---	86	68-151%	---	---	
2,4'-DDD	2.33	0.0500	0.100	ug/kg wet	1	2.50	---	93	71-125%	---	---	
2,4'-DDE	2.42	0.0500	0.100	ug/kg wet	1	2.50	---	97	61-131%	---	---	
2,4'-DDT	2.44	0.0500	0.100	ug/kg wet	1	2.50	---	98	78-133%	---	---	
4,4'-DDD	2.32	0.0500	0.100	ug/kg wet	1	2.50	---	93	71-126%	---	---	
4,4'-DDE	2.43	0.0500	0.100	ug/kg wet	1	2.50	---	97	67-124%	---	---	
4,4'-DDT	2.44	0.0500	0.100	ug/kg wet	1	2.50	---	98	75-130%	---	---	
Dieldrin	2.24	0.0300	0.0300	ug/kg wet	1	2.50	---	90	70-135%	---	---	
Endosulfan I	2.26	0.0500	0.100	ug/kg wet	1	2.50	---	90	62-148%	---	---	
Endosulfan II	2.38	0.0500	0.100	ug/kg wet	1	2.50	---	95	57-141%	---	---	
Endosulfan sulfate	2.17	0.0500	0.100	ug/kg wet	1	2.50	---	87	55-152%	---	---	
Endrin	2.17	0.0500	0.100	ug/kg wet	1	2.50	---	87	73-138%	---	---	
Endrin Aldehyde	1.54	0.0500	0.100	ug/kg wet	1	2.50	---	62	10-146%	---	---	
Endrin ketone	2.19	0.0500	0.100	ug/kg wet	1	2.50	---	87	62-146%	---	---	
Heptachlor	2.27	0.0500	0.100	ug/kg wet	1	2.50	---	91	60-154%	---	---	
Heptachlor epoxide	2.24	0.0500	0.100	ug/kg wet	1	2.50	---	90	65-140%	---	---	
Hexachlorobutadiene	1.63	0.0500	0.100	ug/kg wet	1	2.50	---	65	20-120%	---	---	
Methoxychlor	1.99	0.0500	0.100	ug/kg wet	1	2.50	---	79	73-135%	---	---	
Mirex	2.15	0.0500	0.100	ug/kg wet	1	2.50	---	86	61-149%	---	---	
Oxychlordane	2.26	0.0500	0.100	ug/kg wet	1	2.50	---	90	65-133%	---	---	
trans-Chlordane	2.34	0.0500	0.100	ug/kg wet	1	2.50	---	93	62-145%	---	---	
trans-Nonachlor	1.96	0.0500	0.100	ug/kg wet	1	2.50	---	78	59-153%	---	---	
Surr: gamma-BHC-d6 (Surr)			*Recovery: 81 %*	*Limits: 50-150 %*				*Dilution: 1x*				
4,4'-DDT-d8 (Surr)			*93 %*	*50-150 %*				*"*				
Duplicate (22I0773-DUP1)			Prepared: 09/23/22 11:03	Analyzed: 09/26/22 13:25								**H-08, PRO**
QC Source Sample: Non-SDG (A2I0266-63)												
Aldrin	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by GC/MS/MS

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22I0773 - EPA 3546							**Sediment**					
Duplicate (22I0773-DUP1)			Prepared: 09/23/22 11:03		Analyzed: 09/26/22 13:25							**H-08, PRO**
QC Source Sample: Non-SDG (A2I0266-63)												
alpha-BHC	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
beta-BHC	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
gamma-BHC (Lindane)	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
delta-BHC	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
cis-Chlordane	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
cis-Nonachlor	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
2,4'-DDD	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
2,4'-DDE	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
2,4'-DDT	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	Q-05
4,4'-DDD	**0.0538**	0.0507	0.101	ug/kg dry	1	---	0.0510	---	---	5	30%	Ja
4,4'-DDE	**0.0891**	0.0507	0.101	ug/kg dry	1	---	0.184	---	---	**69**	**30%**	Q-05, Ja
4,4'-DDT	**0.381**	0.0507	0.101	ug/kg dry	1	---	0.358	---	---	6	30%	
Dieldrin	**0.0307**	0.0304	0.0304	ug/kg dry	1	---	0.0462	---	---	**40**	**30%**	Q-05
Endosulfan I	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Endosulfan II	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Endosulfan sulfate	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Endrin	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Endrin Aldehyde	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Endrin ketone	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Heptachlor	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Heptachlor epoxide	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Methoxychlor	ND	0.101	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Mirex	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Oxychlordane	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
trans-Chlordane	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
trans-Nonachlor	ND	0.0507	0.101	ug/kg dry	1	---	ND	---	---	---	30%	
Surr: gamma-BHC-d6 (Surr)			*Recovery: 75 %*		*Limits: 50-150 %*			*Dilution: 1x*				
4,4'-DDT-d8 (Surr)			*95 %*		*50-150 %*			*"*				
Matrix Spike (22I0773-MS1)			Prepared: 09/23/22 11:03		Analyzed: 09/26/22 13:53							**H-08, PRO**
QC Source Sample: Non-SDG (A2I0266-63)												
EPA 8270E OCPs												

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by GC/MS/MS

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22I0773 - EPA 3546							**Sediment**					
Matrix Spike (22I0773-MS1)			Prepared: 09/23/22 11:03		Analyzed: 09/26/22 13:53							**H-08, PRO**
QC Source Sample: Non-SDG (A2I0266-63)												
Aldrin	1.98	0.0508	0.102	ug/kg dry	1	2.54	ND	78	54-135%	---	---	
alpha-BHC	2.20	0.0508	0.102	ug/kg dry	1	2.54	ND	87	58-132%	---	---	
beta-BHC	1.80	0.0508	0.102	ug/kg dry	1	2.54	ND	71	63-140%	---	---	
gamma-BHC (Lindane)	2.06	0.0508	0.102	ug/kg dry	1	2.54	ND	81	62-132%	---	---	
delta-BHC	1.92	0.0508	0.102	ug/kg dry	1	2.54	ND	76	65-140%	---	---	
cis-Chlordane	1.87	0.0508	0.102	ug/kg dry	1	2.54	ND	74	57-151%	---	---	
cis-Nonachlor	1.86	0.0508	0.102	ug/kg dry	1	2.54	ND	73	68-151%	---	---	
2,4'-DDD	2.14	0.0508	0.102	ug/kg dry	1	2.54	ND	84	71-125%	---	---	
2,4'-DDE	2.22	0.0508	0.102	ug/kg dry	1	2.54	ND	87	61-131%	---	---	
2,4'-DDT	2.34	0.0508	0.102	ug/kg dry	1	2.54	ND	92	78-133%	---	---	
4,4'-DDD	2.25	0.0508	0.102	ug/kg dry	1	2.54	0.0510	86	71-126%	---	---	
4,4'-DDE	2.29	0.0508	0.102	ug/kg dry	1	2.54	0.184	83	67-124%	---	---	
4,4'-DDT	2.67	0.0508	0.102	ug/kg dry	1	2.54	0.358	91	75-130%	---	---	
Dieldrin	1.84	0.0305	0.0305	ug/kg dry	1	2.54	0.0462	70	70-135%	---	---	
Endosulfan I	1.87	0.0508	0.102	ug/kg dry	1	2.54	ND	73	62-148%	---	---	
Endosulfan II	2.16	0.0508	0.102	ug/kg dry	1	2.54	ND	85	57-141%	---	---	
Endosulfan sulfate	2.09	0.0508	0.102	ug/kg dry	1	2.54	ND	82	55-152%	---	---	
Endrin	1.82	0.0508	0.102	ug/kg dry	1	2.54	ND	**71**	**73-138%**	---	---	Q-01
Endrin Aldehyde	1.53	0.0508	0.102	ug/kg dry	1	2.54	ND	60	10-146%	---	---	
Endrin ketone	2.14	0.0508	0.102	ug/kg dry	1	2.54	ND	84	62-146%	---	---	
Heptachlor	2.22	0.0508	0.102	ug/kg dry	1	2.54	ND	87	60-154%	---	---	
Heptachlor epoxide	1.90	0.0508	0.102	ug/kg dry	1	2.54	ND	75	65-140%	---	---	
Hexachlorobutadiene	1.92	0.0508	0.102	ug/kg dry	1	2.54	ND	76	20-120%	---	---	
Methoxychlor	2.21	0.0508	0.102	ug/kg dry	1	2.54	ND	87	73-135%	---	---	
Mirex	2.07	0.0508	0.102	ug/kg dry	1	2.54	ND	81	61-149%	---	---	
Oxychlordane	1.84	0.0508	0.102	ug/kg dry	1	2.54	ND	72	65-133%	---	---	
trans-Chlordane	1.88	0.0508	0.102	ug/kg dry	1	2.54	ND	74	62-145%	---	---	
trans-Nonachlor	1.71	0.0508	0.102	ug/kg dry	1	2.54	ND	67	59-153%	---	---	
Surr: gamma-BHC-d6 (Surr)			*Recovery: 75 %*		*Limits: 50-150 %*				*Dilution: 1x*			
4,4'-DDT-d8 (Surr)			*95 %*		*50-150 %*				*"*			

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: [none]	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A2H0382 - 12 12 22 1538

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0793 - EPA 3051A							Sediment					
Blank (22H0793-BLK1)			Prepared: 08/23/22 09:46 Analyzed: 08/23/22 20:20									
EPA 6020B												
Antimony	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Arsenic	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Barium	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Beryllium	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Cadmium	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Chromium	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Copper	ND	0.481	0.962	mg/kg wet	5	---	---	---	---	---	---	
Lead	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Manganese	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Mercury	ND	0.0192	0.0385	mg/kg wet	5	---	---	---	---	---	---	
Nickel	ND	0.481	0.962	mg/kg wet	5	---	---	---	---	---	---	
Selenium	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Silver	ND	0.0481	0.0962	mg/kg wet	5	---	---	---	---	---	---	
Thallium	ND	0.240	0.481	mg/kg wet	5	---	---	---	---	---	---	
Zinc	ND	0.962	1.92	mg/kg wet	5	---	---	---	---	---	---	
LCS (22H0793-BS1)			Prepared: 08/23/22 09:46 Analyzed: 08/23/22 20:26									
EPA 6020B												
Antimony	12.9	0.250	0.500	mg/kg wet	5	12.5	---	103	80-120%	---	---	
Arsenic	23.4	0.250	0.500	mg/kg wet	5	25.0	---	94	80-120%	---	---	
Barium	25.2	0.250	0.500	mg/kg wet	5	25.0	---	101	80-120%	---	---	
Beryllium	12.0	0.0500	0.100	mg/kg wet	5	12.5	---	96	80-120%	---	---	
Cadmium	24.4	0.0500	0.100	mg/kg wet	5	25.0	---	98	80-120%	---	---	
Chromium	24.3	0.250	0.500	mg/kg wet	5	25.0	---	97	80-120%	---	---	
Copper	24.9	0.500	1.00	mg/kg wet	5	25.0	---	100	80-120%	---	---	
Lead	23.1	0.0500	0.100	mg/kg wet	5	25.0	---	92	80-120%	---	---	
Manganese	24.1	0.250	0.500	mg/kg wet	5	25.0	---	96	80-120%	---	---	
Mercury	0.456	0.0200	0.0400	mg/kg wet	5	0.500	---	91	80-120%	---	---	
Nickel	24.7	0.500	1.00	mg/kg wet	5	25.0	---	99	80-120%	---	---	
Selenium	12.9	0.250	0.500	mg/kg wet	5	12.5	---	103	80-120%	---	---	
Silver	11.7	0.0500	0.100	mg/kg wet	5	12.5	---	93	80-120%	---	---	
Thallium	12.2	0.250	0.500	mg/kg wet	5	12.5	---	98	80-120%	---	---	
Zinc	24.5	1.00	2.00	mg/kg wet	5	25.0	---	98	80-120%	---	---	

Apex Laboratories

Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0793 - EPA 3051A							**Sediment**					
Duplicate (22H0793-DUP1)			Prepared: 08/23/22 09:46	Analyzed: 08/23/22 20:36								
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
EPA 6020B												
Antimony	**2.71**	0.283	0.565	mg/kg dry	5	---	2.62	---	---	3	20%	PRO
Arsenic	**4.05**	0.283	0.565	mg/kg dry	5	---	4.21	---	---	4	20%	PRO
Barium	**335**	0.283	0.565	mg/kg dry	5	---	339	---	---	1	20%	PRO
Beryllium	**0.328**	0.0565	0.113	mg/kg dry	5	---	0.327	---	---	0.3	20%	PRO
Cadmium	**2.91**	0.0565	0.113	mg/kg dry	5	---	2.97	---	---	2	20%	PRO
Chromium	**69.3**	0.283	0.565	mg/kg dry	5	---	70.1	---	---	1	20%	PRO
Copper	**254**	0.565	1.13	mg/kg dry	5	---	259	---	---	2	20%	PRO
Lead	**27.6**	0.0565	0.113	mg/kg dry	5	---	27.1	---	---	2	20%	PRO
Manganese	**693**	0.283	0.565	mg/kg dry	5	---	711	---	---	3	20%	PRO
Mercury	**0.456**	0.0226	0.0452	mg/kg dry	5	---	0.485	---	---	6	20%	PRO
Nickel	**36.6**	0.565	1.13	mg/kg dry	5	---	37.8	---	---	3	20%	PRO
Selenium	**2.68**	0.283	0.565	mg/kg dry	5	---	2.46	---	---	8	20%	PRO
Silver	**2.20**	0.0565	0.113	mg/kg dry	5	---	2.27	---	---	3	20%	PRO
Thallium	ND	0.283	0.565	mg/kg dry	5	---	ND	---	---	---	20%	PRO
Zinc	**803**	1.13	2.26	mg/kg dry	5	---	817	---	---	2	20%	PRO
Matrix Spike (22H0793-MS1)			Prepared: 08/23/22 09:46	Analyzed: 08/23/22 20:56								
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
EPA 6020B												
Antimony	14.4	0.281	0.563	mg/kg dry	5	14.1	2.62	84	75-125%	---	---	PRO
Arsenic	29.4	0.281	0.563	mg/kg dry	5	28.1	4.21	90	75-125%	---	---	PRO
Barium	357	0.281	0.563	mg/kg dry	5	28.1	339	**64**	**75-125%**	---	---	PRO,Q-03
Beryllium	14.4	0.0563	0.113	mg/kg dry	5	14.1	0.327	100	75-125%	---	---	PRO
Cadmium	30.3	0.0563	0.113	mg/kg dry	5	28.1	2.97	97	75-125%	---	---	PRO
Chromium	94.8	0.281	0.563	mg/kg dry	5	28.1	70.1	88	75-125%	---	---	PRO
Copper	274	0.563	1.13	mg/kg dry	5	28.1	259	**52**	**75-125%**	---	---	PRO,Q-03
Lead	53.2	0.0563	0.113	mg/kg dry	5	28.1	27.1	93	75-125%	---	---	PRO
Manganese	706	0.281	0.563	mg/kg dry	5	28.1	711	**-16**	**75-125%**	---	---	PRO,Q-03
Mercury	0.997	0.0225	0.0450	mg/kg dry	5	0.563	0.485	91	75-125%	---	---	PRO
Nickel	63.2	0.563	1.13	mg/kg dry	5	28.1	37.8	90	75-125%	---	---	PRO
Selenium	17.3	0.281	0.563	mg/kg dry	5	14.1	2.46	105	75-125%	---	---	PRO

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0793 - EPA 3051A							**Sediment**					
Matrix Spike (22H0793-MS1)			Prepared: 08/23/22 09:46		Analyzed: 08/23/22 20:56							
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
Silver	15.1	0.0563	0.113	mg/kg dry	5	14.1	2.27	91	75-125%	---	---	PRO
Thallium	13.9	0.281	0.563	mg/kg dry	5	14.1	ND	99	75-125%	---	---	PRO
Zinc	806	1.13	2.25	mg/kg dry	5	28.1	817	**-39**	**75-125%**	---	---	PRO,Q-03

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Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

Project: **St. Helens Lagoon**
Project Number: **[none]**
Project Manager: **David Weatherby**

Report ID:
A2H0382 - 12 12 22 1538

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Hexavalent Chromium by Colorimetric Spectrophotometry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0747 - EPA 3060A							**Soil**					
Blank (22H0747-BLK2)			Prepared: 08/22/22 08:37		Analyzed: 08/23/22 14:03							
EPA 7196A												
Chromium (VI)	ND	0.225	0.450	mg/kg wet	1	---	---	---	---	---	---	Q-16
LCS (22H0747-BS2)			Prepared: 08/22/22 08:37		Analyzed: 08/23/22 14:03							
EPA 7196A												
Chromium (VI)	16.4	0.225	0.450	mg/kg wet	1	20.0	---	82	80-120%	---	---	Q-16
Duplicate (22H0747-DUP1)			Prepared: 08/22/22 08:37		Analyzed: 08/23/22 14:06							**PRO**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
EPA 7196A												
Chromium (VI)	ND	10.6	21.2	mg/kg dry	50	---	ND	---	---	---	20%	Q-57
Matrix Spike (22H0747-MS1)			Prepared: 08/22/22 08:37		Analyzed: 08/23/22 14:07							**PRO**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
EPA 7196A												
Chromium (VI)	ND	10.6	21.2	mg/kg dry	50	20.9	ND		**75-125%**	---	---	Cr6-01, Q-57
Matrix Spike (22H0747-MS2)			Prepared: 08/22/22 08:37		Analyzed: 08/23/22 14:09							**PRO**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
EPA 7196A												
Chromium (VI)	ND	21.1	42.2	mg/kg dry	100	1010	ND		**75-125%**	---	---	Cr6-01, Q-57
Post Spike (22H0747-PS1)			Prepared: 08/22/22 08:37		Analyzed: 08/23/22 14:12							**PRO**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
EPA 7196A												
Chromium (VI)	17200			ug/L	50	19900	53.7	86	85-115%		---	Q-57

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0481 - Total Solids (Dry Weight)							**Soil**					
Duplicate (22H0481-DUP1)			Prepared: 08/12/22 13:08		Analyzed: 08/15/22 07:02							**PRO**
QC Source Sample: Non-SDG (A2H0213-02)												
% Solids	**97.8**	1.00	1.00	%	1	---	97.8	---	---	0.02	10%	
Duplicate (22H0481-DUP2)			Prepared: 08/12/22 13:08		Analyzed: 08/15/22 07:02							**PRO**
QC Source Sample: Non-SDG (A2H0213-04)												
% Solids	**97.5**	1.00	1.00	%	1	---	97.5	---	---	0.01	10%	
Duplicate (22H0481-DUP3)			Prepared: 08/12/22 13:08		Analyzed: 08/15/22 07:02							**PRO**
QC Source Sample: Non-SDG (A2H0213-06)												
% Solids	**97.6**	1.00	1.00	%	1	---	97.7	---	---	0.05	10%	
Duplicate (22H0481-DUP4)			Prepared: 08/12/22 19:24		Analyzed: 08/15/22 07:02							**PRO**
QC Source Sample: Non-SDG (A2H0216-02)												
% Solids	**97.5**	1.00	1.00	%	1	---	97.5	---	---	0.04	10%	
Duplicate (22H0481-DUP5)			Prepared: 08/12/22 19:24		Analyzed: 08/15/22 07:02							**PRO**
QC Source Sample: Non-SDG (A2H0216-04)												
% Solids	**97.6**	1.00	1.00	%	1	---	97.6	---	---	0.001	10%	
Duplicate (22H0481-DUP6)			Prepared: 08/12/22 19:24		Analyzed: 08/15/22 07:02							
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-03)												
EPA 8000D												
% Solids	**7.08**	1.00	1.00	%	1	---	6.71	---	---	5	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

Apex Laboratories

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 22H0773 - Total Solids (Dry Weight)							**Soil**					
Duplicate (22H0773-DUP1)			Prepared: 08/22/22 15:12		Analyzed: 08/22/22 15:57							**PRO**
QC Source Sample: DU1-20220810-ISM-COMP (A2H0382-02)												
EPA 8000D												
% Solids	**94.1**	1.00	1.00	%	1	---	93.7	---	---	0.4	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Chlorinated Herbicides by GC/ECD

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W2H1928 - EPA 3550/Sonication							**Solid**					
Blank (W2H1928-BLK1)			Prepared: 08/24/22 09:10 Analyzed: 09/01/22 08:41									
EPA 8151A												
2,4-D	ND	9.3	40	ug/kg	1	---	---	---	---	---	---	
2,4-DB	ND	16	80	ug/kg	1	---	---	---	---	---	---	
2,4,5-T	ND	4.2	20	ug/kg	1	---	---	---	---	---	---	
2,4,5-TP (Silvex)	ND	5.1	20	ug/kg	1	---	---	---	---	---	---	
Dalapon	ND	7.1	40	ug/kg	1	---	---	---	---	---	---	
Dicamba	ND	6.7	40	ug/kg	1	---	---	---	---	---	---	
Dichloroprop	ND	6.8	40	ug/kg	1	---	---	---	---	---	---	
Dinoseb	ND	2.3	20	ug/kg	1	---	---	---	---	---	---	
MCPA	ND	1500	4000	ug/kg	1	---	---	---	---	---	---	
MCPP	ND	750	4000	ug/kg	1	---	---	---	---	---	---	
Pentachlorophenol	ND	6.3	20	ug/kg	1	---	---	---	---	---	---	
Picloram	ND	6.2	20	ug/kg	1	---	---	---	---	---	---	
Surr: 2,4-DCAA			*Recovery: 97 %*	*Limits: 13-119 %*			*Dilution: 1x*					
LCS (W2H1928-BS1)			Prepared: 08/24/22 09:10 Analyzed: 09/01/22 09:13									
EPA 8151A												
2,4-D	91.6	9.3	40	ug/kg	1	100	---	92	53-130%	---	---	
2,4-DB	139	16	80	ug/kg	1	200	---	70	28-119%	---	---	
2,4,5-T	50.5	4.2	20	ug/kg	1	50.0	---	101	40-108%	---	---	
2,4,5-TP (Silvex)	45.5	5.1	20	ug/kg	1	50.0	---	91	38-108%	---	---	
Dalapon	67.7	7.1	40	ug/kg	1	100	---	68	17-122%	---	---	
Dicamba	91.2	6.7	40	ug/kg	1	100	---	91	48-107%	---	---	
Dichloroprop	91.4	6.8	40	ug/kg	1	100	---	91	45-117%	---	---	
Dinoseb	18.2	2.3	20	ug/kg	1	50.0	---	36	0.1-83%	---	---	J
MCPA	10400	1500	4000	ug/kg	1	10000	---	104	33-107%	---	---	
MCPP	8300	750	4000	ug/kg	1	10000	---	83	34-117%	---	---	
Pentachlorophenol	42.3	6.3	20	ug/kg	1	50.0	---	85	40-102%	---	---	
Picloram	44.9	6.2	20	ug/kg	1	50.0	---	90	22-139%	---	---	
Surr: 2,4-DCAA			*Recovery: 110 %*	*Limits: 13-119 %*			*Dilution: 1x*					
Matrix Spike (W2H1928-MS1)			Prepared: 08/24/22 09:10 Analyzed: 09/01/22 09:44									

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Chlorinated Herbicides by GC/ECD

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W2H1928 - EPA 3550/Sonication							**Solid**					
Matrix Spike (W2H1928-MS1)				Prepared: 08/24/22 09:10 Analyzed: 09/01/22 09:44								
QC Source Sample: A2H0382-02 (A2H0382-02)												
EPA 8151A												
2,4-D	ND	0.0	1500	ug/kg	10	365	ND		**21-126%**	---	---	M-02, M-04, MS-01
2,4-DB	32.1	0.0	2900	ug/kg	10	731	ND	**4**	**13-133%**	---	---	M-02, M-04, MS-01, J
2,4,5-T	ND	0.0	730	ug/kg	10	183	ND		**17-123%**	---	---	M-02, M-04, MS-01
2,4,5-TP (Silvex)	20.7	0.0	730	ug/kg	10	183	ND	**11**	**15-126%**	---	---	M-02, M-04, MS-01, J
Dalapon	ND	0.0	1500	ug/kg	10	365	ND		**9.6-101%**	---	---	M-02, M-04, MS-01
Dicamba	12.0	0.0	1500	ug/kg	10	365	ND	**3**	**11-107%**	---	---	M-02, M-04, MS-01, J
Dichloroprop	231	0.0	1500	ug/kg	10	365	ND	63	44-133%	---	---	M-02, M-04, J
Dinoseb	15.8	0.0	730	ug/kg	10	183	ND	9	0.1-72%	---	---	M-02, M-04, J
MCPA	8890	0.0	150000	ug/kg	10	36500	ND	24	23-123%	---	---	M-02, M-04, J
MCPP	ND	0.0	150000	ug/kg	10	36500	ND		**24-120%**	---	---	M-02, M-04, MS-01
Pentachlorophenol	7.57	0.0	730	ug/kg	10	183	ND	**4**	**10-103%**	---	---	M-02, M-04, MS-01, J
Picloram	ND	0.0	730	ug/kg	10	183	ND		**17-155%**	---	---	M-02, M-04, MS-01
Surr: 2,4-DCAA				*Recovery: 8 %*	*Limits: 13-119 %*		*Dilution: 10x*					S-04
Matrix Spike Dup (W2H1928-MSD1)				Prepared: 08/24/22 09:10 Analyzed: 09/01/22 10:15								
QC Source Sample: A2H0382-02 (A2H0382-02)												
EPA 8151A												
2,4-D	261	0.0	1500	ug/kg	10	364	ND	72	21-126%	**200**	**25%**	M-02, M-04, R-03, J
2,4-DB	296	0.0	2900	ug/kg	10	727	ND	41	13-133%	**200**	**25%**	M-02, M-04, R-03, J
2,4,5-T	106	0.0	730	ug/kg	10	182	ND	59	17-123%	**200**	**25%**	M-02, M-04, R-03, J

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Chlorinated Herbicides by GC/ECD

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W2H1928 - EPA 3550/Sonication							**Solid**					
Matrix Spike Dup (W2H1928-MSD1)				Prepared: 08/24/22 09:10 Analyzed: 09/01/22 10:15								
QC Source Sample: A2H0382-02 (A2H0382-02)												
2,4,5-TP (Silvex)	152	0.0	730	ug/kg	10	182	ND	84	15-126%	**200**	**25%**	M-02, M-04, R-03, J
Dalapon	206	0.0	1500	ug/kg	10	364	ND	57	9.6-101%	**200**	**25%**	M-02, M-04, R-03, J
Dicamba	163	0.0	1500	ug/kg	10	364	ND	45	11-107%	**200**	**25%**	M-02, M-04, R-03, J
Dichloroprop	429	250	1500	ug/kg	10	364	ND	118	44-133%	**200**	**25%**	M-02, M-04, R-03, J
Dinoseb	55.2	0.0	730	ug/kg	10	182	ND	30	0.1-72%	**200**	**25%**	M-02, M-04, R-03, J
MCPA	15900	0.0	150000	ug/kg	10	36400	ND	44	23-123%	**200**	**25%**	M-02, M-04, R-03, J
MCPP	32000	27000	150000	ug/kg	10	36400	ND	88	24-120%	**200**	**25%**	M-02, M-04, R-03, J
Pentachlorophenol	57.7	0.0	730	ug/kg	10	182	ND	32	10-103%	**200**	**25%**	M-02, M-04, R-03, J
Picloram	109	0.0	730	ug/kg	10	182	ND	60	17-155%	**200**	**25%**	M-02, M-04, R-03, J
Surr: 2,4-DCAA			*Recovery: 67 %*	*Limits: 13-119 %*			*Dilution: 10x*					

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AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W2H1882 - _NONE (METALS)							**Solid**					
Duplicate (W2H1882-DUP1)			Prepared: 08/23/22 14:37		Analyzed: 08/24/22 16:39							
QC Source Sample: Non-SDG (2H23010-03)												
% Solids	**28.1**		0.100	% by Weight	1	---	27.4	---	---	3	20%	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3546 (Fuels)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 22H0779							
A2H0382-02	Sediment	NWTPH-Dx	08/10/22 09:15	08/22/22 16:14	10.09g/10mL	10g/5mL	1.98

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 22H0476							
A2H0382-01	Sediment	NWTPH-Gx (MS)	08/10/22 09:15	08/10/22 09:15	165.15g/250mL	5g/5mL	1.51

Volatile Organic Compounds by EPA 8260D

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 22H0476							
A2H0382-01	Sediment	5035A/8260D	08/10/22 09:15	08/10/22 09:15	165.15g/250mL	5g/5mL	1.51

Volatile Organic Compounds by EPA 8260D SIM

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 22H0946							
A2H0382-01	Sediment	5035A/8260D SIM	08/10/22 09:15	08/10/22 09:15	165.15g/250mL	5g/5mL	1.51

Semivolatile Organic Compounds by EPA 8270E

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 22H0777							
A2H0382-02	Sediment	EPA 8270E	08/10/22 09:15	08/22/22 16:07	15.09g/5mL	15g/2mL	2.49

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 22H0778							
A2H0382-02	Sediment	EPA 8270E OPPs	08/10/22 09:15	08/22/22 16:11	10.09g/10mL	10g/5mL	1.98

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

Project: **St. Helens Lagoon**
Project Number: **[none]**
Project Manager: **David Weatherby**

Report ID:
A2H0382 - 12 12 22 1538

SAMPLE PREPARATION INFORMATION

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor

Organochlorine Pesticides by GC/MS/MS

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 22I0773							
A2H0382-02	Sediment	EPA 8270E OCPs	08/10/22 09:15	09/23/22 11:03	10.06g/10mL	10g/1mL	9.94

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3051A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 22H0793							
A2H0382-02	Sediment	EPA 6020B	08/10/22 09:15	08/23/22 09:46	0.467g/50mL	0.5g/50mL	1.07

Total Hexavalent Chromium by Colorimetric Spectrophotometry

Prep: EPA 3060A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 22H0747							
A2H0382-02	Sediment	EPA 7196A	08/10/22 09:15	08/22/22 08:37	2.5342g/100mL	2.5g/111mL	0.89

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 22H0481							
A2H0382-01	Sediment	EPA 8000D	08/10/22 09:15	08/12/22 13:08			NA
A2H0382-03	Sediment	EPA 8000D	08/10/22 09:15	08/12/22 13:08			NA
Batch: 22H0773							
A2H0382-02	Sediment	EPA 8000D	08/10/22 09:15	08/22/22 15:12			NA

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

Project: **St. Helens Lagoon**
Project Number: **[none]**
Project Manager: **David Weatherby**

Report ID:
A2H0382 - 12 12 22 1538

Weck Laboratories, Inc.

SAMPLE PREPARATION INFORMATION

Chlorinated Herbicides by GC/ECD

Prep: EPA 3550/Sonication

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: W2H1928							
A2H0382-02	Sediment	EPA 8151A	08/10/22 09:15	08/24/22 09:10	8.34g/10ml	30g/10ml	3.60

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Prep: NONE (METALS)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: W2H1882							
A2H0382-02	Sediment	EPA 160.3M	08/10/22 09:15	08/23/22 14:37	1g/1ml	1g/1ml	NA

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

A-01	Sample was received outside of recommended temperature.
AMEND	The Result, Reporting Level, Recovery and/or RPD has changed. Note: Batch QC marked as AMENDED may or may not have been issued prior to the change. Case Narrative included if client data is affected.
B	Analyte detected in an associated blank at a level above the MRL. (See Notes and Conventions below.)
B-02	Analyte detected in an associated blank at a level between one-half the MRL and the MRL. (See Notes and Conventions below.)
B-07	Analyte detected in the corresponding extraction blank at a level greater than the MRL, and detected in this sample at a level below that found in the blank. Reporting level for this analyte has been raised above the potential analyte contamination.
Cr6-01	Matrix Spike fails due to probable reducing conditions present in the sample. Sample is ND. Data quality is not affected because any hexavalent chromium present in the sample is likely to have been reduced to chromium three.
F-13	The chromatographic pattern does not resemble the fuel standard used for quantitation
H-01	This sample was analyzed outside the recommended holding time.
H-08	Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the method hold time.
Ja	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
PRO	Sample has undergone sample processing prior to extraction and analysis.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-03	Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
Q-05	Analyses are not controlled on RPD values from sample and duplicate concentrations that are below 5 times the reporting level.
Q-16	Reanalysis of an original Batch QC sample.
Q-18	Matrix Spike results for this extraction batch are not reported due to the high dilution necessary for analysis of the source sample.
Q-29	Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high.
Q-30	Recovery for Lab Control Spike (LCS) is below the lower control limit. Data may be biased low.
Q-36	Daily CCV recovery for this analyte was below the +/-20% criteria listed in EPA 8270, however there is adequate sensitivity to ensure detection at the reporting level.
Q-41	Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
Q-52	Due to known erratic recoveries, the result and reporting levels for this analyte are reported as Estimated Values. This analyte may not have passed all QC requirements for this method.
Q-54	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +16%. The results are reported as Estimated Values.
Q-54a	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +19%. The results are reported as Estimated Values.

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

Q-54b	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +2%. The results are reported as Estimated Values.
Q-54c	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +6%. The results are reported as Estimated Values.
Q-54d	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by -13%. The results are reported as Estimated Values.
Q-54e	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by -4%. The results are reported as Estimated Values.
Q-55	Daily CCV/LCS recovery for this analyte was below the +/-20% criteria listed in EPA 8260, however there is adequate sensitivity to ensure detection at the reporting level.
Q-56	Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260
Q-57	Compensation for background color and/or turbidity has been made by subtracting the absorbance of a second aliquot of sample to which all reagents except the color producing reagent have been added, in accordance with the method.
R-02	The Reporting Limit for this analyte has been raised to account for interference from coeluting organic compounds present in the sample.
R-04	Reporting levels elevated due to preparation and/or analytical dilution necessary for analysis.
S-01	Surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interference.
S-05	Surrogate recovery is estimated due to sample dilution required for high analyte concentration and/or matrix interference.

Weck Laboratories, Inc.

J	Estimated conc. detected <MRL and >MDL.
M-02	Due to the nature of matrix interferences, sample was diluted prior to preparation. The MDL and MRL were raised due to the dilution.
M-04	Due to the nature of matrix interferences, sample extract was diluted prior to analysis. The MDL and MRL were raised due to the dilution.
MS-01	The spike recovery for this QC sample is outside of established control limits possibly due to sample matrix interference.
R-03	The RPD is not applicable for result below the reporting limit (either ND or J value).
S-04	The surrogate recovery for this sample is outside of established control limits due to possible sample matrix effect.

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

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
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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

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:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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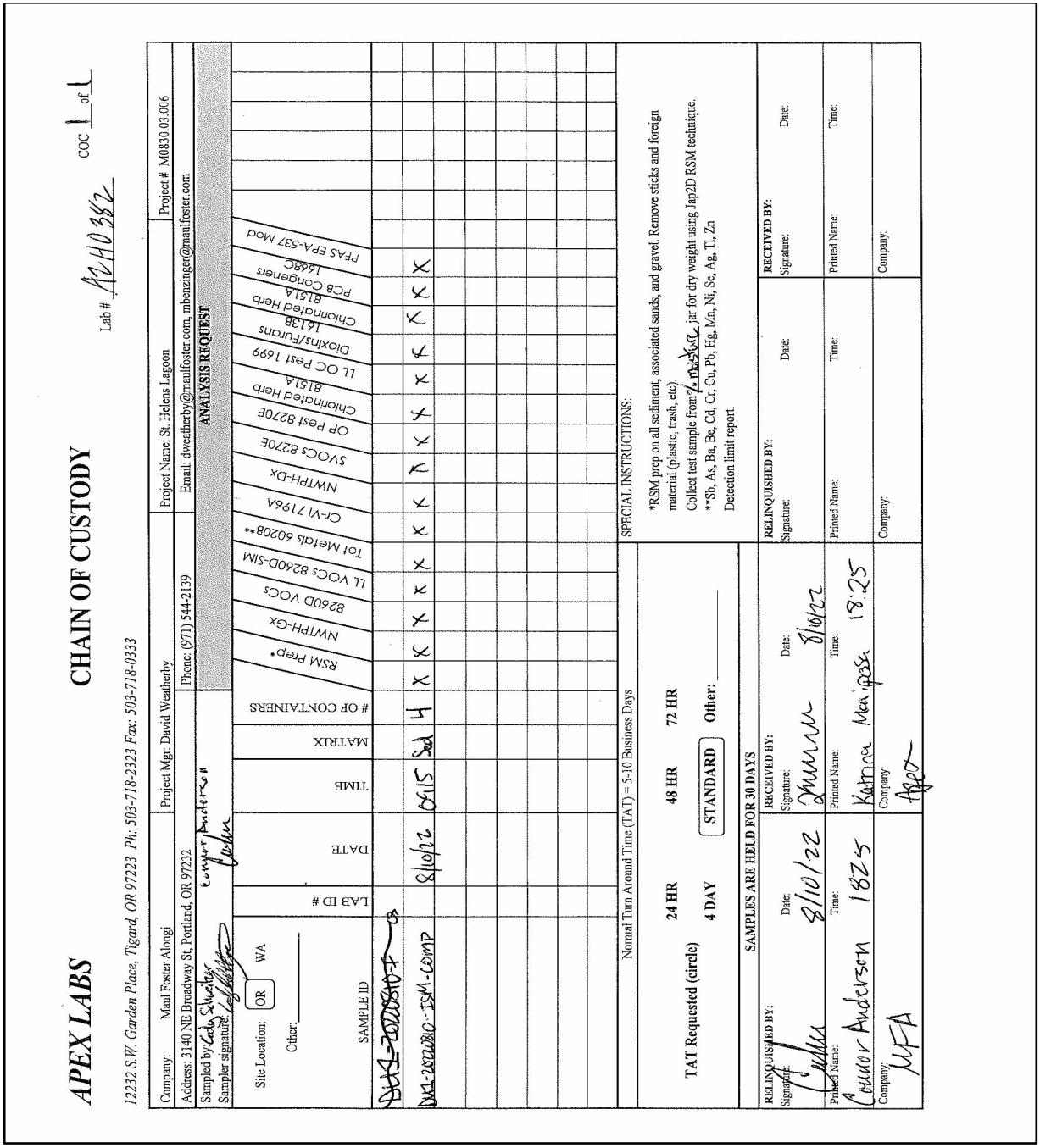
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**



APEX LABS

CHAIN OF CUSTODY

COC 1 of 1

Lab # A2H0382

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster Alongi | Project Mgr: David Weatherby | Project Name: St. Helens Lagoon | Project # M0830.03.006

Address: 3140 NE Broadway St, Portland, OR 97232 | Phone: (971) 544-2139 | Email: dweatherby@maulfoster.com, mbenzinger@maulfoster.com

Sampled by: Cody Schaffer, Connor Anderson

Sampler signature:

Site Location: OR WA

Other:

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	RSM Prep*	NWTPH-Gx	8260D VOCs	LL VOCs 8260D-SIM	Tot Metals 6020B**	Cr-VI 7196A	NWTPH-Dx	SVOCs 8270E	OP Pest 8270E	Chlorinated Herb 8151A	LL OC Pest 1699	Dioxins/Furans 1613B	Chlorinated Herb 8151A	PCB Congeners 1668C	PFAS EPA-537 Mod
DUP-20221208-01																				
SM-20221208-ESM-COMP		8/10/22	0815	Sed	4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Normal Turn Around Time (TAT) = 5-10 Business Days

TAT Requested (circle): 24 HR | 48 HR | 72 HR | 4 DAY | STANDARD | Other: _____

SAMPLES ARE HELD FOR 30 DAYS

SPECIAL INSTRUCTIONS:

*RSM prep on all sediment, associated sands, and gravel. Remove sticks and foreign material (plastic, trash, etc).
Collect test sample from 2 mason jar for dry weight using Jap2D RSM technique.
**Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Se, Ag, Tl, Zn
Detection limit report.

RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:	8/10/22	1825	Signature:	8/10/22	18:25
Printed Name:			Printed Name:		
Company:			Company:		

RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:			Signature:		
Printed Name:			Printed Name:		
Company:			Company:		

RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:			Signature:		
Printed Name:			Printed Name:		
Company:			Company:		

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **[none]**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A2H0382 - 12 12 22 1538**

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster Alongi Element WO#: A2 H0382

Project/Project #: St. Helens Lagoon / M0830-03.006

Delivery Info: 2KAM 8/10

Date/time received: 8/10/22 @ 18:25 By: 2KAM

Delivered by: Apex____Client X ESS____FedEx____UPS____Swift____Senvoy ___SDS___Other_____

Cooler Inspection Date/time inspected: 8/10/22 @ 18:28 By: 2KAM

Chain of Custody included? Yes X No _____ Custody seals? Yes_____ No X

Signed/dated by client? Yes X No _____

Signed/dated by Apex? Yes X No _____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	3.1						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	N						
Ice type: (Gel/Real/Other)	Real						
Condition:	Good						

Cooler out of temp? (Y(N) Possible reason why: _____

Green dots applied to out of temperature samples? Yes/(No)

Out of temperature samples form initiated? Yes/(No)

Sample Inspection: Date/time inspected: 8/11/22 @ 1556 By: LY

All samples intact? Yes X No ___ Comments: _____

Bottle labels/COCs agree? Yes ___ No ___ Comments: _____

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: _____

Do VOA vials have visible headspace? Yes ___ No ___ NA X

Comments _____

Water samples: pH checked: Yes___No___NA X pH appropriate? Yes___No___NA X

Comments: _____

Additional information: _____

Labeled by: LY Witness: DJS Cooler Inspected by: DJS

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Wednesday, April 19, 2023

David Weatherby
Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

RE: A3A1010 - St. Helens Lagoon - M0830.03.006

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 A3A1010, which was received by the laboratory on 1/31/2023 at 10:08:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	3.1 degC	Cooler #2	1.4 degC
Cooler #3	2.8 degC	Cooler #4	0.9 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

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MFA-B1-20230130-21.9	A3A1010-01	Sediment	01/30/23 16:00	01/31/23 10:08
MFA-B3-20230131-31.0	A3A1010-02	Sediment	01/31/23 10:50	01/31/23 10:08
MFA-B2-20230131-23.0	A3A1010-03	Sediment	01/31/23 09:00	01/31/23 10:08
MFA-B4-20230202-SL-26.5	A3A1010-04	Sediment	02/02/23 09:10	01/31/23 10:08
MFA-B5-20230203-SL-27.0	A3A1010-05	Sediment	02/03/23 15:00	01/31/23 10:08
MFA-B1-B5-COMP-SL	A3A1010-06	Sediment	01/30/23 16:00	01/31/23 10:08
MFA-B1-B5-COMP-SL-PRO	A3A1010-07	Sediment	01/30/23 16:00	01/31/23 10:08

Apex Laboratories

Philip Nerenberg

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

ANALYTICAL CASE NARRATIVE

A3A1010	**Apex Laboratories**

Sample Processing: Air Dried Samples

All samples for Chlorinated Pesticides by EPA 8270E are air dried prior to extraction and analysis.
A separate Dry Weight analysis is performed on the air dried samples in order to report data on a dry weight basis .

8270E Chlorinated Pesticides - Reporting levels raised due to Matrix.

Reporting levels for multiple analytes have been raised due to matrix interference for sample " MFA-SL-Composite After Processing" (Apex Labs ID A3A1010-07).

David Jack
Technical Manager
March 15, 2023

Sample B1-B5-COMP-SL (A3A1010-06) was composited by combining equal volumes of methanol from methanol-preserved VOAs for samples MFA-B1-20230130-21.9, MFA-B3-20230131-31.0, MFA-B2-20230131-23.0, MFA-B4-20230202-SL-26.5, and MFA-B5-20230203-SL-27.

Sample B1-B5-COMP-SL-PRO (A3A1010-07) was composited by combining equal weights of material from jars received for samples MFA-B1-20230130-21.9, MFA-B3-20230131-31.0, MFA-B2-20230131-23.0, MFA-B4-20230202-SL-26.5, and MFA-B5-20230203-SL-27.0. The composited sample was air-dried before analysis.

Philip Nerenberg
Lab Director
4/19/23

Apex Laboratories, LLC
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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL-PRO (A3A1010-07)				**Matrix: Sediment**		**Batch: 23B0765**		**COMP, PRO**
Diesel	**26100**	1030	2070	mg/kg dry	100	02/21/23 21:58	NWTPH-Dx	**F-03, F-11**
Oil	ND	2070	4130	mg/kg dry	100	02/21/23 21:58	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)			*Recovery: %*	*Limits: 50-150 %*	*100*	*02/21/23 21:58*	*NWTPH-Dx*	*S-01*

Apex Laboratories

Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL (A3A1010-06)				**Matrix: Sediment**		**Batch: 23B0290**		**COMP**
Gasoline Range Organics	ND	26.7	53.3	mg/kg dry	50	02/08/23 13:31	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*100 %*	*Limits: 50-150 %*	*1*	*02/08/23 13:31*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*106 %*	*50-150 %*	*1*	*02/08/23 13:31*	*NWTPH-Gx (MS)*	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL (A3A1010-06)				**Matrix: Sediment**		**Batch: 23B0290**		**COMP**
Acetone	ND	5330	10700	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Acrylonitrile	ND	533	1070	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Bromobenzene	ND	133	267	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Bromochloromethane	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Bromodichloromethane	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Bromoform	ND	533	1070	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Bromomethane	ND	5330	5330	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
2-Butanone (MEK)	ND	2670	5330	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
n-Butylbenzene	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
sec-Butylbenzene	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
tert-Butylbenzene	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Carbon disulfide	ND	2670	5330	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Carbon tetrachloride	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Chlorobenzene	ND	133	267	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Chloroethane	ND	5330	5330	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Chloromethane	ND	1330	2670	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
2-Chlorotoluene	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
4-Chlorotoluene	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Dibromochloromethane	ND	533	1070	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Dibromomethane	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
1,2-Dichlorobenzene	ND	133	267	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
1,3-Dichlorobenzene	ND	133	267	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
1,4-Dichlorobenzene	ND	133	267	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Dichlorodifluoromethane	ND	533	1070	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
1,3-Dichloropropane	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
2,2-Dichloropropane	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
1,1-Dichloropropene	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Hexachlorobutadiene	ND	533	1070	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
2-Hexanone	ND	2670	5330	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Isopropylbenzene	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
4-Isopropyltoluene	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Methylene chloride	ND	2670	5330	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
4-Methyl-2-pentanone (MiBK)	ND	2670	5330	ug/kg dry	50	02/08/23 13:31	5035A/8260D	

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL (A3A1010-06)				**Matrix: Sediment**		**Batch: 23B0290**		**COMP**
Naphthalene	ND	533	1070	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
n-Propylbenzene	ND	133	267	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Styrene	ND	267	533	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
1,1,1,2-Tetrachloroethane	ND	133	267	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
1,2,3-Trichlorobenzene	ND	1330	2670	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
1,2,4-Trichlorobenzene	ND	1330	2670	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
1,1,1-Trichloroethane	ND	133	267	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Trichlorofluoromethane	ND	533	1070	ug/kg dry	50	02/08/23 13:31	5035A/8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*107 %*	*Limits: 80-120 %*	*1*	*02/08/23 13:31*	*5035A/8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*02/08/23 13:31*	*5035A/8260D*	
4-Bromofluorobenzene (Surr)			*94 %*	*79-120 %*	*1*	*02/08/23 13:31*	*5035A/8260D*	

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Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL (A3A1010-06)				**Matrix: Sediment**		**Batch: 23B0452**		**COMP**
Benzene	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
Toluene	**29.7**	26.7	53.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	**J**
Ethylbenzene	ND	26.7	53.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
m,p-Xylene	ND	53.3	107	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
o-Xylene	ND	26.7	53.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
1,2,4-Trimethylbenzene	ND	53.3	107	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
1,3,5-Trimethylbenzene	ND	53.3	107	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
Chloroform	ND	53.3	107	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
1,2-Dibromo-3-chloropropane	ND	26.7	53.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
1,2-Dibromoethane (EDB)	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
1,1-Dichloroethane	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
1,2-Dichloroethane (EDC)	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
1,1-Dichloroethene	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
cis-1,2-Dichloroethene	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
trans-1,2-Dichloroethene	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
1,2-Dichloropropane	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
cis-1,3-Dichloropropene	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
trans-1,3-Dichloropropene	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	21.3	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
Tetrachloroethene (PCE)	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL (A3A1010-06)				**Matrix: Sediment**		**Batch: 23B0452**		**COMP**
1,1,2,2-Tetrachloroethane	ND	53.3	53.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
Trichloroethene (TCE)	ND	10.7	21.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
1,2,3-Trichloropropane	ND	26.7	53.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
Vinyl chloride	ND	53.3	107	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
1,1,2-Trichloroethane	ND	26.7	53.3	ug/kg dry	100	02/12/23 13:16	5035A/8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*102 %*	*Limits:* *80-120 %*	*1*	*02/12/23 13:16*	*5035A/8260D SIM*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*02/12/23 13:16*	*5035A/8260D SIM*	
4-Bromofluorobenzene (Surr)			*98 %*	*79-120 %*	*1*	*02/12/23 13:16*	*5035A/8260D SIM*	

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ANALYTICAL REPORT

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Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL-PRO (A3A1010-07)				**Matrix: Sediment**		**Batch: 23B0782**		**COMP, H-02, PRO**
Acenaphthene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Acenaphthylene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Anthracene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Benz(a)anthracene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Benzo(a)pyrene	ND	297	594	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Benzo(b)fluoranthene	ND	297	594	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Benzo(k)fluoranthene	ND	297	594	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Benzo(g,h,i)perylene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Chrysene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Dibenz(a,h)anthracene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Fluoranthene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Fluorene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
1-Methylnaphthalene	ND	396	791	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2-Methylnaphthalene	ND	396	791	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Naphthalene	ND	396	791	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Phenanthrene	**582**	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Pyrene	**304**	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	**J**
Carbazole	ND	297	594	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Dibenzofuran	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2-Chlorophenol	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
4-Chloro-3-methylphenol	ND	1970	3960	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2,4-Dichlorophenol	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2,4-Dimethylphenol	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2,4-Dinitrophenol	ND	4940	9900	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	4940	9900	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2-Methylphenol	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
3+4-Methylphenol(s)	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2-Nitrophenol	ND	1970	3960	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
4-Nitrophenol	ND	1970	3960	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Pentachlorophenol (PCP)	ND	1970	3960	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Phenol	ND	396	791	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL-PRO (A3A1010-07)				**Matrix: Sediment**		**Batch: 23B0782**		**COMP, H-02, PRO**
2,3,5,6-Tetrachlorophenol	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2,4,5-Trichlorophenol	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2,4,6-Trichlorophenol	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Bis(2-ethylhexyl)phthalate	**4080**	2970	5940	ug/kg dry	40	02/21/23 23:47	EPA 8270E	**J**
Butyl benzyl phthalate	ND	1970	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Diethylphthalate	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Dimethylphthalate	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Di-n-butylphthalate	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Di-n-octyl phthalate	ND	1720	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
N-Nitrosodimethylamine	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
N-Nitrosodiphenylamine	ND	990	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Bis(2-Chloroethoxy) methane	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Bis(2-Chloroethyl) ether	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Hexachlorobenzene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Hexachlorobutadiene	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Hexachlorocyclopentadiene	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Hexachloroethane	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2-Chloronaphthalene	ND	197	396	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
1,2,4-Trichlorobenzene	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
4-Bromophenyl phenyl ether	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
4-Chlorophenyl phenyl ether	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Aniline	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
4-Chloroaniline	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2-Nitroaniline	ND	3960	7910	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
3-Nitroaniline	ND	3960	7910	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
4-Nitroaniline	ND	3960	7910	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Nitrobenzene	ND	1970	3960	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2,4-Dinitrotoluene	ND	1970	3960	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
2,6-Dinitrotoluene	ND	1970	3960	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Benzoic acid	ND	49400	49400	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Benzyl alcohol	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	

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Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL-PRO (A3A1010-07)				**Matrix: Sediment**		**Batch: 23B0782**		**COMP, H-02, PRO**
Isophorone	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Azobenzene (1,2-DPH)	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	4940	9900	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
3,3'-Dichlorobenzidine	ND	3960	7910	ug/kg dry	40	02/21/23 23:47	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	4940	9900	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
1,3-Dinitrobenzene	ND	4940	9900	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
1,4-Dinitrobenzene	ND	4940	9900	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Pyridine	ND	990	1970	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
1,2-Dichlorobenzene	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
1,3-Dichlorobenzene	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
1,4-Dichlorobenzene	ND	494	990	ug/kg dry	40	02/21/23 23:47	EPA 8270E	
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*49 %*	*Limits: 37-122 %*	*40*	*02/21/23 23:47*	*EPA 8270E*	*S-05*
2-Fluorobiphenyl (Surr)			*63 %*	*44-120 %*	*40*	*02/21/23 23:47*	*EPA 8270E*	*S-05*
Phenol-d6 (Surr)			*17 %*	*33-122 %*	*40*	*02/21/23 23:47*	*EPA 8270E*	*S-05*
p-Terphenyl-d14 (Surr)			*77 %*	*54-127 %*	*40*	*02/21/23 23:47*	*EPA 8270E*	*S-05*
2-Fluorophenol (Surr)			*17 %*	*35-120 %*	*40*	*02/21/23 23:47*	*EPA 8270E*	*S-05*
2,4,6-Tribromophenol (Surr)			*136 %*	*39-132 %*	*40*	*02/21/23 23:47*	*EPA 8270E*	*S-05*

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

ANALYTICAL SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL-PRO (A3A1010-07)				**Matrix: Sediment**		**Batch: 23B0783**		**COMP, H-02, PRO**
Azinphos methyl (Guthion)	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Chlorpyrifos	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Coumaphos	ND	2940	2940	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	R-02
Demeton O	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Demeton S	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Diazinon	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Dichlorvos	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Dimethoate	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Disulfoton	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
EPN	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Ethoprop	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Fensulfothion	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Fenthion	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Malathion	ND	2010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Merphos	ND	30000	30000	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	R-02
Methyl parathion	ND	2010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Mevinphos (Phosdrin)	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Monocrotophos	ND	2010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Naled (Dibrom)	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Parathion, ethyl	ND	9500	9500	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	R-02
Phorate	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Ronnel (Fenchlorphos)	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Sulfotep	ND	1010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Sulprofos (Bolstar)	ND	2010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
TEPP	ND	4030	8050	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Tetrachlorvinphos (Rabon)	ND	11000	11000	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	R-02
Tokuthion (Prothiofos)	ND	2010	2010	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	
Trichloronate	ND	13200	13200	ug/kg dry	40	02/21/23 19:10	EPA 8270E OPPs	R-02
Surrogate: Tributyl phosphate (Surr)		*Recovery:*	*455 %*	*Limits: 10-136 %*	*40*	*02/21/23 19:10*	*EPA 8270E OPPs*	*S-05*
Triphenyl phosphate (Surr)			*221 %*	*34-121 %*	*40*	*02/21/23 19:10*	*EPA 8270E OPPs*	*S-05*

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

ANALYTICAL SAMPLE RESULTS

Organochlorine Pesticides by GC/MS/MS

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL-PRO (A3A1010-07)				**Matrix: Sediment**		**Batch: 23C0074**		**COMP, PRO**
Aldrin	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
alpha-BHC	ND	2.72	2.72	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	R-02
beta-BHC	ND	3.21	3.21	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	R-02
gamma-BHC (Lindane)	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
delta-BHC	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
cis-Chlordane	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
cis-Nonachlor	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
2,4'-DDD	ND	3.95	3.95	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	R-02
2,4'-DDE	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
2,4'-DDT	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
4,4'-DDD	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
4,4'-DDE	**3.05**	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
4,4'-DDT	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
Endosulfan sulfate	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
Endrin	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
Endrin ketone	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
Heptachlor	ND	4.20	4.20	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	R-02
Heptachlor epoxide	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
Hexachlorobutadiene	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
Methoxychlor	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
Mirex	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
Oxychlordane	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
trans-Chlordane	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
trans-Nonachlor	ND	1.24	2.47	ug/kg dry	1	03/03/23 17:29	EPA 8270E OCPs	
Surrogate: gamma-BHC-d6 (Surr)		*Recovery:*	*68 %*	*Limits: 50-150 %*	*1*	*03/03/23 17:29*	*EPA 8270E OCPs*	*S-05*
4,4'-DDT-d8 (Surr)			*80 %*	*50-150 %*	*1*	*03/03/23 17:29*	*EPA 8270E OCPs*	*S-05*
MFA-B1-B5-COMP-SL-PRO (A3A1010-07RE1)				**Matrix: Sediment**		**Batch: 23C0074**		**COMP, PRO**
Dieldrin	ND	242	242	ug/kg dry	10	03/07/23 22:29	EPA 8270E OCPs	R-02
Endosulfan I	ND	12.4	24.7	ug/kg dry	10	03/07/23 22:29	EPA 8270E OCPs	R-02
Endosulfan II	ND	12.4	24.7	ug/kg dry	10	03/07/23 22:29	EPA 8270E OCPs	R-02

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL-PRO (A3A1010-07)				**Matrix: Sediment**				
Batch: 23B0914								
Antimony	**0.944**	0.265	0.530	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO,Q-42**
Arsenic	**3.48**	0.265	0.530	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Barium	**174**	0.265	0.530	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Beryllium	**0.316**	0.0530	0.106	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Cadmium	**3.24**	0.0530	0.106	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Chromium	**191**	0.265	0.530	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Copper	**142**	0.530	1.06	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Lead	**40.2**	0.0530	0.106	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Manganese	**763**	0.265	0.530	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Mercury	**0.881**	0.0212	0.0424	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Nickel	**46.8**	0.530	1.06	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Selenium	**0.813**	0.265	0.530	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Silver	**2.50**	0.0530	0.106	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**
Thallium	ND	0.265	0.530	mg/kg dry	5	02/27/23 18:43	EPA 6020B	COMP, PRO
Zinc	**531**	1.06	2.12	mg/kg dry	5	02/27/23 18:43	EPA 6020B	**COMP, PRO**

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

ANALYTICAL SAMPLE RESULTS

Total Hexavalent Chromium by Colorimetric Spectrophotometry

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-B5-COMP-SL-PRO (A3A1010-07)				**Matrix: Sediment**		**Batch: 23B0959**		**COMP, PRO**
Chromium (VI)	ND	11.4	20.1	mg/kg	50	02/28/23 12:45	EPA 7196A	Q-57, R-04

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ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B1-20230130-21.9 (A3A1010-01)				**Matrix: Sediment**		**Batch: 23B0043**		
% Solids	**14.0**	1.00	1.00	%	1	02/02/23 05:57	EPA 8000D	
MFA-B3-20230131-31.0 (A3A1010-02)				**Matrix: Sediment**		**Batch: 23B0116**		
% Solids	**14.0**	1.00	1.00	%	1	02/03/23 04:15	EPA 8000D	
MFA-B2-20230131-23.0 (A3A1010-03)				**Matrix: Sediment**		**Batch: 23B0116**		
% Solids	**16.4**	1.00	1.00	%	1	02/03/23 04:15	EPA 8000D	
MFA-B4-20230202-SL-26.5 (A3A1010-04)				**Matrix: Sediment**		**Batch: 23B0202**		
% Solids	**17.2**	1.00	1.00	%	1	02/07/23 06:25	EPA 8000D	
MFA-B5-20230203-SL-27.0 (A3A1010-05)				**Matrix: Sediment**		**Batch: 23B0202**		
% Solids	**34.3**	1.00	1.00	%	1	02/07/23 06:25	EPA 8000D	
MFA-B1-B5-COMP-SL (A3A1010-06)				**Matrix: Sediment**		**Batch: 23B0202**		**COMP**
% Solids	**19.2**	1.00	1.00	%	1	02/07/23 00:00	EPA 8000D	**A-01**
MFA-B1-B5-COMP-SL-PRO (A3A1010-07)				**Matrix: Sediment**		**Batch: 23B0961**		**COMP, PRO**
% Solids	**95.7**	1.00	1.00	%	1	02/28/23 06:46	EPA 8000D	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0765 - EPA 3546 (Fuels)							**Sediment**					
Blank (23B0765-BLK1)			Prepared: 02/21/23 07:18		Analyzed: 02/21/23 21:17							
NWTPH-Dx												
Diesel	ND	10.0	20.0	mg/kg wet	1	---	---	---	---	---	---	
Oil	ND	20.0	40.0	mg/kg wet	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 88 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS (23B0765-BS1)			Prepared: 02/21/23 07:18		Analyzed: 02/21/23 21:37							
NWTPH-Dx												
Diesel	115	10.0	20.0	mg/kg wet	1	125	---	92	38-132%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 105 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Duplicate (23B0765-DUP1)			Prepared: 02/21/23 07:18		Analyzed: 02/21/23 22:18							**COMP, PRO**
QC Source Sample: MFA-B1-B5-COMP-SL-PRO (A3A1010-07)												
NWTPH-Dx												
Diesel	**22700**	1010	2020	mg/kg dry	100	---	26100	---	---	14	30%	F-03, F-11
Oil	ND	2020	4030	mg/kg dry	100	---	ND	---	---	---	30%	
Surr: o-Terphenyl (Surr)			*Recovery: %*		*Limits: 50-150 %*		*Dilution: 100x*					S-01

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QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							**Soil**					
Blank (23B0290-BLK1)			Prepared: 02/08/23 08:00 Analyzed: 02/08/23 11:49									
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	2.50	5.00	mg/kg wet	50	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 93 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*			*"*					
LCS (23B0290-BS2)			Prepared: 02/08/23 08:00 Analyzed: 02/08/23 11:23									
NWTPH-Gx (MS)												
Gasoline Range Organics	20.4	2.50	5.00	mg/kg wet	50	25.0	---	82	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 92 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*101 %*	*50-150 %*			*"*					
Duplicate (23B0290-DUP1)			Prepared: 02/07/23 11:34 Analyzed: 02/08/23 14:22									**V-15**
QC Source Sample: Non-SDG (A3B0183-01)												
Gasoline Range Organics	ND	111	221	mg/kg wet	500	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 93 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*			*"*					
Duplicate (23B0290-DUP2)			Prepared: 02/03/23 08:52 Analyzed: 02/08/23 15:38									**COMP**
QC Source Sample: Non-SDG (A3B0176-21)												
Gasoline Range Organics	ND	3.07	6.14	mg/kg dry	50	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 94 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*107 %*	*50-150 %*			*"*					

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ANALYTICAL REPORT

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3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							**Soil**					
Blank (23B0290-BLK1)			Prepared: 02/08/23 08:00 Analyzed: 02/08/23 11:49									
5035A/8260D												
Acetone	ND	500	1000	ug/kg wet	50	---	---	---	---	---	---	
Acrylonitrile	ND	50.0	100	ug/kg wet	50	---	---	---	---	---	---	
Benzene	ND	5.00	10.0	ug/kg wet	50	---	---	---	---	---	---	
Bromobenzene	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
Bromochloromethane	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Bromodichloromethane	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Bromoform	ND	50.0	100	ug/kg wet	50	---	---	---	---	---	---	
Bromomethane	ND	500	500	ug/kg wet	50	---	---	---	---	---	---	
2-Butanone (MEK)	ND	250	500	ug/kg wet	50	---	---	---	---	---	---	
n-Butylbenzene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
sec-Butylbenzene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
tert-Butylbenzene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Carbon disulfide	ND	250	500	ug/kg wet	50	---	---	---	---	---	---	
Carbon tetrachloride	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Chlorobenzene	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
Chloroethane	ND	500	500	ug/kg wet	50	---	---	---	---	---	---	
Chloroform	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Chloromethane	ND	125	250	ug/kg wet	50	---	---	---	---	---	---	
2-Chlorotoluene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
4-Chlorotoluene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Dibromochloromethane	ND	50.0	100	ug/kg wet	50	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	125	250	ug/kg wet	50	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Dibromomethane	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	50.0	100	ug/kg wet	50	---	---	---	---	---	---	
1,1-Dichloroethane	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
1,1-Dichloroethene	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							Soil					
Blank (23B0290-BLK1)			Prepared: 02/08/23 08:00 Analyzed: 02/08/23 11:49									
1,2-Dichloropropane	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
1,3-Dichloropropane	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
2,2-Dichloropropane	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
1,1-Dichloropropene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Ethylbenzene	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
Hexachlorobutadiene	ND	50.0	100	ug/kg wet	50	---	---	---	---	---	---	
2-Hexanone	ND	250	500	ug/kg wet	50	---	---	---	---	---	---	
Isopropylbenzene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
4-Isopropyltoluene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Methylene chloride	ND	250	500	ug/kg wet	50	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	250	500	ug/kg wet	50	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Naphthalene	ND	50.0	100	ug/kg wet	50	---	---	---	---	---	---	
n-Propylbenzene	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
Styrene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
Toluene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	125	250	ug/kg wet	50	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	125	250	ug/kg wet	50	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
Trichlorofluoromethane	ND	50.0	100	ug/kg wet	50	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
Vinyl chloride	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	
m,p-Xylene	ND	25.0	50.0	ug/kg wet	50	---	---	---	---	---	---	
o-Xylene	ND	12.5	25.0	ug/kg wet	50	---	---	---	---	---	---	

Surr: 1,4-Difluorobenzene (Surr) *Recovery: 106 %* *Limits: 80-120 %* *Dilution: 1x*

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							**Soil**					
Blank (23B0290-BLK1)				Prepared: 02/08/23 08:00 Analyzed: 02/08/23 11:49								
Surr: Toluene-d8 (Surr)			*Recovery: 102 %*	*Limits: 80-120 %*			*Dilution: 1x*					
4-Bromofluorobenzene (Surr)			*95 %*	*79-120 %*			*"*					
LCS (23B0290-BS1)				Prepared: 02/08/23 08:00 Analyzed: 02/08/23 10:58								
5035A/8260D												
Acetone	2690	500	1000	ug/kg wet	50	2000	---	**135**	**80-120%**	---	---	Q-56
Acrylonitrile	1260	50.0	100	ug/kg wet	50	1000	---	**126**	**80-120%**	---	---	Q-56
Benzene	1090	5.00	10.0	ug/kg wet	50	1000	---	109	80-120%	---	---	
Bromobenzene	926	12.5	25.0	ug/kg wet	50	1000	---	93	80-120%	---	---	
Bromochloromethane	1250	25.0	50.0	ug/kg wet	50	1000	---	**125**	**80-120%**	---	---	Q-56
Bromodichloromethane	1110	25.0	50.0	ug/kg wet	50	1000	---	111	80-120%	---	---	
Bromoform	988	50.0	100	ug/kg wet	50	1000	---	99	80-120%	---	---	
Bromomethane	2090	500	500	ug/kg wet	50	1000	---	**209**	**80-120%**	---	---	Q-56
2-Butanone (MEK)	2460	250	500	ug/kg wet	50	2000	---	**123**	**80-120%**	---	---	Q-56
n-Butylbenzene	879	25.0	50.0	ug/kg wet	50	1000	---	88	80-120%	---	---	
sec-Butylbenzene	922	25.0	50.0	ug/kg wet	50	1000	---	92	80-120%	---	---	
tert-Butylbenzene	826	25.0	50.0	ug/kg wet	50	1000	---	83	80-120%	---	---	
Carbon disulfide	1020	250	500	ug/kg wet	50	1000	---	102	80-120%	---	---	
Carbon tetrachloride	1110	25.0	50.0	ug/kg wet	50	1000	---	111	80-120%	---	---	
Chlorobenzene	994	12.5	25.0	ug/kg wet	50	1000	---	99	80-120%	---	---	
Chloroethane	770	500	500	ug/kg wet	50	1000	---	**77**	**80-120%**	---	---	Q-55
Chloroform	1160	25.0	50.0	ug/kg wet	50	1000	---	116	80-120%	---	---	
Chloromethane	1010	125	250	ug/kg wet	50	1000	---	101	80-120%	---	---	
2-Chlorotoluene	884	25.0	50.0	ug/kg wet	50	1000	---	88	80-120%	---	---	
4-Chlorotoluene	898	25.0	50.0	ug/kg wet	50	1000	---	90	80-120%	---	---	
Dibromochloromethane	962	50.0	100	ug/kg wet	50	1000	---	96	80-120%	---	---	
1,2-Dibromo-3-chloropropane	884	125	250	ug/kg wet	50	1000	---	88	80-120%	---	---	
1,2-Dibromoethane (EDB)	1040	25.0	50.0	ug/kg wet	50	1000	---	104	80-120%	---	---	
Dibromomethane	1170	25.0	50.0	ug/kg wet	50	1000	---	117	80-120%	---	---	
1,2-Dichlorobenzene	955	12.5	25.0	ug/kg wet	50	1000	---	96	80-120%	---	---	
1,3-Dichlorobenzene	969	12.5	25.0	ug/kg wet	50	1000	---	97	80-120%	---	---	
1,4-Dichlorobenzene	964	12.5	25.0	ug/kg wet	50	1000	---	96	80-120%	---	---	
Dichlorodifluoromethane	964	50.0	100	ug/kg wet	50	1000	---	96	80-120%	---	---	
1,1-Dichloroethane	1180	12.5	25.0	ug/kg wet	50	1000	---	118	80-120%	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							**Soil**					
LCS (23B0290-BS1)			Prepared: 02/08/23 08:00 Analyzed: 02/08/23 10:58									
1,2-Dichloroethane (EDC)	1210	12.5	25.0	ug/kg wet	50	1000	---	**121**	**80-120%**	---	---	Q-56
1,1-Dichloroethene	1120	12.5	25.0	ug/kg wet	50	1000	---	112	80-120%	---	---	
cis-1,2-Dichloroethene	1110	12.5	25.0	ug/kg wet	50	1000	---	111	80-120%	---	---	
trans-1,2-Dichloroethene	1110	12.5	25.0	ug/kg wet	50	1000	---	111	80-120%	---	---	
1,2-Dichloropropane	1120	12.5	25.0	ug/kg wet	50	1000	---	112	80-120%	---	---	
1,3-Dichloropropane	1000	25.0	50.0	ug/kg wet	50	1000	---	100	80-120%	---	---	
2,2-Dichloropropane	1130	25.0	50.0	ug/kg wet	50	1000	---	113	80-120%	---	---	
1,1-Dichloropropene	1040	25.0	50.0	ug/kg wet	50	1000	---	104	80-120%	---	---	
cis-1,3-Dichloropropene	1050	25.0	50.0	ug/kg wet	50	1000	---	105	80-120%	---	---	
trans-1,3-Dichloropropene	1080	25.0	50.0	ug/kg wet	50	1000	---	108	80-120%	---	---	
Ethylbenzene	986	12.5	25.0	ug/kg wet	50	1000	---	99	80-120%	---	---	
Hexachlorobutadiene	961	50.0	100	ug/kg wet	50	1000	---	96	80-120%	---	---	
2-Hexanone	1810	250	500	ug/kg wet	50	2000	---	91	80-120%	---	---	
Isopropylbenzene	872	25.0	50.0	ug/kg wet	50	1000	---	87	80-120%	---	---	
4-Isopropyltoluene	874	25.0	50.0	ug/kg wet	50	1000	---	87	80-120%	---	---	
Methylene chloride	1080	250	500	ug/kg wet	50	1000	---	108	80-120%	---	---	
4-Methyl-2-pentanone (MiBK)	1980	250	500	ug/kg wet	50	2000	---	99	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	1020	25.0	50.0	ug/kg wet	50	1000	---	102	80-120%	---	---	
Naphthalene	808	50.0	100	ug/kg wet	50	1000	---	81	80-120%	---	---	
n-Propylbenzene	941	12.5	25.0	ug/kg wet	50	1000	---	94	80-120%	---	---	
Styrene	846	25.0	50.0	ug/kg wet	50	1000	---	85	80-120%	---	---	
1,1,1,2-Tetrachloroethane	1020	12.5	25.0	ug/kg wet	50	1000	---	102	80-120%	---	---	
1,1,2,2-Tetrachloroethane	1030	25.0	50.0	ug/kg wet	50	1000	---	103	80-120%	---	---	
Tetrachloroethene (PCE)	1060	12.5	25.0	ug/kg wet	50	1000	---	106	80-120%	---	---	
Toluene	1000	25.0	50.0	ug/kg wet	50	1000	---	100	80-120%	---	---	
1,2,3-Trichlorobenzene	946	125	250	ug/kg wet	50	1000	---	95	80-120%	---	---	
1,2,4-Trichlorobenzene	803	125	250	ug/kg wet	50	1000	---	80	80-120%	---	---	
1,1,1-Trichloroethane	1120	12.5	25.0	ug/kg wet	50	1000	---	112	80-120%	---	---	
1,1,2-Trichloroethane	1040	12.5	25.0	ug/kg wet	50	1000	---	104	80-120%	---	---	
Trichloroethene (TCE)	1100	12.5	25.0	ug/kg wet	50	1000	---	110	80-120%	---	---	
Trichlorofluoromethane	873	50.0	100	ug/kg wet	50	1000	---	87	80-120%	---	---	
1,2,3-Trichloropropane	1040	25.0	50.0	ug/kg wet	50	1000	---	104	80-120%	---	---	
1,2,4-Trimethylbenzene	932	25.0	50.0	ug/kg wet	50	1000	---	93	80-120%	---	---	
1,3,5-Trimethylbenzene	964	25.0	50.0	ug/kg wet	50	1000	---	96	80-120%	---	---	

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							Soil					
LCS (23B0290-BS1)			Prepared: 02/08/23 08:00 Analyzed: 02/08/23 10:58									
Vinyl chloride	1950	12.5	25.0	ug/kg wet	50	1000	---	**195**	**80-120%**	---	---	Q-56
m,p-Xylene	1990	25.0	50.0	ug/kg wet	50	2000	---	99	80-120%	---	---	
o-Xylene	851	12.5	25.0	ug/kg wet	50	1000	---	85	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 105 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*101 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*92 %*		*79-120 %*			*"*				
Duplicate (23B0290-DUP1)			Prepared: 02/07/23 11:34 Analyzed: 02/08/23 14:22									**V-15**
QC Source Sample: Non-SDG (A3B0183-01)												
Acetone	ND	22100	44200	ug/kg wet	500	---	ND	---	---	---	30%	
Acrylonitrile	ND	2210	4420	ug/kg wet	500	---	ND	---	---	---	30%	
Benzene	ND	221	442	ug/kg wet	500	---	ND	---	---	---	30%	
Bromobenzene	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
Bromochloromethane	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Bromodichloromethane	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Bromoform	ND	2210	4420	ug/kg wet	500	---	ND	---	---	---	30%	
Bromomethane	ND	22100	22100	ug/kg wet	500	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	11100	22100	ug/kg wet	500	---	ND	---	---	---	30%	
n-Butylbenzene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Carbon disulfide	ND	11100	22100	ug/kg wet	500	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Chlorobenzene	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
Chloroethane	ND	22100	22100	ug/kg wet	500	---	ND	---	---	---	30%	
Chloroform	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Chloromethane	ND	5530	11100	ug/kg wet	500	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Dibromochloromethane	ND	2210	4420	ug/kg wet	500	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	5530	11100	ug/kg wet	500	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Dibromomethane	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							**Soil**					
Duplicate (23B0290-DUP1)			Prepared: 02/07/23 11:34 Analyzed: 02/08/23 14:22									V-15
QC Source Sample: Non-SDG (A3B0183-01)												
1,3-Dichlorobenzene	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	2210	4420	ug/kg wet	500	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Ethylbenzene	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2210	4420	ug/kg wet	500	---	ND	---	---	---	30%	
2-Hexanone	ND	11100	22100	ug/kg wet	500	---	ND	---	---	---	30%	
Isopropylbenzene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Methylene chloride	ND	11100	22100	ug/kg wet	500	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	11100	22100	ug/kg wet	500	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Naphthalene	ND	2210	4420	ug/kg wet	500	---	ND	---	---	---	30%	
n-Propylbenzene	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
Styrene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
Toluene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	5530	11100	ug/kg wet	500	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	5530	11100	ug/kg wet	500	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							**Soil**					
Duplicate (23B0290-DUP1)			Prepared: 02/07/23 11:34		Analyzed: 02/08/23 14:22							**V-15**
QC Source Sample: Non-SDG (A3B0183-01)												
Trichloroethene (TCE)	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	2210	4420	ug/kg wet	500	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
Vinyl chloride	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
m,p-Xylene	ND	1110	2210	ug/kg wet	500	---	ND	---	---	---	30%	
o-Xylene	ND	553	1110	ug/kg wet	500	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 107 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*101 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*93 %*		*79-120 %*		*"*					
Duplicate (23B0290-DUP2)			Prepared: 02/03/23 08:52		Analyzed: 02/08/23 15:38							**COMP**
QC Source Sample: Non-SDG (A3B0176-21)												
Acetone	ND	614	1230	ug/kg dry	50	---	ND	---	---	---	30%	
Acrylonitrile	ND	61.4	123	ug/kg dry	50	---	ND	---	---	---	30%	
Benzene	ND	6.14	12.3	ug/kg dry	50	---	ND	---	---	---	30%	
Bromobenzene	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
Bromochloromethane	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
Bromodichloromethane	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
Bromoform	ND	61.4	123	ug/kg dry	50	---	ND	---	---	---	30%	
Bromomethane	ND	614	614	ug/kg dry	50	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	307	614	ug/kg dry	50	---	ND	---	---	---	30%	
n-Butylbenzene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
Carbon disulfide	ND	307	614	ug/kg dry	50	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
Chlorobenzene	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
Chloroethane	ND	614	614	ug/kg dry	50	---	ND	---	---	---	30%	
Chloroform	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
Chloromethane	ND	154	307	ug/kg dry	50	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							**Soil**					
Duplicate (23B0290-DUP2)			Prepared: 02/03/23 08:52		Analyzed: 02/08/23 15:38							**COMP**
QC Source Sample: Non-SDG (A3B0176-21)												
4-Chlorotoluene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
Dibromochloromethane	ND	61.4	123	ug/kg dry	50	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	154	307	ug/kg dry	50	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
Dibromomethane	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	61.4	123	ug/kg dry	50	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
Ethylbenzene	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	61.4	123	ug/kg dry	50	---	ND	---	---	---	30%	
2-Hexanone	ND	307	614	ug/kg dry	50	---	ND	---	---	---	30%	
Isopropylbenzene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
Methylene chloride	ND	307	614	ug/kg dry	50	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	307	614	ug/kg dry	50	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
Naphthalene	ND	61.4	123	ug/kg dry	50	---	ND	---	---	---	30%	
n-Propylbenzene	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
Styrene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							**Soil**					
Duplicate (23B0290-DUP2)			Prepared: 02/03/23 08:52		Analyzed: 02/08/23 15:38							**COMP**
QC Source Sample: Non-SDG (A3B0176-21)												
Tetrachloroethene (PCE)	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
Toluene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	154	307	ug/kg dry	50	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	154	307	ug/kg dry	50	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	61.4	123	ug/kg dry	50	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
Vinyl chloride	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
m,p-Xylene	ND	30.7	61.4	ug/kg dry	50	---	ND	---	---	---	30%	
o-Xylene	ND	15.4	30.7	ug/kg dry	50	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 107 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*102 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*93 %*		*79-120 %*			*"*				
Matrix Spike (23B0290-MS1)			Prepared: 02/03/23 10:53		Analyzed: 02/08/23 19:53							**COMP**
QC Source Sample: Non-SDG (A3B0176-30)												
5035A/8260D												
Acetone	3770	586	1170	ug/kg dry	50	2340	ND	161	36-164%	---	---	Q-54a
Acrylonitrile	1590	58.6	117	ug/kg dry	50	1170	ND	**136**	**65-134%**	---	---	Q-54d
Benzene	1400	5.86	11.7	ug/kg dry	50	1170	ND	120	77-121%	---	---	
Bromobenzene	1140	14.7	29.3	ug/kg dry	50	1170	ND	98	78-121%	---	---	
Bromochloromethane	1630	29.3	58.6	ug/kg dry	50	1170	ND	**139**	**78-125%**	---	---	Q-54c
Bromodichloromethane	1420	29.3	58.6	ug/kg dry	50	1170	ND	121	75-127%	---	---	
Bromoform	1180	58.6	117	ug/kg dry	50	1170	ND	101	67-132%	---	---	
Bromomethane	2790	586	586	ug/kg dry	50	1170	ND	**238**	**53-143%**	---	---	Q-54f
2-Butanone (MEK)	3230	293	586	ug/kg dry	50	2340	ND	138	51-148%	---	---	Q-54b
n-Butylbenzene	1140	29.3	58.6	ug/kg dry	50	1170	ND	97	70-128%	---	---	
sec-Butylbenzene	1160	29.3	58.6	ug/kg dry	50	1170	ND	99	73-126%	---	---	
tert-Butylbenzene	1040	29.3	58.6	ug/kg dry	50	1170	ND	89	73-125%	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							**Soil**					
Matrix Spike (23B0290-MS1)			Prepared: 02/03/23 10:53 Analyzed: 02/08/23 19:53									**COMP**
QC Source Sample: Non-SDG (A3B0176-30)												
Carbon disulfide	1340	293	586	ug/kg dry	50	1170	ND	114	63-132%	---	---	
Carbon tetrachloride	1410	29.3	58.6	ug/kg dry	50	1170	ND	120	70-135%	---	---	
Chlorobenzene	1240	14.7	29.3	ug/kg dry	50	1170	ND	106	79-120%	---	---	
Chloroethane	1310	586	586	ug/kg dry	50	1170	ND	111	59-139%	---	---	Q-54g
Chloroform	1480	29.3	58.6	ug/kg dry	50	1170	ND	**126**	**78-123%**	---	---	
Chloromethane	1400	147	293	ug/kg dry	50	1170	ND	119	50-136%	---	---	
2-Chlorotoluene	1090	29.3	58.6	ug/kg dry	50	1170	ND	93	75-122%	---	---	
4-Chlorotoluene	1120	29.3	58.6	ug/kg dry	50	1170	ND	96	72-124%	---	---	
Dibromochloromethane	1180	58.6	117	ug/kg dry	50	1170	ND	101	74-126%	---	---	
1,2-Dibromo-3-chloropropane	1100	147	293	ug/kg dry	50	1170	ND	94	61-132%	---	---	
1,2-Dibromoethane (EDB)	1320	29.3	58.6	ug/kg dry	50	1170	ND	112	78-122%	---	---	
Dibromomethane	1480	29.3	58.6	ug/kg dry	50	1170	ND	**126**	**78-125%**	---	---	
1,2-Dichlorobenzene	1150	14.7	29.3	ug/kg dry	50	1170	ND	98	78-121%	---	---	
1,3-Dichlorobenzene	1190	14.7	29.3	ug/kg dry	50	1170	ND	102	77-121%	---	---	
1,4-Dichlorobenzene	1180	14.7	29.3	ug/kg dry	50	1170	ND	101	75-120%	---	---	
Dichlorodifluoromethane	1350	58.6	117	ug/kg dry	50	1170	ND	115	29-149%	---	---	
1,1-Dichloroethane	1520	14.7	29.3	ug/kg dry	50	1170	ND	**130**	**76-125%**	---	---	Q-01
1,2-Dichloroethane (EDC)	1540	14.7	29.3	ug/kg dry	50	1170	ND	**131**	**73-128%**	---	---	Q-54
1,1-Dichloroethene	1470	14.7	29.3	ug/kg dry	50	1170	ND	126	70-131%	---	---	
cis-1,2-Dichloroethene	1430	14.7	29.3	ug/kg dry	50	1170	ND	122	77-123%	---	---	
trans-1,2-Dichloroethene	1420	14.7	29.3	ug/kg dry	50	1170	ND	121	74-125%	---	---	
1,2-Dichloropropane	1480	14.7	29.3	ug/kg dry	50	1170	ND	**126**	**76-123%**	---	---	Q-01
1,3-Dichloropropane	1260	29.3	58.6	ug/kg dry	50	1170	ND	107	77-121%	---	---	
2,2-Dichloropropane	1370	29.3	58.6	ug/kg dry	50	1170	ND	117	67-133%	---	---	
1,1-Dichloropropene	1330	29.3	58.6	ug/kg dry	50	1170	ND	114	76-125%	---	---	
cis-1,3-Dichloropropene	1290	29.3	58.6	ug/kg dry	50	1170	ND	110	74-126%	---	---	
trans-1,3-Dichloropropene	1320	29.3	58.6	ug/kg dry	50	1170	ND	113	71-130%	---	---	
Ethylbenzene	1240	14.7	29.3	ug/kg dry	50	1170	ND	106	76-122%	---	---	
Hexachlorobutadiene	1140	58.6	117	ug/kg dry	50	1170	ND	97	61-135%	---	---	
2-Hexanone	2230	293	586	ug/kg dry	50	2340	ND	95	53-145%	---	---	
Isopropylbenzene	1080	29.3	58.6	ug/kg dry	50	1170	ND	92	68-134%	---	---	
4-Isopropyltoluene	1070	29.3	58.6	ug/kg dry	50	1170	ND	92	73-127%	---	---	
Methylene chloride	1420	293	586	ug/kg dry	50	1170	ND	121	70-128%	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0290 - EPA 5035A							**Soil**					
Matrix Spike (23B0290-MS1)			Prepared: 02/03/23 10:53 Analyzed: 02/08/23 19:53									**COMP**
QC Source Sample: Non-SDG (A3B0176-30)												
4-Methyl-2-pentanone (MiBK)	2550	293	586	ug/kg dry	50	2340	ND	109	65-135%	---	---	
Methyl tert-butyl ether (MTBE)	1260	29.3	58.6	ug/kg dry	50	1170	ND	108	73-125%	---	---	
Naphthalene	1030	58.6	117	ug/kg dry	50	1170	ND	88	62-129%	---	---	
n-Propylbenzene	1190	14.7	29.3	ug/kg dry	50	1170	ND	102	73-125%	---	---	
Styrene	1080	29.3	58.6	ug/kg dry	50	1170	ND	92	76-124%	---	---	
1,1,1,2-Tetrachloroethane	1280	14.7	29.3	ug/kg dry	50	1170	ND	109	78-125%	---	---	
1,1,2,2-Tetrachloroethane	1290	29.3	58.6	ug/kg dry	50	1170	ND	110	70-124%	---	---	
Tetrachloroethene (PCE)	1310	14.7	29.3	ug/kg dry	50	1170	ND	112	73-128%	---	---	
Toluene	1260	29.3	58.6	ug/kg dry	50	1170	ND	107	77-121%	---	---	
1,2,3-Trichlorobenzene	1130	147	293	ug/kg dry	50	1170	ND	97	66-130%	---	---	
1,2,4-Trichlorobenzene	1000	147	293	ug/kg dry	50	1170	ND	85	67-129%	---	---	
1,1,1-Trichloroethane	1440	14.7	29.3	ug/kg dry	50	1170	ND	123	73-130%	---	---	
1,1,2-Trichloroethane	1300	14.7	29.3	ug/kg dry	50	1170	ND	111	78-121%	---	---	
Trichloroethene (TCE)	1400	14.7	29.3	ug/kg dry	50	1170	ND	119	77-123%	---	---	
Trichlorofluoromethane	3230	58.6	117	ug/kg dry	50	1170	ND	**275**	**62-140%**	---	---	Q-01
1,2,3-Trichloropropane	1270	29.3	58.6	ug/kg dry	50	1170	ND	108	73-125%	---	---	
1,2,4-Trimethylbenzene	1190	29.3	58.6	ug/kg dry	50	1170	ND	102	75-123%	---	---	
1,3,5-Trimethylbenzene	1200	29.3	58.6	ug/kg dry	50	1170	ND	103	73-124%	---	---	
Vinyl chloride	2710	14.7	29.3	ug/kg dry	50	1170	ND	**231**	**56-135%**	---	---	Q-54e
m,p-Xylene	2510	29.3	58.6	ug/kg dry	50	2340	ND	107	77-124%	---	---	
o-Xylene	1070	14.7	29.3	ug/kg dry	50	1170	ND	92	77-123%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 105 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*99 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*90 %*		*79-120 %*			*"*				

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0452 - EPA 5035A							Soil					
Blank (23B0452-BLK1)			Prepared: 02/12/23 10:17 Analyzed: 02/12/23 12:49									
5035A/8260D SIM												
Benzene	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
Toluene	ND	2.50	5.00	ug/kg wet	100	---	---	---	---	---	---	
Ethylbenzene	ND	2.50	5.00	ug/kg wet	100	---	---	---	---	---	---	
m,p-Xylene	ND	5.00	10.0	ug/kg wet	100	---	---	---	---	---	---	
o-Xylene	ND	2.50	5.00	ug/kg wet	100	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	5.00	10.0	ug/kg wet	100	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	5.00	10.0	ug/kg wet	100	---	---	---	---	---	---	
Chloroform	ND	5.00	10.0	ug/kg wet	100	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/kg wet	100	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
1,1-Dichloroethane	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
1,1-Dichloroethene	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
1,2-Dichloropropane	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	2.50	5.00	ug/kg wet	100	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	1.00	2.00	ug/kg wet	100	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	2.50	5.00	ug/kg wet	100	---	---	---	---	---	---	
Vinyl chloride	ND	5.00	10.0	ug/kg wet	100	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	2.50	5.00	ug/kg wet	100	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 102 %*			*Limits: 80-120 %*			*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*			*80-120 %*			*"*			
4-Bromofluorobenzene (Surr)			*98 %*			*79-120 %*			*"*			
LCS (23B0452-BS1)			Prepared: 02/12/23 10:17 Analyzed: 02/12/23 11:56									
5035A/8260D SIM												
Benzene	20.9	1.00	2.00	ug/kg wet	100	20.0	---	105	80-120%	---	---	
Toluene	19.8	2.50	5.00	ug/kg wet	100	20.0	---	99	80-120%	---	---	

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Philip Nerenberg, Lab Director

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0452 - EPA 5035A												**Soil**
LCS (23B0452-BS1)			Prepared: 02/12/23 10:17 Analyzed: 02/12/23 11:56									
Ethylbenzene	19.8	2.50	5.00	ug/kg wet	100	20.0	---	99	80-120%	---	---	
m,p-Xylene	39.5	5.00	10.0	ug/kg wet	100	40.0	---	99	80-120%	---	---	
o-Xylene	20.0	2.50	5.00	ug/kg wet	100	20.0	---	100	80-120%	---	---	
1,2,4-Trimethylbenzene	19.7	5.00	10.0	ug/kg wet	100	20.0	---	98	80-120%	---	---	
1,3,5-Trimethylbenzene	19.4	5.00	10.0	ug/kg wet	100	20.0	---	97	80-120%	---	---	
Chloroform	19.5	5.00	10.0	ug/kg wet	100	20.0	---	98	80-120%	---	---	
1,2-Dibromo-3-chloropropane	21.6	2.50	5.00	ug/kg wet	100	20.0	---	108	80-120%	---	---	
1,2-Dibromoethane (EDB)	20.7	1.00	2.00	ug/kg wet	100	20.0	---	104	80-120%	---	---	
1,1-Dichloroethane	20.9	1.00	2.00	ug/kg wet	100	20.0	---	105	80-120%	---	---	
1,2-Dichloroethane (EDC)	20.8	1.00	2.00	ug/kg wet	100	20.0	---	104	80-120%	---	---	
1,1-Dichloroethene	21.2	1.00	2.00	ug/kg wet	100	20.0	---	106	80-120%	---	---	
cis-1,2-Dichloroethene	21.4	1.00	2.00	ug/kg wet	100	20.0	---	107	80-120%	---	---	
trans-1,2-Dichloroethene	20.0	1.00	2.00	ug/kg wet	100	20.0	---	100	80-120%	---	---	
1,2-Dichloropropane	21.5	1.00	2.00	ug/kg wet	100	20.0	---	108	80-120%	---	---	
cis-1,3-Dichloropropene	20.4	1.00	2.00	ug/kg wet	100	20.0	---	102	80-120%	---	---	
trans-1,3-Dichloropropene	21.6	1.00	2.00	ug/kg wet	100	20.0	---	108	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	20.9	1.00	2.00	ug/kg wet	100	20.0	---	104	80-120%	---	---	
Tetrachloroethene (PCE)	19.5	1.00	2.00	ug/kg wet	100	20.0	---	97	80-120%	---	---	
1,1,2,2-Tetrachloroethane	22.1	2.50	5.00	ug/kg wet	100	20.0	---	111	80-120%	---	---	
Trichloroethene (TCE)	20.1	1.00	2.00	ug/kg wet	100	20.0	---	101	80-120%	---	---	
1,2,3-Trichloropropane	20.7	2.50	5.00	ug/kg wet	100	20.0	---	103	80-120%	---	---	
Vinyl chloride	20.4	5.00	10.0	ug/kg wet	100	20.0	---	102	80-120%	---	---	
1,1,2-Trichloroethane	20.5	2.50	5.00	ug/kg wet	100	20.0	---	102	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 100 %*	*Limits: 80-120 %*				*Dilution: 1x*				
Toluene-d8 (Surr)			*99 %*	*80-120 %*				*"*				
4-Bromofluorobenzene (Surr)			*97 %*	*79-120 %*				*"*				
Duplicate (23B0452-DUP1)			Prepared: 01/30/23 16:00 Analyzed: 02/12/23 13:43									**COMP**
QC Source Sample: MFA-B1-B5-COMP-SL (A3A1010-06)												
5035A/8260D SIM												
Benzene	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
Toluene	**31.0**	26.7	53.3	ug/kg dry	100	---	29.7	---	---	4	30%	J
Ethylbenzene	ND	26.7	53.3	ug/kg dry	100	---	ND	---	---	---	30%	
m,p-Xylene	ND	53.3	107	ug/kg dry	100	---	ND	---	---	---	30%	

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0452 - EPA 5035A							**Soil**					
Duplicate (23B0452-DUP1)			Prepared: 01/30/23 16:00		Analyzed: 02/12/23 13:43							**COMP**
QC Source Sample: MFA-B1-B5-COMP-SL (A3A1010-06)												
o-Xylene	ND	26.7	53.3	ug/kg dry	100	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	53.3	107	ug/kg dry	100	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	53.3	107	ug/kg dry	100	---	ND	---	---	---	30%	
Chloroform	ND	53.3	107	ug/kg dry	100	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	26.7	53.3	ug/kg dry	100	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	53.3	53.3	ug/kg dry	100	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	10.7	21.3	ug/kg dry	100	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	26.7	53.3	ug/kg dry	100	---	ND	---	---	---	30%	
Vinyl chloride	ND	53.3	107	ug/kg dry	100	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	26.7	53.3	ug/kg dry	100	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 103 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*97 %*		*79-120 %*				*"*			
Matrix Spike (23B0452-MS1)			Prepared: 01/30/23 16:00		Analyzed: 02/12/23 14:10							**COMP**
QC Source Sample: MFA-B1-B5-COMP-SL (A3A1010-06)												
5035A/8260D SIM												
Benzene	214	10.7	21.3	ug/kg dry	100	213	ND	100	77-121%	---	---	
Toluene	212	26.7	53.3	ug/kg dry	100	213	29.7	85	77-121%	---	---	
Ethylbenzene	199	26.7	53.3	ug/kg dry	100	213	ND	93	76-122%	---	---	
m,p-Xylene	386	53.3	107	ug/kg dry	100	426	ND	91	77-124%	---	---	
o-Xylene	194	26.7	53.3	ug/kg dry	100	213	ND	91	77-123%	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0452 - EPA 5035A							Soil					
Matrix Spike (23B0452-MS1)			Prepared: 01/30/23 16:00 Analyzed: 02/12/23 14:10									COMP
QC Source Sample: MFA-B1-B5-COMP-SL (A3A1010-06)												
1,2,4-Trimethylbenzene	204	53.3	107	ug/kg dry	100	213	ND	96	75-123%	---	---	
1,3,5-Trimethylbenzene	203	53.3	107	ug/kg dry	100	213	ND	95	73-124%	---	---	
Chloroform	203	53.3	107	ug/kg dry	100	213	ND	95	78-123%	---	---	
1,2-Dibromo-3-chloropropane	160	26.7	53.3	ug/kg dry	100	213	ND	75	61-132%	---	---	
1,2-Dibromoethane (EDB)	187	10.7	21.3	ug/kg dry	100	213	ND	88	78-122%	---	---	
1,1-Dichloroethane	212	10.7	21.3	ug/kg dry	100	213	ND	99	76-125%	---	---	
1,2-Dichloroethane (EDC)	204	10.7	21.3	ug/kg dry	100	213	ND	95	73-128%	---	---	
1,1-Dichloroethene	238	10.7	21.3	ug/kg dry	100	213	ND	112	70-131%	---	---	
cis-1,2-Dichloroethene	217	10.7	21.3	ug/kg dry	100	213	ND	102	77-123%	---	---	
trans-1,2-Dichloroethene	215	10.7	21.3	ug/kg dry	100	213	ND	101	74-125%	---	---	
1,2-Dichloropropane	209	10.7	21.3	ug/kg dry	100	213	ND	98	76-123%	---	---	
cis-1,3-Dichloropropene	190	10.7	21.3	ug/kg dry	100	213	ND	89	74-126%	---	---	
trans-1,3-Dichloropropene	193	10.7	21.3	ug/kg dry	100	213	ND	91	71-130%	---	---	
Methyl tert-butyl ether (MTBE)	204	10.7	21.3	ug/kg dry	100	213	ND	91	73-125%	---	---	
Tetrachloroethene (PCE)	199	10.7	21.3	ug/kg dry	100	213	ND	93	73-128%	---	---	
1,1,2,2-Tetrachloroethane	222	26.7	53.3	ug/kg dry	100	213	ND	82	70-124%	---	---	
Trichloroethene (TCE)	206	10.7	21.3	ug/kg dry	100	213	ND	97	77-123%	---	---	
1,2,3-Trichloropropane	168	26.7	53.3	ug/kg dry	100	213	ND	79	73-125%	---	---	
Vinyl chloride	252	53.3	107	ug/kg dry	100	213	ND	118	56-135%	---	---	
1,1,2-Trichloroethane	183	26.7	53.3	ug/kg dry	100	213	ND	86	78-121%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 103 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*99 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*98 %*		*79-120 %*			*"*				

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0782 - EPA 3546							**Sediment**					
Blank (23B0782-BLK1)			Prepared: 02/21/23 10:05 Analyzed: 02/21/23 22:07									
EPA 8270E												
Acenaphthene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Acenaphthylene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Anthracene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	2.00	4.00	ug/kg wet	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	2.00	4.00	ug/kg wet	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	2.00	4.00	ug/kg wet	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Chrysene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Fluoranthene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Fluorene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	2.67	5.33	ug/kg wet	1	---	---	---	---	---	---	
2-Methylnaphthalene	ND	2.67	5.33	ug/kg wet	1	---	---	---	---	---	---	
Naphthalene	ND	2.67	5.33	ug/kg wet	1	---	---	---	---	---	---	
Phenanthrene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Pyrene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Carbazole	ND	2.00	4.00	ug/kg wet	1	---	---	---	---	---	---	
Dibenzofuran	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
2-Chlorophenol	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
4-Chloro-3-methylphenol	ND	13.3	26.7	ug/kg wet	1	---	---	---	---	---	---	
2,4-Dichlorophenol	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
2,4-Dimethylphenol	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrophenol	ND	33.3	66.7	ug/kg wet	1	---	---	---	---	---	---	
4,6-Dinitro-2-methylphenol	ND	33.3	66.7	ug/kg wet	1	---	---	---	---	---	---	
2-Methylphenol	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
3+4-Methylphenol(s)	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
2-Nitrophenol	ND	13.3	26.7	ug/kg wet	1	---	---	---	---	---	---	
4-Nitrophenol	ND	13.3	26.7	ug/kg wet	1	---	---	---	---	---	---	
Pentachlorophenol (PCP)	ND	13.3	26.7	ug/kg wet	1	---	---	---	---	---	---	
Phenol	ND	2.67	5.33	ug/kg wet	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0782 - EPA 3546							**Sediment**					
Blank (23B0782-BLK1)			Prepared: 02/21/23 10:05 Analyzed: 02/21/23 22:07									
2,3,5,6-Tetrachlorophenol	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	20.0	40.0	ug/kg wet	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	9.50	13.3	ug/kg wet	1	---	---	---	---	---	---	
Diethylphthalate	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
Dimethylphthalate	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	11.6	13.3	ug/kg wet	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
Hexachlorocyclopentadiene	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
Hexachloroethane	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
2-Chloronaphthalene	ND	1.33	2.67	ug/kg wet	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
4-Bromophenyl phenyl ether	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
4-Chlorophenyl phenyl ether	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
Aniline	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
4-Chloroaniline	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
2-Nitroaniline	ND	26.7	53.3	ug/kg wet	1	---	---	---	---	---	---	
3-Nitroaniline	ND	26.7	53.3	ug/kg wet	1	---	---	---	---	---	---	
4-Nitroaniline	ND	26.7	53.3	ug/kg wet	1	---	---	---	---	---	---	
Nitrobenzene	ND	13.3	26.7	ug/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	13.3	26.7	ug/kg wet	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	13.3	26.7	ug/kg wet	1	---	---	---	---	---	---	
Benzoic acid	ND	167	333	ug/kg wet	1	---	---	---	---	---	---	
Benzyl alcohol	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
Isophorone	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0782 - EPA 3546							**Sediment**					
Blank (23B0782-BLK1)			Prepared: 02/21/23 10:05 Analyzed: 02/21/23 22:07									
Azobenzene (1,2-DPH)	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	33.3	66.7	ug/kg wet	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	26.7	53.3	ug/kg wet	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	33.3	66.7	ug/kg wet	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	33.3	66.7	ug/kg wet	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	33.3	66.7	ug/kg wet	1	---	---	---	---	---	---	
Pyridine	ND	6.67	13.3	ug/kg wet	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	3.33	6.67	ug/kg wet	1	---	---	---	---	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 90 %*		*Limits: 37-122 %*				*Dilution: 1x*			
2-Fluorobiphenyl (Surr)			*84 %*		*44-120 %*				*"*			
Phenol-d6 (Surr)			*90 %*		*33-122 %*				*"*			
p-Terphenyl-d14 (Surr)			*101 %*		*54-127 %*				*"*			
2-Fluorophenol (Surr)			*91 %*		*35-120 %*				*"*			
2,4,6-Tribromophenol (Surr)			*78 %*		*39-132 %*				*"*			
LCS (23B0782-BS1)			Prepared: 02/21/23 10:05 Analyzed: 02/21/23 22:40									
EPA 8270E												
Acenaphthene	449	5.32	10.7	ug/kg wet	4	533	---	84	40-123%	---	---	
Acenaphthylene	486	5.32	10.7	ug/kg wet	4	533	---	91	32-132%	---	---	
Anthracene	490	5.32	10.7	ug/kg wet	4	533	---	92	47-123%	---	---	
Benz(a)anthracene	487	5.32	10.7	ug/kg wet	4	533	---	91	49-126%	---	---	
Benzo(a)pyrene	511	8.00	16.0	ug/kg wet	4	533	---	96	45-129%	---	---	
Benzo(b)fluoranthene	524	8.00	16.0	ug/kg wet	4	533	---	98	45-132%	---	---	
Benzo(k)fluoranthene	517	8.00	16.0	ug/kg wet	4	533	---	97	47-132%	---	---	
Benzo(g,h,i)perylene	472	5.32	10.7	ug/kg wet	4	533	---	88	43-134%	---	---	
Chrysene	469	5.32	10.7	ug/kg wet	4	533	---	88	50-124%	---	---	
Dibenz(a,h)anthracene	480	5.32	10.7	ug/kg wet	4	533	---	90	45-134%	---	---	
Fluoranthene	489	5.32	10.7	ug/kg wet	4	533	---	92	50-127%	---	---	
Fluorene	472	5.32	10.7	ug/kg wet	4	533	---	89	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	495	5.32	10.7	ug/kg wet	4	533	---	93	45-133%	---	---	
1-Methylnaphthalene	444	10.7	21.3	ug/kg wet	4	533	---	83	40-120%	---	---	
2-Methylnaphthalene	459	10.7	21.3	ug/kg wet	4	533	---	86	38-122%	---	---	

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Philip Nerenberg, Lab Director

APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0782 - EPA 3546							**Sediment**					
LCS (23B0782-BS1)			Prepared: 02/21/23 10:05		Analyzed: 02/21/23 22:40							
Naphthalene	444	10.7	21.3	ug/kg wet	4	533	---	83	35-123%	---	---	
Phenanthrene	453	5.32	10.7	ug/kg wet	4	533	---	85	50-121%	---	---	
Pyrene	488	5.32	10.7	ug/kg wet	4	533	---	91	47-127%	---	---	
Carbazole	490	8.00	16.0	ug/kg wet	4	533	---	92	50-123%	---	---	
Dibenzofuran	457	5.32	10.7	ug/kg wet	4	533	---	86	44-120%	---	---	
2-Chlorophenol	475	26.7	53.2	ug/kg wet	4	533	---	89	34-121%	---	---	
4-Chloro-3-methylphenol	500	53.2	107	ug/kg wet	4	533	---	94	45-122%	---	---	
2,4-Dichlorophenol	500	26.7	53.2	ug/kg wet	4	533	---	94	40-122%	---	---	
2,4-Dimethylphenol	501	26.7	53.2	ug/kg wet	4	533	---	94	30-127%	---	---	
2,4-Dinitrophenol	407	133	267	ug/kg wet	4	533	---	76	10-137%	---	---	
4,6-Dinitro-2-methylphenol	450	133	267	ug/kg wet	4	533	---	84	29-132%	---	---	
2-Methylphenol	450	13.3	26.7	ug/kg wet	4	533	---	84	32-122%	---	---	
3+4-Methylphenol(s)	457	13.3	26.7	ug/kg wet	4	533	---	86	34-120%	---	---	
2-Nitrophenol	547	53.2	107	ug/kg wet	4	533	---	103	36-123%	---	---	
4-Nitrophenol	461	53.2	107	ug/kg wet	4	533	---	86	30-132%	---	---	
Pentachlorophenol (PCP)	361	53.2	107	ug/kg wet	4	533	---	68	25-133%	---	---	
Phenol	515	10.7	21.3	ug/kg wet	4	533	---	97	34-121%	---	---	
2,3,4,6-Tetrachlorophenol	441	26.7	53.2	ug/kg wet	4	533	---	83	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	438	26.7	53.2	ug/kg wet	4	533	---	82	40-120%	---	---	
2,4,5-Trichlorophenol	490	26.7	53.2	ug/kg wet	4	533	---	92	41-124%	---	---	
2,4,6-Trichlorophenol	485	26.7	53.2	ug/kg wet	4	533	---	91	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	526	80.0	160	ug/kg wet	4	533	---	99	51-133%	---	---	
Butyl benzyl phthalate	553	38.0	53.2	ug/kg wet	4	533	---	104	48-132%	---	---	
Diethylphthalate	484	26.7	53.2	ug/kg wet	4	533	---	91	50-124%	---	---	
Dimethylphthalate	468	26.7	53.2	ug/kg wet	4	533	---	88	48-124%	---	---	
Di-n-butylphthalate	540	26.7	53.2	ug/kg wet	4	533	---	101	51-128%	---	---	
Di-n-octyl phthalate	667	46.4	53.2	ug/kg wet	4	533	---	125	45-140%	---	---	
N-Nitrosodimethylamine	447	13.3	26.7	ug/kg wet	4	533	---	84	23-120%	---	---	
N-Nitroso-di-n-propylamine	472	13.3	26.7	ug/kg wet	4	533	---	88	36-120%	---	---	
N-Nitrosodiphenylamine	469	13.3	26.7	ug/kg wet	4	533	---	88	38-127%	---	---	
Bis(2-Chloroethoxy) methane	455	13.3	26.7	ug/kg wet	4	533	---	85	36-121%	---	---	
Bis(2-Chloroethyl) ether	450	13.3	26.7	ug/kg wet	4	533	---	84	31-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	437	13.3	26.7	ug/kg wet	4	533	---	82	39-120%	---	---	
Hexachlorobenzene	456	5.32	10.7	ug/kg wet	4	533	---	85	45-122%	---	---	

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Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0782 - EPA 3546							**Sediment**					
LCS (23B0782-BS1)			Prepared: 02/21/23 10:05		Analyzed: 02/21/23 22:40							
Hexachlorobutadiene	410	13.3	26.7	ug/kg wet	4	533	---	77	32-123%	---	---	
Hexachlorocyclopentadiene	463	26.7	53.2	ug/kg wet	4	533	---	87	10-140%	---	---	
Hexachloroethane	438	13.3	26.7	ug/kg wet	4	533	---	82	28-120%	---	---	
2-Chloronaphthalene	458	5.32	10.7	ug/kg wet	4	533	---	86	41-120%	---	---	
1,2,4-Trichlorobenzene	442	13.3	26.7	ug/kg wet	4	533	---	83	34-120%	---	---	
4-Bromophenyl phenyl ether	459	13.3	26.7	ug/kg wet	4	533	---	86	46-124%	---	---	
4-Chlorophenyl phenyl ether	455	13.3	26.7	ug/kg wet	4	533	---	85	45-121%	---	---	
Aniline	302	26.7	53.2	ug/kg wet	4	533	---	57	10-120%	---	---	
4-Chloroaniline	269	13.3	26.7	ug/kg wet	4	533	---	50	17-120%	---	---	Q-31
2-Nitroaniline	476	107	213	ug/kg wet	4	533	---	89	44-127%	---	---	
3-Nitroaniline	381	107	213	ug/kg wet	4	533	---	71	33-120%	---	---	
4-Nitroaniline	460	107	213	ug/kg wet	4	533	---	86	51-125%	---	---	
Nitrobenzene	464	53.2	107	ug/kg wet	4	533	---	87	34-122%	---	---	
2,4-Dinitrotoluene	467	53.2	107	ug/kg wet	4	533	---	87	48-126%	---	---	
2,6-Dinitrotoluene	457	53.2	107	ug/kg wet	4	533	---	86	46-124%	---	---	
Benzoic acid	1090	668	668	ug/kg wet	4	1070	---	102	10-140%	---	---	Q-31
Benzyl alcohol	423	26.7	53.2	ug/kg wet	4	533	---	79	29-122%	---	---	
Isophorone	467	13.3	26.7	ug/kg wet	4	533	---	88	30-122%	---	---	
Azobenzene (1,2-DPH)	481	13.3	26.7	ug/kg wet	4	533	---	90	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	569	133	267	ug/kg wet	4	533	---	107	61-121%	---	---	
3,3'-Dichlorobenzidine	2010	107	213	ug/kg wet	4	1070	---	**189**	**22-121%**	---	---	Q-29, Q-52
1,2-Dinitrobenzene	464	133	267	ug/kg wet	4	533	---	87	44-120%	---	---	
1,3-Dinitrobenzene	459	133	267	ug/kg wet	4	533	---	86	43-127%	---	---	
1,4-Dinitrobenzene	487	133	267	ug/kg wet	4	533	---	91	37-132%	---	---	
Pyridine	379	26.7	53.2	ug/kg wet	4	533	---	71	10-120%	---	---	
1,2-Dichlorobenzene	429	13.3	26.7	ug/kg wet	4	533	---	81	33-120%	---	---	
1,3-Dichlorobenzene	428	13.3	26.7	ug/kg wet	4	533	---	80	30-120%	---	---	
1,4-Dichlorobenzene	424	13.3	26.7	ug/kg wet	4	533	---	80	31-120%	---	---	

Surr: Nitrobenzene-d5 (Surr)	*Recovery: 90 %*	*Limits: 37-122 %*	*Dilution: 4x*
2-Fluorobiphenyl (Surr)	*89 %*	*44-120 %*	*"*
Phenol-d6 (Surr)	*89 %*	*33-122 %*	*"*
p-Terphenyl-d14 (Surr)	*103 %*	*54-127 %*	*"*
2-Fluorophenol (Surr)	*93 %*	*35-120 %*	*"*
2,4,6-Tribromophenol (Surr)	*90 %*	*39-132 %*	*"*

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Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0782 - EPA 3546							**Sediment**					
LCS Dup (23B0782-BSD1)			Prepared: 02/21/23 10:08		Analyzed: 02/21/23 23:14							**Q-19**
EPA 8270E												
Acenaphthene	454	5.32	10.7	ug/kg wet	4	533	---	85	40-123%	1	30%	
Acenaphthylene	483	5.32	10.7	ug/kg wet	4	533	---	91	32-132%	0.7	30%	
Anthracene	478	5.32	10.7	ug/kg wet	4	533	---	90	47-123%	2	30%	
Benz(a)anthracene	486	5.32	10.7	ug/kg wet	4	533	---	91	49-126%	0.3	30%	
Benzo(a)pyrene	505	8.00	16.0	ug/kg wet	4	533	---	95	45-129%	1	30%	
Benzo(b)fluoranthene	512	8.00	16.0	ug/kg wet	4	533	---	96	45-132%	2	30%	
Benzo(k)fluoranthene	501	8.00	16.0	ug/kg wet	4	533	---	94	47-132%	3	30%	
Benzo(g,h,i)perylene	471	5.32	10.7	ug/kg wet	4	533	---	88	43-134%	0.3	30%	
Chrysene	474	5.32	10.7	ug/kg wet	4	533	---	89	50-124%	1	30%	
Dibenz(a,h)anthracene	464	5.32	10.7	ug/kg wet	4	533	---	87	45-134%	4	30%	
Fluoranthene	479	5.32	10.7	ug/kg wet	4	533	---	90	50-127%	2	30%	
Fluorene	474	5.32	10.7	ug/kg wet	4	533	---	89	43-125%	0.3	30%	
Indeno(1,2,3-cd)pyrene	488	5.32	10.7	ug/kg wet	4	533	---	91	45-133%	1	30%	
1-Methylnaphthalene	441	10.7	21.3	ug/kg wet	4	533	---	83	40-120%	0.7	30%	
2-Methylnaphthalene	451	10.7	21.3	ug/kg wet	4	533	---	85	38-122%	2	30%	
Naphthalene	447	10.7	21.3	ug/kg wet	4	533	---	84	35-123%	0.6	30%	
Phenanthrene	451	5.32	10.7	ug/kg wet	4	533	---	84	50-121%	0.6	30%	
Pyrene	483	5.32	10.7	ug/kg wet	4	533	---	91	47-127%	1	30%	
Carbazole	463	8.00	16.0	ug/kg wet	4	533	---	87	50-123%	6	30%	
Dibenzofuran	458	5.32	10.7	ug/kg wet	4	533	---	86	44-120%	0.2	30%	
2-Chlorophenol	474	26.7	53.2	ug/kg wet	4	533	---	89	34-121%	0.09	30%	
4-Chloro-3-methylphenol	481	53.2	107	ug/kg wet	4	533	---	90	45-122%	4	30%	
2,4-Dichlorophenol	493	26.7	53.2	ug/kg wet	4	533	---	92	40-122%	2	30%	
2,4-Dimethylphenol	499	26.7	53.2	ug/kg wet	4	533	---	94	30-127%	0.4	30%	
2,4-Dinitrophenol	401	133	267	ug/kg wet	4	533	---	75	10-137%	2	30%	
4,6-Dinitro-2-methylphenol	456	133	267	ug/kg wet	4	533	---	85	29-132%	1	30%	
2-Methylphenol	453	13.3	26.7	ug/kg wet	4	533	---	85	32-122%	0.6	30%	
3+4-Methylphenol(s)	446	13.3	26.7	ug/kg wet	4	533	---	84	34-120%	2	30%	
2-Nitrophenol	548	53.2	107	ug/kg wet	4	533	---	103	36-123%	0.1	30%	
4-Nitrophenol	450	53.2	107	ug/kg wet	4	533	---	84	30-132%	3	30%	
Pentachlorophenol (PCP)	357	53.2	107	ug/kg wet	4	533	---	67	25-133%	1	30%	
Phenol	509	10.7	21.3	ug/kg wet	4	533	---	95	34-121%	1	30%	
2,3,4,6-Tetrachlorophenol	438	26.7	53.2	ug/kg wet	4	533	---	82	44-125%	0.8	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0782 - EPA 3546							**Sediment**					
LCS Dup (23B0782-BSD1)			Prepared: 02/21/23 10:08		Analyzed: 02/21/23 23:14							**Q-19**
2,3,5,6-Tetrachlorophenol	438	26.7	53.2	ug/kg wet	4	533	---	82	40-120%	0.07	30%	
2,4,5-Trichlorophenol	491	26.7	53.2	ug/kg wet	4	533	---	92	41-124%	0.2	30%	
2,4,6-Trichlorophenol	469	26.7	53.2	ug/kg wet	4	533	---	88	39-126%	3	30%	
Bis(2-ethylhexyl)phthalate	523	80.0	160	ug/kg wet	4	533	---	98	51-133%	0.6	30%	
Butyl benzyl phthalate	546	38.0	53.2	ug/kg wet	4	533	---	102	48-132%	1	30%	
Diethylphthalate	488	26.7	53.2	ug/kg wet	4	533	---	91	50-124%	0.7	30%	
Dimethylphthalate	472	26.7	53.2	ug/kg wet	4	533	---	88	48-124%	0.7	30%	
Di-n-butylphthalate	546	26.7	53.2	ug/kg wet	4	533	---	102	51-128%	1	30%	
Di-n-octyl phthalate	644	46.4	53.2	ug/kg wet	4	533	---	121	45-140%	3	30%	
N-Nitrosodimethylamine	451	13.3	26.7	ug/kg wet	4	533	---	85	23-120%	1	30%	
N-Nitroso-di-n-propylamine	457	13.3	26.7	ug/kg wet	4	533	---	86	36-120%	3	30%	
N-Nitrosodiphenylamine	461	13.3	26.7	ug/kg wet	4	533	---	86	38-127%	2	30%	
Bis(2-Chloroethoxy) methane	457	13.3	26.7	ug/kg wet	4	533	---	86	36-121%	0.4	30%	
Bis(2-Chloroethyl) ether	444	13.3	26.7	ug/kg wet	4	533	---	83	31-120%	1	30%	
2,2'-Oxybis(1-Chloropropane)	433	13.3	26.7	ug/kg wet	4	533	---	81	39-120%	0.9	30%	
Hexachlorobenzene	452	5.32	10.7	ug/kg wet	4	533	---	85	45-122%	0.7	30%	
Hexachlorobutadiene	420	13.3	26.7	ug/kg wet	4	533	---	79	32-123%	2	30%	
Hexachlorocyclopentadiene	475	26.7	53.2	ug/kg wet	4	533	---	89	10-140%	3	30%	
Hexachloroethane	440	13.3	26.7	ug/kg wet	4	533	---	82	28-120%	0.5	30%	
2-Chloronaphthalene	461	5.32	10.7	ug/kg wet	4	533	---	86	41-120%	0.7	30%	
1,2,4-Trichlorobenzene	450	13.3	26.7	ug/kg wet	4	533	---	84	34-120%	2	30%	
4-Bromophenyl phenyl ether	455	13.3	26.7	ug/kg wet	4	533	---	85	46-124%	0.8	30%	
4-Chlorophenyl phenyl ether	461	13.3	26.7	ug/kg wet	4	533	---	87	45-121%	1	30%	
Aniline	314	26.7	53.2	ug/kg wet	4	533	---	59	10-120%	4	30%	
4-Chloroaniline	277	13.3	26.7	ug/kg wet	4	533	---	52	17-120%	3	30%	Q-31
2-Nitroaniline	469	107	213	ug/kg wet	4	533	---	88	44-127%	1	30%	
3-Nitroaniline	380	107	213	ug/kg wet	4	533	---	71	33-120%	0.2	30%	
4-Nitroaniline	454	107	213	ug/kg wet	4	533	---	85	51-125%	1	30%	
Nitrobenzene	459	53.2	107	ug/kg wet	4	533	---	86	34-122%	1	30%	
2,4-Dinitrotoluene	477	53.2	107	ug/kg wet	4	533	---	89	48-126%	2	30%	
2,6-Dinitrotoluene	459	53.2	107	ug/kg wet	4	533	---	86	46-124%	0.4	30%	
Benzoic acid	948	668	668	ug/kg wet	4	1070	---	89	10-140%	14	30%	Q-31
Benzyl alcohol	409	26.7	53.2	ug/kg wet	4	533	---	77	29-122%	3	30%	
Isophorone	453	13.3	26.7	ug/kg wet	4	533	---	85	30-122%	3	30%	

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503-718-2323
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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0782 - EPA 3546							**Sediment**					
LCS Dup (23B0782-BSD1)			Prepared: 02/21/23 10:08		Analyzed: 02/21/23 23:14							**Q-19**
Azobenzene (1,2-DPH)	480	13.3	26.7	ug/kg wet	4	533	---	90	39-125%	0.2	30%	
Bis(2-Ethylhexyl) adipate	564	133	267	ug/kg wet	4	533	---	106	61-121%	0.8	30%	
3,3'-Dichlorobenzidine	1970	107	213	ug/kg wet	4	1070	---	**184**	**22-121%**	2	30%	Q-29, Q-52
1,2-Dinitrobenzene	471	133	267	ug/kg wet	4	533	---	88	44-120%	2	30%	
1,3-Dinitrobenzene	456	133	267	ug/kg wet	4	533	---	86	43-127%	0.7	30%	
1,4-Dinitrobenzene	484	133	267	ug/kg wet	4	533	---	91	37-132%	0.6	30%	
Pyridine	389	26.7	53.2	ug/kg wet	4	533	---	73	10-120%	3	30%	
1,2-Dichlorobenzene	437	13.3	26.7	ug/kg wet	4	533	---	82	33-120%	2	30%	
1,3-Dichlorobenzene	433	13.3	26.7	ug/kg wet	4	533	---	81	30-120%	1	30%	
1,4-Dichlorobenzene	432	13.3	26.7	ug/kg wet	4	533	---	81	31-120%	2	30%	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 87 %*		*Limits: 37-122 %*			*Dilution: 4x*				
2-Fluorobiphenyl (Surr)			*86 %*		*44-120 %*			*"*				
Phenol-d6 (Surr)			*85 %*		*33-122 %*			*"*				
p-Terphenyl-d14 (Surr)			*97 %*		*54-127 %*			*"*				
2-Fluorophenol (Surr)			*92 %*		*35-120 %*			*"*				
2,4,6-Tribromophenol (Surr)			*86 %*		*39-132 %*			*"*				
Matrix Spike (23B0782-MS1)			Prepared: 02/21/23 10:05		Analyzed: 02/22/23 12:55							**COMP, H-02, PRO**
QC Source Sample: MFA-B1-B5-COMP-SL-PRO (A3A1010-07)												
EPA 8270E												
Acenaphthene	314	198	397	ug/kg dry	40	794	ND	40	40-123%	---	---	J, Q-11
Acenaphthylene	257	198	397	ug/kg dry	40	794	ND	32	32-132%	---	---	J, Q-11
Anthracene	323	198	397	ug/kg dry	40	794	ND	**41**	**47-123%**	---	---	Q-11, J
Benz(a)anthracene	333	198	397	ug/kg dry	40	794	ND	**42**	**49-126%**	---	---	Q-11, J
Benzo(a)pyrene	386	298	595	ug/kg dry	40	794	ND	49	45-129%	---	---	Q-11, J
Benzo(b)fluoranthene	389	298	595	ug/kg dry	40	794	ND	49	45-132%	---	---	Q-11, J
Benzo(k)fluoranthene	361	298	595	ug/kg dry	40	794	ND	**45**	**47-132%**	---	---	Q-11, J
Benzo(g,h,i)perylene	ND	198	397	ug/kg dry	40	794	ND		**43-134%**	---	---	Q-11
Chrysene	268	198	397	ug/kg dry	40	794	ND	**34**	**50-124%**	---	---	Q-11, J
Dibenz(a,h)anthracene	ND	198	397	ug/kg dry	40	794	ND		**45-134%**	---	---	Q-11
Fluoranthene	423	198	397	ug/kg dry	40	794	ND	53	50-127%	---	---	Q-11
Fluorene	356	198	397	ug/kg dry	40	794	ND	45	43-125%	---	---	Q-11, J
Indeno(1,2,3-cd)pyrene	ND	198	397	ug/kg dry	40	794	ND		**45-133%**	---	---	Q-11
1-Methylnaphthalene	ND	397	793	ug/kg dry	40	794	ND		**40-120%**	---	---	Q-11

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0782 - EPA 3546							**Sediment**					
Matrix Spike (23B0782-MS1)			Prepared: 02/21/23 10:05		Analyzed: 02/22/23 12:55							**COMP, H-02, PRO**
QC Source Sample: MFA-B1-B5-COMP-SL-PRO (A3A1010-07)												
2-Methylnaphthalene	ND	397	793	ug/kg dry	40	794	ND		**38-122%**	---	---	Q-11
Naphthalene	ND	397	793	ug/kg dry	40	794	ND		**35-123%**	---	---	Q-11
Phenanthrene	565	198	397	ug/kg dry	40	794	582	**-2**	**50-121%**	---	---	Q-11
Pyrene	427	198	397	ug/kg dry	40	794	304	**15**	**47-127%**	---	---	Q-11
Carbazole	445	298	595	ug/kg dry	40	794	ND	56	50-123%	---	---	Q-11, J
Dibenzofuran	301	198	397	ug/kg dry	40	794	ND	**38**	**44-120%**	---	---	Q-11, J
2-Chlorophenol	ND	993	1980	ug/kg dry	40	794	ND		**34-121%**	---	---	Q-11
4-Chloro-3-methylphenol	ND	1980	3970	ug/kg dry	40	794	ND		**45-122%**	---	---	Q-11, Q-41
2,4-Dichlorophenol	ND	993	1980	ug/kg dry	40	794	ND		**40-122%**	---	---	Q-11
2,4-Dimethylphenol	ND	993	1980	ug/kg dry	40	794	ND		**30-127%**	---	---	Q-11
2,4-Dinitrophenol	ND	4960	9930	ug/kg dry	40	794	ND		**10-137%**	---	---	Q-11, Q-41
4,6-Dinitro-2-methylphenol	ND	4960	9930	ug/kg dry	40	794	ND		**29-132%**	---	---	Q-11, Q-41
2-Methylphenol	ND	496	993	ug/kg dry	40	794	ND		**32-122%**	---	---	Q-11
3+4-Methylphenol(s)	ND	496	993	ug/kg dry	40	794	ND		**34-120%**	---	---	Q-11
2-Nitrophenol	ND	1980	3970	ug/kg dry	40	794	ND		**36-123%**	---	---	Q-11
4-Nitrophenol	ND	1980	3970	ug/kg dry	40	794	ND		**30-132%**	---	---	Q-11, Q-41
Pentachlorophenol (PCP)	ND	1980	3970	ug/kg dry	40	794	ND		**25-133%**	---	---	Q-11
Phenol	ND	397	793	ug/kg dry	40	794	ND		**34-121%**	---	---	Q-11, Q-41
2,3,4,6-Tetrachlorophenol	ND	993	1980	ug/kg dry	40	794	ND		**44-125%**	---	---	Q-11
2,3,5,6-Tetrachlorophenol	ND	993	1980	ug/kg dry	40	794	ND		**40-120%**	---	---	Q-11
2,4,5-Trichlorophenol	ND	993	1980	ug/kg dry	40	794	ND		**41-124%**	---	---	Q-11
2,4,6-Trichlorophenol	ND	993	1980	ug/kg dry	40	794	ND		**39-126%**	---	---	Q-11
Bis(2-ethylhexyl)phthalate	ND	2980	5950	ug/kg dry	40	794	4080	**-514**	**51-133%**	---	---	Q-11
Butyl benzyl phthalate	1840	1410	1980	ug/kg dry	40	794	ND	**11**	**48-132%**	---	---	Q-11, J
Diethylphthalate	ND	993	1980	ug/kg dry	40	794	ND		**50-124%**	---	---	Q-11
Dimethylphthalate	ND	993	1980	ug/kg dry	40	794	ND		**48-124%**	---	---	Q-11
Di-n-butylphthalate	ND	993	1980	ug/kg dry	40	794	ND		**51-128%**	---	---	Q-11
Di-n-octyl phthalate	2050	1730	1980	ug/kg dry	40	794	ND	**259**	**45-140%**	---	---	Q-11
N-Nitrosodimethylamine	ND	496	993	ug/kg dry	40	794	ND		**23-120%**	---	---	Q-11
N-Nitroso-di-n-propylamine	ND	496	993	ug/kg dry	40	794	ND		**36-120%**	---	---	Q-11
N-Nitrosodiphenylamine	687	496	993	ug/kg dry	40	794	ND	**-13**	**38-127%**	---	---	Q-11, J
Bis(2-Chloroethoxy) methane	ND	496	993	ug/kg dry	40	794	ND		**36-121%**	---	---	Q-11
Bis(2-Chloroethyl) ether	ND	496	993	ug/kg dry	40	794	ND		**31-120%**	---	---	Q-11, Q-41

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0782 - EPA 3546							**Sediment**					
Matrix Spike (23B0782-MS1)			Prepared: 02/21/23 10:05		Analyzed: 02/22/23 12:55							**COMP, H-02, PRO**
QC Source Sample: MFA-B1-B5-COMP-SL-PRO (A3A1010-07)												
2,2'-Oxybis(1-Chloropropane)	ND	496	993	ug/kg dry	40	794	ND		**39-120%**	---	---	Q-11
Hexachlorobenzene	267	198	397	ug/kg dry	40	794	ND	**34**	**45-122%**	---	---	Q-11, J
Hexachlorobutadiene	ND	496	993	ug/kg dry	40	794	ND		**32-123%**	---	---	Q-11
Hexachlorocyclopentadiene	ND	993	1980	ug/kg dry	40	794	ND		**10-140%**	---	---	Q-11, Q-41
Hexachloroethane	ND	496	993	ug/kg dry	40	794	ND		**28-120%**	---	---	Q-11
2-Chloronaphthalene	280	198	397	ug/kg dry	40	794	ND	**35**	**41-120%**	---	---	Q-11, J
1,2,4-Trichlorobenzene	ND	496	993	ug/kg dry	40	794	ND		**34-120%**	---	---	Q-11
4-Bromophenyl phenyl ether	ND	496	993	ug/kg dry	40	794	ND		**46-124%**	---	---	Q-11
4-Chlorophenyl phenyl ether	ND	496	993	ug/kg dry	40	794	ND		**45-121%**	---	---	Q-11
Aniline	ND	993	1980	ug/kg dry	40	794	ND		**10-120%**	---	---	Q-11
4-Chloroaniline	ND	496	993	ug/kg dry	40	794	ND		**17-120%**	---	---	Q-11
2-Nitroaniline	ND	3970	7930	ug/kg dry	40	794	ND		**44-127%**	---	---	Q-11
3-Nitroaniline	ND	3970	7930	ug/kg dry	40	794	ND		**33-120%**	---	---	Q-11
4-Nitroaniline	ND	3970	7930	ug/kg dry	40	794	ND		**51-125%**	---	---	Q-11
Nitrobenzene	ND	1980	3970	ug/kg dry	40	794	ND		**34-122%**	---	---	Q-11
2,4-Dinitrotoluene	ND	1980	3970	ug/kg dry	40	794	ND		**48-126%**	---	---	Q-11
2,6-Dinitrotoluene	ND	1980	3970	ug/kg dry	40	794	ND		**46-124%**	---	---	Q-11
Benzoic acid	ND	24900	49600	ug/kg dry	40	1590	ND		**10-140%**	---	---	Q-11
Benzyl alcohol	ND	993	1980	ug/kg dry	40	794	ND		**29-122%**	---	---	Q-11
Isophorone	ND	496	993	ug/kg dry	40	794	ND		**30-122%**	---	---	Q-11
Azobenzene (1,2-DPH)	ND	496	993	ug/kg dry	40	794	ND		**39-125%**	---	---	Q-11
Bis(2-Ethylhexyl) adipate	ND	4960	9930	ug/kg dry	40	794	ND		**61-121%**	---	---	Q-11
3,3'-Dichlorobenzidine	ND	3970	7930	ug/kg dry	40	1590	ND		**22-121%**	---	---	Q-11, Q-52
1,2-Dinitrobenzene	ND	4960	9930	ug/kg dry	40	794	ND		**44-120%**	---	---	Q-11
1,3-Dinitrobenzene	ND	4960	9930	ug/kg dry	40	794	ND		**43-127%**	---	---	Q-11
1,4-Dinitrobenzene	ND	4960	9930	ug/kg dry	40	794	ND		**37-132%**	---	---	Q-11, Q-41
Pyridine	ND	993	1980	ug/kg dry	40	794	ND		**10-120%**	---	---	Q-11
1,2-Dichlorobenzene	ND	496	993	ug/kg dry	40	794	ND		**33-120%**	---	---	Q-11
1,3-Dichlorobenzene	ND	496	993	ug/kg dry	40	794	ND		**30-120%**	---	---	Q-11
1,4-Dichlorobenzene	ND	496	993	ug/kg dry	40	794	ND		**31-120%**	---	---	Q-11
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 23 %*		*Limits: 37-122 %*			*Dilution: 40x*				S-05
2-Fluorobiphenyl (Surr)			*34 %*		*44-120 %*			*"*				S-05
Phenol-d6 (Surr)			*12 %*		*33-122 %*			*"*				S-05

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0782 - EPA 3546							**Sediment**					
Matrix Spike (23B0782-MS1)			Prepared: 02/21/23 10:05 Analyzed: 02/22/23 12:55									**COMP, H-02, PRO**
QC Source Sample: MFA-B1-B5-COMP-SL-PRO (A3A1010-07)												
Surr: p-Terphenyl-d14 (Surr)			*Recovery: 46 %*	*Limits: 54-127 %*	*Dilution: 40x*							S-05
2-Fluorophenol (Surr)			*13 %*	*35-120 %*	*"*							S-05
2,4,6-Tribromophenol (Surr)			*130 %*	*39-132 %*	*"*							

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0783 - EPA 3546							**Sediment**					
Blank (23B0783-BLK1)			Prepared: 02/21/23 10:10 Analyzed: 02/21/23 17:23									
EPA 8270E OPPs												
Azinphos methyl (Guthion)	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Chlorpyrifos	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Coumaphos	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Demeton O	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Demeton S	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Diazinon	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Dichlorvos	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Dimethoate	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Disulfoton	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
EPN	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Ethoprop	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Fensulfothion	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Fenthion	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Malathion	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Merphos	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Methyl parathion	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Mevinphos (Phosdrin)	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Monocrotophos	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Naled (Dibrom)	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Parathion, ethyl	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Phorate	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Ronnel (Fenchlorphos)	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Sulfotep	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Sulprofos (Bolstar)	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
TEPP	ND	100	200	ug/kg wet	1	---	---	---	---	---	---	
Tetrachlorvinphos (Rabon)	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Tokuthion (Prothiofos)	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Trichloronate	ND	25.0	50.0	ug/kg wet	1	---	---	---	---	---	---	
Surr: Tributyl phosphate (Surr)			*Recovery: 72 %*		*Limits: 10-136 %*			*Dilution: 1x*				
Triphenyl phosphate (Surr)			*85 %*		*34-121 %*			*"*				
LCS (23B0783-BS1)			Prepared: 02/21/23 10:10 Analyzed: 02/21/23 17:58									
EPA 8270E OPPs												

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0783 - EPA 3546							**Sediment**					
LCS (23B0783-BS1)			Prepared: 02/21/23 10:10 Analyzed: 02/21/23 17:58									
Azinphos methyl (Guthion)	424	25.0	50.0	ug/kg wet	1	400	---	106	38-156%	---	---	
Chlorpyrifos	371	25.0	50.0	ug/kg wet	1	400	---	93	47-140%	---	---	
Coumaphos	432	25.0	50.0	ug/kg wet	1	400	---	108	37-160%	---	---	
Demeton O	188	25.0	50.0	ug/kg wet	1	184	---	102	66-127%	---	---	
Demeton S	182	25.0	50.0	ug/kg wet	1	194	---	94	70-121%	---	---	
Diazinon	417	25.0	50.0	ug/kg wet	1	400	---	104	42-134%	---	---	
Dichlorvos	411	25.0	50.0	ug/kg wet	1	400	---	103	39-142%	---	---	
Dimethoate	387	25.0	50.0	ug/kg wet	1	400	---	97	16-139%	---	---	
Disulfoton	427	25.0	50.0	ug/kg wet	1	400	---	107	28-145%	---	---	
EPN	447	25.0	50.0	ug/kg wet	1	400	---	112	44-137%	---	---	
Ethoprop	402	25.0	50.0	ug/kg wet	1	400	---	100	47-128%	---	---	
Fensulfothion	414	25.0	50.0	ug/kg wet	1	400	---	103	27-147%	---	---	
Fenthion	389	25.0	50.0	ug/kg wet	1	400	---	97	44-134%	---	---	
Malathion	348	25.0	50.0	ug/kg wet	1	400	---	87	46-137%	---	---	
Merphos	446	25.0	50.0	ug/kg wet	1	400	---	112	66-131%	---	---	
Methyl parathion	438	25.0	50.0	ug/kg wet	1	400	---	109	49-138%	---	---	
Mevinphos (Phosdrin)	405	25.0	50.0	ug/kg wet	1	400	---	101	12-176%	---	---	
Monocrotophos	346	25.0	50.0	ug/kg wet	1	400	---	86	10-153%	---	---	
Naled (Dibrom)	414	25.0	50.0	ug/kg wet	1	400	---	103	10-174%	---	---	
Parathion, ethyl	409	25.0	50.0	ug/kg wet	1	400	---	102	50-139%	---	---	
Phorate	441	25.0	50.0	ug/kg wet	1	400	---	110	23-142%	---	---	
Ronnel (Fenchlorphos)	379	25.0	50.0	ug/kg wet	1	400	---	95	45-138%	---	---	
Sulfotep	370	25.0	50.0	ug/kg wet	1	400	---	93	52-126%	---	---	
Sulprofos (Bolstar)	398	25.0	50.0	ug/kg wet	1	400	---	100	48-139%	---	---	
TEPP	333	100	200	ug/kg wet	1	400	---	83	16-126%	---	---	
Tetrachlorvinphos (Rabon)	444	25.0	50.0	ug/kg wet	1	400	---	111	54-129%	---	---	
Tokuthion (Prothiofos)	423	25.0	50.0	ug/kg wet	1	400	---	106	45-136%	---	---	
Trichloronate	395	25.0	50.0	ug/kg wet	1	400	---	99	37-140%	---	---	
Surr: Tributyl phosphate (Surr)			*Recovery: 90 %*		*Limits: 10-136 %*			*Dilution: 1x*				
Triphenyl phosphate (Surr)			*101 %*		*34-121 %*			*"*				
LCS Dup (23B0783-BSD1)			Prepared: 02/21/23 10:11 Analyzed: 02/21/23 18:34									**Q-19**
EPA 8270E OPPs												
Azinphos methyl (Guthion)	409	25.0	50.0	ug/kg wet	1	400	---	102	38-156%	3	30%	

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Philip Nerenberg

Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0783 - EPA 3546							**Sediment**					
LCS Dup (23B0783-BSD1)			Prepared: 02/21/23 10:11		Analyzed: 02/21/23 18:34							**Q-19**
Chlorpyrifos	362	25.0	50.0	ug/kg wet	1	400	---	91	47-140%	2	30%	
Coumaphos	409	25.0	50.0	ug/kg wet	1	400	---	102	37-160%	5	30%	
Demeton O	186	25.0	50.0	ug/kg wet	1	184	---	101	66-127%	1	30%	
Demeton S	177	25.0	50.0	ug/kg wet	1	194	---	91	70-121%	3	30%	
Diazinon	410	25.0	50.0	ug/kg wet	1	400	---	102	42-134%	2	30%	
Dichlorvos	414	25.0	50.0	ug/kg wet	1	400	---	103	39-142%	0.6	30%	
Dimethoate	382	25.0	50.0	ug/kg wet	1	400	---	95	16-139%	1	30%	
Disulfoton	413	25.0	50.0	ug/kg wet	1	400	---	103	28-145%	3	30%	
EPN	429	25.0	50.0	ug/kg wet	1	400	---	107	44-137%	4	30%	
Ethoprop	391	25.0	50.0	ug/kg wet	1	400	---	98	47-128%	3	30%	
Fensulfothion	402	25.0	50.0	ug/kg wet	1	400	---	100	27-147%	3	30%	
Fenthion	381	25.0	50.0	ug/kg wet	1	400	---	95	44-134%	2	30%	
Malathion	338	25.0	50.0	ug/kg wet	1	400	---	85	46-137%	3	30%	
Merphos	429	25.0	50.0	ug/kg wet	1	400	---	107	66-131%	4	30%	
Methyl parathion	432	25.0	50.0	ug/kg wet	1	400	---	108	49-138%	1	30%	
Mevinphos (Phosdrin)	407	25.0	50.0	ug/kg wet	1	400	---	102	12-176%	0.4	30%	
Monocrotophos	361	25.0	50.0	ug/kg wet	1	400	---	90	10-153%	4	30%	
Naled (Dibrom)	409	25.0	50.0	ug/kg wet	1	400	---	102	10-174%	1	30%	
Parathion, ethyl	403	25.0	50.0	ug/kg wet	1	400	---	101	50-139%	1	30%	
Phorate	430	25.0	50.0	ug/kg wet	1	400	---	108	23-142%	2	30%	
Ronnel (Fenchlorphos)	376	25.0	50.0	ug/kg wet	1	400	---	94	45-138%	1	30%	
Sulfotep	361	25.0	50.0	ug/kg wet	1	400	---	90	52-126%	2	30%	
Sulprofos (Bolstar)	383	25.0	50.0	ug/kg wet	1	400	---	96	48-139%	4	30%	
TEPP	356	100	200	ug/kg wet	1	400	---	89	16-126%	7	30%	
Tetrachlorvinphos (Rabon)	437	25.0	50.0	ug/kg wet	1	400	---	109	54-129%	2	30%	
Tokuthion (Prothiofos)	418	25.0	50.0	ug/kg wet	1	400	---	104	45-136%	1	30%	
Trichloronate	384	25.0	50.0	ug/kg wet	1	400	---	96	37-140%	3	30%	
Surr: Tributyl phosphate (Surr)			*Recovery: 87 %*		*Limits: 10-136 %*				*Dilution: 1x*			
Triphenyl phosphate (Surr)			*94 %*		*34-121 %*				*"*			
Matrix Spike (23B0783-MS1)			Prepared: 02/21/23 10:10		Analyzed: 02/22/23 14:24							**COMP, H-02, PRO**
QC Source Sample: MFA-B1-B5-COMP-SL-PRO (A3A1010-07)												
EPA 8270E OPPs												
Azinphos methyl (Guthion)	ND	972	1940	ug/kg dry	40	389	ND		**38-156%**	---	---	Q-11

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0783 - EPA 3546							**Sediment**					
Matrix Spike (23B0783-MS1)			Prepared: 02/21/23 10:10		Analyzed: 02/22/23 14:24							**COMP, H-02, PRO**
QC Source Sample: MFA-B1-B5-COMP-SL-PRO (A3A1010-07)												
Chlorpyrifos	ND	972	1940	ug/kg dry	40	389	ND		**47-140%**	---	---	Q-11
Coumaphos	4750	2840	2840	ug/kg dry	40	389	ND	**469**	**37-160%**	---	---	Q-11
Demeton O	ND	972	1940	ug/kg dry	40	179	ND		**66-127%**	---	---	Q-11
Demeton S	ND	972	1940	ug/kg dry	40	189	ND		**70-121%**	---	---	Q-11
Diazinon	ND	972	1940	ug/kg dry	40	389	ND		**42-134%**	---	---	Q-11
Dichlorvos	ND	972	1940	ug/kg dry	40	389	ND		**39-142%**	---	---	Q-11
Dimethoate	ND	972	1940	ug/kg dry	40	389	ND		**16-139%**	---	---	Q-11
Disulfoton	ND	972	1940	ug/kg dry	40	389	ND		**28-145%**	---	---	Q-11
EPN	ND	972	1940	ug/kg dry	40	389	ND		**44-137%**	---	---	Q-11
Ethoprop	ND	972	1940	ug/kg dry	40	389	ND		**47-128%**	---	---	Q-11
Fensulfothion	ND	972	1940	ug/kg dry	40	389	ND		**27-147%**	---	---	Q-11
Fenthion	ND	972	1940	ug/kg dry	40	389	ND		**44-134%**	---	---	Q-11
Malathion	ND	1940	1940	ug/kg dry	40	389	ND		**46-137%**	---	---	Q-11
Merphos	ND	28900	28900	ug/kg dry	40	389	ND	**-7680**	**66-131%**	---	---	Q-11
Methyl parathion	ND	1940	1940	ug/kg dry	40	389	ND		**49-138%**	---	---	Q-11
Mevinphos (Phosdrin)	ND	972	1940	ug/kg dry	40	389	ND		**12-176%**	---	---	Q-11
Monocrotophos	ND	1940	1940	ug/kg dry	40	389	ND		**10-153%**	---	---	Q-11
Naled (Dibrom)	ND	972	1940	ug/kg dry	40	389	ND		**10-174%**	---	---	Q-11
Parathion, ethyl	ND	9170	9170	ug/kg dry	40	389	ND	**-2440**	**50-139%**	---	---	Q-11
Phorate	ND	972	1940	ug/kg dry	40	389	ND		**23-142%**	---	---	Q-11, Q-41
Ronnel (Fenchlorphos)	ND	972	1940	ug/kg dry	40	389	ND		**45-138%**	---	---	Q-11
Sulfotep	ND	972	1940	ug/kg dry	40	389	ND		**52-126%**	---	---	Q-11
Sulprofos (Bolstar)	ND	1940	1940	ug/kg dry	40	389	ND		**48-139%**	---	---	Q-11
TEPP	ND	3890	7770	ug/kg dry	40	389	ND		**16-126%**	---	---	Q-11
Tetrachlorvinphos (Rabon)	10700	10600	10600	ug/kg dry	40	389	ND	**-50**	**54-129%**	---	---	Q-11
Tokuthion (Prothiofos)	ND	1940	1940	ug/kg dry	40	389	ND		**45-136%**	---	---	Q-11
Trichloronate	ND	12800	12800	ug/kg dry	40	389	ND	**-3380**	**37-140%**	---	---	Q-11
Surr: Tributyl phosphate (Surr)			*Recovery: 455 %*		*Limits: 10-136 %*			*Dilution: 40x*				S-05
Triphenyl phosphate (Surr)			*181 %*		*34-121 %*			*"*				S-05

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by GC/MS/MS

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23C0074 - EPA 3546							**Soil**					
Blank (23C0074-BLK1)			Prepared: 03/02/23 09:12 Analyzed: 03/03/23 15:06									
EPA 8270E OCPs												
Aldrin	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
alpha-BHC	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
beta-BHC	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
gamma-BHC (Lindane)	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
delta-BHC	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
cis-Chlordane	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
cis-Nonachlor	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
2,4'-DDD	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
2,4'-DDE	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
2,4'-DDT	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
4,4'-DDD	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
4,4'-DDE	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
4,4'-DDT	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Dieldrin	ND	0.0300	0.0300	ug/kg wet	1	---	---	---	---	---	---	
Endosulfan I	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Endosulfan II	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Endosulfan sulfate	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Endrin	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Endrin ketone	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Heptachlor	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Heptachlor epoxide	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Methoxychlor	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Mirex	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Oxychlordane	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
trans-Chlordane	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
trans-Nonachlor	ND	0.0500	0.100	ug/kg wet	1	---	---	---	---	---	---	
Surr: gamma-BHC-d6 (Surr)			*Recovery: 95 %*		*Limits: 50-150 %*			*Dilution: 1x*				
4,4'-DDT-d8 (Surr)			*104 %*		*50-150 %*			*"*				
Blank (23C0074-BLK2)			Prepared: 03/02/23 09:12 Analyzed: 03/07/23 20:06									**Q-16**
EPA 8270E OCPs												
Endrin Aldehyde	ND	0.100	0.100	ug/kg wet	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by GC/MS/MS

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23C0074 - EPA 3546							**Soil**					
LCS (23C0074-BS1)			Prepared: 03/02/23 09:12 Analyzed: 03/03/23 15:34									**Q-21**
EPA 8270E OCPs												
Aldrin	2.59	0.0500	0.100	ug/kg wet	1	2.50	---	104	54-135%	---	---	
alpha-BHC	2.63	0.0500	0.100	ug/kg wet	1	2.50	---	105	58-132%	---	---	
beta-BHC	2.68	0.0500	0.100	ug/kg wet	1	2.50	---	107	63-140%	---	---	
gamma-BHC (Lindane)	2.57	0.0500	0.100	ug/kg wet	1	2.50	---	103	62-132%	---	---	
delta-BHC	2.66	0.0500	0.100	ug/kg wet	1	2.50	---	106	65-140%	---	---	
cis-Chlordane	2.71	0.0500	0.100	ug/kg wet	1	2.50	---	108	57-151%	---	---	
cis-Nonachlor	2.67	0.0500	0.100	ug/kg wet	1	2.50	---	107	68-151%	---	---	
2,4'-DDD	2.40	0.0500	0.100	ug/kg wet	1	2.50	---	96	71-125%	---	---	
2,4'-DDE	2.42	0.0500	0.100	ug/kg wet	1	2.50	---	97	61-131%	---	---	
2,4'-DDT	2.56	0.0500	0.100	ug/kg wet	1	2.50	---	102	78-133%	---	---	
4,4'-DDD	2.40	0.0500	0.100	ug/kg wet	1	2.50	---	96	71-126%	---	---	
4,4'-DDE	2.36	0.0500	0.100	ug/kg wet	1	2.50	---	94	67-124%	---	---	
4,4'-DDT	2.52	0.0500	0.100	ug/kg wet	1	2.50	---	101	75-130%	---	---	
Dieldrin	2.49	0.0300	0.0300	ug/kg wet	1	2.50	---	99	70-135%	---	---	
Endosulfan I	2.77	0.0500	0.100	ug/kg wet	1	2.50	---	111	62-148%	---	---	
Endosulfan II	2.26	0.0500	0.100	ug/kg wet	1	2.50	---	90	57-141%	---	---	
Endosulfan sulfate	2.39	0.0500	0.100	ug/kg wet	1	2.50	---	96	55-152%	---	---	
Endrin	2.69	0.0500	0.100	ug/kg wet	1	2.50	---	107	73-138%	---	---	
Endrin ketone	2.47	0.0500	0.100	ug/kg wet	1	2.50	---	99	62-146%	---	---	
Heptachlor	2.82	0.0500	0.100	ug/kg wet	1	2.50	---	113	60-154%	---	---	
Heptachlor epoxide	2.68	0.0500	0.100	ug/kg wet	1	2.50	---	107	65-140%	---	---	
Hexachlorobutadiene	1.62	0.0500	0.100	ug/kg wet	1	2.50	---	65	20-120%	---	---	
Methoxychlor	2.59	0.0500	0.100	ug/kg wet	1	2.50	---	104	73-135%	---	---	
Mirex	2.42	0.0500	0.100	ug/kg wet	1	2.50	---	97	61-149%	---	---	
Oxychlordane	2.60	0.0500	0.100	ug/kg wet	1	2.50	---	104	65-133%	---	---	
trans-Chlordane	2.81	0.0500	0.100	ug/kg wet	1	2.50	---	112	62-145%	---	---	
trans-Nonachlor	2.73	0.0500	0.100	ug/kg wet	1	2.50	---	109	59-153%	---	---	
Surr: gamma-BHC-d6 (Surr)			*Recovery: 95 %*		*Limits: 50-150 %*			*Dilution: 1x*				
4,4'-DDT-d8 (Surr)			*103 %*		*50-150 %*			*"*				
LCS (23C0074-BS2)			Prepared: 03/02/23 09:12 Analyzed: 03/07/23 20:35									**Q-16, Q-21**
EPA 8270E OCPs												

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by GC/MS/MS

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23C0074 - EPA 3546							**Soil**					
LCS (23C0074-BS2)			Prepared: 03/02/23 09:12		Analyzed: 03/07/23 20:35							**Q-16, Q-21**
Endrin Aldehyde	1.52	0.100	0.100	ug/kg wet	1	2.50	---	61	10-146%	---	---	
LCS Dup (23C0074-BSD1)			Prepared: 03/02/23 09:12		Analyzed: 03/03/23 16:03							
EPA 8270E OCPs												
Aldrin	2.46	0.0500	0.100	ug/kg wet	1	2.50	---	99	54-135%	5	30%	
alpha-BHC	2.54	0.0500	0.100	ug/kg wet	1	2.50	---	102	58-132%	3	30%	
beta-BHC	2.56	0.0500	0.100	ug/kg wet	1	2.50	---	102	63-140%	5	30%	
gamma-BHC (Lindane)	2.48	0.0500	0.100	ug/kg wet	1	2.50	---	99	62-132%	4	30%	
delta-BHC	2.55	0.0500	0.100	ug/kg wet	1	2.50	---	102	65-140%	4	30%	
cis-Chlordane	2.72	0.0500	0.100	ug/kg wet	1	2.50	---	109	57-151%	0.2	30%	
cis-Nonachlor	2.54	0.0500	0.100	ug/kg wet	1	2.50	---	102	68-151%	5	30%	
2,4'-DDD	2.48	0.0500	0.100	ug/kg wet	1	2.50	---	99	71-125%	3	30%	
2,4'-DDE	2.43	0.0500	0.100	ug/kg wet	1	2.50	---	97	61-131%	0.6	30%	
2,4'-DDT	2.62	0.0500	0.100	ug/kg wet	1	2.50	---	105	78-133%	3	30%	
4,4'-DDD	2.46	0.0500	0.100	ug/kg wet	1	2.50	---	98	71-126%	3	30%	
4,4'-DDE	2.39	0.0500	0.100	ug/kg wet	1	2.50	---	96	67-124%	1	30%	
4,4'-DDT	2.60	0.0500	0.100	ug/kg wet	1	2.50	---	104	75-130%	3	30%	
Dieldrin	2.41	0.0300	0.0300	ug/kg wet	1	2.50	---	96	70-135%	3	30%	
Endosulfan I	2.69	0.0500	0.100	ug/kg wet	1	2.50	---	108	62-148%	3	30%	
Endosulfan II	2.33	0.0500	0.100	ug/kg wet	1	2.50	---	93	57-141%	3	30%	
Endosulfan sulfate	2.49	0.0500	0.100	ug/kg wet	1	2.50	---	100	55-152%	4	30%	
Endrin	2.53	0.0500	0.100	ug/kg wet	1	2.50	---	101	73-138%	6	30%	
Endrin ketone	2.58	0.0500	0.100	ug/kg wet	1	2.50	---	103	62-146%	4	30%	
Heptachlor	2.69	0.0500	0.100	ug/kg wet	1	2.50	---	108	60-154%	5	30%	
Heptachlor epoxide	2.56	0.0500	0.100	ug/kg wet	1	2.50	---	102	65-140%	4	30%	
Hexachlorobutadiene	1.84	0.0500	0.100	ug/kg wet	1	2.50	---	74	20-120%	13	30%	
Methoxychlor	2.73	0.0500	0.100	ug/kg wet	1	2.50	---	109	73-135%	5	30%	
Mirex	2.49	0.0500	0.100	ug/kg wet	1	2.50	---	100	61-149%	3	30%	
Oxychlordane	2.51	0.0500	0.100	ug/kg wet	1	2.50	---	100	65-133%	4	30%	
trans-Chlordane	2.59	0.0500	0.100	ug/kg wet	1	2.50	---	104	62-145%	8	30%	
trans-Nonachlor	2.58	0.0500	0.100	ug/kg wet	1	2.50	---	103	59-153%	6	30%	
Surr: gamma-BHC-d6 (Surr)			*Recovery: 95 %*		*Limits: 50-150 %*				*Dilution: 1x*			
4,4'-DDT-d8 (Surr)			*105 %*		*50-150 %*				*"*			

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by GC/MS/MS

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23C0074 - EPA 3546							**Soil**					
LCS Dup (23C0074-BSD2)			Prepared: 03/02/23 09:12		Analyzed: 03/07/23 21:03							**Q-16**
EPA 8270E OCPs												
Endrin Aldehyde	1.51	0.100	0.100	ug/kg wet	1	2.50	---	60	10-146%	0.9	30%	

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0914 - EPA 3051A							Sediment					
Blank (23B0914-BLK1)			Prepared: 02/27/23 06:58 Analyzed: 02/27/23 18:16									
EPA 6020B												
Antimony	ND	0.250	0.500	mg/kg wet	5	---	---	---	---	---	---	
Arsenic	ND	0.250	0.500	mg/kg wet	5	---	---	---	---	---	---	
Barium	ND	0.250	0.500	mg/kg wet	5	---	---	---	---	---	---	
Beryllium	ND	0.0500	0.100	mg/kg wet	5	---	---	---	---	---	---	
Cadmium	ND	0.0500	0.100	mg/kg wet	5	---	---	---	---	---	---	
Chromium	ND	0.250	0.500	mg/kg wet	5	---	---	---	---	---	---	
Copper	ND	0.500	1.00	mg/kg wet	5	---	---	---	---	---	---	
Lead	ND	0.0500	0.100	mg/kg wet	5	---	---	---	---	---	---	
Manganese	ND	0.250	0.500	mg/kg wet	5	---	---	---	---	---	---	
Mercury	ND	0.0200	0.0400	mg/kg wet	5	---	---	---	---	---	---	
Nickel	ND	0.500	1.00	mg/kg wet	5	---	---	---	---	---	---	
Selenium	ND	0.250	0.500	mg/kg wet	5	---	---	---	---	---	---	
Silver	ND	0.0500	0.100	mg/kg wet	5	---	---	---	---	---	---	
Thallium	ND	0.250	0.500	mg/kg wet	5	---	---	---	---	---	---	
Zinc	ND	1.00	2.00	mg/kg wet	5	---	---	---	---	---	---	
LCS (23B0914-BS1)			Prepared: 02/27/23 06:58 Analyzed: 02/27/23 18:27									
EPA 6020B												
Antimony	12.2	0.250	0.500	mg/kg wet	5	12.5	---	97	80-120%	---	---	
Arsenic	23.2	0.250	0.500	mg/kg wet	5	25.0	---	93	80-120%	---	---	
Barium	24.4	0.250	0.500	mg/kg wet	5	25.0	---	97	80-120%	---	---	
Beryllium	12.0	0.0500	0.100	mg/kg wet	5	12.5	---	96	80-120%	---	---	
Cadmium	23.2	0.0500	0.100	mg/kg wet	5	25.0	---	93	80-120%	---	---	
Chromium	22.1	0.250	0.500	mg/kg wet	5	25.0	---	89	80-120%	---	---	
Copper	22.4	0.500	1.00	mg/kg wet	5	25.0	---	90	80-120%	---	---	
Lead	24.5	0.0500	0.100	mg/kg wet	5	25.0	---	98	80-120%	---	---	
Manganese	23.1	0.250	0.500	mg/kg wet	5	25.0	---	92	80-120%	---	---	
Mercury	0.455	0.0200	0.0400	mg/kg wet	5	0.500	---	91	80-120%	---	---	
Nickel	23.1	0.500	1.00	mg/kg wet	5	25.0	---	92	80-120%	---	---	
Selenium	11.5	0.250	0.500	mg/kg wet	5	12.5	---	92	80-120%	---	---	
Silver	12.1	0.0500	0.100	mg/kg wet	5	12.5	---	97	80-120%	---	---	
Thallium	11.9	0.250	0.500	mg/kg wet	5	12.5	---	95	80-120%	---	---	
Zinc	23.6	1.00	2.00	mg/kg wet	5	25.0	---	95	80-120%	---	---	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0914 - EPA 3051A							**Sediment**					
Duplicate (23B0914-DUP1)			Prepared: 02/27/23 06:58		Analyzed: 02/27/23 18:48							
QC Source Sample: MFA-B1-B5-COMP-SL-PRO (A3A1010-07)												
EPA 6020B												
Antimony	**0.902**	0.277	0.555	mg/kg dry	5	---	0.944	---	---	5	20%	COMP, PRO
Arsenic	**3.49**	0.277	0.555	mg/kg dry	5	---	3.48	---	---	0.2	20%	COMP, PRO
Barium	**169**	0.277	0.555	mg/kg dry	5	---	174	---	---	3	20%	COMP, PRO
Beryllium	**0.336**	0.0555	0.111	mg/kg dry	5	---	0.316	---	---	6	20%	COMP, PRO
Cadmium	**3.04**	0.0555	0.111	mg/kg dry	5	---	3.24	---	---	6	20%	COMP, PRO
Chromium	**183**	0.277	0.555	mg/kg dry	5	---	191	---	---	5	20%	COMP, PRO
Copper	**128**	0.555	1.11	mg/kg dry	5	---	142	---	---	10	20%	COMP, PRO
Lead	**39.5**	0.0555	0.111	mg/kg dry	5	---	40.2	---	---	2	20%	COMP, PRO
Manganese	**699**	0.277	0.555	mg/kg dry	5	---	763	---	---	9	20%	COMP, PRO
Mercury	**0.833**	0.0222	0.0444	mg/kg dry	5	---	0.881	---	---	6	20%	COMP, PRO
Nickel	**44.6**	0.555	1.11	mg/kg dry	5	---	46.8	---	---	5	20%	COMP, PRO
Selenium	**0.767**	0.277	0.555	mg/kg dry	5	---	0.813	---	---	6	20%	COMP, PRO
Silver	**2.49**	0.0555	0.111	mg/kg dry	5	---	2.50	---	---	0.3	20%	COMP, PRO
Thallium	ND	0.277	0.555	mg/kg dry	5	---	ND	---	---	---	20%	COMP, PRO
Zinc	**482**	1.11	2.22	mg/kg dry	5	---	531	---	---	10	20%	COMP, PRO
Matrix Spike (23B0914-MS1)			Prepared: 02/27/23 06:58		Analyzed: 02/27/23 18:53							
QC Source Sample: MFA-B1-B5-COMP-SL-PRO (A3A1010-07)												
EPA 6020B												
Antimony	10.4	0.268	0.536	mg/kg dry	5	13.4	0.944	**71**	**75-125%**	---	---	COMP, PRO,Q-01
Arsenic	27.6	0.268	0.536	mg/kg dry	5	26.8	3.48	90	75-125%	---	---	COMP, PRO
Barium	199	0.268	0.536	mg/kg dry	5	26.8	174	91	75-125%	---	---	COMP, PRO
Beryllium	13.4	0.0536	0.107	mg/kg dry	5	13.4	0.316	97	75-125%	---	---	COMP, PRO
Cadmium	29.0	0.0536	0.107	mg/kg dry	5	26.8	3.24	96	75-125%	---	---	COMP, PRO
Chromium	203	0.268	0.536	mg/kg dry	5	26.8	191	**44**	**75-125%**	---	---	COMP, PRO,Q-65
Copper	158	0.536	1.07	mg/kg dry	5	26.8	142	**59**	**75-125%**	---	---	COMP, PRO,Q-65
Lead	66.3	0.0536	0.107	mg/kg dry	5	26.8	40.2	97	75-125%	---	---	COMP, PRO
Manganese	739	0.268	0.536	mg/kg dry	5	26.8	763	**-91**	**75-125%**	---	---	COMP, PRO,Q-65
Mercury	1.41	0.0215	0.0429	mg/kg dry	5	0.536	0.881	99	75-125%	---	---	COMP, PRO

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0914 - EPA 3051A							**Sediment**					
Matrix Spike (23B0914-MS1)			Prepared: 02/27/23 06:58		Analyzed: 02/27/23 18:53							
QC Source Sample: MFA-B1-B5-COMP-SL-PRO (A3A1010-07)												
Nickel	68.9	0.536	1.07	mg/kg dry	5	26.8	46.8	82	75-125%	---	---	COMP, PRO
Selenium	14.1	0.268	0.536	mg/kg dry	5	13.4	0.813	99	75-125%	---	---	COMP, PRO
Silver	15.3	0.0536	0.107	mg/kg dry	5	13.4	2.50	95	75-125%	---	---	COMP, PRO
Thallium	13.0	0.268	0.536	mg/kg dry	5	13.4	ND	97	75-125%	---	---	COMP, PRO
Zinc	529	1.07	2.15	mg/kg dry	5	26.8	531	**-6**	**75-125%**	---	---	COMP, PRO,Q-65

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Hexavalent Chromium by Colorimetric Spectrophotometry

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0959 - EPA 3060A							**Solid**					
Blank (23B0959-BLK1)			Prepared: 02/27/23 14:57		Analyzed: 02/28/23 12:44							
EPA 7196A												
Chromium (VI)	ND	0.225	0.450	mg/kg	1	---	---	---	---	---	---	
LCS (23B0959-BS1)			Prepared: 02/27/23 14:57		Analyzed: 02/28/23 12:44							
EPA 7196A												
Chromium (VI)	17.0	0.225	0.450	mg/kg	1	20.0	---	85	80-120%	---	---	
LCS Dup (23B0959-BSD1)			Prepared: 02/27/23 14:57		Analyzed: 02/28/23 12:45							
EPA 7196A												
Chromium (VI)	19.4	0.225	0.450	mg/kg	1	20.0	---	97	80-120%	13	20%	
Matrix Spike (23B0959-MS1)			Prepared: 02/27/23 14:57		Analyzed: 02/28/23 12:46							
EPA 7196A												
Chromium (VI)	ND	10.0	20.0	mg/kg	50	19.7			**75-125%**	---	---	Cr6-01, Q-57, R-04
Post Spike (23B0959-PS1)			Prepared: 02/27/23 14:57		Analyzed: 02/28/23 12:50							
EPA 7196A												
Chromium (VI)	ND			ug/L	50	19900			**85-115%**		---	Cr6-01, Q-57, R-04

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Philip Nerenberg, Lab Director

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0043 - Total Solids (Dry Weight)							**Soil**					
Duplicate (23B0043-DUP1)			Prepared: 02/01/23 13:29		Analyzed: 02/02/23 05:57							**PRO**
QC Source Sample: Non-SDG (A3A0911-02)												
% Solids	**97.2**	1.00	1.00	%	1	---	97.2	---	---	0.01	10%	
Duplicate (23B0043-DUP2)			Prepared: 02/01/23 13:29		Analyzed: 02/02/23 05:57							**PRO**
QC Source Sample: Non-SDG (A3A0911-04)												
% Solids	**97.5**	1.00	1.00	%	1	---	97.4	---	---	0.08	10%	
Duplicate (23B0043-DUP3)			Prepared: 02/01/23 18:38		Analyzed: 02/02/23 05:57							
QC Source Sample: Non-SDG (A3B0033-01)												
% Solids	**76.1**	1.00	1.00	%	1	---	75.9	---	---	0.3	10%	
Duplicate (23B0043-DUP4)			Prepared: 02/01/23 18:38		Analyzed: 02/02/23 05:57							
QC Source Sample: Non-SDG (A3B0033-02)												
% Solids	**77.3**	1.00	1.00	%	1	---	77.6	---	---	0.4	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0116 - Total Solids (Dry Weight)							**Soil**					
Duplicate (23B0116-DUP1)			Prepared: 02/02/23 19:28		Analyzed: 02/03/23 04:15							
QC Source Sample: Non-SDG (A3B0049-01)												
% Solids	**64.5**	1.00	1.00	%	1	---	60.6	---	---	6	10%	
Duplicate (23B0116-DUP2)			Prepared: 02/02/23 19:28		Analyzed: 02/03/23 04:15							
QC Source Sample: Non-SDG (A3B0049-02)												
% Solids	**56.0**	1.00	1.00	%	1	---	55.9	---	---	0.1	10%	
Duplicate (23B0116-DUP3)			Prepared: 02/02/23 19:28		Analyzed: 02/03/23 04:15							
QC Source Sample: Non-SDG (A3B0049-03)												
% Solids	**64.5**	1.00	1.00	%	1	---	65.1	---	---	0.8	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0202 - Total Solids (Dry Weight)							Soil					
Duplicate (23B0202-DUP1)			Prepared: 02/06/23 13:38		Analyzed: 02/07/23 06:25							**PRO**
QC Source Sample: Non-SDG (A3A0960-02)												
% Solids	**97.3**	1.00	1.00	%	1	---	97.4	---	---	0.1	10%	
Duplicate (23B0202-DUP2)			Prepared: 02/06/23 13:38		Analyzed: 02/07/23 06:25							**PRO**
QC Source Sample: Non-SDG (A3A0960-04)												
% Solids	**97.1**	1.00	1.00	%	1	---	97.1	---	---	0.04	10%	
Duplicate (23B0202-DUP3)			Prepared: 02/06/23 13:38		Analyzed: 02/07/23 06:25							**PRO**
QC Source Sample: Non-SDG (A3A0960-06)												
% Solids	**96.9**	1.00	1.00	%	1	---	97.0	---	---	0.09	10%	
Duplicate (23B0202-DUP4)			Prepared: 02/06/23 13:38		Analyzed: 02/07/23 06:25							**PRO**
QC Source Sample: Non-SDG (A3A0960-08)												
% Solids	**96.9**	1.00	1.00	%	1	---	96.9	---	---	0.03	10%	
Duplicate (23B0202-DUP5)			Prepared: 02/06/23 13:38		Analyzed: 02/07/23 06:25							
QC Source Sample: Non-SDG (A3B0140-01)												
% Solids	**75.1**	1.00	1.00	%	1	---	73.2	---	---	3	10%	
Duplicate (23B0202-DUP6)			Prepared: 02/06/23 13:38		Analyzed: 02/07/23 06:25							
QC Source Sample: Non-SDG (A3B0140-02)												
% Solids	**90.2**	1.00	1.00	%	1	---	90.2	---	---	0.02	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Portland, OR 97232	Project Manager: David Weatherby	A3A1010 - 04 19 23 1708

QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0961 - Total Solids (Dry Weight)							Soil					
Duplicate (23B0961-DUP1)			Prepared: 02/27/23 15:30		Analyzed: 02/28/23 06:46							
QC Source Sample: Non-SDG (A3B0820-01)												
% Solids	**76.8**	1.00	1.00	%	1	---	76.1	---	---	0.9	10%	
Duplicate (23B0961-DUP2)			Prepared: 02/27/23 15:30		Analyzed: 02/28/23 06:46							
QC Source Sample: Non-SDG (A3B0820-02)												
% Solids	**77.7**	1.00	1.00	%	1	---	78.5	---	---	1	10%	
Duplicate (23B0961-DUP3)			Prepared: 02/27/23 19:00		Analyzed: 02/28/23 06:46							
QC Source Sample: Non-SDG (A3B0849-03)												
% Solids	**91.6**	1.00	1.00	%	1	---	91.6	---	---	0.06	10%	
Duplicate (23B0961-DUP4)			Prepared: 02/27/23 19:00		Analyzed: 02/28/23 06:46							
QC Source Sample: Non-SDG (A3B0849-04)												
% Solids	**91.5**	1.00	1.00	%	1	---	92.0	---	---	0.5	10%	
Duplicate (23B0961-DUP5)			Prepared: 02/27/23 19:00		Analyzed: 02/28/23 06:46							
QC Source Sample: Non-SDG (A3B0849-05)												
% Solids	**91.9**	1.00	1.00	%	1	---	92.2	---	---	0.3	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3546 (Fuels)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0765							
A3A1010-07	Sediment	NWTPH-Dx	01/30/23 16:00	02/21/23 07:18	10.11g/5mL	10g/5mL	0.99

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0290							
A3A1010-06	Sediment	NWTPH-Gx (MS)	01/30/23 16:00	01/30/23 16:00	20.2g/25mL	5g/5mL	1.24

Volatile Organic Compounds by EPA 8260D

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0290							
A3A1010-06	Sediment	5035A/8260D	01/30/23 16:00	01/30/23 16:00	20.2g/25mL	5g/5mL	1.24

Volatile Organic Compounds by EPA 8260D SIM

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0452							
A3A1010-06	Sediment	5035A/8260D SIM	01/30/23 16:00	01/30/23 16:00	20.2g/25mL	5g/5mL	1.24

Semivolatile Organic Compounds by EPA 8270E

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0782							
A3A1010-07	Sediment	EPA 8270E	01/30/23 16:00	02/21/23 10:05	10.56g/5mL	15g/2mL	3.55

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0783							
A3A1010-07	Sediment	EPA 8270E OPPs	01/30/23 16:00	02/21/23 10:10	10.38g/5mL	10g/5mL	0.96

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SAMPLE PREPARATION INFORMATION

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor

Organochlorine Pesticides by GC/MS/MS

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23C0074							
A3A1010-07	Sediment	EPA 8270E OCPs	01/30/23 16:00	03/02/23 09:12	10.57g/25mL	10g/1mL	23.70
A3A1010-07RE1	Sediment	EPA 8270E OCPs	01/30/23 16:00	03/02/23 09:12	10.57g/25mL	10g/1mL	23.70

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3051A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0914							
A3A1010-07	Sediment	EPA 6020B	01/30/23 16:00	02/27/23 06:58	0.493g/50mL	0.5g/50mL	1.01

Total Hexavalent Chromium by Colorimetric Spectrophotometry

Prep: EPA 3060A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0959							
A3A1010-07	Sediment	EPA 7196A	01/30/23 16:00	02/27/23 14:57	2.5194g/100mL	2.5g/111mL	0.89

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0043							
A3A1010-01	Sediment	EPA 8000D	01/30/23 16:00	02/01/23 13:29			NA
Batch: 23B0116							
A3A1010-02	Sediment	EPA 8000D	01/31/23 10:50	02/02/23 19:28			NA
A3A1010-03	Sediment	EPA 8000D	01/31/23 09:00	02/02/23 19:28			NA
Batch: 23B0202							
A3A1010-04	Sediment	EPA 8000D	02/02/23 09:10	02/06/23 13:38			NA
A3A1010-05	Sediment	EPA 8000D	02/03/23 15:00	02/06/23 13:38			NA
A3A1010-06	Sediment	EPA 8000D	01/30/23 16:00	02/06/23 00:00			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
Batch: 23B0961							
A3A1010-07	Sediment	EPA 8000D	01/30/23 16:00	02/27/23 19:00			NA

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

A-01	The Average of Dry Weight Results from the discrete samples was used for DW for Composite sample for Volatiles.
COMP	Analyzed sample is a composite of discrete samples that was performed in the laboratory.
Cr6-01	Matrix Spike fails due to probable reducing conditions present in the sample. Sample is ND. Data quality is not affected because any hexavalent chromium present in the sample is likely to have been reduced to chromium three.
F-03	The result for this hydrocarbon range is elevated due to the presence of individual analyte peaks in the quantitation range that are not representative of the fuel pattern reported.
F-11	The hydrocarbon pattern indicates possible weathered diesel, mineral oil, or a contribution from a related component.
H-02	This sample was extracted outside of the recommended holding time.
J	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
PRO	Sample has undergone sample processing prior to extraction and analysis.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-11	Spike recovery is estimated due to sample dilution required for high analyte concentration and/or matrix interference.
Q-16	Reanalysis of an original Batch QC sample.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-21	Matrix Spike results for this extraction batch are not reported due to the interfering organic compounds in the source sample. Batch is accepted based on results of the Blank Spikes.
Q-29	Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high.
Q-31	Estimated Results. Recovery of Continuing Calibration Verification sample below lower control limit for this analyte. Results are likely biased low.
Q-41	Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
Q-42	Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)
Q-52	Due to known erratic recoveries, the result and reporting levels for this analyte are reported as Estimated Values. This analyte may not have passed all QC requirements for this method.
Q-54	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +1%. The results are reported as Estimated Values.
Q-54a	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +15%. The results are reported as Estimated Values.
Q-54b	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +3%. The results are reported as Estimated Values.

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Q-54c	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +5%. The results are reported as Estimated Values.
Q-54d	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +6%. The results are reported as Estimated Values.
Q-54e	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +75%. The results are reported as Estimated Values.
Q-54f	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +89%. The results are reported as Estimated Values.
Q-54g	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by -3%. The results are reported as Estimated Values.
Q-55	Daily CCV/LCS recovery for this analyte was below the +/-20% criteria listed in EPA 8260, however there is adequate sensitivity to ensure detection at the reporting level.
Q-56	Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260
Q-57	Compensation for background color and/or turbidity has been made by subtracting the absorbance of a second aliquot of sample to which all reagents except the color producing reagent have been added, in accordance with the method.
Q-65	Spike recovery is estimated due to the high analyte concentration of the source sample.
R-02	The Reporting Limit for this analyte has been raised to account for interference from coeluting organic compounds present in the sample.
R-04	Reporting levels elevated due to preparation and/or analytical dilution necessary for analysis.
S-01	Surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interference.
S-05	Surrogate recovery is estimated due to sample dilution required for high analyte concentration and/or matrix interference.
V-15	Sample aliquot was subsampled from the sample container. The subsampled aliquot was preserved in the laboratory within 48 hours of sampling.

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 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
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

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:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
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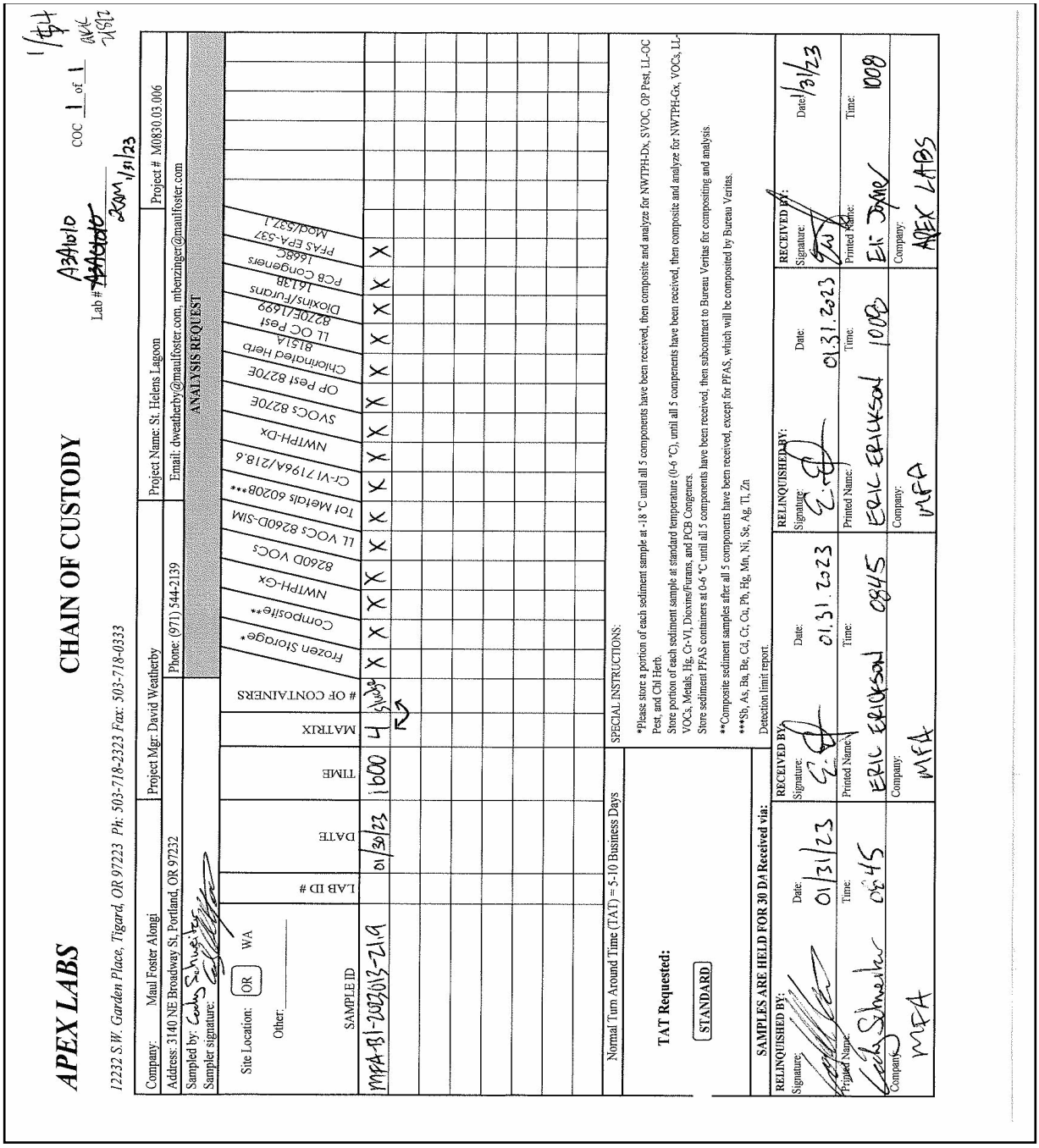
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**



APEX LABS

CHAIN OF CUSTODY

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

COC 1 of 1

Lab # A3A1010

Company: Maul Foster Alongi | Project Mgr: David Weatherby | Project Name: St. Helens Lagoon | Project # M0830.03.006

Address: 3140 NE Broadway St, Portland, OR 97232 | Phone: (971) 544-2139 | Email: dweatherby@maulfoster.com, mbenzinger@maulfoster.com

Sampled by: Cathy Schweitzer

Sampler signature:

Site Location: OR WA Other:

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	Frozen Storage*	Composite**	NWTPH-Gx	8260D VOCs	LL VOCs 8260D-SIM	Tot Metals 6020B***	Cr-VI 7196A/218.6	NWTPH-Dx	SVOCs 8270E	OP Pest 8270E	Chlorinated Herb 8151A	LL OC Pest 8270E/1699	Dioxins/Furans 1613B	PCB Congeners 1668C	PFAS EPA-537 Mod/537.1
MFA-SL-20230131-2119		01/30/23	1600	S	4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Normal Turn Around Time (TAT) = 5-10 Business Days

TAT Requested: STANDARD

SPECIAL INSTRUCTIONS:

*Please store a portion of each sediment sample at -18 °C until all 5 components have been received, then composite and analyze for NWTPH-Dx, SVOC, OP Pest, LL-OC Pest, and Chl Herb.
Store portion of each sediment sample at standard temperature (0-6 °C), until all 5 components have been received, then composite and analyze for NWTPH-Gx, VOCs, LL-VOCs, Metals, Hg, Cr-VI, Dioxins/Furans, and PCB Congeners.
Store sediment PFAS containers at 0-6 °C until all 5 components have been received, then subcontract to Bureau Veritas for compositing and analysis.
**Composite sediment samples after all 5 components have been received, except for PFAS, which will be composited by Bureau Veritas.
***Sb, As, Ba, Be, Cd, Cr, Co, Pb, Hg, Mn, Ni, Se, Ag, Tl, Zn
Detection limit report.

SAMPLES ARE HELD FOR 30 DA Received via:

RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:	RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:	01/31/23	0845	Signature:	01.31.2023	0845	Signature:	01.31.2023	1000	Signature:	1/31/23	
Printed Name: Cathy Schweitzer			Printed Name: ERIC ERICKSON			Printed Name: ERIC ERICKSON			Printed Name: Eli Jones		1008
Company: MFA			Company: MFA			Company: MFA			Company: APEX LABS		

Apex Laboratories

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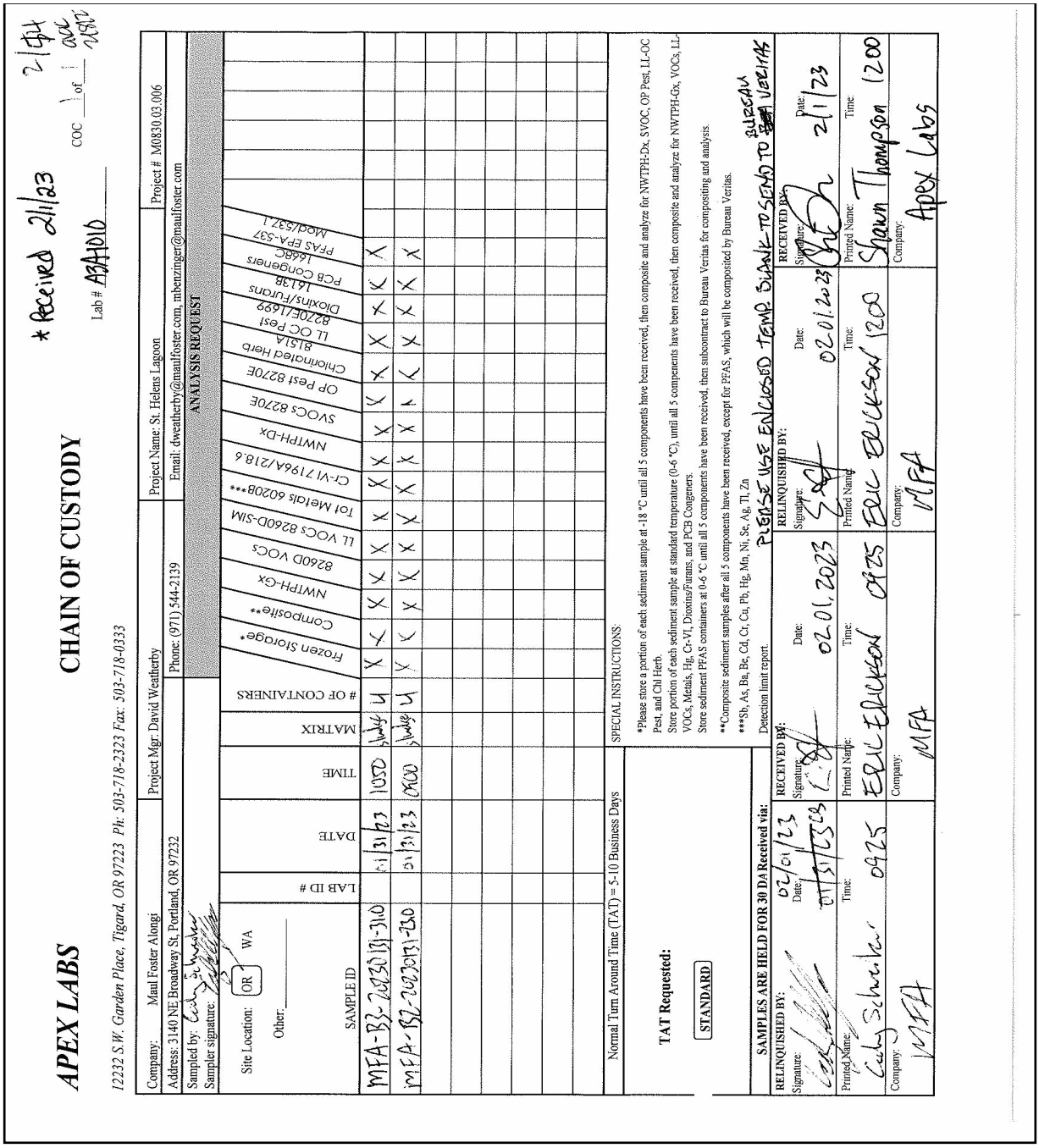
Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**



APEX LABS

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

CHAIN OF CUSTODY

* Received 2/1/23

COC 1 of 1

Lab # A3A1010

Company: Maul Foster Alongi | Project Mgr: David Weatherby | Project Name: St. Helens Lagoon | Project # M0830.03.006

Address: 3140 NE Broadway St, Portland, OR 97232 | Phone: (971) 544-2139 | Email: dweatherby@maulfoster.com, mbenzinger@maulfoster.com

Sampled by: Cody Schneider

Sampler signature:

Site Location: OR WA

Other:

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	Frozen Storage*	Composite**	NWTPH-Gx	8260D VOCs	LL VOCs 8260D-SIM	Tot Metals 6020B***	Cr-VI 7196A/218.6	NWTPH-Dx	SVOCs 8270E	Op Pest 8270E	Chlorinated Herb 8151A	LL OC Pest 8270E/1699	Dioxins/Furans 1613B	PCB Congeners 1668C	PFAS EPA-537 Mod/537.1
MFA-B2-20230131-310		1/31/23	1030	Sludge	4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MFA-B2-20230131-330		1/31/23	0900	Sludge	4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Normal Turn Around Time (TAT) = 5-10 Business Days

TAT Requested: STANDARD

SPECIAL INSTRUCTIONS:

*Please store a portion of each sediment sample at -18 °C until all 5 components have been received, then composite and analyze for NWTPH-Dx, SVOC, OP Pest, LL-OC Pest, and Chl Herb.
Store portion of each sediment sample at standard temperature (0-6 °C), until all 5 components have been received, then composite and analyze for NWTPH-Gx, VOCs, LL-VOCs, Metals, Hg, Cr-VI, Dioxins/Furans, and PCB Congeners.
Store sediment PFAS containers at 0-6 °C until all 5 components have been received, then subcontract to Bureau Veritas for compositing and analysis.
**Composite sediment samples after all 5 components have been received, except for PFAS, which will be composited by Bureau Veritas.
***Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Se, Ag, Tl, Zn
Detection limit report.

PLEASE USE ENCLOSED TEMP BLANK TO SEND TO Bureau Veritas

SAMPLES ARE HELD FOR 30 DA Received via:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:	Signature:	Signature:
Date: 02/01/23	Date: 02.01.2023	Date: 02.01.2023	Date: 2/1/23
Time: 1715/1730	Time: 0925	Time: 1200	Time: 1200
Printed Name: Cody Schneider	Printed Name: ERIC ERICKSON	Printed Name: Eric Erickson	Printed Name: Shawn Thompson
Company: MFA	Company: MFA	Company: MFA	Company: Apex Labs

Apex Laboratories

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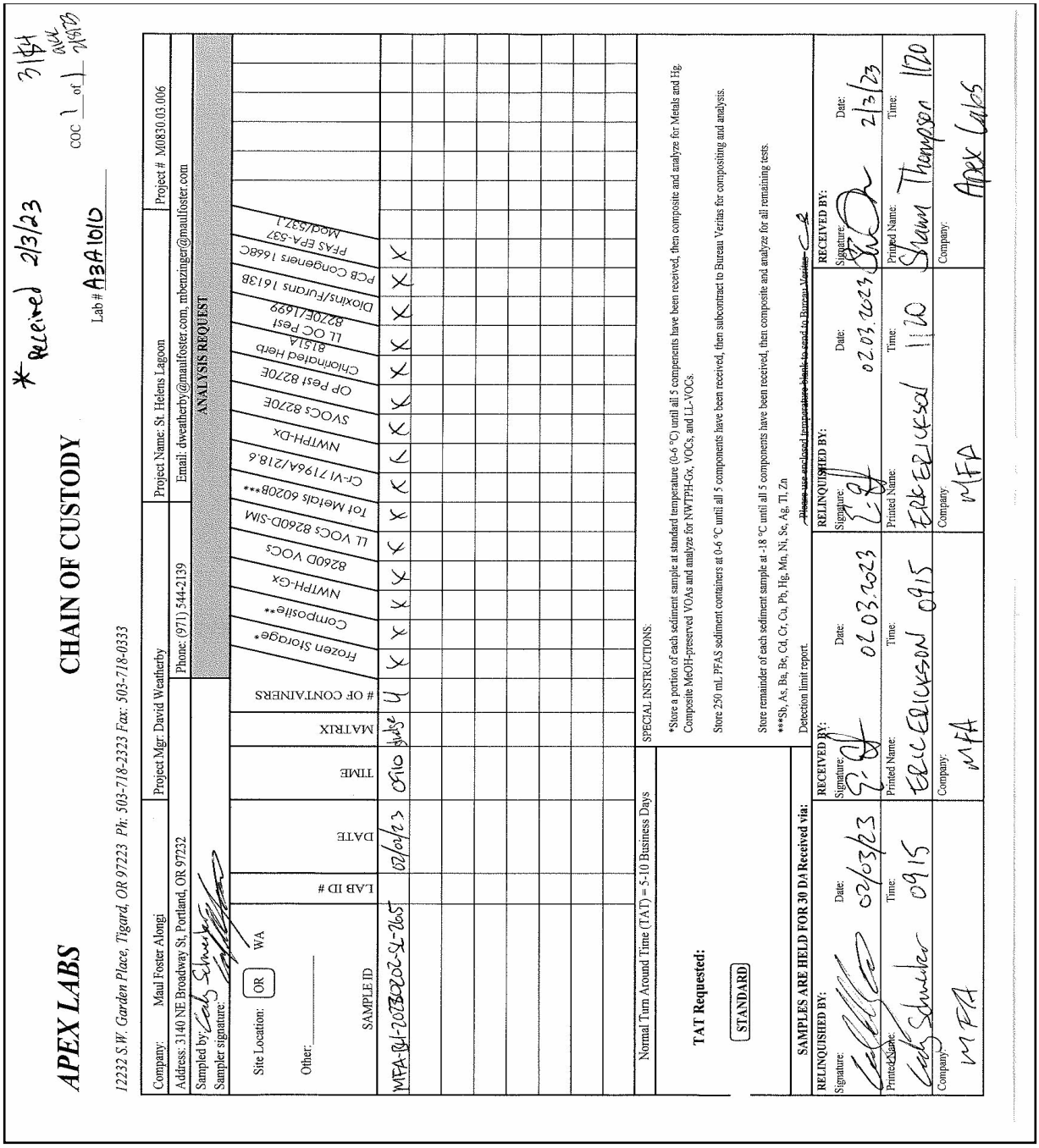
Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**



APEX LABS

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

CHAIN OF CUSTODY

*Received 2/3/23

COC 1 of 1

Lab # A3A1010

Company: Maul Foster Alongi | Project Mgr: David Weatherby | Project Name: St. Helens Lagoon | Project # M0830.03.006

Address: 3140 NE Broadway St, Portland, OR 97232 | Phone: (971) 544-2139 | Email: dweatherby@maulfoster.com, mbenzinger@maulfoster.com

Sampled by: Carly Schmuker

Sampler signature:

Site Location: OR WA

Other:

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	Frozen storage*	Composite**	NWTPH-Gx	8260D VOCs	LL VOCs 8260D-SIM	Tot Metals 6020B***	Cr-VI 7196A/218.6	NWTPH-Dx	SVOCs 8270E	Op Pest 8270E	Chlorinated Herb 8151A	LL OC Pest 8270E/1699	Dioxins/Furans 1613B	PCB Congeners 1668C	PFAS EPA-537 Mod/537.1
MFA-SH-20230202-SL-2045		02/02/23	0910	Solids	4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Normal Turn Around Time (TAT) = 5-10 Business Days

TAT Requested:

STANDARD

SPECIAL INSTRUCTIONS:

*Store a portion of each sediment sample at standard temperature (0-6 °C) until all 5 components have been received, then composite and analyze for Metals and Hg. Composite MeOH-preserved VOAs and analyze for NWTPH-Gx, VOCs, and LL-VOCs.

Store 250 mL PFAS sediment containers at 0-6 °C until all 5 components have been received, then subcontract to Bureau Veritas for compositing and analysis.

Store remainder of each sediment sample at -18 °C until all 5 components have been received, then composite and analyze for all remaining tests.

***Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Se, Ag, Tl, Zn

Please use enclosed temperature blank to send to Bureau Veritas. CS

Detection limit report.

SAMPLES ARE HELD FOR 30 DA Received via:

RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:	RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:	02/03/23		Signature:	02/03/2023		Signature:	02.03.2023		Signature:	2/3/23	
Printed Name: Carly Schmuker		0915	Printed Name: ERIC ERICKSON		0915	Printed Name: ERIC ERICKSON		1110	Printed Name: Shawn Thompson		1170
Company: MFA			Company: MFA			Company: MFA			Company: Apex Labs		

Apex Laboratories

Philip Nerenberg

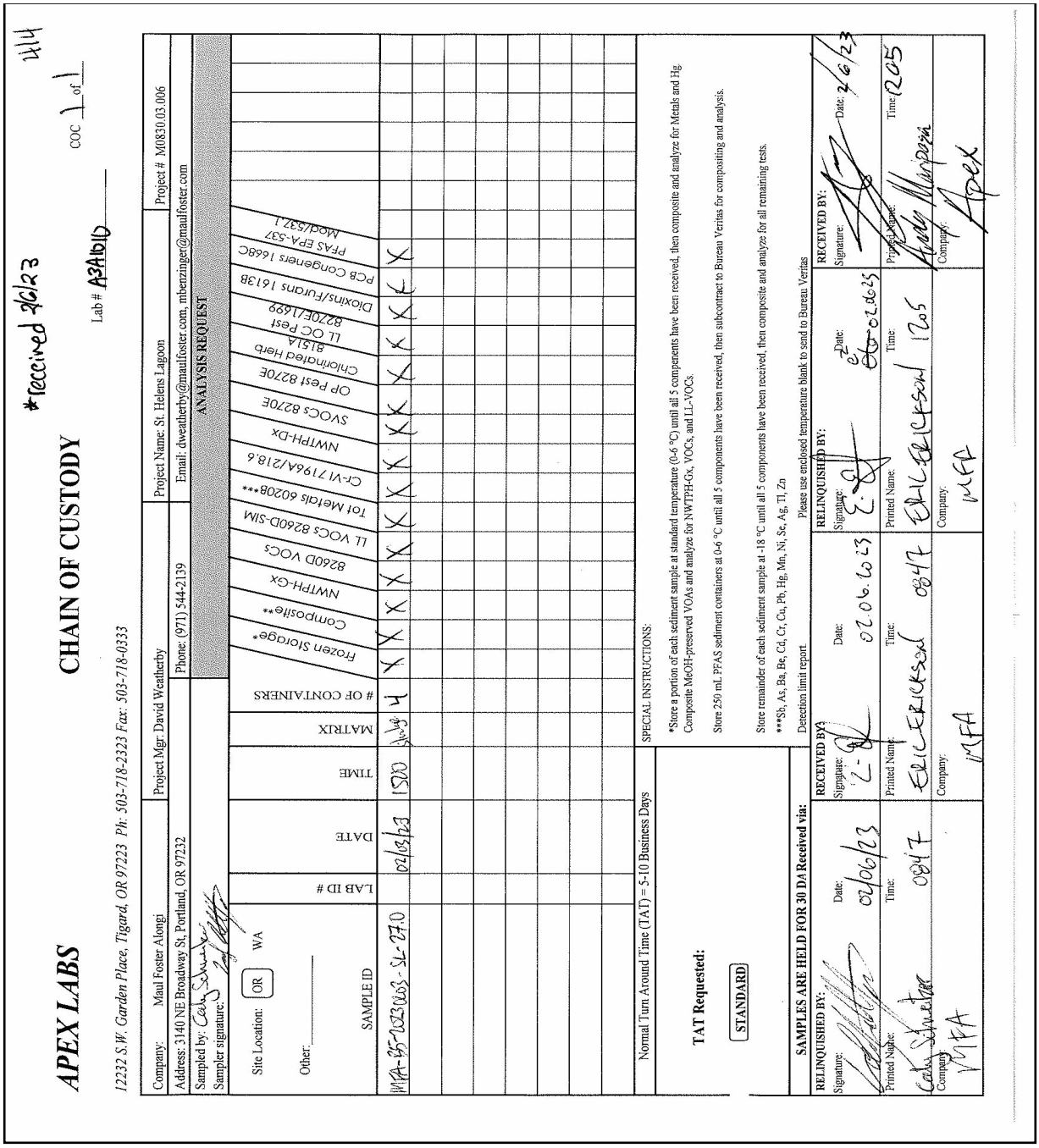
Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**



APEX LABS

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

CHAIN OF CUSTODY

*received 4/6/23

COC 1 of 1

Lab # A3A1010

Company: Maul Foster Alongi | Project Mgr: David Weatherby | Project Name: St. Helens Lagoon | Project # M0830.03.006

Address: 3140 NE Broadway St, Portland, OR 97232 | Phone: (971) 544-2139 | Email: dweatherby@maulfoster.com, mbenzinger@maulfoster.com

Sampled by: Cody Schuster

Sampler signature:

Site Location: OR WA

Other:

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	Frozen Storage*	Composite**	NWTPH-Gx	8260D VOCs	LL VOCs 8260D-SIM	Tot Metals 6020B***	Cr-VI 7196A/218.6	NWTPH-Dx	SVOCs 8270E	OP Pest 8270E	Chlorinated Herb 8151A	LL OC Pest 8270E/1699	Dioxins/Furans 1613B	PCB Congeners 1668C	PFAS EPA-537 Mod/537.1
MA-050323-SL-2710		04/05/23	1300	Sediment	4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Normal Turn Around Time (TAT) = 5-10 Business Days

TAT Requested: STANDARD

SPECIAL INSTRUCTIONS:

*Store a portion of each sediment sample at standard temperature (0-6 °C) until all 5 components have been received, then composite and analyze for Metals and Hg
Composite MeOH-preserved VOAs and analyze for NWTPH-Gx, VOCs, and LL-VOCs.

Store 250 mL PFAS sediment containers at 0-6 °C until all 5 components have been received, then subcontract to Bureau Veritas for compositing and analysis.

Store remainder of each sediment sample at -18 °C until all 5 components have been received, then composite and analyze for all remaining tests.

***Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Se, Ag, Tl, Zn

Please use enclosed temperature blank to send to Bureau Veritas

Detection limit report

SAMPLES ARE HELD FOR 30 DA Received via:

RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:	RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:
Signature:	04/06/23	0847	Signature:	04.06.23		Signature:	2nd 04.06.23		Signature:	4/6/23
Printed Name: Cody Schuster			Printed Name: Eric Erickson			Printed Name: Eric Erickson		1205	Printed Name: Mary Morrison	Time: 1205
Company: MFA			Company: MFA			Company: MFA			Company: Apex	

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

APEX LABS COOLER RECEIPT FORM

1/24 ace 218220

Client: Maul Foster Alongi Element WO#: A3A1010

Project/Project #: St. Helens Lagoon M0830.03.006

Delivery Info:

Date/time received: 1/31/23 @ 1008 By: EST

Delivered by: Apex X Client ESS FedEx UPS Radio Morgan SDS Evergreen Other

Cooler Inspection Date/time inspected: 1/31/23 @ 1113 By: EST

Chain of Custody included? Yes X No

Signed/dated by client? Yes X No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	3.1						
Custody seals? (Y/N)	N						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	Y						
Ice type: (Gel/Real/Other)	Real						
Condition (In/Out):	In						

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: 1/31/23 @ 12:07 By: ZKAM

All samples intact? Yes X No Comments:

Bottle labels/COCs agree? Yes X No Comments:

COC/container discrepancies form initiated? Yes No X

Containers/volumes received appropriate for analysis? Yes X No Comments:

Do VOA vials have visible headspace? Yes No NA X

Comments

Water samples: pH checked: Yes No NA X pH appropriate? Yes No NA X

Comments:

Additional information: Subsampler: ZKAM
Witness: DJS

Labeled by: ZKAM Witness: DJS Cooler Inspected by: ZKAM

Form Y-003 R-00

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

APEX LABS COOLER RECEIPT FORM

2/4 AKK 2/6/23

Client: MAUL FOSTER ALONGI Element WO#: A3A1010

Project/Project #: ST. HELENS LAGOON # M0830.03.006

Delivery Info: *Additional volume*

Date/time received: 2/1/23 @ 1200 By: SAT

Delivered by: Apex X Client ESS FedEx UPS Radio Morgan SDS Evergreen Other

Cooler Inspection Date/time inspected: 2/1/23 @ 1655 By: SAT

Chain of Custody included? Yes X No

Signed/dated by client? Yes X No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	1.4						
Custody seals? (Y/N)	N						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	Y						
Ice type: (Gel/Real/Other)	Real						
Condition (In/Out):	IN						

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: 2/1/23 @ 14:24 By: KAM

All samples intact? Yes X No ___ Comments:

Bottle labels/COCs agree? Yes X No ___ Comments:

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments:

Do VOA vials have visible headspace? Yes ___ No ___ NA X

Comments

Water samples: pH checked: Yes ___ No ___ NA X pH appropriate? Yes ___ No ___ NA X

Comments:

Subsamples: KAM

Additional information: Witness: AKK

Labeled by: KAM Witness: AKK Cooler Inspected by: KAM

Form Y-003 R-00

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

APEX LABS COOLER RECEIPT FORM

31 $4 acic 28779

Client: MFA - PORTLAND Element WO#: A3 A1C1D

Project/Project #: ST. HELENS LAGOON # M0830-03-006 *Additional volume*

Delivery Info:

Date/time received: 2/3/23 @ 1120 By: SAT

Delivered by: Apex X Client __ ESS __ FedEx __ UPS __ Radio __ Morgan __ SDS __ Evergreen __ Other __

Cooler Inspection Date/time inspected: 2/3/23 @ 1325 By: SAT

Chain of Custody included? Yes X No ____

Signed/dated by client? Yes X No ____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	2.8						
Custody seals? (Y/N)	N						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	Y						
Ice type: (Gel/Real/Other)	Real						
Condition (In/Out):	IN						

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: 2/3/23 @ 4:04 By: KAM

All samples intact? Yes X No ___ Comments: ____

Bottle labels/COCs agree? Yes X No ___ Comments: ____

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: ____

Do VOA vials have visible headspace? Yes ___ No ___ NA X

Comments ____

Water samples: pH checked: Yes ___ No ___ NA X pH appropriate? Yes ___ No ___ NA X

Comments: ____

Additional information: Subsampler: KAM
Witness: DSS

Labeled by: KAM Witness: DSS Cooler Inspected by: KAM

Form Y-003 R-00

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3A1010 - 04 19 23 1708**

414

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster Alongi Element WO#: A3A1010

Project/Project #: St. Helens Lagoon #M0830.03.006

Delivery Info: 4.2/6 *Additional volume*

Date/time received: 2/6/23 @ 1705 By: KAM

Delivered by: Apex X Client ESS FedEx UPS Radio Morgan SDS Evergreen Other

Cooler Inspection Date/time inspected: 2/6/23 @ 1521 By: KM

Chain of Custody included? Yes X No

Signed/dated by client? Yes X No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	0.9						
Custody seals? (Y/N)	N						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	Y						
Ice type: (Gel/Real/Other)	Real						
Condition (In/Out):	In						

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: 2/6/23 @ 16:04 By: KAM

All samples intact? Yes X No Comments:

Bottle labels/COCs agree? Yes X No Comments:

COC/container discrepancies form initiated? Yes No X

Containers/volumes received appropriate for analysis? Yes X No Comments:

Do VOA vials have visible headspace? Yes No NA X

Comments

Water samples: pH checked: Yes No NA X pH appropriate? Yes No NA X

Comments:

Additional information: Subsamples: KAM

Witness: RWP

Labeled by: KAM Witness: RWP Cooler Inspected by: KAM

Form Y-003 R-00

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Friday, April 21, 2023

David Weatherby
Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

RE: A3B0217 - St. Helens Lagoon - M0830.03.006

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 A3B0217, which was received by the laboratory on 2/7/2023 at 2:29:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Default Cooler	4.4 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MFA-B3A-20230207-GW-36.0	**A3B0217-01**	**Water**	**02/07/23 08:30**	**02/07/23 14:29**
Field Blank	**A3B0217-02**	**Water**	**02/07/23 08:20**	**02/07/23 14:29**
Trip Blank	**A3B0217-03**	**Water**	**02/07/23 00:00**	**02/07/23 14:29**

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01)				**Matrix: Water**		**Batch: 23B0657**		
Diesel	ND	0.112	0.225	mg/L	1	02/18/23 02:55	NWTPH-Dx	
Oil	ND	0.225	0.449	mg/L	1	02/18/23 02:55	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)			*Recovery: 93 %*	*Limits: 50-150 %*	*1*	*02/18/23 02:55*	*NWTPH-Dx*	

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Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01RE1)				**Matrix: Water**		**Batch: 23B0509**		**V-04**
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	02/14/23 11:15	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 97 %*		*Limits: 50-150 %*	*1*	*02/14/23 11:15*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*107 %*		*50-150 %*	*1*	*02/14/23 11:15*	*NWTPH-Gx (MS)*	

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ANALYTICAL REPORT

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3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01RE1)				**Matrix: Water**		**Batch: 23B0509**		**V-04**
Acetone	ND	20.0	20.0	ug/L	1	02/14/23 11:15	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/14/23 11:15	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/14/23 11:15	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/14/23 11:15	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/14/23 11:15	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 11:15	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/14/23 11:15	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 11:15	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 11:15	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/14/23 11:15	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/14/23 11:15	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/14/23 11:15	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/14/23 11:15	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/14/23 11:15	EPA 8260D	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01RE1)				**Matrix: Water**		**Batch: 23B0509**		**V-04**
Naphthalene	ND	1.00	2.00	ug/L	1	02/14/23 11:15	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/14/23 11:15	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/14/23 11:15	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/14/23 11:15	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/14/23 11:15	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/14/23 11:15	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/14/23 11:15	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/14/23 11:15	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 93 %*	*Limits: 80-120 %*		*1*	*02/14/23 11:15*	*EPA 8260D*	
Toluene-d8 (Surr)		*105 %*	*80-120 %*		*1*	*02/14/23 11:15*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*97 %*	*80-120 %*		*1*	*02/14/23 11:15*	*EPA 8260D*	
Trip Blank (A3B0217-03)				**Matrix: Water**		**Batch: 23B0344**		
Acetone	ND	10.0	20.0	ug/L	1	02/09/23 12:40	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/09/23 12:40	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/09/23 12:40	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/09/23 12:40	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/09/23 12:40	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/09/23 12:40	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/09/23 12:40	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/09/23 12:40	EPA 8260D	

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Trip Blank (A3B0217-03)				**Matrix: Water**		**Batch: 23B0344**		
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/09/23 12:40	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/09/23 12:40	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/09/23 12:40	EPA 8260D	
2-Hexanone	ND	5.00	10.0	ug/L	1	02/09/23 12:40	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/09/23 12:40	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/09/23 12:40	EPA 8260D	
Naphthalene	ND	1.00	2.00	ug/L	1	02/09/23 12:40	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/09/23 12:40	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/09/23 12:40	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/09/23 12:40	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/09/23 12:40	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/09/23 12:40	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/09/23 12:40	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/09/23 12:40	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*94 %*	*Limits:*	*80-120 %*	*1*	*02/09/23 12:40*	*EPA 8260D*
Toluene-d8 (Surr)			*104 %*		*80-120 %*	*1*	*02/09/23 12:40*	*EPA 8260D*
4-Bromofluorobenzene (Surr)			*100 %*		*80-120 %*	*1*	*02/09/23 12:40*	*EPA 8260D*

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01)				**Matrix: Water**		**Batch: 23B0743**		
Benzene	**0.0754**	0.0500	0.100	ug/L	1	02/20/23 18:00	EPA 8260D SIM	**Ja**
Toluene	**0.0904**	0.0500	0.100	ug/L	1	02/20/23 18:00	EPA 8260D SIM	**Ja**
Ethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
m,p-Xylene	ND	0.100	0.200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
o-Xylene	ND	0.0500	0.100	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
1,2,4-Trimethylbenzene	**0.0578**	0.0500	0.100	ug/L	1	02/20/23 18:00	EPA 8260D SIM	**Ja**
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
Chloroform	**0.122**	0.0500	0.100	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
1,1-Dichloroethene	ND	0.0200	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:00	EPA 8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*104 %*	*Limits:*	*80-120 %*	*1*	*02/20/23 18:00*	*EPA 8260D SIM*
Toluene-d8 (Surr)			*100 %*		*80-120 %*	*1*	*02/20/23 18:00*	*EPA 8260D SIM*
4-Bromofluorobenzene (Surr)			*100 %*		*80-120 %*	*1*	*02/20/23 18:00*	*EPA 8260D SIM*
Trip Blank (A3B0217-03)				**Matrix: Water**		**Batch: 23B0743**		
Benzene	ND	0.0500	0.100	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
Toluene	ND	0.0500	0.100	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
m,p-Xylene	ND	0.100	0.200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Trip Blank (A3B0217-03)				**Matrix: Water**		**Batch: 23B0743**		
o-Xylene	ND	0.0500	0.100	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
Chloroform	**0.0693**	0.0500	0.100	ug/L	1	02/20/23 16:12	EPA 8260D SIM	**Ja**
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 16:12	EPA 8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*103 %*	*Limits: 80-120 %*	*1*	*02/20/23 16:12*	*EPA 8260D SIM*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*02/20/23 16:12*	*EPA 8260D SIM*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*02/20/23 16:12*	*EPA 8260D SIM*	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01RE3)				**Matrix: Water**		**Batch: 23B0481**		
Acenaphthene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	Q-30
Acenaphthylene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
Anthracene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
Benz(a)anthracene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
Benzo(a)pyrene	ND	0.0192	0.0385	ug/L	1	02/13/23 19:59	EPA 8270E	
Benzo(b)fluoranthene	ND	0.0192	0.0385	ug/L	1	02/13/23 19:59	EPA 8270E	
Benzo(k)fluoranthene	ND	0.0192	0.0385	ug/L	1	02/13/23 19:59	EPA 8270E	
Benzo(g,h,i)perylene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
Chrysene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
Dibenz(a,h)anthracene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
Fluoranthene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
Fluorene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
1-Methylnaphthalene	ND	0.0256	0.0513	ug/L	1	02/13/23 19:59	EPA 8270E	Q-30
2-Methylnaphthalene	ND	0.0256	0.0513	ug/L	1	02/13/23 19:59	EPA 8270E	Q-30
Naphthalene	ND	0.0256	0.0513	ug/L	1	02/13/23 19:59	EPA 8270E	Q-30
Phenanthrene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
Pyrene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
Carbazole	ND	0.0192	0.0385	ug/L	1	02/13/23 19:59	EPA 8270E	
Dibenzofuran	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	Q-30
2-Chlorophenol	ND	0.0641	0.128	ug/L	1	02/13/23 19:59	EPA 8270E	
4-Chloro-3-methylphenol	ND	0.128	0.256	ug/L	1	02/13/23 19:59	EPA 8270E	
2,4-Dichlorophenol	ND	0.0641	0.128	ug/L	1	02/13/23 19:59	EPA 8270E	
2,4-Dimethylphenol	ND	0.0641	0.128	ug/L	1	02/13/23 19:59	EPA 8270E	
2,4-Dinitrophenol	ND	0.321	0.641	ug/L	1	02/13/23 19:59	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	0.321	0.641	ug/L	1	02/13/23 19:59	EPA 8270E	
2-Methylphenol	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	
3+4-Methylphenol(s)	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	
2-Nitrophenol	ND	0.128	0.256	ug/L	1	02/13/23 19:59	EPA 8270E	
4-Nitrophenol	ND	0.256	0.256	ug/L	1	02/13/23 19:59	EPA 8270E	
Pentachlorophenol (PCP)	ND	0.128	0.256	ug/L	1	02/13/23 19:59	EPA 8270E	
Phenol	ND	0.256	0.513	ug/L	1	02/13/23 19:59	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	0.0641	0.128	ug/L	1	02/13/23 19:59	EPA 8270E	

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Philip Nerenberg, Lab Director

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01RE3)				**Matrix: Water**		**Batch: 23B0481**		
2,3,5,6-Tetrachlorophenol	ND	0.0641	0.128	ug/L	1	02/13/23 19:59	EPA 8270E	
2,4,5-Trichlorophenol	ND	0.0641	0.128	ug/L	1	02/13/23 19:59	EPA 8270E	
2,4,6-Trichlorophenol	**0.0665**	0.0641	0.128	ug/L	1	02/13/23 19:59	EPA 8270E	**Ja**
Bis(2-ethylhexyl)phthalate	ND	0.256	0.513	ug/L	1	02/13/23 19:59	EPA 8270E	
Butyl benzyl phthalate	ND	0.256	0.513	ug/L	1	02/13/23 19:59	EPA 8270E	
Diethylphthalate	ND	0.256	0.513	ug/L	1	02/13/23 19:59	EPA 8270E	
Dimethylphthalate	ND	0.256	0.513	ug/L	1	02/13/23 19:59	EPA 8270E	
Di-n-butylphthalate	ND	0.256	0.513	ug/L	1	02/13/23 19:59	EPA 8270E	
Di-n-octyl phthalate	ND	0.256	0.513	ug/L	1	02/13/23 19:59	EPA 8270E	
N-Nitrosodimethylamine	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	0.0641	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	
N-Nitrosodiphenylamine	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	
Bis(2-Chloroethoxy) methane	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	
Bis(2-Chloroethyl) ether	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	
Hexachlorobenzene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	
Hexachlorobutadiene	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	
Hexachlorocyclopentadiene	ND	0.0641	0.128	ug/L	1	02/13/23 19:59	EPA 8270E	
Hexachloroethane	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	
2-Chloronaphthalene	ND	0.0128	0.0256	ug/L	1	02/13/23 19:59	EPA 8270E	Q-30
1,2,4-Trichlorobenzene	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	Q-30
4-Bromophenyl phenyl ether	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	Q-30
4-Chlorophenyl phenyl ether	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	Q-30
Aniline	ND	0.0641	0.128	ug/L	1	02/13/23 19:59	EPA 8270E	
4-Chloroaniline	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	
2-Nitroaniline	ND	0.256	0.513	ug/L	1	02/13/23 19:59	EPA 8270E	
3-Nitroaniline	ND	0.256	0.513	ug/L	1	02/13/23 19:59	EPA 8270E	
4-Nitroaniline	ND	0.256	0.513	ug/L	1	02/13/23 19:59	EPA 8270E	
Nitrobenzene	ND	0.128	0.256	ug/L	1	02/13/23 19:59	EPA 8270E	
2,4-Dinitrotoluene	ND	0.128	0.256	ug/L	1	02/13/23 19:59	EPA 8270E	
2,6-Dinitrotoluene	ND	0.256	0.256	ug/L	1	02/13/23 19:59	EPA 8270E	
Isophorone	**0.0541**	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	**Ja**
Azobenzene (1,2-DPH)	ND	0.0641	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01RE3)				**Matrix: Water**		**Batch: 23B0481**		
Bis(2-Ethylhexyl) adipate	ND	0.321	0.641	ug/L	1	02/13/23 19:59	EPA 8270E	
3,3'-Dichlorobenzidine	ND	0.641	1.28	ug/L	1	02/13/23 19:59	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	0.321	0.641	ug/L	1	02/13/23 19:59	EPA 8270E	
1,3-Dinitrobenzene	ND	0.321	0.641	ug/L	1	02/13/23 19:59	EPA 8270E	
1,4-Dinitrobenzene	ND	0.321	0.641	ug/L	1	02/13/23 19:59	EPA 8270E	
Pyridine	ND	0.128	0.256	ug/L	1	02/13/23 19:59	EPA 8270E	
1,2-Dichlorobenzene	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	Q-30
1,3-Dichlorobenzene	**0.0432**	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	**Ja, Q-30**
1,4-Dichlorobenzene	ND	0.0321	0.0641	ug/L	1	02/13/23 19:59	EPA 8270E	Q-30
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*47 %*	*Limits: 44-120 %*	*1*	*02/13/23 19:59*	*EPA 8270E*	
2-Fluorobiphenyl (Surr)			*40 %*	*44-120 %*	*1*	*02/13/23 19:59*	*EPA 8270E*	*S-06*
Phenol-d6 (Surr)			*21 %*	*10-133 %*	*1*	*02/13/23 19:59*	*EPA 8270E*	
p-Terphenyl-d14 (Surr)			*69 %*	*50-134 %*	*1*	*02/13/23 19:59*	*EPA 8270E*	
2-Fluorophenol (Surr)			*31 %*	*19-120 %*	*1*	*02/13/23 19:59*	*EPA 8270E*	
2,4,6-Tribromophenol (Surr)			*75 %*	*43-140 %*	*1*	*02/13/23 19:59*	*EPA 8270E*	
MFA-B3A-20230207-GW-36.0 (A3B0217-01RE4)				**Matrix: Water**		**Batch: 23B0481**		
Benzoic acid	**1.83**	1.60	3.21	ug/L	1	02/14/23 14:06	EPA 8270E	**Ja**
Benzyl alcohol	**0.212**	0.128	0.256	ug/L	1	02/14/23 14:06	EPA 8270E	**Ja**

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Philip Nerenberg, Lab Director

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01RE1)				**Matrix: Water**		**Batch: 23B0312**		
Azinphos methyl (Guthion)	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Chlorpyrifos	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Coumaphos	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Demeton O	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Demeton S	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Diazinon	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Dichlorvos	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Dimethoate	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Disulfoton	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
EPN	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Ethoprop	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Fensulfothion	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Fenthion	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Malathion	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Merphos	ND	0.658	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Methyl parathion	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Mevinphos (Phosdrin)	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Monocrotophos	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Naled (Dibrom)	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Parathion, ethyl	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Phorate	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Ronnel (Fenchlorphos)	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Sulfotep	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Sulprofos (Bolstar)	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
TEPP	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Tetrachlorvinphos (Rabon)	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Tokuthion (Prothiofos)	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Trichloronate	ND	0.329	0.658	ug/L	1	02/08/23 19:48	EPA 8270E OPPs	
Surrogate: Tributyl phosphate (Surr)		*Recovery:*	*85 %*	*Limits:*	*56-124 %*	*1*	*02/08/23 19:48*	*EPA 8270E OPPs*	
Triphenyl phosphate (Surr)			*82 %*		*58-121 %*	*1*	*02/08/23 19:48*	*EPA 8270E OPPs*	

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Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01)				**Matrix: Water**				
Batch: 23B0281								
Antimony	**0.697**	0.500	1.00	ug/L	1	02/09/23 19:39	EPA 6020B	**Ja**
Arsenic	**29.1**	0.500	1.00	ug/L	1	02/09/23 19:39	EPA 6020B	
Barium	**1080**	1.00	2.00	ug/L	1	02/09/23 19:39	EPA 6020B	
Beryllium	**6.44**	0.100	0.200	ug/L	1	02/09/23 19:39	EPA 6020B	
Cadmium	**1.50**	0.100	0.200	ug/L	1	02/09/23 19:39	EPA 6020B	
Chromium	**339**	1.00	2.00	ug/L	1	02/09/23 19:39	EPA 6020B	
Copper	**210**	1.00	2.00	ug/L	1	02/09/23 19:39	EPA 6020B	
Lead	**66.8**	0.110	0.200	ug/L	1	02/09/23 19:39	EPA 6020B	
Manganese	**2350**	0.500	1.00	ug/L	1	02/09/23 19:39	EPA 6020B	
Nickel	**285**	1.00	2.00	ug/L	1	02/09/23 19:39	EPA 6020B	
Selenium	**4.48**	0.500	1.00	ug/L	1	02/09/23 19:39	EPA 6020B	
Silver	**0.776**	0.100	0.200	ug/L	1	02/09/23 19:39	EPA 6020B	
Thallium	**0.711**	0.100	0.200	ug/L	1	02/09/23 19:39	EPA 6020B	
Zinc	**802**	2.00	4.00	ug/L	1	02/09/23 19:39	EPA 6020B	
MFA-B3A-20230207-GW-36.0 (A3B0217-01RE2)				**Matrix: Water**				
Batch: 23B0281								
Mercury	**0.328**	0.0800	0.160	ug/L	2	02/13/23 10:12	EPA 6020B	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Chlorinated Herbicides by GC/ECD

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01)				**Matrix: Water**		**Batch: W3B1025**		
Batch: W3B1025								
2,4-D	ND	0.34	0.50	ug/l	1	02/25/23 08:34	EPA 8151A	
2,4-DB	ND	0.99	2.5	ug/l	1	02/25/23 08:34	EPA 8151A	
2,4,5-T	ND	0.14	0.25	ug/l	1	02/25/23 08:34	EPA 8151A	
2,4,5-TP (Silvex)	ND	0.14	0.25	ug/l	1	02/25/23 08:34	EPA 8151A	
3,5-Dichlorobenzoic acid	ND	0.28	1.2	ug/l	1	02/25/23 08:34	EPA 8151A	
4-Nitrophenol	ND	0.50	1.2	ug/l	1	02/25/23 08:34	EPA 8151A	
Acifluorfen	ND	0.24	0.50	ug/l	1	02/25/23 08:34	EPA 8151A	
Bentazon	ND	0.55	2.5	ug/l	1	02/25/23 08:34	EPA 8151A	
Dalapon	ND	0.16	0.50	ug/l	1	02/25/23 08:34	EPA 8151A	
Dicamba	ND	0.19	0.75	ug/l	1	02/25/23 08:34	EPA 8151A	
Dichloroprop	ND	0.24	1.0	ug/l	1	02/25/23 08:34	EPA 8151A	
Dinoseb	ND	0.090	0.50	ug/l	1	02/25/23 08:34	EPA 8151A	
DCPA	ND	0.20	0.25	ug/l	1	02/25/23 08:34	EPA 8151A	
MCPA	ND	40	100	ug/l	1	02/25/23 08:34	EPA 8151A	
MCPP	ND	27	100	ug/l	1	02/25/23 08:34	EPA 8151A	
Pentachlorophenol	ND	0.18	0.25	ug/l	1	02/25/23 08:34	EPA 8151A	
Picloram	ND	0.13	0.75	ug/l	1	02/25/23 08:34	EPA 8151A	
Batch: W3B1025								
Surrogate: 2,4-DCAA		*Recovery: 91 %*		*Limits: 56-156 %*	*1*	*02/25/23 08:34*	*EPA 8151A*	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Hexavalent Chromium by IC

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MFA-B3A-20230207-GW-36.0 (A3B0217-01)				**Matrix: Water**		**Batch: W3B1145**		
Batch: W3B1145								
Chromium 6+	**0.057**	0.0079	0.020	ug/l	1	02/14/23 16:44	EPA 218.6	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0657 - EPA 3510C (Fuels/Acid Ext.)									Water			
Blank (23B0657-BLK1)			Prepared: 02/17/23 07:46		Analyzed: 02/18/23 01:45							
NWTPH-Dx												
Diesel	ND	0.100	0.200	mg/L	1	---	---	---	---	---	---	
Oil	ND	0.200	0.400	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 131 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS (23B0657-BS1)			Prepared: 02/17/23 07:46		Analyzed: 02/18/23 02:08							
NWTPH-Dx												
Diesel	0.860	0.100	0.200	mg/L	1	1.25	---	69	36-132%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 99 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS Dup (23B0657-BSD1)			Prepared: 02/17/23 07:46		Analyzed: 02/18/23 02:32							**Q-19**
NWTPH-Dx												
Diesel	0.782	0.100	0.200	mg/L	1	1.25	---	63	36-132%	9	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 92 %*		*Limits: 50-150 %*		*Dilution: 1x*					

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Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C							Water					
Blank (23B0344-BLK1)			Prepared: 02/09/23 08:37 Analyzed: 02/09/23 12:18									
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 92 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*105 %*	*50-150 %*			*"*					
LCS (23B0344-BS2)			Prepared: 02/09/23 08:37 Analyzed: 02/09/23 11:44									
NWTPH-Gx (MS)												
Gasoline Range Organics	0.543	0.0500	0.100	mg/L	1	0.500	---	109	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 101 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*			*"*					
Duplicate (23B0344-DUP1)			Prepared: 02/09/23 08:37 Analyzed: 02/09/23 13:47									
QC Source Sample: Non-SDG (A3B0269-13)												
Gasoline Range Organics	**0.485**	0.0500	0.100	mg/L	1	---	0.419	---	---	15	30%	F-12
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 96 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*110 %*	*50-150 %*			*"*					
Duplicate (23B0344-DUP2)			Prepared: 02/09/23 08:37 Analyzed: 02/09/23 14:54									
QC Source Sample: Non-SDG (A3B0270-01)												
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 99 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*110 %*	*50-150 %*			*"*					

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C									Water			
Blank (23B0509-BLK1)			Prepared: 02/14/23 08:30		Analyzed: 02/14/23 10:53							
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 96 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*107 %*		*50-150 %*				*"*			
LCS (23B0509-BS2)			Prepared: 02/14/23 08:30		Analyzed: 02/14/23 10:31							
NWTPH-Gx (MS)												
Gasoline Range Organics	0.515	0.0500	0.100	mg/L	1	0.500	---	103	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 101 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*106 %*		*50-150 %*				*"*			
Duplicate (23B0509-DUP1)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 12:00							
QC Source Sample: Non-SDG (A3B0393-04)												
Gasoline Range Organics	**0.169**	0.0500	0.100	mg/L	1	---	0.162	---	---	5	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 101 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*109 %*		*50-150 %*				*"*			
Duplicate (23B0509-DUP2)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 13:29							
QC Source Sample: Non-SDG (A3B0406-03)												
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 98 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*108 %*		*50-150 %*				*"*			

Apex Laboratories

Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C							**Water**					
Blank (23B0344-BLK1)			Prepared: 02/09/23 08:37		Analyzed: 02/09/23 12:18							
EPA 8260D												
Acetone	ND	10.0	20.0	ug/L	1	---	---	---	---	---	---	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Benzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C									Water			
Blank (23B0344-BLK1)			Prepared: 02/09/23 08:37 Analyzed: 02/09/23 12:18									
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Styrene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	

Surr: 1,4-Difluorobenzene (Surr) *Recovery: 94 %* *Limits: 80-120 %* *Dilution: 1x*

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ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C									**Water**			
Blank (23B0344-BLK1)				Prepared: 02/09/23 08:37 Analyzed: 02/09/23 12:18								
Surr: Toluene-d8 (Surr)			*Recovery: 107 %*	*Limits: 80-120 %*				*Dilution: 1x*				
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*				*"*				
LCS (23B0344-BS1)				Prepared: 02/09/23 08:37 Analyzed: 02/09/23 10:43								
EPA 8260D												
Acetone	42.3	10.0	20.0	ug/L	1	40.0	---	106	80-120%	---	---	ICV-01
Acrylonitrile	17.6	1.00	2.00	ug/L	1	20.0	---	88	80-120%	---	---	
Benzene	19.2	0.100	0.200	ug/L	1	20.0	---	96	80-120%	---	---	
Bromobenzene	18.6	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Bromochloromethane	21.7	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
Bromodichloromethane	21.0	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
Bromoform	21.7	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
Bromomethane	20.3	5.00	5.00	ug/L	1	20.0	---	101	80-120%	---	---	
2-Butanone (MEK)	37.0	5.00	10.0	ug/L	1	40.0	---	92	80-120%	---	---	ICV-01
n-Butylbenzene	22.4	0.500	1.00	ug/L	1	20.0	---	112	80-120%	---	---	
sec-Butylbenzene	21.8	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
tert-Butylbenzene	20.0	0.500	1.00	ug/L	1	20.0	---	100	80-120%	---	---	
Carbon disulfide	21.1	5.00	10.0	ug/L	1	20.0	---	105	80-120%	---	---	
Carbon tetrachloride	24.0	0.500	1.00	ug/L	1	20.0	---	120	80-120%	---	---	
Chlorobenzene	20.5	0.250	0.500	ug/L	1	20.0	---	102	80-120%	---	---	
Chloroethane	27.8	5.00	5.00	ug/L	1	20.0	---	**139**	**80-120%**	---	---	Q-56
Chloroform	21.2	0.500	1.00	ug/L	1	20.0	---	106	80-120%	---	---	
Chloromethane	17.3	2.50	5.00	ug/L	1	20.0	---	87	80-120%	---	---	
2-Chlorotoluene	19.5	0.500	1.00	ug/L	1	20.0	---	97	80-120%	---	---	
4-Chlorotoluene	19.6	0.500	1.00	ug/L	1	20.0	---	98	80-120%	---	---	
Dibromochloromethane	21.8	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
1,2-Dibromo-3-chloropropane	16.7	2.50	5.00	ug/L	1	20.0	---	83	80-120%	---	---	
1,2-Dibromoethane (EDB)	20.0	0.250	0.500	ug/L	1	20.0	---	100	80-120%	---	---	
Dibromomethane	20.1	0.500	1.00	ug/L	1	20.0	---	100	80-120%	---	---	
1,2-Dichlorobenzene	19.7	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
1,3-Dichlorobenzene	19.5	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
1,4-Dichlorobenzene	18.9	0.250	0.500	ug/L	1	20.0	---	95	80-120%	---	---	
Dichlorodifluoromethane	23.6	0.500	1.00	ug/L	1	20.0	---	118	80-120%	---	---	
1,1-Dichloroethane	20.1	0.200	0.400	ug/L	1	20.0	---	100	80-120%	---	---	

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C							**Water**					
LCS (23B0344-BS1)			Prepared: 02/09/23 08:37		Analyzed: 02/09/23 10:43							
1,2-Dichloroethane (EDC)	22.1	0.200	0.400	ug/L	1	20.0	---	110	80-120%	---	---	
1,1-Dichloroethene	23.0	0.200	0.400	ug/L	1	20.0	---	115	80-120%	---	---	
cis-1,2-Dichloroethene	19.2	0.200	0.400	ug/L	1	20.0	---	96	80-120%	---	---	
trans-1,2-Dichloroethene	20.1	0.200	0.400	ug/L	1	20.0	---	100	80-120%	---	---	
1,2-Dichloropropane	18.3	0.250	0.500	ug/L	1	20.0	---	92	80-120%	---	---	
1,3-Dichloropropane	20.7	0.500	1.00	ug/L	1	20.0	---	104	80-120%	---	---	
2,2-Dichloropropane	22.1	0.500	1.00	ug/L	1	20.0	---	110	80-120%	---	---	
1,1-Dichloropropene	19.8	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
cis-1,3-Dichloropropene	21.0	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
trans-1,3-Dichloropropene	22.9	0.500	1.00	ug/L	1	20.0	---	114	80-120%	---	---	
Ethylbenzene	21.6	0.250	0.500	ug/L	1	20.0	---	108	80-120%	---	---	
Hexachlorobutadiene	19.9	2.50	5.00	ug/L	1	20.0	---	99	80-120%	---	---	
2-Hexanone	38.2	5.00	10.0	ug/L	1	40.0	---	95	80-120%	---	---	
Isopropylbenzene	21.8	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
4-Isopropyltoluene	21.1	0.500	1.00	ug/L	1	20.0	---	106	80-120%	---	---	
Methylene chloride	19.4	5.00	10.0	ug/L	1	20.0	---	97	80-120%	---	---	
4-Methyl-2-pentanone (MiBK)	40.5	5.00	10.0	ug/L	1	40.0	---	101	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	17.9	0.500	1.00	ug/L	1	20.0	---	89	80-120%	---	---	
Naphthalene	17.5	1.00	2.00	ug/L	1	20.0	---	87	80-120%	---	---	
n-Propylbenzene	21.2	0.250	0.500	ug/L	1	20.0	---	106	80-120%	---	---	
Styrene	20.6	0.500	1.00	ug/L	1	20.0	---	103	80-120%	---	---	
1,1,1,2-Tetrachloroethane	20.0	0.200	0.400	ug/L	1	20.0	---	100	80-120%	---	---	
1,1,2,2-Tetrachloroethane	20.7	0.250	0.500	ug/L	1	20.0	---	104	80-120%	---	---	
Tetrachloroethene (PCE)	19.8	0.200	0.400	ug/L	1	20.0	---	99	80-120%	---	---	
Toluene	20.4	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
1,2,3-Trichlorobenzene	19.1	1.00	2.00	ug/L	1	20.0	---	96	80-120%	---	---	
1,2,4-Trichlorobenzene	17.1	1.00	2.00	ug/L	1	20.0	---	85	80-120%	---	---	
1,1,1-Trichloroethane	22.1	0.200	0.400	ug/L	1	20.0	---	111	80-120%	---	---	
1,1,2-Trichloroethane	20.2	0.250	0.500	ug/L	1	20.0	---	101	80-120%	---	---	
Trichloroethene (TCE)	16.6	0.200	0.400	ug/L	1	20.0	---	83	80-120%	---	---	
Trichlorofluoromethane	26.7	1.00	2.00	ug/L	1	20.0	---	**133**	**80-120%**	---	---	Q-56
1,2,3-Trichloropropane	20.9	0.500	1.00	ug/L	1	20.0	---	104	80-120%	---	---	
1,2,4-Trimethylbenzene	21.6	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
1,3,5-Trimethylbenzene	20.9	0.500	1.00	ug/L	1	20.0	---	104	80-120%	---	---	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C									**Water**			
LCS (23B0344-BS1)			Prepared: 02/09/23 08:37		Analyzed: 02/09/23 10:43							
Vinyl chloride	19.8	0.200	0.400	ug/L	1	20.0	---	99	80-120%	---	---	
m,p-Xylene	43.3	0.500	1.00	ug/L	1	40.0	---	108	80-120%	---	---	
o-Xylene	20.8	0.250	0.500	ug/L	1	20.0	---	104	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 90 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*103 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*90 %*		*80-120 %*				*"*			
Duplicate (23B0344-DUP1)			Prepared: 02/09/23 08:37		Analyzed: 02/09/23 13:47							
QC Source Sample: Non-SDG (A3B0269-13)												
Acetone	ND	20.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	**0.820**	0.500	1.00	ug/L	1	---	0.630	---	---	26	30%	Ja
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C							**Water**					
Duplicate (23B0344-DUP1)			Prepared: 02/09/23 08:37		Analyzed: 02/09/23 13:47							
QC Source Sample: Non-SDG (A3B0269-13)												
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	**13.7**	0.200	0.400	ug/L	1	---	13.2	---	---	4	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	**170**	0.200	0.400	ug/L	1	---	145	---	---	16	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC

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ORELAP ID: **OR100062**

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3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C							**Water**					
Duplicate (23B0344-DUP1)			Prepared: 02/09/23 08:37		Analyzed: 02/09/23 13:47							
QC Source Sample: Non-SDG (A3B0269-13)												
Trichloroethene (TCE)	**18.9**	0.200	0.400	ug/L	1	---	16.8	---	---	12	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 97 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*106 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*97 %*		*80-120 %*		*"*					
Duplicate (23B0344-DUP2)			Prepared: 02/09/23 08:37		Analyzed: 02/09/23 14:54							
QC Source Sample: Non-SDG (A3B0270-01)												
Acetone	ND	20.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C							**Water**					
Duplicate (23B0344-DUP2)			Prepared: 02/09/23 08:37		Analyzed: 02/09/23 14:54							
QC Source Sample: Non-SDG (A3B0270-01)												
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C							**Water**					
Duplicate (23B0344-DUP2)			Prepared: 02/09/23 08:37		Analyzed: 02/09/23 14:54							
QC Source Sample: Non-SDG (A3B0270-01)												
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 97 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*106 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*97 %*		*80-120 %*		*"*					
Matrix Spike (23B0344-MS1)			Prepared: 02/09/23 08:37		Analyzed: 02/09/23 21:58							
QC Source Sample: Non-SDG (A3B0266-01)												
EPA 8260D												
Acetone	39.4	10.0	20.0	ug/L	1	40.0	ND	98	39-160%	---	---	ICV-01
Acrylonitrile	15.8	1.00	2.00	ug/L	1	20.0	ND	79	63-135%	---	---	
Benzene	19.7	0.100	0.200	ug/L	1	20.0	2.66	85	79-120%	---	---	
Bromobenzene	15.1	0.250	0.500	ug/L	1	20.0	ND	**76**	**80-120%**	---	---	Q-01
Bromochloromethane	19.0	0.500	1.00	ug/L	1	20.0	ND	95	78-123%	---	---	
Bromodichloromethane	19.0	0.500	1.00	ug/L	1	20.0	ND	95	79-125%	---	---	
Bromoform	18.9	0.500	1.00	ug/L	1	20.0	ND	94	66-130%	---	---	
Bromomethane	21.6	5.00	5.00	ug/L	1	20.0	ND	108	53-141%	---	---	
2-Butanone (MEK)	31.7	5.00	10.0	ug/L	1	40.0	ND	79	56-143%	---	---	ICV-01
n-Butylbenzene	18.3	0.500	1.00	ug/L	1	20.0	ND	92	75-128%	---	---	
sec-Butylbenzene	18.4	0.500	1.00	ug/L	1	20.0	ND	92	77-126%	---	---	
tert-Butylbenzene	16.9	0.500	1.00	ug/L	1	20.0	ND	85	78-124%	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C							**Water**					
Matrix Spike (23B0344-MS1)			Prepared: 02/09/23 08:37		Analyzed: 02/09/23 21:58							
QC Source Sample: Non-SDG (A3B0266-01)												
Carbon disulfide	19.0	5.00	10.0	ug/L	1	20.0	ND	95	64-133%	---	---	
Carbon tetrachloride	21.2	0.500	1.00	ug/L	1	20.0	ND	106	72-136%	---	---	
Chlorobenzene	17.3	0.250	0.500	ug/L	1	20.0	ND	87	80-120%	---	---	
Chloroethane	28.8	5.00	5.00	ug/L	1	20.0	ND	**144**	**60-138%**	---	---	Q-54c
Chloroform	18.9	0.500	1.00	ug/L	1	20.0	ND	94	79-124%	---	---	
Chloromethane	16.6	2.50	5.00	ug/L	1	20.0	ND	83	50-139%	---	---	
2-Chlorotoluene	15.9	0.500	1.00	ug/L	1	20.0	ND	80	79-122%	---	---	
4-Chlorotoluene	15.7	0.500	1.00	ug/L	1	20.0	ND	78	78-122%	---	---	
Dibromochloromethane	18.5	0.500	1.00	ug/L	1	20.0	ND	93	74-126%	---	---	
1,2-Dibromo-3-chloropropane	13.3	2.50	5.00	ug/L	1	20.0	ND	66	62-128%	---	---	
1,2-Dibromoethane (EDB)	16.9	0.250	0.500	ug/L	1	20.0	ND	84	77-121%	---	---	
Dibromomethane	17.3	0.500	1.00	ug/L	1	20.0	ND	87	79-123%	---	---	
1,2-Dichlorobenzene	16.5	0.250	0.500	ug/L	1	20.0	ND	83	80-120%	---	---	
1,3-Dichlorobenzene	16.5	0.250	0.500	ug/L	1	20.0	ND	82	80-120%	---	---	
1,4-Dichlorobenzene	16.2	0.250	0.500	ug/L	1	20.0	ND	81	79-120%	---	---	
Dichlorodifluoromethane	22.0	0.500	1.00	ug/L	1	20.0	ND	110	32-152%	---	---	
1,1-Dichloroethane	18.5	0.200	0.400	ug/L	1	20.0	ND	93	77-125%	---	---	
1,2-Dichloroethane (EDC)	20.0	0.200	0.400	ug/L	1	20.0	ND	100	73-128%	---	---	
1,1-Dichloroethene	20.6	0.200	0.400	ug/L	1	20.0	ND	103	71-131%	---	---	
cis-1,2-Dichloroethene	16.6	0.200	0.400	ug/L	1	20.0	ND	83	78-123%	---	---	
trans-1,2-Dichloroethene	18.1	0.200	0.400	ug/L	1	20.0	ND	90	75-124%	---	---	
1,2-Dichloropropane	16.8	0.250	0.500	ug/L	1	20.0	ND	84	78-122%	---	---	
1,3-Dichloropropane	17.3	0.500	1.00	ug/L	1	20.0	ND	86	80-120%	---	---	
2,2-Dichloropropane	17.2	0.500	1.00	ug/L	1	20.0	ND	86	60-139%	---	---	
1,1-Dichloropropene	17.8	0.500	1.00	ug/L	1	20.0	ND	89	79-125%	---	---	
cis-1,3-Dichloropropene	15.6	0.500	1.00	ug/L	1	20.0	ND	78	75-124%	---	---	
trans-1,3-Dichloropropene	18.8	0.500	1.00	ug/L	1	20.0	ND	94	73-127%	---	---	
Ethylbenzene	18.2	0.250	0.500	ug/L	1	20.0	ND	91	79-121%	---	---	
Hexachlorobutadiene	15.6	2.50	5.00	ug/L	1	20.0	ND	78	66-134%	---	---	
2-Hexanone	30.6	5.00	10.0	ug/L	1	40.0	ND	76	57-139%	---	---	
Isopropylbenzene	18.6	0.500	1.00	ug/L	1	20.0	ND	93	72-131%	---	---	
4-Isopropyltoluene	17.7	0.500	1.00	ug/L	1	20.0	ND	89	77-127%	---	---	
Methylene chloride	17.2	5.00	10.0	ug/L	1	20.0	ND	86	74-124%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0344 - EPA 5030C							**Water**					
Matrix Spike (23B0344-MS1)			Prepared: 02/09/23 08:37 Analyzed: 02/09/23 21:58									
QC Source Sample: Non-SDG (A3B0266-01)												
4-Methyl-2-pentanone (MiBK)	32.7	5.00	10.0	ug/L	1	40.0	ND	82	67-130%	---	---	
Methyl tert-butyl ether (MTBE)	15.5	0.500	1.00	ug/L	1	20.0	ND	78	71-124%	---	---	
Naphthalene	14.2	1.00	2.00	ug/L	1	20.0	ND	71	61-128%	---	---	
n-Propylbenzene	17.5	0.250	0.500	ug/L	1	20.0	ND	88	76-126%	---	---	
Styrene	17.0	0.500	1.00	ug/L	1	20.0	ND	85	78-123%	---	---	
1,1,1,2-Tetrachloroethane	17.0	0.200	0.400	ug/L	1	20.0	ND	85	78-124%	---	---	
1,1,2,2-Tetrachloroethane	16.6	0.250	0.500	ug/L	1	20.0	ND	83	71-121%	---	---	
Tetrachloroethene (PCE)	17.0	0.200	0.400	ug/L	1	20.0	ND	85	74-129%	---	---	
Toluene	17.5	0.500	1.00	ug/L	1	20.0	ND	87	80-121%	---	---	
1,2,3-Trichlorobenzene	16.0	1.00	2.00	ug/L	1	20.0	ND	80	69-129%	---	---	
1,2,4-Trichlorobenzene	13.8	1.00	2.00	ug/L	1	20.0	ND	69	69-130%	---	---	
1,1,1-Trichloroethane	20.8	0.200	0.400	ug/L	1	20.0	ND	104	74-131%	---	---	
1,1,2-Trichloroethane	17.2	0.250	0.500	ug/L	1	20.0	ND	86	80-120%	---	---	
Trichloroethene (TCE)	14.9	0.200	0.400	ug/L	1	20.0	ND	**74**	**79-123%**	---	---	Q-01
Trichlorofluoromethane	25.6	1.00	2.00	ug/L	1	20.0	ND	128	65-141%	---	---	Q-54a
1,2,3-Trichloropropane	17.3	0.500	1.00	ug/L	1	20.0	ND	86	73-122%	---	---	
1,2,4-Trimethylbenzene	17.6	0.500	1.00	ug/L	1	20.0	ND	88	76-124%	---	---	
1,3,5-Trimethylbenzene	16.9	0.500	1.00	ug/L	1	20.0	ND	84	75-124%	---	---	
Vinyl chloride	19.6	0.200	0.400	ug/L	1	20.0	ND	98	58-137%	---	---	
m,p-Xylene	36.9	0.500	1.00	ug/L	1	40.0	ND	92	80-121%	---	---	
o-Xylene	17.1	0.250	0.500	ug/L	1	20.0	ND	86	78-122%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 93 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*101 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*86 %*		*80-120 %*			*"*				

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Blank (23B0509-BLK1)			Prepared: 02/14/23 08:30 Analyzed: 02/14/23 10:53									
EPA 8260D												
Acetone	ND	10.0	20.0	ug/L	1	---	---	---	---	---	---	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Benzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Blank (23B0509-BLK1)			Prepared: 02/14/23 08:30 Analyzed: 02/14/23 10:53									
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Styrene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	

Surr: 1,4-Difluorobenzene (Surr) *Recovery: 95 %* *Limits: 80-120 %* *Dilution: 1x*

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C									Water			
Blank (23B0509-BLK1)				Prepared: 02/14/23 08:30 Analyzed: 02/14/23 10:53								
Surr: Toluene-d8 (Surr)			*Recovery: 107 %*	*Limits: 80-120 %*				*Dilution: 1x*				
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*				*"*				
LCS (23B0509-BS1)				Prepared: 02/14/23 08:30 Analyzed: 02/14/23 09:58								
EPA 8260D												
Acetone	39.5	10.0	20.0	ug/L	1	40.0	---	99	80-120%	---	---	ICV-01
Acrylonitrile	19.9	1.00	2.00	ug/L	1	20.0	---	99	80-120%	---	---	
Benzene	19.3	0.100	0.200	ug/L	1	20.0	---	97	80-120%	---	---	
Bromobenzene	18.6	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Bromochloromethane	22.5	0.500	1.00	ug/L	1	20.0	---	112	80-120%	---	---	
Bromodichloromethane	21.8	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
Bromoform	22.4	0.500	1.00	ug/L	1	20.0	---	112	80-120%	---	---	
Bromomethane	24.2	5.00	5.00	ug/L	1	20.0	---	**121**	**80-120%**	---	---	Q-56
2-Butanone (MEK)	38.2	5.00	10.0	ug/L	1	40.0	---	96	80-120%	---	---	ICV-01
n-Butylbenzene	21.5	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
sec-Butylbenzene	21.6	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
tert-Butylbenzene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
Carbon disulfide	21.6	5.00	10.0	ug/L	1	20.0	---	108	80-120%	---	---	
Carbon tetrachloride	23.7	0.500	1.00	ug/L	1	20.0	---	119	80-120%	---	---	
Chlorobenzene	19.8	0.250	0.500	ug/L	1	20.0	---	99	80-120%	---	---	
Chloroethane	34.9	5.00	5.00	ug/L	1	20.0	---	**175**	**80-120%**	---	---	Q-56
Chloroform	21.4	0.500	1.00	ug/L	1	20.0	---	107	80-120%	---	---	
Chloromethane	19.3	2.50	5.00	ug/L	1	20.0	---	97	80-120%	---	---	
2-Chlorotoluene	19.7	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
4-Chlorotoluene	19.3	0.500	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
Dibromochloromethane	21.5	0.500	1.00	ug/L	1	20.0	---	107	80-120%	---	---	
1,2-Dibromo-3-chloropropane	16.3	2.50	5.00	ug/L	1	20.0	---	81	80-120%	---	---	
1,2-Dibromoethane (EDB)	19.5	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
Dibromomethane	20.7	0.500	1.00	ug/L	1	20.0	---	103	80-120%	---	---	
1,2-Dichlorobenzene	20.3	0.250	0.500	ug/L	1	20.0	---	101	80-120%	---	---	
1,3-Dichlorobenzene	19.8	0.250	0.500	ug/L	1	20.0	---	99	80-120%	---	---	
1,4-Dichlorobenzene	19.6	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
Dichlorodifluoromethane	23.2	0.500	1.00	ug/L	1	20.0	---	116	80-120%	---	---	
1,1-Dichloroethane	20.8	0.200	0.400	ug/L	1	20.0	---	104	80-120%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
LCS (23B0509-BS1)			Prepared: 02/14/23 08:30		Analyzed: 02/14/23 09:58							
1,2-Dichloroethane (EDC)	22.7	0.200	0.400	ug/L	1	20.0	---	114	80-120%	---	---	
1,1-Dichloroethene	22.6	0.200	0.400	ug/L	1	20.0	---	113	80-120%	---	---	
cis-1,2-Dichloroethene	19.7	0.200	0.400	ug/L	1	20.0	---	98	80-120%	---	---	
trans-1,2-Dichloroethene	19.8	0.200	0.400	ug/L	1	20.0	---	99	80-120%	---	---	
1,2-Dichloropropane	19.3	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
1,3-Dichloropropane	20.5	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
2,2-Dichloropropane	22.0	0.500	1.00	ug/L	1	20.0	---	110	80-120%	---	---	
1,1-Dichloropropene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
cis-1,3-Dichloropropene	20.0	0.500	1.00	ug/L	1	20.0	---	100	80-120%	---	---	
trans-1,3-Dichloropropene	22.7	0.500	1.00	ug/L	1	20.0	---	114	80-120%	---	---	
Ethylbenzene	20.4	0.250	0.500	ug/L	1	20.0	---	102	80-120%	---	---	
Hexachlorobutadiene	19.5	2.50	5.00	ug/L	1	20.0	---	97	80-120%	---	---	
2-Hexanone	37.3	5.00	10.0	ug/L	1	40.0	---	93	80-120%	---	---	
Isopropylbenzene	20.8	0.500	1.00	ug/L	1	20.0	---	104	80-120%	---	---	
4-Isopropyltoluene	21.0	0.500	1.00	ug/L	1	20.0	---	105	80-120%	---	---	
Methylene chloride	20.0	5.00	10.0	ug/L	1	20.0	---	100	80-120%	---	---	
4-Methyl-2-pentanone (MiBK)	38.6	5.00	10.0	ug/L	1	40.0	---	96	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	18.4	0.500	1.00	ug/L	1	20.0	---	92	80-120%	---	---	
Naphthalene	17.6	1.00	2.00	ug/L	1	20.0	---	88	80-120%	---	---	
n-Propylbenzene	20.6	0.250	0.500	ug/L	1	20.0	---	103	80-120%	---	---	
Styrene	20.4	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	
1,1,1,2-Tetrachloroethane	19.5	0.200	0.400	ug/L	1	20.0	---	97	80-120%	---	---	
1,1,2,2-Tetrachloroethane	20.1	0.250	0.500	ug/L	1	20.0	---	100	80-120%	---	---	
Tetrachloroethene (PCE)	19.2	0.200	0.400	ug/L	1	20.0	---	96	80-120%	---	---	
Toluene	19.3	0.500	1.00	ug/L	1	20.0	---	97	80-120%	---	---	
1,2,3-Trichlorobenzene	19.5	1.00	2.00	ug/L	1	20.0	---	97	80-120%	---	---	
1,2,4-Trichlorobenzene	17.6	1.00	2.00	ug/L	1	20.0	---	88	80-120%	---	---	
1,1,1-Trichloroethane	22.1	0.200	0.400	ug/L	1	20.0	---	111	80-120%	---	---	
1,1,2-Trichloroethane	20.8	0.250	0.500	ug/L	1	20.0	---	104	80-120%	---	---	
Trichloroethene (TCE)	18.2	0.200	0.400	ug/L	1	20.0	---	91	80-120%	---	---	
Trichlorofluoromethane	27.4	1.00	2.00	ug/L	1	20.0	---	**137**	**80-120%**	---	---	Q-56
1,2,3-Trichloropropane	21.7	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
1,2,4-Trimethylbenzene	21.5	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
1,3,5-Trimethylbenzene	20.5	0.500	1.00	ug/L	1	20.0	---	102	80-120%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C									Water			
LCS (23B0509-BS1)			Prepared: 02/14/23 08:30 Analyzed: 02/14/23 09:58									
Vinyl chloride	22.2	0.200	0.400	ug/L	1	20.0	---	111	80-120%	---	---	
m,p-Xylene	41.3	0.500	1.00	ug/L	1	40.0	---	103	80-120%	---	---	
o-Xylene	19.6	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 94 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*101 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*91 %*		*80-120 %*				*"*			
Duplicate (23B0509-DUP1)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 12:00									
QC Source Sample: Non-SDG (A3B0393-04)												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	**11.4**	0.100	0.200	ug/L	1	---	11.3	---	---	1	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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AMENDED REPORT

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QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Duplicate (23B0509-DUP1)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 12:00							
QC Source Sample: Non-SDG (A3B0393-04)												
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	**4.45**	0.250	0.500	ug/L	1	---	4.25	---	---	5	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	**0.550**	0.500	1.00	ug/L	1	---	0.530	---	---	4	30%	Ja
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	**2.69**	1.00	2.00	ug/L	1	---	2.49	---	---	8	30%	
n-Propylbenzene	**0.760**	0.250	0.500	ug/L	1	---	0.780	---	---	3	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C												
Duplicate (23B0509-DUP1)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 12:00									
QC Source Sample: Non-SDG (A3B0393-04)												
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	**2.85**	0.500	1.00	ug/L	1	---	2.73	---	---	4	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	**0.840**	0.500	1.00	ug/L	1	---	0.760	---	---	10	30%	Ja
o-Xylene	**5.89**	0.250	0.500	ug/L	1	---	5.58	---	---	5	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 94 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*106 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*94 %*		*80-120 %*		*"*					
Duplicate (23B0509-DUP2)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 13:29									
QC Source Sample: Non-SDG (A3B0406-03)												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Duplicate (23B0509-DUP2)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 13:29							
QC Source Sample: Non-SDG (A3B0406-03)												
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Duplicate (23B0509-DUP2)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 13:29							
QC Source Sample: Non-SDG (A3B0406-03)												
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 96 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*104 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*100 %*		*80-120 %*		*"*					
Matrix Spike (23B0509-MS1)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 14:35							
QC Source Sample: Non-SDG (A3B0406-06)												
EPA 8260D												
Acetone	1090	10.0	20.0	ug/L	1	40.0	1070	47	39-160%	---	---	E, ICV-01
Acrylonitrile	22.5	1.00	2.00	ug/L	1	20.0	ND	99	63-135%	---	---	
Benzene	48.9	0.100	0.200	ug/L	1	20.0	29.5	97	79-120%	---	---	
Bromobenzene	18.5	0.250	0.500	ug/L	1	20.0	ND	92	80-120%	---	---	
Bromochloromethane	21.1	0.500	1.00	ug/L	1	20.0	ND	106	78-123%	---	---	
Bromodichloromethane	21.2	0.500	1.00	ug/L	1	20.0	ND	106	79-125%	---	---	
Bromoform	20.2	0.500	1.00	ug/L	1	20.0	ND	101	66-130%	---	---	
Bromomethane	82.5	5.00	5.00	ug/L	1	20.0	61.0	108	53-141%	---	---	Q-54
2-Butanone (MEK)	113	5.00	10.0	ug/L	1	40.0	69.1	110	56-143%	---	---	ICV-01
n-Butylbenzene	23.5	0.500	1.00	ug/L	1	20.0	0.690	114	75-128%	---	---	
sec-Butylbenzene	21.4	0.500	1.00	ug/L	1	20.0	1.07	102	77-126%	---	---	
tert-Butylbenzene	19.7	0.500	1.00	ug/L	1	20.0	ND	99	78-124%	---	---	

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C							**Water**					
Matrix Spike (23B0509-MS1)			Prepared: 02/14/23 10:22		Analyzed: 02/14/23 14:35							
QC Source Sample: Non-SDG (A3B0406-06)												
Carbon disulfide	28.3	5.00	10.0	ug/L	1	20.0	ND	**141**	**64-133%**	---	---	Q-01
Carbon tetrachloride	24.6	0.500	1.00	ug/L	1	20.0	ND	123	72-136%	---	---	
Chlorobenzene	19.6	0.250	0.500	ug/L	1	20.0	ND	98	80-120%	---	---	
Chloroethane	43.8	5.00	5.00	ug/L	1	20.0	13.3	**152**	**60-138%**	---	---	Q-54d
Chloroform	21.2	0.500	1.00	ug/L	1	20.0	ND	106	79-124%	---	---	
Chloromethane	144	2.50	5.00	ug/L	1	20.0	127	84	50-139%	---	---	
2-Chlorotoluene	18.9	0.500	1.00	ug/L	1	20.0	ND	95	79-122%	---	---	
4-Chlorotoluene	18.6	0.500	1.00	ug/L	1	20.0	ND	93	78-122%	---	---	
Dibromochloromethane	20.9	0.500	1.00	ug/L	1	20.0	ND	105	74-126%	---	---	
1,2-Dibromo-3-chloropropane	20.4	2.50	5.00	ug/L	1	20.0	ND	102	62-128%	---	---	
1,2-Dibromoethane (EDB)	20.2	0.250	0.500	ug/L	1	20.0	ND	101	77-121%	---	---	
Dibromomethane	20.3	0.500	1.00	ug/L	1	20.0	ND	102	79-123%	---	---	
1,2-Dichlorobenzene	19.4	0.250	0.500	ug/L	1	20.0	ND	97	80-120%	---	---	
1,3-Dichlorobenzene	18.8	0.250	0.500	ug/L	1	20.0	ND	94	80-120%	---	---	
1,4-Dichlorobenzene	18.3	0.250	0.500	ug/L	1	20.0	ND	92	79-120%	---	---	
Dichlorodifluoromethane	23.0	0.500	1.00	ug/L	1	20.0	ND	115	32-152%	---	---	
1,1-Dichloroethane	21.0	0.200	0.400	ug/L	1	20.0	ND	105	77-125%	---	---	
1,2-Dichloroethane (EDC)	20.7	0.200	0.400	ug/L	1	20.0	ND	102	73-128%	---	---	
1,1-Dichloroethene	23.5	0.200	0.400	ug/L	1	20.0	ND	118	71-131%	---	---	
cis-1,2-Dichloroethene	20.6	0.200	0.400	ug/L	1	20.0	ND	103	78-123%	---	---	
trans-1,2-Dichloroethene	21.7	0.200	0.400	ug/L	1	20.0	ND	108	75-124%	---	---	
1,2-Dichloropropane	20.1	0.250	0.500	ug/L	1	20.0	ND	101	78-122%	---	---	
1,3-Dichloropropane	19.6	0.500	1.00	ug/L	1	20.0	ND	98	80-120%	---	---	
2,2-Dichloropropane	21.0	0.500	1.00	ug/L	1	20.0	ND	105	60-139%	---	---	
1,1-Dichloropropene	22.1	0.500	1.00	ug/L	1	20.0	ND	110	79-125%	---	---	
cis-1,3-Dichloropropene	19.1	0.500	1.00	ug/L	1	20.0	ND	96	75-124%	---	---	
trans-1,3-Dichloropropene	21.2	0.500	1.00	ug/L	1	20.0	ND	106	73-127%	---	---	
Ethylbenzene	177	0.250	0.500	ug/L	1	20.0	180	**-13**	**79-121%**	---	---	Q-03
Hexachlorobutadiene	17.2	2.50	5.00	ug/L	1	20.0	ND	86	66-134%	---	---	
2-Hexanone	54.6	5.00	10.0	ug/L	1	40.0	10.6	110	57-139%	---	---	
Isopropylbenzene	29.8	0.500	1.00	ug/L	1	20.0	9.06	104	72-131%	---	---	
4-Isopropyltoluene	26.0	0.500	1.00	ug/L	1	20.0	3.15	114	77-127%	---	---	
Methylene chloride	20.9	5.00	10.0	ug/L	1	20.0	ND	104	74-124%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0509 - EPA 5030C								**Water**				
Matrix Spike (23B0509-MS1)			Prepared: 02/14/23 10:22 Analyzed: 02/14/23 14:35									
QC Source Sample: Non-SDG (A3B0406-06)												
4-Methyl-2-pentanone (MiBK)	64.1	5.00	10.0	ug/L	1	40.0	22.9	103	67-130%	---	---	
Methyl tert-butyl ether (MTBE)	18.6	0.500	1.00	ug/L	1	20.0	ND	93	71-124%	---	---	
Naphthalene	95.8	1.00	2.00	ug/L	1	20.0	83.8	**60**	**61-128%**	---	---	Q-03
n-Propylbenzene	40.6	0.250	0.500	ug/L	1	20.0	21.4	96	76-126%	---	---	
Styrene	18.8	0.500	1.00	ug/L	1	20.0	ND	94	78-123%	---	---	
1,1,1,2-Tetrachloroethane	18.4	0.200	0.400	ug/L	1	20.0	ND	92	78-124%	---	---	
1,1,2,2-Tetrachloroethane	20.4	0.250	0.500	ug/L	1	20.0	ND	102	71-121%	---	---	
Tetrachloroethene (PCE)	19.9	0.200	0.400	ug/L	1	20.0	ND	100	74-129%	---	---	
Toluene	116	0.500	1.00	ug/L	1	20.0	107	**43**	**80-121%**	---	---	Q-01
1,2,3-Trichlorobenzene	19.4	1.00	2.00	ug/L	1	20.0	ND	97	69-129%	---	---	
1,2,4-Trichlorobenzene	18.0	1.00	2.00	ug/L	1	20.0	ND	90	69-130%	---	---	
1,1,1-Trichloroethane	22.3	0.200	0.400	ug/L	1	20.0	ND	111	74-131%	---	---	
1,1,2-Trichloroethane	19.3	0.250	0.500	ug/L	1	20.0	ND	97	80-120%	---	---	
Trichloroethene (TCE)	18.3	0.200	0.400	ug/L	1	20.0	ND	92	79-123%	---	---	
Trichlorofluoromethane	27.0	1.00	2.00	ug/L	1	20.0	ND	135	65-141%	---	---	Q-54b
1,2,3-Trichloropropane	20.8	0.500	1.00	ug/L	1	20.0	ND	104	73-122%	---	---	
1,2,4-Trimethylbenzene	264	0.500	1.00	ug/L	1	20.0	269	**-25**	**76-124%**	---	---	E, Q-03
1,3,5-Trimethylbenzene	84.9	0.500	1.00	ug/L	1	20.0	69.3	78	75-124%	---	---	
Vinyl chloride	25.1	0.200	0.400	ug/L	1	20.0	ND	126	58-137%	---	---	
m,p-Xylene	627	0.500	1.00	ug/L	1	40.0	802	**-437**	**80-121%**	---	---	Q-03, E
o-Xylene	393	0.250	0.500	ug/L	1	20.0	443	**-251**	**78-122%**	---	---	E, Q-03
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*			*Limits: 80-120 %*			*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*			*80-120 %*			*"*			
4-Bromofluorobenzene (Surr)			*95 %*			*80-120 %*			*"*			

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0743 - EPA 5030C							**Water**					
Blank (23B0743-BLK1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 15:45									
EPA 8260D SIM												
Benzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 104 %*			*Limits: 80-120 %*			*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*			*80-120 %*			*"*			
4-Bromofluorobenzene (Surr)			*99 %*			*80-120 %*			*"*			
LCS (23B0743-BS1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 14:52									
EPA 8260D SIM												
Benzene	0.227	0.0500	0.100	ug/L	1	0.200	---	114	80-120%	---	---	
Toluene	0.209	0.0500	0.100	ug/L	1	0.200	---	105	80-120%	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0743 - EPA 5030C									**Water**			
LCS (23B0743-BS1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 14:52									
Ethylbenzene	0.202	0.0500	0.100	ug/L	1	0.200	---	101	80-120%	---	---	
m,p-Xylene	0.408	0.100	0.200	ug/L	1	0.400	---	102	80-120%	---	---	
o-Xylene	0.204	0.0500	0.100	ug/L	1	0.200	---	102	80-120%	---	---	
1,2,4-Trimethylbenzene	0.207	0.0500	0.100	ug/L	1	0.200	---	104	80-120%	---	---	
1,3,5-Trimethylbenzene	0.205	0.0500	0.100	ug/L	1	0.200	---	103	80-120%	---	---	
Chloroform	0.232	0.0500	0.100	ug/L	1	0.200	---	116	80-120%	---	---	
1,2-Dibromo-3-chloropropane	0.202	0.100	0.200	ug/L	1	0.200	---	101	80-120%	---	---	
1,2-Dibromoethane (EDB)	0.199	0.0100	0.0200	ug/L	1	0.200	---	100	80-120%	---	---	
1,1-Dichloroethane	0.234	0.0100	0.0200	ug/L	1	0.200	---	117	80-120%	---	---	
1,2-Dichloroethane (EDC)	0.221	0.0100	0.0200	ug/L	1	0.200	---	111	80-120%	---	---	
1,1-Dichloroethene	0.228	0.0100	0.0200	ug/L	1	0.200	---	114	80-120%	---	---	
cis-1,2-Dichloroethene	0.235	0.0100	0.0200	ug/L	1	0.200	---	118	80-120%	---	---	
trans-1,2-Dichloroethene	0.228	0.0100	0.0200	ug/L	1	0.200	---	114	80-120%	---	---	
1,2-Dichloropropane	0.229	0.0100	0.0200	ug/L	1	0.200	---	114	80-120%	---	---	
cis-1,3-Dichloropropene	0.202	0.0100	0.0200	ug/L	1	0.200	---	101	80-120%	---	---	
trans-1,3-Dichloropropene	0.210	0.0100	0.0200	ug/L	1	0.200	---	105	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	0.223	0.0100	0.0200	ug/L	1	0.200	---	112	80-120%	---	---	
1,1,2,2-Tetrachloroethane	0.214	0.0100	0.0200	ug/L	1	0.200	---	107	80-120%	---	---	
Tetrachloroethene (PCE)	0.196	0.0100	0.0200	ug/L	1	0.200	---	98	80-120%	---	---	
Trichloroethene (TCE)	0.219	0.0100	0.0200	ug/L	1	0.200	---	110	80-120%	---	---	
1,2,3-Trichloropropane	0.196	0.0500	0.100	ug/L	1	0.200	---	98	80-120%	---	---	
Vinyl chloride	0.227	0.0100	0.0200	ug/L	1	0.200	---	113	80-120%	---	---	
1,1,2-Trichloroethane	0.204	0.0100	0.0200	ug/L	1	0.200	---	102	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 104 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*95 %*		*80-120 %*				*"*			
Duplicate (23B0743-DUP1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 17:33									
QC Source Sample: Non-SDG (A3B0522-01)												
Benzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0743 - EPA 5030C							**Water**					
Duplicate (23B0743-DUP1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 17:33									
QC Source Sample: Non-SDG (A3B0522-01)												
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 103 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*99 %*		*80-120 %*				*"*			
Matrix Spike (23B0743-MS1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 20:14									
QC Source Sample: Non-SDG (A3B0522-05)												
EPA 8260D SIM												
Benzene	0.192	0.0500	0.100	ug/L	1	0.200	ND	96	79-120%	---	---	
Toluene	0.166	0.0500	0.100	ug/L	1	0.200	ND	83	80-121%	---	---	
Ethylbenzene	0.147	0.0500	0.100	ug/L	1	0.200	ND	**74**	**79-121%**	---	---	Q-01
m,p-Xylene	0.285	0.100	0.200	ug/L	1	0.400	ND	**71**	**80-121%**	---	---	Q-01
o-Xylene	0.142	0.0500	0.100	ug/L	1	0.200	ND	**71**	**78-122%**	---	---	Q-01
1,2,4-Trimethylbenzene	0.142	0.0500	0.100	ug/L	1	0.200	ND	**71**	**76-124%**	---	---	Q-01

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0743 - EPA 5030C								**Water**				
Matrix Spike (23B0743-MS1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 20:14									
QC Source Sample: Non-SDG (A3B0522-05)												
1,3,5-Trimethylbenzene	0.132	0.0500	0.100	ug/L	1	0.200	ND	**66**	**75-124%**	---	---	Q-01
Chloroform	0.179	0.0500	0.100	ug/L	1	0.200	ND	90	79-124%	---	---	
1,2-Dibromo-3-chloropropane	0.134	0.100	0.200	ug/L	1	0.200	ND	67	62-128%	---	---	Ja
1,2-Dibromoethane (EDB)	0.150	0.0100	0.0200	ug/L	1	0.200	ND	**75**	**77-121%**	---	---	Q-01
1,1-Dichloroethane	0.191	0.0100	0.0200	ug/L	1	0.200	ND	95	77-125%	---	---	
1,2-Dichloroethane (EDC)	0.177	0.0100	0.0200	ug/L	1	0.200	ND	88	73-128%	---	---	
1,1-Dichloroethene	0.196	0.0100	0.0200	ug/L	1	0.200	ND	98	71-131%	---	---	
cis-1,2-Dichloroethene	0.204	0.0100	0.0200	ug/L	1	0.200	0.0212	91	78-123%	---	---	
trans-1,2-Dichloroethene	0.190	0.0100	0.0200	ug/L	1	0.200	ND	95	75-124%	---	---	
1,2-Dichloropropane	0.178	0.0100	0.0200	ug/L	1	0.200	ND	89	78-122%	---	---	
cis-1,3-Dichloropropene	0.154	0.0100	0.0200	ug/L	1	0.200	ND	77	75-124%	---	---	
trans-1,3-Dichloropropene	0.158	0.0100	0.0200	ug/L	1	0.200	ND	79	73-127%	---	---	
Methyl tert-butyl ether (MTBE)	0.178	0.0100	0.0200	ug/L	1	0.200	ND	89	71-124%	---	---	
1,1,2,2-Tetrachloroethane	0.164	0.0100	0.0200	ug/L	1	0.200	ND	82	71-121%	---	---	
Tetrachloroethene (PCE)	0.158	0.0100	0.0200	ug/L	1	0.200	ND	79	74-129%	---	---	
Trichloroethene (TCE)	0.175	0.0100	0.0200	ug/L	1	0.200	ND	87	79-123%	---	---	
1,2,3-Trichloropropane	0.154	0.0500	0.100	ug/L	1	0.200	ND	77	73-122%	---	---	
Vinyl chloride	0.227	0.0100	0.0200	ug/L	1	0.200	ND	113	58-137%	---	---	
1,1,2-Trichloroethane	0.157	0.0100	0.0200	ug/L	1	0.200	ND	**78**	**80-120%**	---	---	Q-01
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 105 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*98 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*98 %*		*80-120 %*			*"*				

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Apex Laboratories, LLC

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ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0481 - EPA 3510C (Acid/Base Neutral)							**Water**					
Blank (23B0481-BLK1)			Prepared: 02/13/23 11:36 Analyzed: 02/13/23 18:15									
EPA 8270E												
Acenaphthene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	Q-30
Acenaphthylene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Chrysene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Fluoranthene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Fluorene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	Q-30
2-Methylnaphthalene	ND	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	Q-30
Naphthalene	ND	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	Q-30
Phenanthrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Pyrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Carbazole	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Dibenzofuran	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	Q-30
2-Chlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
4-Chloro-3-methylphenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,4-Dichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4-Dimethylphenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4-Dinitrophenol	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
4,6-Dinitro-2-methylphenol	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
2-Methylphenol	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
3+4-Methylphenol(s)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2-Nitrophenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Pentachlorophenol (PCP)	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Phenol	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0481 - EPA 3510C (Acid/Base Neutral)							Water					
Blank (23B0481-BLK1)			Prepared: 02/13/23 11:36 Analyzed: 02/13/23 18:15									
2,3,5,6-Tetrachlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Diethylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Dimethylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Hexachlorocyclopentadiene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Hexachloroethane	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2-Chloronaphthalene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	Q-30
1,2,4-Trichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
4-Bromophenyl phenyl ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
4-Chlorophenyl phenyl ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
Aniline	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
4-Chloroaniline	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
3-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
4-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Nitrobenzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Benzoic acid	ND	1.25	2.50	ug/L	1	---	---	---	---	---	---	
Benzyl alcohol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Isophorone	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0481 - EPA 3510C (Acid/Base Neutral)								**Water**				
Blank (23B0481-BLK1)			Prepared: 02/13/23 11:36 Analyzed: 02/13/23 18:15									
Azobenzene (1,2-DPH)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Pyridine	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
1,3-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
1,4-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 72 %*		*Limits: 44-120 %*				*Dilution: 1x*			
2-Fluorobiphenyl (Surr)			*55 %*		*44-120 %*				*"*			
Phenol-d6 (Surr)			*24 %*		*10-133 %*				*"*			
p-Terphenyl-d14 (Surr)			*93 %*		*50-134 %*				*"*			
2-Fluorophenol (Surr)			*42 %*		*19-120 %*				*"*			
2,4,6-Tribromophenol (Surr)			*63 %*		*43-140 %*				*"*			
LCS (23B0481-BS1)			Prepared: 02/13/23 11:36 Analyzed: 02/13/23 18:50									
EPA 8270E												
Acenaphthene	1.80	0.0400	0.0800	ug/L	4	4.00	---	**45**	**47-122%**	---	---	Q-30
Acenaphthylene	1.99	0.0400	0.0800	ug/L	4	4.00	---	50	41-130%	---	---	
Anthracene	2.95	0.0400	0.0800	ug/L	4	4.00	---	74	57-123%	---	---	
Benz(a)anthracene	3.45	0.0400	0.0800	ug/L	4	4.00	---	86	58-125%	---	---	
Benzo(a)pyrene	3.42	0.0600	0.120	ug/L	4	4.00	---	85	54-128%	---	---	
Benzo(b)fluoranthene	3.66	0.0600	0.120	ug/L	4	4.00	---	91	53-131%	---	---	
Benzo(k)fluoranthene	3.63	0.0600	0.120	ug/L	4	4.00	---	91	57-129%	---	---	
Benzo(g,h,i)perylene	3.53	0.0400	0.0800	ug/L	4	4.00	---	88	50-134%	---	---	
Chrysene	3.35	0.0400	0.0800	ug/L	4	4.00	---	84	59-123%	---	---	
Dibenz(a,h)anthracene	3.43	0.0400	0.0800	ug/L	4	4.00	---	86	51-134%	---	---	
Fluoranthene	3.43	0.0400	0.0800	ug/L	4	4.00	---	86	57-128%	---	---	
Fluorene	2.34	0.0400	0.0800	ug/L	4	4.00	---	58	52-124%	---	---	
Indeno(1,2,3-cd)pyrene	3.51	0.0400	0.0800	ug/L	4	4.00	---	88	52-134%	---	---	
1-Methylnaphthalene	1.31	0.0800	0.160	ug/L	4	4.00	---	**33**	**41-120%**	---	---	Q-30
2-Methylnaphthalene	1.27	0.0800	0.160	ug/L	4	4.00	---	**32**	**40-121%**	---	---	Q-30

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0481 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS (23B0481-BS1)			Prepared: 02/13/23 11:36		Analyzed: 02/13/23 18:50							
Naphthalene	1.37	0.0800	0.160	ug/L	4	4.00	---	**34**	**40-121%**	---	---	Q-30
Phenanthrene	2.83	0.0400	0.0800	ug/L	4	4.00	---	71	59-120%	---	---	
Pyrene	3.41	0.0400	0.0800	ug/L	4	4.00	---	85	57-126%	---	---	
Carbazole	3.27	0.0600	0.120	ug/L	4	4.00	---	82	60-122%	---	---	
Dibenzofuran	1.93	0.0400	0.0800	ug/L	4	4.00	---	**48**	**53-120%**	---	---	Q-30
2-Chlorophenol	2.20	0.200	0.400	ug/L	4	4.00	---	55	38-120%	---	---	
4-Chloro-3-methylphenol	2.38	0.400	0.800	ug/L	4	4.00	---	60	52-120%	---	---	
2,4-Dichlorophenol	2.26	0.200	0.400	ug/L	4	4.00	---	56	47-121%	---	---	
2,4-Dimethylphenol	2.41	0.200	0.400	ug/L	4	4.00	---	60	31-124%	---	---	
2,4-Dinitrophenol	2.67	1.00	2.00	ug/L	4	4.00	---	67	23-143%	---	---	
4,6-Dinitro-2-methylphenol	3.14	1.00	2.00	ug/L	4	4.00	---	78	44-137%	---	---	
2-Methylphenol	1.87	0.100	0.200	ug/L	4	4.00	---	47	30-120%	---	---	
3+4-Methylphenol(s)	1.63	0.100	0.200	ug/L	4	4.00	---	41	29-120%	---	---	
2-Nitrophenol	2.30	0.400	0.800	ug/L	4	4.00	---	58	47-123%	---	---	
4-Nitrophenol	1.07	0.400	0.800	ug/L	4	4.00	---	27	10-120%	---	---	
Pentachlorophenol (PCP)	2.78	0.400	0.800	ug/L	4	4.00	---	70	35-138%	---	---	
Phenol	0.921	0.800	0.800	ug/L	4	4.00	---	23	10-120%	---	---	
2,3,4,6-Tetrachlorophenol	2.82	0.200	0.400	ug/L	4	4.00	---	70	50-128%	---	---	
2,3,5,6-Tetrachlorophenol	2.68	0.200	0.400	ug/L	4	4.00	---	67	50-121%	---	---	
2,4,5-Trichlorophenol	2.55	0.200	0.400	ug/L	4	4.00	---	64	53-123%	---	---	
2,4,6-Trichlorophenol	2.33	0.200	0.400	ug/L	4	4.00	---	58	50-125%	---	---	
Bis(2-ethylhexyl)phthalate	3.51	0.800	1.60	ug/L	4	4.00	---	88	55-135%	---	---	
Butyl benzyl phthalate	3.64	0.800	1.60	ug/L	4	4.00	---	91	53-134%	---	---	
Diethylphthalate	3.93	0.800	1.60	ug/L	4	4.00	---	98	56-125%	---	---	
Dimethylphthalate	3.53	0.800	1.60	ug/L	4	4.00	---	88	45-127%	---	---	
Di-n-butylphthalate	4.14	0.800	1.60	ug/L	4	4.00	---	104	59-127%	---	---	
Di-n-octyl phthalate	3.86	0.800	1.60	ug/L	4	4.00	---	96	51-140%	---	---	
N-Nitrosodimethylamine	1.56	0.100	0.200	ug/L	4	4.00	---	39	19-120%	---	---	
N-Nitroso-di-n-propylamine	2.42	0.100	0.200	ug/L	4	4.00	---	61	49-120%	---	---	
N-Nitrosodiphenylamine	2.65	0.100	0.200	ug/L	4	4.00	---	66	51-123%	---	---	
Bis(2-Chloroethoxy) methane	2.62	0.100	0.200	ug/L	4	4.00	---	66	48-120%	---	---	
Bis(2-Chloroethyl) ether	2.30	0.100	0.200	ug/L	4	4.00	---	57	43-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	1.90	0.100	0.200	ug/L	4	4.00	---	48	41-120%	---	---	
Hexachlorobenzene	2.32	0.0400	0.0800	ug/L	4	4.00	---	58	53-125%	---	---	

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Philip Nerenberg, Lab Director

APEX LABORATORIES

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0481 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS (23B0481-BS1)			Prepared: 02/13/23 11:36 Analyzed: 02/13/23 18:50									
Hexachlorobutadiene	0.893	0.100	0.200	ug/L	4	4.00	---	22	22-124%	---	---	
Hexachlorocyclopentadiene	0.414	0.200	0.400	ug/L	4	4.00	---	10	10-127%	---	---	Q-31
Hexachloroethane	0.858	0.100	0.200	ug/L	4	4.00	---	21	21-120%	---	---	
2-Chloronaphthalene	1.37	0.0400	0.0800	ug/L	4	4.00	---	**34**	**40-120%**	---	---	Q-30
1,2,4-Trichlorobenzene	1.08	0.100	0.200	ug/L	4	4.00	---	**27**	**29-120%**	---	---	Q-30
4-Bromophenyl phenyl ether	2.07	0.100	0.200	ug/L	4	4.00	---	**52**	**55-124%**	---	---	Q-30
4-Chlorophenyl phenyl ether	1.88	0.100	0.200	ug/L	4	4.00	---	**47**	**53-121%**	---	---	Q-30
Aniline	1.71	0.200	0.400	ug/L	4	4.00	---	43	10-120%	---	---	Q-31
4-Chloroaniline	1.98	0.100	0.200	ug/L	4	4.00	---	50	33-120%	---	---	
2-Nitroaniline	2.52	0.800	1.60	ug/L	4	4.00	---	63	55-127%	---	---	
3-Nitroaniline	2.86	0.800	1.60	ug/L	4	4.00	---	72	41-128%	---	---	
4-Nitroaniline	2.97	0.800	1.60	ug/L	4	4.00	---	74	25-120%	---	---	
Nitrobenzene	2.00	0.400	0.800	ug/L	4	4.00	---	50	45-121%	---	---	
2,4-Dinitrotoluene	3.33	0.400	0.800	ug/L	4	4.00	---	83	57-128%	---	---	
2,6-Dinitrotoluene	3.10	0.400	0.800	ug/L	4	4.00	---	78	57-124%	---	---	
Benzoic acid	3.11	0.200	0.200	ug/L	4	8.00	---	39	10-120%	---	---	Q-31
Benzyl alcohol	1.68	0.400	0.800	ug/L	4	4.00	---	42	31-120%	---	---	Q-31
Isophorone	2.65	0.100	0.200	ug/L	4	4.00	---	66	42-124%	---	---	
Azobenzene (1,2-DPH)	2.59	0.100	0.200	ug/L	4	4.00	---	65	61-120%	---	---	
Bis(2-Ethylhexyl) adipate	3.72	1.00	2.00	ug/L	4	4.00	---	93	63-121%	---	---	
3,3'-Dichlorobenzidine	14.6	2.00	4.00	ug/L	4	8.00	---	**182**	**27-129%**	---	---	Q-29, Q-41, Q-52
1,2-Dinitrobenzene	3.19	1.00	2.00	ug/L	4	4.00	---	80	59-120%	---	---	
1,3-Dinitrobenzene	2.82	1.00	2.00	ug/L	4	4.00	---	71	49-128%	---	---	
1,4-Dinitrobenzene	2.69	1.00	2.00	ug/L	4	4.00	---	67	54-120%	---	---	
Pyridine	1.19	0.400	0.800	ug/L	4	4.00	---	30	10-120%	---	---	
1,2-Dichlorobenzene	1.02	0.100	0.200	ug/L	4	4.00	---	**25**	**32-120%**	---	---	Q-30
1,3-Dichlorobenzene	0.971	0.100	0.200	ug/L	4	4.00	---	**24**	**28-120%**	---	---	Q-30
1,4-Dichlorobenzene	0.984	0.100	0.200	ug/L	4	4.00	---	**25**	**29-120%**	---	---	Q-30

Surr: Nitrobenzene-d5 (Surr)	*Recovery: 52 %*	*Limits: 44-120 %*	*Dilution: 4x*	
2-Fluorobiphenyl (Surr)	*52 %*	*44-120 %*	*"*	
Phenol-d6 (Surr)	*19 %*	*10-133 %*	*"*	
p-Terphenyl-d14 (Surr)	*89 %*	*50-134 %*	*"*	
2-Fluorophenol (Surr)	*38 %*	*19-120 %*	*"*	
2,4,6-Tribromophenol (Surr)	*67 %*	*43-140 %*	*"*	

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3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

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Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0481 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS Dup (23B0481-BSD1)			Prepared: 02/13/23 11:36 Analyzed: 02/13/23 19:24									**Q-19**
EPA 8270E												
Acenaphthene	2.18	0.0400	0.0800	ug/L	4	4.00	---	55	47-122%	19	30%	
Acenaphthylene	2.48	0.0400	0.0800	ug/L	4	4.00	---	62	41-130%	22	30%	
Anthracene	3.41	0.0400	0.0800	ug/L	4	4.00	---	85	57-123%	14	30%	
Benz(a)anthracene	3.79	0.0400	0.0800	ug/L	4	4.00	---	95	58-125%	9	30%	
Benzo(a)pyrene	3.77	0.0600	0.120	ug/L	4	4.00	---	94	54-128%	10	30%	
Benzo(b)fluoranthene	3.97	0.0600	0.120	ug/L	4	4.00	---	99	53-131%	8	30%	
Benzo(k)fluoranthene	3.94	0.0600	0.120	ug/L	4	4.00	---	99	57-129%	8	30%	
Benzo(g,h,i)perylene	3.90	0.0400	0.0800	ug/L	4	4.00	---	97	50-134%	10	30%	
Chrysene	3.75	0.0400	0.0800	ug/L	4	4.00	---	94	59-123%	11	30%	
Dibenz(a,h)anthracene	3.78	0.0400	0.0800	ug/L	4	4.00	---	95	51-134%	10	30%	
Fluoranthene	3.83	0.0400	0.0800	ug/L	4	4.00	---	96	57-128%	11	30%	
Fluorene	2.68	0.0400	0.0800	ug/L	4	4.00	---	67	52-124%	14	30%	
Indeno(1,2,3-cd)pyrene	3.87	0.0400	0.0800	ug/L	4	4.00	---	97	52-134%	10	30%	
1-Methylnaphthalene	1.71	0.0800	0.160	ug/L	4	4.00	---	43	41-120%	27	30%	
2-Methylnaphthalene	1.67	0.0800	0.160	ug/L	4	4.00	---	42	40-121%	27	30%	
Naphthalene	1.75	0.0800	0.160	ug/L	4	4.00	---	44	40-121%	24	30%	
Phenanthrene	3.21	0.0400	0.0800	ug/L	4	4.00	---	80	59-120%	13	30%	
Pyrene	3.82	0.0400	0.0800	ug/L	4	4.00	---	95	57-126%	11	30%	
Carbazole	3.79	0.0600	0.120	ug/L	4	4.00	---	95	60-122%	15	30%	
Dibenzofuran	2.38	0.0400	0.0800	ug/L	4	4.00	---	59	53-120%	21	30%	
2-Chlorophenol	2.78	0.200	0.400	ug/L	4	4.00	---	70	38-120%	23	30%	
4-Chloro-3-methylphenol	3.07	0.400	0.800	ug/L	4	4.00	---	77	52-120%	25	30%	
2,4-Dichlorophenol	3.05	0.200	0.400	ug/L	4	4.00	---	76	47-121%	30	30%	
2,4-Dimethylphenol	2.99	0.200	0.400	ug/L	4	4.00	---	75	31-124%	22	30%	
2,4-Dinitrophenol	4.21	1.00	2.00	ug/L	4	4.00	---	105	23-143%	**45**	**30%**	Q-24
4,6-Dinitro-2-methylphenol	3.98	1.00	2.00	ug/L	4	4.00	---	100	44-137%	24	30%	
2-Methylphenol	2.47	0.100	0.200	ug/L	4	4.00	---	62	30-120%	28	30%	
3+4-Methylphenol(s)	2.17	0.100	0.200	ug/L	4	4.00	---	54	29-120%	28	30%	
2-Nitrophenol	3.61	0.400	0.800	ug/L	4	4.00	---	90	47-123%	**44**	**30%**	Q-24
4-Nitrophenol	1.21	0.400	0.800	ug/L	4	4.00	---	30	10-120%	13	30%	
Pentachlorophenol (PCP)	3.44	0.400	0.800	ug/L	4	4.00	---	86	35-138%	21	30%	
Phenol	1.03	0.800	0.800	ug/L	4	4.00	---	26	10-120%	12	30%	
2,3,4,6-Tetrachlorophenol	3.29	0.200	0.400	ug/L	4	4.00	---	82	50-128%	16	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0481 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS Dup (23B0481-BSD1)			Prepared: 02/13/23 11:36		Analyzed: 02/13/23 19:24							**Q-19**
2,3,5,6-Tetrachlorophenol	3.24	0.200	0.400	ug/L	4	4.00	---	81	50-121%	19	30%	
2,4,5-Trichlorophenol	3.20	0.200	0.400	ug/L	4	4.00	---	80	53-123%	22	30%	
2,4,6-Trichlorophenol	3.06	0.200	0.400	ug/L	4	4.00	---	76	50-125%	27	30%	
Bis(2-ethylhexyl)phthalate	3.81	0.800	1.60	ug/L	4	4.00	---	95	55-135%	8	30%	
Butyl benzyl phthalate	4.02	0.800	1.60	ug/L	4	4.00	---	100	53-134%	10	30%	
Diethylphthalate	3.80	0.800	1.60	ug/L	4	4.00	---	95	56-125%	3	30%	
Dimethylphthalate	3.69	0.800	1.60	ug/L	4	4.00	---	92	45-127%	4	30%	
Di-n-butylphthalate	4.38	0.800	1.60	ug/L	4	4.00	---	109	59-127%	5	30%	
Di-n-octyl phthalate	4.17	0.800	1.60	ug/L	4	4.00	---	104	51-140%	8	30%	
N-Nitrosodimethylamine	1.86	0.100	0.200	ug/L	4	4.00	---	47	19-120%	18	30%	
N-Nitroso-di-n-propylamine	3.53	0.100	0.200	ug/L	4	4.00	---	88	49-120%	**37**	**30%**	Q-24
N-Nitrosodiphenylamine	3.23	0.100	0.200	ug/L	4	4.00	---	81	51-123%	20	30%	
Bis(2-Chloroethoxy) methane	3.29	0.100	0.200	ug/L	4	4.00	---	82	48-120%	23	30%	
Bis(2-Chloroethyl) ether	3.19	0.100	0.200	ug/L	4	4.00	---	80	43-120%	**32**	**30%**	Q-24
2,2'-Oxybis(1-Chloropropane)	2.56	0.100	0.200	ug/L	4	4.00	---	64	41-120%	29	30%	
Hexachlorobenzene	2.50	0.0400	0.0800	ug/L	4	4.00	---	63	53-125%	8	30%	
Hexachlorobutadiene	1.03	0.100	0.200	ug/L	4	4.00	---	26	22-124%	14	30%	
Hexachlorocyclopentadiene	0.590	0.200	0.400	ug/L	4	4.00	---	15	10-127%	**35**	**30%**	Q-24, Q-31
Hexachloroethane	1.10	0.100	0.200	ug/L	4	4.00	---	27	21-120%	24	30%	
2-Chloronaphthalene	1.75	0.0400	0.0800	ug/L	4	4.00	---	44	40-120%	24	30%	
1,2,4-Trichlorobenzene	1.31	0.100	0.200	ug/L	4	4.00	---	33	29-120%	19	30%	
4-Bromophenyl phenyl ether	2.45	0.100	0.200	ug/L	4	4.00	---	61	55-124%	17	30%	
4-Chlorophenyl phenyl ether	2.16	0.100	0.200	ug/L	4	4.00	---	54	53-121%	14	30%	
Aniline	2.22	0.200	0.400	ug/L	4	4.00	---	55	10-120%	26	30%	Q-31
4-Chloroaniline	2.51	0.100	0.200	ug/L	4	4.00	---	63	33-120%	24	30%	
2-Nitroaniline	3.40	0.800	1.60	ug/L	4	4.00	---	85	55-127%	30	30%	
3-Nitroaniline	3.45	0.800	1.60	ug/L	4	4.00	---	86	41-128%	19	30%	
4-Nitroaniline	2.84	0.800	1.60	ug/L	4	4.00	---	71	25-120%	4	30%	
Nitrobenzene	2.96	0.400	0.800	ug/L	4	4.00	---	74	45-121%	**39**	**30%**	Q-24
2,4-Dinitrotoluene	3.61	0.400	0.800	ug/L	4	4.00	---	90	57-128%	8	30%	
2,6-Dinitrotoluene	3.51	0.400	0.800	ug/L	4	4.00	---	88	57-124%	12	30%	
Benzoic acid	3.72	0.200	0.200	ug/L	4	8.00	---	46	10-120%	18	30%	Q-31
Benzyl alcohol	2.34	0.400	0.800	ug/L	4	4.00	---	59	31-120%	**33**	**30%**	Q-24, Q-31
Isophorone	3.43	0.100	0.200	ug/L	4	4.00	---	86	42-124%	25	30%	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0481 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS Dup (23B0481-BSD1)			Prepared: 02/13/23 11:36		Analyzed: 02/13/23 19:24							**Q-19**
Azobenzene (1,2-DPH)	3.20	0.100	0.200	ug/L	4	4.00	---	80	61-120%	21	30%	
Bis(2-Ethylhexyl) adipate	4.00	1.00	2.00	ug/L	4	4.00	---	100	63-121%	7	30%	
3,3'-Dichlorobenzidine	15.1	2.00	4.00	ug/L	4	8.00	---	**189**	**27-129%**	3	30%	Q-29, Q-41, Q-52
1,2-Dinitrobenzene	3.59	1.00	2.00	ug/L	4	4.00	---	90	59-120%	12	30%	
1,3-Dinitrobenzene	3.38	1.00	2.00	ug/L	4	4.00	---	85	49-128%	18	30%	
1,4-Dinitrobenzene	3.45	1.00	2.00	ug/L	4	4.00	---	86	54-120%	25	30%	
Pyridine	1.77	0.400	0.800	ug/L	4	4.00	---	44	10-120%	**39**	**30%**	Q-24
1,2-Dichlorobenzene	1.31	0.100	0.200	ug/L	4	4.00	---	33	32-120%	25	30%	
1,3-Dichlorobenzene	1.21	0.100	0.200	ug/L	4	4.00	---	30	28-120%	22	30%	
1,4-Dichlorobenzene	1.23	0.100	0.200	ug/L	4	4.00	---	31	29-120%	22	30%	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 79 %*		*Limits: 44-120 %*			*Dilution: 4x*				
2-Fluorobiphenyl (Surr)			*66 %*		*44-120 %*			*"*				
Phenol-d6 (Surr)			*23 %*		*10-133 %*			*"*				
p-Terphenyl-d14 (Surr)			*95 %*		*50-134 %*			*"*				
2-Fluorophenol (Surr)			*41 %*		*19-120 %*			*"*				
2,4,6-Tribromophenol (Surr)			*83 %*		*43-140 %*			*"*				

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0312 - EPA 3510C (Neutral pH)							**Water**					
Blank (23B0312-BLK1)			Prepared: 02/08/23 12:07 Analyzed: 02/08/23 16:18									
EPA 8270E OPPs												
Azinphos methyl (Guthion)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chlorpyrifos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Coumaphos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Demeton O	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Demeton S	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Diazinon	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorvos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dimethoate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Disulfoton	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
EPN	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Ethoprop	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Fensulfothion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Fenthion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Malathion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Merphos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Methyl parathion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Mevinphos (Phosdrin)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Monocrotophos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Naled (Dibrom)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Parathion, ethyl	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Phorate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Ronnel (Fenchlorphos)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Sulfotep	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Sulprofos (Bolstar)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
TEPP	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachlorvinphos (Rabon)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tokuthion (Prothiofos)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloronate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Surr: Tributyl phosphate (Surr)			*Recovery: 88 %*		*Limits: 56-124 %*				*Dilution: 1x*			
Triphenyl phosphate (Surr)			*93 %*		*58-121 %*				*"*			
LCS (23B0312-BS1)			Prepared: 02/08/23 12:07 Analyzed: 02/08/23 16:53									
EPA 8270E OPPs												

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0312 - EPA 3510C (Neutral pH)							**Water**					
LCS (23B0312-BS1)			Prepared: 02/08/23 12:07 Analyzed: 02/08/23 16:53									
Azinphos methyl (Guthion)	4.66	0.500	1.00	ug/L	2	4.00	---	116	43-135%	---	---	
Chlorpyrifos	3.89	0.500	1.00	ug/L	2	4.00	---	97	47-133%	---	---	
Coumaphos	4.47	0.500	1.00	ug/L	2	4.00	---	112	45-135%	---	---	
Demeton O	1.86	0.500	1.00	ug/L	2	1.84	---	101	10-125%	---	---	
Demeton S	1.85	0.500	1.00	ug/L	2	1.94	---	95	21-162%	---	---	
Diazinon	4.42	0.500	1.00	ug/L	2	4.00	---	110	43-129%	---	---	
Dichlorvos	4.64	0.500	1.00	ug/L	2	4.00	---	116	39-138%	---	---	
Dimethoate	3.79	0.500	1.00	ug/L	2	4.00	---	95	26-125%	---	---	
Disulfoton	4.09	0.500	1.00	ug/L	2	4.00	---	102	36-134%	---	---	
EPN	4.52	0.500	1.00	ug/L	2	4.00	---	113	47-133%	---	---	
Ethoprop	4.21	0.500	1.00	ug/L	2	4.00	---	105	52-125%	---	---	
Fensulfothion	4.79	0.500	1.00	ug/L	2	4.00	---	120	15-141%	---	---	
Fenthion	4.20	0.500	1.00	ug/L	2	4.00	---	105	42-137%	---	---	
Malathion	3.86	0.500	1.00	ug/L	2	4.00	---	96	44-132%	---	---	
Merphos	4.66	0.500	1.00	ug/L	2	4.00	---	116	26-133%	---	---	
Methyl parathion	4.47	0.500	1.00	ug/L	2	4.00	---	112	49-134%	---	---	
Mevinphos (Phosdrin)	4.24	0.500	1.00	ug/L	2	4.00	---	106	10-196%	---	---	
Monocrotophos	1.14	0.500	1.00	ug/L	2	4.00	---	29	10-159%	---	---	
Naled (Dibrom)	4.26	0.500	1.00	ug/L	2	4.00	---	107	10-146%	---	---	
Parathion, ethyl	4.33	0.500	1.00	ug/L	2	4.00	---	108	52-134%	---	---	
Phorate	4.45	0.500	1.00	ug/L	2	4.00	---	111	23-139%	---	---	
Ronnel (Fenchlorphos)	3.95	0.500	1.00	ug/L	2	4.00	---	99	42-133%	---	---	
Sulfotep	3.86	0.500	1.00	ug/L	2	4.00	---	97	47-126%	---	---	
Sulprofos (Bolstar)	4.07	0.500	1.00	ug/L	2	4.00	---	102	47-135%	---	---	
TEPP	3.87	0.500	1.00	ug/L	2	4.00	---	97	10-208%	---	---	
Tetrachlorvinphos (Rabon)	4.76	0.500	1.00	ug/L	2	4.00	---	119	42-125%	---	---	
Tokuthion (Prothiofos)	4.47	0.500	1.00	ug/L	2	4.00	---	112	43-132%	---	---	
Trichloronate	3.92	0.500	1.00	ug/L	2	4.00	---	98	28-137%	---	---	
Surr: Tributyl phosphate (Surr)			*Recovery: 95 %*		*Limits: 56-124 %*			*Dilution: 2x*				
Triphenyl phosphate (Surr)			*102 %*		*58-121 %*			*"*				
LCS Dup (23B0312-BSD1)			Prepared: 02/08/23 12:07 Analyzed: 02/08/23 17:28									**Q-19**
EPA 8270E OPPs												
Azinphos methyl (Guthion)	4.57	0.500	1.00	ug/L	2	4.00	---	114	43-135%	2	30%	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0312 - EPA 3510C (Neutral pH)							**Water**					
LCS Dup (23B0312-BSD1)			Prepared: 02/08/23 12:07 Analyzed: 02/08/23 17:28									**Q-19**
Chlorpyrifos	3.82	0.500	1.00	ug/L	2	4.00	---	96	47-133%	2	30%	
Coumaphos	4.35	0.500	1.00	ug/L	2	4.00	---	109	45-135%	3	30%	
Demeton O	1.85	0.500	1.00	ug/L	2	1.84	---	100	10-125%	0.7	30%	
Demeton S	1.81	0.500	1.00	ug/L	2	1.94	---	93	21-162%	2	30%	
Diazinon	4.30	0.500	1.00	ug/L	2	4.00	---	108	43-129%	3	30%	
Dichlorvos	4.60	0.500	1.00	ug/L	2	4.00	---	115	39-138%	0.8	30%	
Dimethoate	3.76	0.500	1.00	ug/L	2	4.00	---	94	26-125%	0.8	30%	
Disulfoton	3.96	0.500	1.00	ug/L	2	4.00	---	99	36-134%	3	30%	
EPN	4.48	0.500	1.00	ug/L	2	4.00	---	112	47-133%	0.9	30%	
Ethoprop	4.09	0.500	1.00	ug/L	2	4.00	---	102	52-125%	3	30%	
Fensulfothion	4.78	0.500	1.00	ug/L	2	4.00	---	119	15-141%	0.3	30%	
Fenthion	4.00	0.500	1.00	ug/L	2	4.00	---	100	42-137%	5	30%	
Malathion	3.72	0.500	1.00	ug/L	2	4.00	---	93	44-132%	4	30%	
Merphos	4.61	0.500	1.00	ug/L	2	4.00	---	115	26-133%	1	30%	
Methyl parathion	4.41	0.500	1.00	ug/L	2	4.00	---	110	49-134%	1	30%	
Mevinphos (Phosdrin)	4.26	0.500	1.00	ug/L	2	4.00	---	106	10-196%	0.3	30%	
Monocrotophos	1.22	0.500	1.00	ug/L	2	4.00	---	31	10-159%	7	30%	
Naled (Dibrom)	4.13	0.500	1.00	ug/L	2	4.00	---	103	10-146%	3	30%	
Parathion, ethyl	4.11	0.500	1.00	ug/L	2	4.00	---	103	52-134%	5	30%	
Phorate	4.17	0.500	1.00	ug/L	2	4.00	---	104	23-139%	7	30%	
Ronnel (Fenchlorphos)	3.88	0.500	1.00	ug/L	2	4.00	---	97	42-133%	2	30%	
Sulfotep	3.77	0.500	1.00	ug/L	2	4.00	---	94	47-126%	2	30%	
Sulprofos (Bolstar)	3.92	0.500	1.00	ug/L	2	4.00	---	98	47-135%	4	30%	
TEPP	3.80	0.500	1.00	ug/L	2	4.00	---	95	10-208%	2	30%	
Tetrachlorvinphos (Rabon)	4.59	0.500	1.00	ug/L	2	4.00	---	115	42-125%	4	30%	
Tokuthion (Prothiofos)	4.41	0.500	1.00	ug/L	2	4.00	---	110	43-132%	1	30%	
Trichloronate	3.81	0.500	1.00	ug/L	2	4.00	---	95	28-137%	3	30%	

Surr: Tributyl phosphate (Surr)	*Recovery: 91 %*	*Limits: 56-124 %*	*Dilution: 2x*
Triphenyl phosphate (Surr)	*97 %*	*58-121 %*	*"*

Apex Laboratories

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0281 - EPA 3015A							Water					
Blank (23B0281-BLK1)			Prepared: 02/08/23 07:43		Analyzed: 02/09/23 15:08							
EPA 6020B												
Antimony	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Arsenic	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Barium	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Beryllium	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Cadmium	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Chromium	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Copper	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Lead	ND	0.110	0.200	ug/L	1	---	---	---	---	---	---	
Manganese	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Nickel	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Selenium	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Silver	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Thallium	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Zinc	ND	2.00	4.00	ug/L	1	---	---	---	---	---	---	
Blank (23B0281-BLK2)			Prepared: 02/08/23 07:43		Analyzed: 02/10/23 11:47							
EPA 6020B												
Mercury	ND	0.0400	0.0800	ug/L	1	---	---	---	---	---	---	Q-16
LCS (23B0281-BS1)			Prepared: 02/08/23 07:43		Analyzed: 02/09/23 15:13							
EPA 6020B												
Antimony	27.9	0.500	1.00	ug/L	1	27.8	---	101	80-120%	---	---	
Arsenic	53.8	0.500	1.00	ug/L	1	55.6	---	97	80-120%	---	---	
Barium	58.1	1.00	2.00	ug/L	1	55.6	---	105	80-120%	---	---	
Beryllium	26.7	0.100	0.200	ug/L	1	27.8	---	96	80-120%	---	---	
Cadmium	56.5	0.100	0.200	ug/L	1	55.6	---	102	80-120%	---	---	
Chromium	54.2	1.00	2.00	ug/L	1	55.6	---	98	80-120%	---	---	
Copper	56.4	1.00	2.00	ug/L	1	55.6	---	101	80-120%	---	---	
Lead	56.3	0.110	0.200	ug/L	1	55.6	---	101	80-120%	---	---	
Manganese	56.0	0.500	1.00	ug/L	1	55.6	---	101	80-120%	---	---	
Mercury	1.08	0.0400	0.0800	ug/L	1	1.11	---	97	80-120%	---	---	
Nickel	56.6	1.00	2.00	ug/L	1	55.6	---	102	80-120%	---	---	
Selenium	28.2	0.500	1.00	ug/L	1	27.8	---	101	80-120%	---	---	

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Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0281 - EPA 3015A							**Water**					
LCS (23B0281-BS1)			Prepared: 02/08/23 07:43		Analyzed: 02/09/23 15:13							
Silver	29.6	0.100	0.200	ug/L	1	27.8	---	107	80-120%	---	---	
Thallium	27.1	0.100	0.200	ug/L	1	27.8	---	97	80-120%	---	---	
Zinc	54.6	2.00	4.00	ug/L	1	55.6	---	98	80-120%	---	---	
Duplicate (23B0281-DUP1)			Prepared: 02/08/23 07:43		Analyzed: 02/09/23 15:23							
QC Source Sample: Non-SDG (A3B0239-01)												
Antimony	**4.01**	0.500	1.00	ug/L	1	---	4.16	---	---	4	20%	
Arsenic	**0.636**	0.500	1.00	ug/L	1	---	0.643	---	---	1	20%	Ja
Barium	**14.9**	1.00	2.00	ug/L	1	---	14.4	---	---	3	20%	
Beryllium	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Cadmium	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Chromium	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	20%	
Copper	**6.31**	1.00	2.00	ug/L	1	---	6.12	---	---	3	20%	
Lead	**0.998**	0.110	0.200	ug/L	1	---	1.06	---	---	6	20%	
Manganese	**14.8**	0.500	1.00	ug/L	1	---	14.9	---	---	0.7	20%	
Mercury	ND	0.0400	0.0800	ug/L	1	---	ND	---	---	---	20%	
Nickel	**1.16**	1.00	2.00	ug/L	1	---	1.21	---	---	4	20%	Ja
Selenium	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	20%	
Silver	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Thallium	ND	0.100	0.200	ug/L	1	---	0.156	---	---	***	**20%**	
Zinc	**95.2**	2.00	4.00	ug/L	1	---	93.3	---	---	2	20%	
Matrix Spike (23B0281-MS1)			Prepared: 02/08/23 07:43		Analyzed: 02/09/23 15:28							
QC Source Sample: Non-SDG (A3B0239-01)												
EPA 6020B												
Antimony	33.3	0.500	1.00	ug/L	1	27.8	4.16	105	75-125%	---	---	
Arsenic	54.5	0.500	1.00	ug/L	1	55.6	0.643	97	75-125%	---	---	
Barium	73.4	1.00	2.00	ug/L	1	55.6	14.4	106	75-125%	---	---	
Beryllium	28.3	0.100	0.200	ug/L	1	27.8	ND	102	75-125%	---	---	
Cadmium	57.3	0.100	0.200	ug/L	1	55.6	ND	103	75-125%	---	---	
Chromium	54.4	1.00	2.00	ug/L	1	55.6	ND	98	75-125%	---	---	
Copper	60.9	1.00	2.00	ug/L	1	55.6	6.12	99	75-125%	---	---	
Lead	56.5	0.110	0.200	ug/L	1	55.6	1.06	100	75-125%	---	---	
Manganese	70.3	0.500	1.00	ug/L	1	55.6	14.9	100	75-125%	---	---	

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0281 - EPA 3015A							**Water**					
Matrix Spike (23B0281-MS1)			Prepared: 02/08/23 07:43		Analyzed: 02/09/23 15:28							
QC Source Sample: Non-SDG (A3B0239-01)												
Mercury	1.07	0.0400	0.0800	ug/L	1	1.11	ND	96	75-125%	---	---	
Nickel	56.0	1.00	2.00	ug/L	1	55.6	1.21	99	75-125%	---	---	
Selenium	28.2	0.500	1.00	ug/L	1	27.8	ND	102	75-125%	---	---	
Silver	29.8	0.100	0.200	ug/L	1	27.8	ND	107	75-125%	---	---	
Thallium	26.7	0.100	0.200	ug/L	1	27.8	0.156	96	75-125%	---	---	
Zinc	147	2.00	4.00	ug/L	1	55.6	93.3	97	75-125%	---	---	

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Philip Nerenberg

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ANALYTICAL REPORT

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Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Chlorinated Herbicides by GC/ECD

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W3B1025 - EPA 3510C							**Water**					
Blank (W3B1025-BLK1)			Prepared: 02/13/23 07:55 Analyzed: 02/25/23 03:52									
EPA 8151A												
2,4-D	ND	0.34	0.50	ug/l	1	---	---	---	---	---	---	
2,4-DB	ND	0.99	2.5	ug/l	1	---	---	---	---	---	---	
2,4,5-T	ND	0.14	0.25	ug/l	1	---	---	---	---	---	---	
2,4,5-TP (Silvex)	ND	0.14	0.25	ug/l	1	---	---	---	---	---	---	
3,5-Dichlorobenzoic acid	ND	0.28	1.2	ug/l	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.50	1.2	ug/l	1	---	---	---	---	---	---	
Acifluorfen	ND	0.24	0.50	ug/l	1	---	---	---	---	---	---	
Bentazon	ND	0.55	2.5	ug/l	1	---	---	---	---	---	---	
Dalapon	ND	0.16	0.50	ug/l	1	---	---	---	---	---	---	
Dicamba	ND	0.19	0.75	ug/l	1	---	---	---	---	---	---	
Dichloroprop	ND	0.24	1.0	ug/l	1	---	---	---	---	---	---	
Dinoseb	ND	0.090	0.50	ug/l	1	---	---	---	---	---	---	
DCPA	ND	0.20	0.25	ug/l	1	---	---	---	---	---	---	
MCPA	ND	40	100	ug/l	1	---	---	---	---	---	---	
MCPP	ND	27	100	ug/l	1	---	---	---	---	---	---	
Pentachlorophenol	ND	0.18	0.25	ug/l	1	---	---	---	---	---	---	
Picloram	ND	0.13	0.75	ug/l	1	---	---	---	---	---	---	
Surr: 2,4-DCAA		*Recovery: 98 %*	*Limits: 56-156 %*		*Dilution: 1x*							
LCS (W3B1025-BS1)			Prepared: 02/13/23 07:55 Analyzed: 02/25/23 04:23									
EPA 8151A												
2,4-D	2.18	0.34	0.50	ug/l	1	3.00	---	73	56-164%	---	---	
2,4-DB	3.61	0.99	2.5	ug/l	1	6.00	---	60	27-161%	---	---	
2,4,5-T	1.05	0.14	0.25	ug/l	1	1.50	---	70	39-151%	---	---	
2,4,5-TP (Silvex)	1.08	0.14	0.25	ug/l	1	1.50	---	72	46-142%	---	---	
3,5-Dichlorobenzoic acid	2.36	0.28	1.2	ug/l	1	3.00	---	79	54-154%	---	---	
4-Nitrophenol	4.05	0.50	1.2	ug/l	1	6.00	---	68	3-105%	---	---	
Acifluorfen	1.43	0.24	0.50	ug/l	1	1.50	---	95	39-134%	---	---	
Bentazon	4.78	0.55	2.5	ug/l	1	6.00	---	80	44-139%	---	---	
Dalapon	2.21	0.16	0.50	ug/l	1	3.00	---	74	40-139%	---	---	
Dicamba	2.28	0.19	0.75	ug/l	1	3.00	---	76	46-140%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0217 - 04 21 23 1023

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Chlorinated Herbicides by GC/ECD

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W3B1025 - EPA 3510C							**Water**					
LCS (W3B1025-BS1)			Prepared: 02/13/23 07:55 Analyzed: 02/25/23 04:23									
Dichloroprop	2.31	0.24	1.0	ug/l	1	3.00	---	77	43-158%	---	---	
Dinoseb	1.15	0.090	0.50	ug/l	1	1.50	---	77	42-146%	---	---	
DCPA	1.18	0.20	0.25	ug/l	1	1.50	---	79	34-135%	---	---	
MCPA	228	40	100	ug/l	1	300	---	76	28-144%	---	---	
MCPP	193	27	100	ug/l	1	300	---	64	31-153%	---	---	
Pentachlorophenol	1.08	0.18	0.25	ug/l	1	1.50	---	72	37-136%	---	---	
Picloram	1.05	0.13	0.75	ug/l	1	1.50	---	70	35-138%	---	---	
Surr: 2,4-DCAA			*Recovery: 94 %*	*Limits: 56-156 %*			*Dilution: 1x*					
LCS Dup (W3B1025-BSD1)			Prepared: 02/13/23 07:55 Analyzed: 02/25/23 04:54									
EPA 8151A												
2,4-D	2.72	0.34	0.50	ug/l	1	3.00	---	91	56-164%	22	25%	
2,4-DB	4.58	0.99	2.5	ug/l	1	6.00	---	76	27-161%	24	25%	
2,4,5-T	1.26	0.14	0.25	ug/l	1	1.50	---	84	39-151%	18	25%	
2,4,5-TP (Silvex)	1.34	0.14	0.25	ug/l	1	1.50	---	89	46-142%	22	25%	
3,5-Dichlorobenzoic acid	2.87	0.28	1.2	ug/l	1	3.00	---	96	54-154%	20	25%	
4-Nitrophenol	4.87	0.50	1.2	ug/l	1	6.00	---	81	3-105%	18	25%	
Acifluorfen	1.81	0.24	0.50	ug/l	1	1.50	---	121	39-134%	23	25%	
Bentazon	5.96	0.55	2.5	ug/l	1	6.00	---	99	44-139%	22	25%	
Dalapon	2.63	0.16	0.50	ug/l	1	3.00	---	88	40-139%	17	25%	
Dicamba	2.73	0.19	0.75	ug/l	1	3.00	---	91	46-140%	18	25%	
Dichloroprop	2.74	0.24	1.0	ug/l	1	3.00	---	91	43-158%	17	25%	
Dinoseb	1.43	0.090	0.50	ug/l	1	1.50	---	95	42-146%	22	25%	
DCPA	1.44	0.20	0.25	ug/l	1	1.50	---	96	34-135%	20	25%	
MCPA	278	40	100	ug/l	1	300	---	93	28-144%	20	25%	
MCPP	236	27	100	ug/l	1	300	---	79	31-153%	20	25%	
Pentachlorophenol	1.31	0.18	0.25	ug/l	1	1.50	---	87	37-136%	19	25%	
Picloram	1.34	0.13	0.75	ug/l	1	1.50	---	89	35-138%	24	25%	
Surr: 2,4-DCAA			*Recovery: 112 %*	*Limits: 56-156 %*			*Dilution: 1x*					

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Hexavalent Chromium by IC

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W3B1145 - _NONE (LC)							**Water**					
Blank (W3B1145-BLK1)			Prepared: 02/14/23 10:02		Analyzed: 02/14/23 16:44							
EPA 218.6												
Chromium 6+	ND	0.0079	0.020	ug/l	1	---	---	---	---	---	---	
LCS (W3B1145-BS1)			Prepared: 02/14/23 10:02		Analyzed: 02/14/23 16:44							
EPA 218.6												
Chromium 6+	4.87	0.0079	0.020	ug/l	1	5.00	---	97	90-110%	---	---	
Matrix Spike (W3B1145-MS1)			Prepared: 02/14/23 10:02		Analyzed: 02/14/23 16:44							
QC Source Sample: Non-SDG (3B08159-05)												
EPA 218.6												
Chromium 6+	7.53	0.0079	0.020	ug/l	1	5.00	0.227	**146**	**88-112%**	---	---	MS-05
Matrix Spike (W3B1145-MS2)			Prepared: 02/14/23 10:02		Analyzed: 02/14/23 16:44							
QC Source Sample: Non-SDG (3B08159-07)												
EPA 218.6												
Chromium 6+	6.10	0.0079	0.020	ug/l	1	5.00	0.0353	**121**	**88-112%**	---	---	MS-05
Matrix Spike Dup (W3B1145-MSD1)			Prepared: 02/14/23 10:02		Analyzed: 02/14/23 16:44							
QC Source Sample: Non-SDG (3B08159-05)												
Chromium 6+	5.78	0.0079	0.020	ug/l	1	5.00	0.227	111	88-112%	**26**	**10%**	MS-05
Matrix Spike Dup (W3B1145-MSD2)			Prepared: 02/14/23 10:02		Analyzed: 02/14/23 16:44							
QC Source Sample: Non-SDG (3B08159-07)												
Chromium 6+	6.53	0.0079	0.020	ug/l	1	5.00	0.0353	**130**	**88-112%**	7	10%	MS-05

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0657							
A3B0217-01	Water	NWTPH-Dx	02/07/23 08:30	02/17/23 07:46	890mL/5mL	1000mL/5mL	1.12

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0509							
A3B0217-01RE1	Water	NWTPH-Gx (MS)	02/07/23 08:30	02/14/23 10:24	5mL/5mL	5mL/5mL	1.00

Volatile Organic Compounds by EPA 8260D

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0344							
A3B0217-03	Water	EPA 8260D	02/07/23 00:00	02/09/23 08:37	5mL/5mL	5mL/5mL	1.00
Batch: 23B0509							
A3B0217-01RE1	Water	EPA 8260D	02/07/23 08:30	02/14/23 10:24	5mL/5mL	5mL/5mL	1.00

Volatile Organic Compounds by EPA 8260D SIM

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0743							
A3B0217-01	Water	EPA 8260D SIM	02/07/23 08:30	02/20/23 13:10	5mL/5mL	5mL/5mL	1.00
A3B0217-03	Water	EPA 8260D SIM	02/07/23 00:00	02/20/23 13:10	5mL/5mL	5mL/5mL	1.00

Semivolatile Organic Compounds by EPA 8270E

Prep: EPA 3510C (Acid/Base Neutral)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0481							
A3B0217-01RE3	Water	EPA 8270E	02/07/23 08:30	02/13/23 11:36	780mL/1mL	1000mL/1mL	1.28
A3B0217-01RE4	Water	EPA 8270E	02/07/23 08:30	02/13/23 11:36	780mL/1mL	1000mL/1mL	1.28

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

Project: **St. Helens Lagoon**
Project Number: **M0830.03.006**
Project Manager: **David Weatherby**

Report ID:
A3B0217 - 04 21 23 1023

SAMPLE PREPARATION INFORMATION

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Prep: EPA 3510C (Neutral pH)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0312							
A3B0217-01RE1	Water	EPA 8270E OPPs	02/07/23 08:30	02/08/23 12:07	760mL/2mL	1000mL/2mL	1.32

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0281							
A3B0217-01	Water	EPA 6020B	02/07/23 08:30	02/08/23 07:43	45mL/50mL	45mL/50mL	1.00
A3B0217-01RE2	Water	EPA 6020B	02/07/23 08:30	02/08/23 07:43	45mL/50mL	45mL/50mL	1.00

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

Weck Laboratories, Inc.

SAMPLE PREPARATION INFORMATION

Chlorinated Herbicides by GC/ECD

Prep: EPA 3510C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: W3B1025							
A3B0217-01	Water	EPA 8151A	02/07/23 08:30	02/13/23 07:55	952ml/10ml	1000ml/10ml	1.05

Hexavalent Chromium by IC

Prep: NONE (LC)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: W3B1145							
A3B0217-01	Water	EPA 218.6	02/07/23 08:30	02/14/23 10:02	5ml/5ml	5ml/5ml	1.00

Apex Laboratories

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

E	Estimated Value. The result is above the calibration range of the instrument.
F-12	The result for this hydrocarbon range is primarily due to the presence of individual analyte peaks in the quantitation range. No fuel pattern detected.
ICV-01	Estimated Result. Initial Calibration Verification (ICV) failed high. There is no effect on non-detect results.
Ja	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-03	Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
Q-16	Reanalysis of an original Batch QC sample.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-24	The RPD for this spike and spike duplicate is above established control limits. Recoveries for both the spike and spike duplicate are within control limits.
Q-29	Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high.
Q-30	Recovery for Lab Control Spike (LCS) is below the lower control limit. Data may be biased low.
Q-31	Estimated Results. Recovery of Continuing Calibration Verification sample below lower control limit for this analyte. Results are likely biased low.
Q-41	Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
Q-52	Due to known erratic recoveries, the result and reporting levels for this analyte are reported as Estimated Values. This analyte may not have passed all QC requirements for this method.
Q-54	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +1%. The results are reported as Estimated Values.
Q-54a	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +13%. The results are reported as Estimated Values.
Q-54b	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +17%. The results are reported as Estimated Values.
Q-54c	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +19%. The results are reported as Estimated Values.
Q-54d	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +55%. The results are reported as Estimated Values.
Q-56	Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260
S-06	Surrogate recovery is outside of established control limits.

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
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V-04 Composite of VOA vials analyzed due to sediment in vials.

Weck Laboratories, Inc.

MS-05 The spike recovery and/or RPD were outside acceptance limits for the MS and/or MSD due to possible matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

Apex Laboratories

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
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Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

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
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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

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:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Philip Nerenberg, Lab Director

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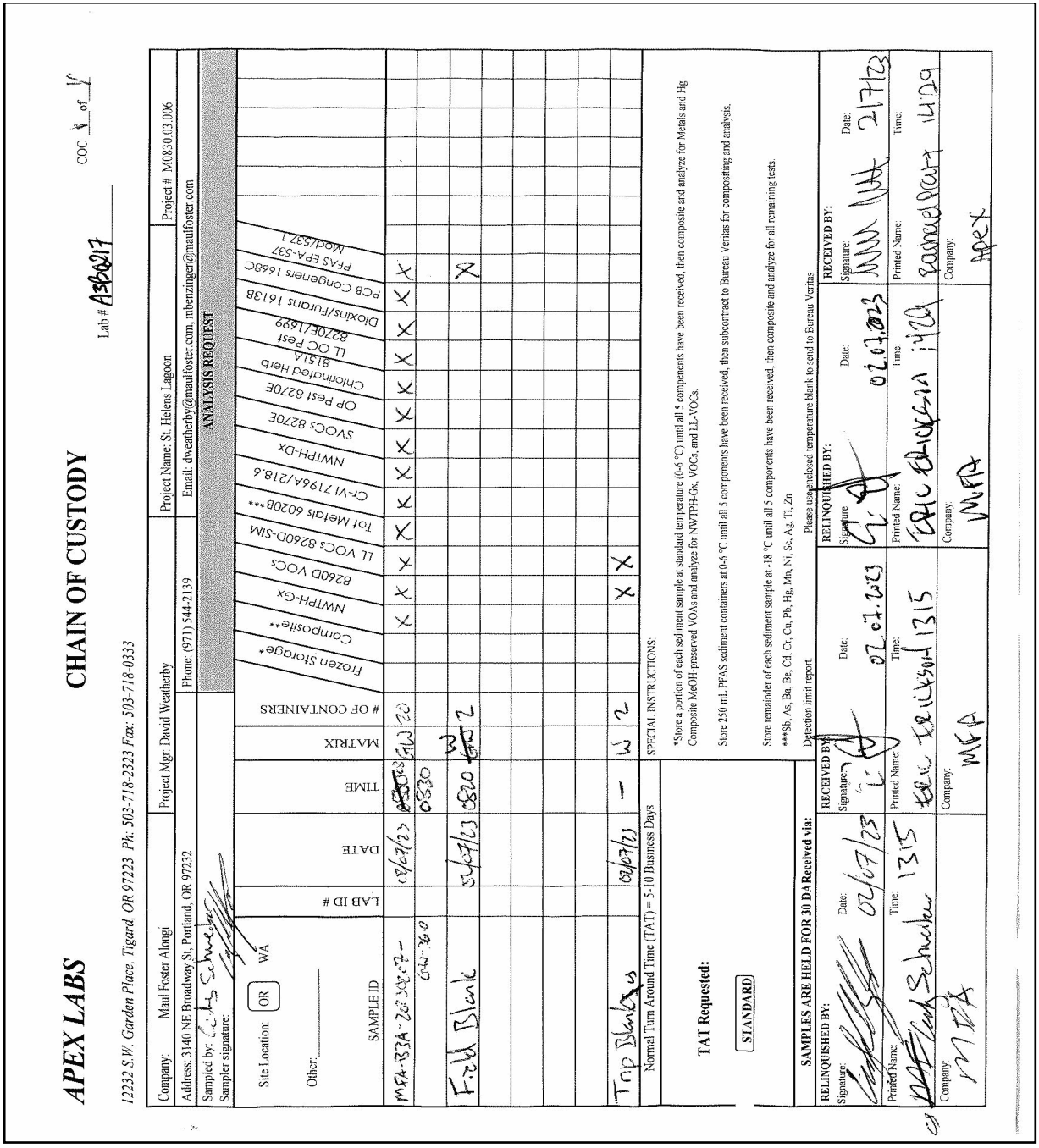
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**



APEX LABS — **CHAIN OF CUSTODY** — COC 1 of 1 — Lab # A3B0217

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster Alongi | Project Mgr: David Weatherby | Project Name: St. Helens Lagoon | Project # M0830.03.006
Address: 3140 NE Broadway St, Portland, OR 97232 | Phone: (971) 544-2139 | Email: dweatherby@maulfoster.com, mbenzinger@maulfoster.com
Sampled by: Cathy Schreiber
Sampler signature:

Site Location: OR WA
Other:

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST: Frozen Storage*	Composite**	NWTPH-Gx	8260D VOCs	LL VOCs 8260D-SIM	Tot Metals 6020B***	Cr-VI 7196A/218.6	NWTPH-Dx	SVOCs 8270E	OP Pest 8270E	Chlorinated Herb 8151A	LL OC Pest 8270E/1629	Dioxins/Furans 1613B	PCB Congeners 1668C	PFAS EPA-537 Mod/537.1
MFA-STA-20230407		04/07/23	0830	GW	2		X													
DUP-20230407			0830		2															
Field Blank		04/07/23	0820		2															
Trip Blank		04/07/23	—	W	2				X	X										

Normal Turn Around Time (TAT) = 5-10 Business Days

SPECIAL INSTRUCTIONS:

*Store a portion of each sediment sample at standard temperature (0-6 °C) until all 5 components have been received, then composite and analyze for Metals and Hg.
Composite MeOH-preserved VOAs and analyze for NWTPH-Gx, VOCs, and LL-VOCs.

Store 250 mL PFAS sediment containers at 0-6 °C until all 5 components have been received, then subcontract to Bureau Veritas for compositing and analysis.

Store remainder of each sediment sample at -18 °C until all 5 components have been received, then composite and analyze for all remaining tests.

***Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Se, Ag, Tl, Zn

Please use enclosed temperature blank to send to Bureau Veritas

Detection limit report

TAT Requested:
STANDARD

SAMPLES ARE HELD FOR 30 DA Received via:

RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:	RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:	04/07/23	1315	Signature:	04.07.2023		Signature:	04.07.2023	1700	Signature:	21723	
Printed Name: Cathy Schreiber			Printed Name: Eric Erickson			Printed Name: Eric Erickson			Printed Name: Rachel Pearl		14:29
Company: MFA			Company: MFA			Company: MFA			Company: Apex		

Apex Laboratories

Philip Nerenberg

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ANALYTICAL REPORT

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0217 - 04 21 23 1023**

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster Alongi Element WO#: A3B0217

Project/Project #: St. Helens Lagoon / M0830.03.006

Delivery Info:

Date/time received: 2/7/23 @ 14:29 By: RMP

Delivered by: Apex__Client X ESS__FedEx__UPS__Radio__Morgan__SDS__Evergreen__Other__

Cooler Inspection Date/time inspected: 2/7/23 @ 14:29 By: RMP

Chain of Custody included? Yes X No ____

Signed/dated by client? Yes X No ____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	4.4						
Custody seals? (Y/N)	N						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	N						
Ice type: (Gel/Real/Other)	Real						
Condition (In/Out):	In						

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: 2/7/23 @ 17:17 By: ZAM

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 X NA ____

Comments ~~All VOA's have sediment~~ ZAM 2/7/23 SIS for MFA-B3A-20230207-GW-360 have sediment.

Water samples: pH checked: Yes X No___NA___ pH appropriate? Yes X No___NA____

Comments: ____

Additional information: TAT 3239

Labeled by: ZAM Witness: VT Cooler Inspected by: ZAM

Form Y-003 R-00

Apex Laboratories

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Tuesday, May 2, 2023

David Weatherby
Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

RE: A3B0522 - St. Helens Lagoon - M0830.03.006

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 A3B0522, which was received by the laboratory on 2/15/2023 at 7:30:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler#1	1.9 degC	Cooler#2	0.3 degC
Cooler#3	0.3 degC	Cooler#4	0.4 degC
Cooler#5	0.9 degC	Cooler#6	5.4 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW3-20230214-GW-35	A3B0522-01	Water	02/14/23 10:05	02/15/23 07:30
MW3-20230214-GW-35-DUP	A3B0522-02	Water	02/14/23 10:05	02/15/23 07:30
MW5-20230214-GW-40	A3B0522-03	Water	02/14/23 12:51	02/15/23 07:30
MW4-20230214-GW-40	A3B0522-04	Water	02/14/23 14:37	02/15/23 07:30
MW6-20230214-GW-40.25	A3B0522-05	Water	02/14/23 16:17	02/15/23 07:30
Field Blank-02	A3B0522-06	Water	02/14/23 16:10	02/15/23 07:30
Trip Blank	A3B0522-07	Water	02/14/23 00:00	02/15/23 07:30

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL CASE NARRATIVE

A3B0522	**Apex Laboratories**

Amended Report Revision 1:

EPA Method 8270E data correction.

This report supersedes all previous reports.

Samples were originally reported from an out of hold time batch (23B0895). The samples were re-extracted due to low Blank Spike recoveries. The original in hold time batch (23B0761) is now reported.

Mark Zehr
Organics Manager
4/21/2023

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: 23B0986**		
Diesel	ND	0.103	0.206	mg/L	1	03/01/23 01:12	NWTPH-Dx	
Oil	ND	0.206	0.412	mg/L	1	03/01/23 01:12	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 81 %*	*Limits: 50-150 %*		*1*	*03/01/23 01:12*	*NWTPH-Dx*	
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0986**		
Diesel	ND	0.108	0.215	mg/L	1	03/01/23 01:32	NWTPH-Dx	
Oil	ND	0.215	0.430	mg/L	1	03/01/23 01:32	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 70 %*	*Limits: 50-150 %*		*1*	*03/01/23 01:32*	*NWTPH-Dx*	
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0986**		**PRES**
Diesel	**0.139**	0.103	0.206	mg/L	1	03/01/23 01:53	NWTPH-Dx	**Ja**
Oil	ND	0.206	0.412	mg/L	1	03/01/23 01:53	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 90 %*	*Limits: 50-150 %*		*1*	*03/01/23 01:53*	*NWTPH-Dx*	
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0986**		
Diesel	**0.148**	0.106	0.213	mg/L	1	03/01/23 02:13	NWTPH-Dx	**Ja**
Oil	**0.213**	0.213	0.426	mg/L	1	03/01/23 02:13	NWTPH-Dx	**Ja**
Surrogate: o-Terphenyl (Surr)		*Recovery: 79 %*	*Limits: 50-150 %*		*1*	*03/01/23 02:13*	*NWTPH-Dx*	
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0986**		
Diesel	**0.180**	0.105	0.211	mg/L	1	03/01/23 02:34	NWTPH-Dx	**Ja**
Oil	**0.316**	0.211	0.421	mg/L	1	03/01/23 02:34	NWTPH-Dx	**Ja**
Surrogate: o-Terphenyl (Surr)		*Recovery: 87 %*	*Limits: 50-150 %*		*1*	*03/01/23 02:34*	*NWTPH-Dx*	

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: 23B0828**		
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	02/22/23 17:01	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 100 %*		*Limits: 50-150 %*	*1*	*02/22/23 17:01*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*109 %*	*50-150 %*	*1*	*02/22/23 17:01*	*NWTPH-Gx (MS)*	
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0828**		
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	02/22/23 17:23	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 98 %*		*Limits: 50-150 %*	*1*	*02/22/23 17:23*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*106 %*	*50-150 %*	*1*	*02/22/23 17:23*	*NWTPH-Gx (MS)*	
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0828**		
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	02/22/23 17:45	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 102 %*		*Limits: 50-150 %*	*1*	*02/22/23 17:45*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*107 %*	*50-150 %*	*1*	*02/22/23 17:45*	*NWTPH-Gx (MS)*	
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0828**		
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	02/22/23 18:07	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 97 %*		*Limits: 50-150 %*	*1*	*02/22/23 18:07*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*105 %*	*50-150 %*	*1*	*02/22/23 18:07*	*NWTPH-Gx (MS)*	
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0828**		
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	02/22/23 18:30	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 100 %*		*Limits: 50-150 %*	*1*	*02/22/23 18:30*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*108 %*	*50-150 %*	*1*	*02/22/23 18:30*	*NWTPH-Gx (MS)*	

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Philip Nerenberg

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: 23B0828**		
Acetone	ND	10.0	20.0	ug/L	1	02/22/23 17:01	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/22/23 17:01	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/22/23 17:01	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/22/23 17:01	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/22/23 17:01	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/22/23 17:01	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	
1,3-Dichlorobenzene	**0.350**	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	**Ja**
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 17:01	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/22/23 17:01	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 17:01	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 17:01	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 17:01	EPA 8260D	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: 23B0828**		
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/22/23 17:01	EPA 8260D	
2-Hexanone	ND	10.0	10.0	ug/L	1	02/22/23 17:01	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/22/23 17:01	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/22/23 17:01	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Naphthalene	ND	2.00	2.00	ug/L	1	02/22/23 17:01	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/22/23 17:01	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/22/23 17:01	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 17:01	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/22/23 17:01	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/22/23 17:01	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/22/23 17:01	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/22/23 17:01	EPA 8260D	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: 23B0828**		
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*	*Limits: 80-120 %*	*1*	*02/22/23 17:01*	*EPA 8260D*	
Toluene-d8 (Surr)			*104 %*	*80-120 %*	*1*	*02/22/23 17:01*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*02/22/23 17:01*	*EPA 8260D*	
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0828**		
Acetone	ND	10.0	20.0	ug/L	1	02/22/23 17:23	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/22/23 17:23	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/22/23 17:23	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/22/23 17:23	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/22/23 17:23	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/22/23 17:23	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/22/23 17:23	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	
1,3-Dichlorobenzene	**0.440**	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	**Ja**
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 17:23	EPA 8260D	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0828**		
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/22/23 17:23	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 17:23	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 17:23	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 17:23	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/22/23 17:23	EPA 8260D	
2-Hexanone	ND	10.0	10.0	ug/L	1	02/22/23 17:23	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/22/23 17:23	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/22/23 17:23	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Naphthalene	ND	2.00	2.00	ug/L	1	02/22/23 17:23	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/22/23 17:23	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/22/23 17:23	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 17:23	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 17:23	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 17:23	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/22/23 17:23	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/22/23 17:23	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0828**		
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/22/23 17:23	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/22/23 17:23	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/22/23 17:23	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*98 %*	*Limits: 80-120 %*	*1*	*02/22/23 17:23*	*EPA 8260D*	
Toluene-d8 (Surr)			*102 %*	*80-120 %*	*1*	*02/22/23 17:23*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*02/22/23 17:23*	*EPA 8260D*	
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0828**		
Acetone	ND	10.0	20.0	ug/L	1	02/22/23 17:45	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/22/23 17:45	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/22/23 17:45	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/22/23 17:45	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/22/23 17:45	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/22/23 17:45	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0828**		
1,3-Dichlorobenzene	**0.260**	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	**Ja**
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 17:45	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/22/23 17:45	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 17:45	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 17:45	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 17:45	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/22/23 17:45	EPA 8260D	
2-Hexanone	ND	10.0	10.0	ug/L	1	02/22/23 17:45	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/22/23 17:45	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/22/23 17:45	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Naphthalene	ND	2.00	2.00	ug/L	1	02/22/23 17:45	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/22/23 17:45	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/22/23 17:45	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 17:45	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0828**		
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/22/23 17:45	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/22/23 17:45	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/22/23 17:45	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/22/23 17:45	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 97 %*		*Limits: 80-120 %*	*1*	*02/22/23 17:45*	*EPA 8260D*	
Toluene-d8 (Surr)			*102 %*	*80-120 %*	*1*	*02/22/23 17:45*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*02/22/23 17:45*	*EPA 8260D*	
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0828**		
Acetone	ND	10.0	20.0	ug/L	1	02/22/23 18:07	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/22/23 18:07	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/22/23 18:07	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/22/23 18:07	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/22/23 18:07	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/22/23 18:07	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0828**		
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/22/23 18:07	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	
1,3-Dichlorobenzene	**0.330**	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	**Ja**
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 18:07	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/22/23 18:07	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 18:07	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 18:07	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 18:07	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/22/23 18:07	EPA 8260D	
2-Hexanone	ND	10.0	10.0	ug/L	1	02/22/23 18:07	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/22/23 18:07	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/22/23 18:07	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Naphthalene	ND	2.00	2.00	ug/L	1	02/22/23 18:07	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/22/23 18:07	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/22/23 18:07	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0828**		
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 18:07	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 18:07	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 18:07	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/22/23 18:07	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/22/23 18:07	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/22/23 18:07	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/22/23 18:07	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/22/23 18:07	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 96 %*	*Limits: 80-120 %*	*1*	*02/22/23 18:07*	*EPA 8260D*	
Toluene-d8 (Surr)			*103 %*	*80-120 %*	*1*	*02/22/23 18:07*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*97 %*	*80-120 %*	*1*	*02/22/23 18:07*	*EPA 8260D*	
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0828**		
Acetone	ND	10.0	20.0	ug/L	1	02/22/23 18:30	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/22/23 18:30	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/22/23 18:30	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/22/23 18:30	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/22/23 18:30	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0828**		
Chloromethane	ND	2.50	5.00	ug/L	1	02/22/23 18:30	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/22/23 18:30	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	
1,3-Dichlorobenzene	**0.250**	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	**Ja**
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 18:30	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/22/23 18:30	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 18:30	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 18:30	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 18:30	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/22/23 18:30	EPA 8260D	
2-Hexanone	ND	10.0	10.0	ug/L	1	02/22/23 18:30	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/22/23 18:30	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/22/23 18:30	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Naphthalene	ND	2.00	2.00	ug/L	1	02/22/23 18:30	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0828**		
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/22/23 18:30	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/22/23 18:30	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 18:30	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 18:30	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 18:30	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/22/23 18:30	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/22/23 18:30	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/22/23 18:30	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/22/23 18:30	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/22/23 18:30	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 97 %*	*Limits: 80-120 %*	*1*	*02/22/23 18:30*	*EPA 8260D*	
Toluene-d8 (Surr)			*103 %*	*80-120 %*	*1*	*02/22/23 18:30*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*98 %*	*80-120 %*	*1*	*02/22/23 18:30*	*EPA 8260D*	
Trip Blank (A3B0522-07)				**Matrix: Water**		**Batch: 23B0828**		
Acetone	ND	10.0	20.0	ug/L	1	02/22/23 16:16	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Benzene	ND	0.100	0.200	ug/L	1	02/22/23 16:16	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/22/23 16:16	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/22/23 16:16	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/22/23 16:16	EPA 8260D	

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Philip Nerenberg

Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Trip Blank (A3B0522-07)				**Matrix: Water**		**Batch: 23B0828**		
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Chloroform	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/22/23 16:16	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 16:16	EPA 8260D	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	02/22/23 16:16	EPA 8260D	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 16:16	EPA 8260D	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 16:16	EPA 8260D	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	02/22/23 16:16	EPA 8260D	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Ethylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/22/23 16:16	EPA 8260D	
2-Hexanone	ND	10.0	10.0	ug/L	1	02/22/23 16:16	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/22/23 16:16	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/22/23 16:16	EPA 8260D	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Trip Blank (A3B0522-07)				**Matrix: Water**		**Batch: 23B0828**		
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Naphthalene	ND	2.00	2.00	ug/L	1	02/22/23 16:16	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/22/23 16:16	EPA 8260D	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	02/22/23 16:16	EPA 8260D	
Toluene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 16:16	EPA 8260D	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	02/22/23 16:16	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
Vinyl chloride	ND	0.200	0.400	ug/L	1	02/22/23 16:16	EPA 8260D	
m,p-Xylene	ND	0.500	1.00	ug/L	1	02/22/23 16:16	EPA 8260D	
o-Xylene	ND	0.250	0.500	ug/L	1	02/22/23 16:16	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*98 %*	*Limits:* *80-120 %*	*1*	*02/22/23 16:16*	*EPA 8260D*	
Toluene-d8 (Surr)			*105 %*	*80-120 %*	*1*	*02/22/23 16:16*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*02/22/23 16:16*	*EPA 8260D*	

Apex Laboratories

Philip Nerenberg, Lab Director

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: 23B0743**		
Benzene	ND	0.0500	0.100	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
Toluene	ND	0.0500	0.100	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
m,p-Xylene	ND	0.100	0.200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
o-Xylene	ND	0.0500	0.100	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
Chloroform	ND	0.0500	0.100	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 17:06	EPA 8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*104 %*	*Limits:*	*80-120 %*	*02/20/23 17:06*	*EPA 8260D SIM*	
Toluene-d8 (Surr)			*99 %*		*80-120 %*	*02/20/23 17:06*	*EPA 8260D SIM*	
4-Bromofluorobenzene (Surr)			*99 %*		*80-120 %*	*02/20/23 17:06*	*EPA 8260D SIM*	
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0743**		
Benzene	ND	0.0500	0.100	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
Toluene	ND	0.0500	0.100	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
m,p-Xylene	ND	0.100	0.200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0743**		
o-Xylene	ND	0.0500	0.100	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
Chloroform	ND	0.0500	0.100	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:27	EPA 8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*103 %*	*Limits: 80-120 %*	*1*	*02/20/23 18:27*	*EPA 8260D SIM*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*02/20/23 18:27*	*EPA 8260D SIM*	
4-Bromofluorobenzene (Surr)			*98 %*	*80-120 %*	*1*	*02/20/23 18:27*	*EPA 8260D SIM*	
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0743**		
Benzene	ND	0.0500	0.100	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
Toluene	ND	0.0500	0.100	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
m,p-Xylene	ND	0.100	0.200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
o-Xylene	ND	0.0500	0.100	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
Chloroform	ND	0.0500	0.100	ug/L	1	02/20/23 18:54	EPA 8260D SIM	

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Philip Nerenberg

Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0743**		
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
cis-1,2-Dichloroethene	**0.0291**	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 18:54	EPA 8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*105 %*	*Limits:*	*80-120 %*	*02/20/23 18:54*	*EPA 8260D SIM*	
Toluene-d8 (Surr)			*98 %*		*80-120 %*	*02/20/23 18:54*	*EPA 8260D SIM*	
4-Bromofluorobenzene (Surr)			*98 %*		*80-120 %*	*02/20/23 18:54*	*EPA 8260D SIM*	
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0743**		
Benzene	ND	0.0500	0.100	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
Toluene	ND	0.0500	0.100	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
m,p-Xylene	ND	0.100	0.200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
o-Xylene	ND	0.0500	0.100	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
Chloroform	ND	0.0500	0.100	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0743**		
1,1-Dichloroethene	ND	0.0200	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
cis-1,2-Dichloroethene	ND	0.0200	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 19:20	EPA 8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*105 %*	*Limits:*	*80-120 %*	*02/20/23 19:20*	*EPA 8260D SIM*	
Toluene-d8 (Surr)			*98 %*		*80-120 %*	*02/20/23 19:20*	*EPA 8260D SIM*	
4-Bromofluorobenzene (Surr)			*98 %*		*80-120 %*	*02/20/23 19:20*	*EPA 8260D SIM*	
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0743**		
Benzene	ND	0.0500	0.100	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
Toluene	ND	0.0500	0.100	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 19:47	EPA 8260D SIM	Q-42
m,p-Xylene	ND	0.100	0.200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	Q-42
o-Xylene	ND	0.0500	0.100	ug/L	1	02/20/23 19:47	EPA 8260D SIM	Q-42
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 19:47	EPA 8260D SIM	Q-42
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 19:47	EPA 8260D SIM	Q-42
Chloroform	ND	0.0500	0.100	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	Q-42
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
cis-1,2-Dichloroethene	**0.0212**	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0743**		
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 19:47	EPA 8260D SIM	Q-42
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 104 %*	*Limits: 80-120 %*	*1*	*02/20/23 19:47*	*EPA 8260D SIM*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*02/20/23 19:47*	*EPA 8260D SIM*	
4-Bromofluorobenzene (Surr)			*98 %*	*80-120 %*	*1*	*02/20/23 19:47*	*EPA 8260D SIM*	
Trip Blank (A3B0522-07)				**Matrix: Water**		**Batch: 23B0743**		
Benzene	ND	0.0500	0.100	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
Toluene	ND	0.0500	0.100	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
m,p-Xylene	ND	0.100	0.200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
o-Xylene	ND	0.0500	0.100	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
Chloroform	**0.218**	0.0500	0.100	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Trip Blank (A3B0522-07)				**Matrix: Water**		**Batch: 23B0743**		
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	02/20/23 16:39	EPA 8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*104 %*	*Limits: 80-120 %*	*1*	*02/20/23 16:39*	*EPA 8260D SIM*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*02/20/23 16:39*	*EPA 8260D SIM*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*02/20/23 16:39*	*EPA 8260D SIM*	

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Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Acenaphthene	**0.0419**	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	
Acenaphthylene	**0.0340**	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	
Anthracene	**0.0165**	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	**Ja**
Benz(a)anthracene	ND	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	
Benzo(a)pyrene	ND	0.0144	0.0288	ug/L	1	02/21/23 19:16	EPA 8270E	
Benzo(b)fluoranthene	ND	0.0144	0.0288	ug/L	1	02/21/23 19:16	EPA 8270E	
Benzo(k)fluoranthene	ND	0.0144	0.0288	ug/L	1	02/21/23 19:16	EPA 8270E	
Benzo(g,h,i)perylene	ND	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	
Chrysene	ND	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	
Dibenz(a,h)anthracene	ND	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	
Fluoranthene	**0.0240**	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	
Fluorene	**0.0586**	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	
1-Methylnaphthalene	**0.0239**	0.0192	0.0385	ug/L	1	02/21/23 19:16	EPA 8270E	**Q-30, Ja**
2-Methylnaphthalene	ND	0.0192	0.0385	ug/L	1	02/21/23 19:16	EPA 8270E	Q-30
Naphthalene	**0.0722**	0.0192	0.0385	ug/L	1	02/21/23 19:16	EPA 8270E	**Q-30**
Phenanthrene	ND	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	
Pyrene	ND	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	
Carbazole	**0.0178**	0.0144	0.0288	ug/L	1	02/21/23 19:16	EPA 8270E	**Ja**
Dibenzofuran	**0.0174**	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	**Ja**
2-Chlorophenol	ND	0.0481	0.0962	ug/L	1	02/21/23 19:16	EPA 8270E	
4-Chloro-3-methylphenol	ND	0.0962	0.192	ug/L	1	02/21/23 19:16	EPA 8270E	
2,4-Dichlorophenol	ND	0.0481	0.0962	ug/L	1	02/21/23 19:16	EPA 8270E	
2,4-Dimethylphenol	ND	0.0481	0.0962	ug/L	1	02/21/23 19:16	EPA 8270E	
2,4-Dinitrophenol	ND	0.240	0.481	ug/L	1	02/21/23 19:16	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	0.240	0.481	ug/L	1	02/21/23 19:16	EPA 8270E	
2-Methylphenol	ND	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	
3+4-Methylphenol(s)	ND	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	
2-Nitrophenol	ND	0.0962	0.192	ug/L	1	02/21/23 19:16	EPA 8270E	
4-Nitrophenol	ND	0.0962	0.192	ug/L	1	02/21/23 19:16	EPA 8270E	
Pentachlorophenol (PCP)	ND	0.0962	0.192	ug/L	1	02/21/23 19:16	EPA 8270E	
Phenol	ND	0.192	0.385	ug/L	1	02/21/23 19:16	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	0.0481	0.0962	ug/L	1	02/21/23 19:16	EPA 8270E	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
2,3,5,6-Tetrachlorophenol	ND	0.0481	0.0962	ug/L	1	02/21/23 19:16	EPA 8270E	
2,4,5-Trichlorophenol	ND	0.0481	0.0962	ug/L	1	02/21/23 19:16	EPA 8270E	
2,4,6-Trichlorophenol	ND	0.0481	0.0962	ug/L	1	02/21/23 19:16	EPA 8270E	
Bis(2-ethylhexyl)phthalate	ND	0.192	0.385	ug/L	1	02/21/23 19:16	EPA 8270E	
Butyl benzyl phthalate	ND	0.192	0.385	ug/L	1	02/21/23 19:16	EPA 8270E	
Diethylphthalate	ND	0.192	0.385	ug/L	1	02/21/23 19:16	EPA 8270E	
Dimethylphthalate	ND	0.192	0.385	ug/L	1	02/21/23 19:16	EPA 8270E	
Di-n-butylphthalate	ND	0.192	0.385	ug/L	1	02/21/23 19:16	EPA 8270E	
Di-n-octyl phthalate	ND	0.192	0.385	ug/L	1	02/21/23 19:16	EPA 8270E	
N-Nitrosodimethylamine	ND	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	
N-Nitrosodiphenylamine	**0.0257**	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	**Ja**
Bis(2-Chloroethoxy) methane	**0.0623**	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	
Bis(2-Chloroethyl) ether	**0.0407**	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	**Ja**
2,2'-Oxybis(1-Chloropropane)	**0.0264**	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	**Ja**
Hexachlorobenzene	**0.0179**	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	**Ja**
Hexachlorobutadiene	**0.0358**	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	**Q-30, Ja**
Hexachlorocyclopentadiene	ND	0.0481	0.0962	ug/L	1	02/21/23 19:16	EPA 8270E	Q-30
Hexachloroethane	**0.0378**	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	**Q-30, Ja**
2-Chloronaphthalene	**0.0513**	0.00962	0.0192	ug/L	1	02/21/23 19:16	EPA 8270E	**Q-30**
1,2,4-Trichlorobenzene	ND	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	Q-30
4-Bromophenyl phenyl ether	**0.0493**	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	
4-Chlorophenyl phenyl ether	**0.0507**	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	
Aniline	ND	0.0481	0.0962	ug/L	1	02/21/23 19:16	EPA 8270E	
4-Chloroaniline	ND	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	
2-Nitroaniline	ND	0.192	0.385	ug/L	1	02/21/23 19:16	EPA 8270E	
3-Nitroaniline	ND	0.192	0.385	ug/L	1	02/21/23 19:16	EPA 8270E	
4-Nitroaniline	ND	0.192	0.385	ug/L	1	02/21/23 19:16	EPA 8270E	
Nitrobenzene	ND	0.0962	0.192	ug/L	1	02/21/23 19:16	EPA 8270E	
2,4-Dinitrotoluene	ND	0.0962	0.192	ug/L	1	02/21/23 19:16	EPA 8270E	
2,6-Dinitrotoluene	ND	0.0962	0.192	ug/L	1	02/21/23 19:16	EPA 8270E	
Benzoic acid	ND	2.40	2.40	ug/L	1	02/21/23 19:16	EPA 8270E	
Benzyl alcohol	ND	0.0962	0.192	ug/L	1	02/21/23 19:16	EPA 8270E	

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Isophorone	**0.0272**	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	**Ja**
Azobenzene (1,2-DPH)	ND	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	0.240	0.481	ug/L	1	02/21/23 19:16	EPA 8270E	
3,3'-Dichlorobenzidine	ND	0.481	0.962	ug/L	1	02/21/23 19:16	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	0.240	0.481	ug/L	1	02/21/23 19:16	EPA 8270E	
1,3-Dinitrobenzene	ND	0.240	0.481	ug/L	1	02/21/23 19:16	EPA 8270E	
1,4-Dinitrobenzene	ND	0.240	0.481	ug/L	1	02/21/23 19:16	EPA 8270E	
Pyridine	ND	0.0962	0.192	ug/L	1	02/21/23 19:16	EPA 8270E	
1,2-Dichlorobenzene	ND	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	Q-30
1,3-Dichlorobenzene	**0.0950**	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	**Q-30**
1,4-Dichlorobenzene	ND	0.0240	0.0481	ug/L	1	02/21/23 19:16	EPA 8270E	Q-30
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*42 %*	*Limits: 44-120 %*	*1*	*02/21/23 19:16*	*EPA 8270E*	*S-06*
2-Fluorobiphenyl (Surr)			*31 %*	*44-120 %*	*1*	*02/21/23 19:16*	*EPA 8270E*	*S-06*
Phenol-d6 (Surr)			*18 %*	*10-133 %*	*1*	*02/21/23 19:16*	*EPA 8270E*	
p-Terphenyl-d14 (Surr)			*73 %*	*50-134 %*	*1*	*02/21/23 19:16*	*EPA 8270E*	
2-Fluorophenol (Surr)			*27 %*	*19-120 %*	*1*	*02/21/23 19:16*	*EPA 8270E*	
2,4,6-Tribromophenol (Surr)			*64 %*	*43-140 %*	*1*	*02/21/23 19:16*	*EPA 8270E*	
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Acenaphthene	**0.0167**	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	**Ja**
Acenaphthylene	**0.0129**	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	**Ja**
Anthracene	ND	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	
Benz(a)anthracene	ND	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	
Benzo(a)pyrene	ND	0.0142	0.0283	ug/L	1	02/21/23 19:50	EPA 8270E	
Benzo(b)fluoranthene	ND	0.0142	0.0283	ug/L	1	02/21/23 19:50	EPA 8270E	
Benzo(k)fluoranthene	ND	0.0142	0.0283	ug/L	1	02/21/23 19:50	EPA 8270E	
Benzo(g,h,i)perylene	ND	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	
Chrysene	ND	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	
Dibenz(a,h)anthracene	ND	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	
Fluoranthene	**0.0106**	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	**Ja**
Fluorene	**0.0201**	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	
1-Methylnaphthalene	ND	0.0189	0.0377	ug/L	1	02/21/23 19:50	EPA 8270E	Q-30
2-Methylnaphthalene	ND	0.0189	0.0377	ug/L	1	02/21/23 19:50	EPA 8270E	Q-30

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Philip Nerenberg

Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Naphthalene	**0.0362**	0.0189	0.0377	ug/L	1	02/21/23 19:50	EPA 8270E	**Q-30, Ja**
Phenanthrene	ND	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	
Pyrene	ND	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	
Carbazole	ND	0.0142	0.0283	ug/L	1	02/21/23 19:50	EPA 8270E	
Dibenzofuran	ND	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	
2-Chlorophenol	ND	0.0472	0.0943	ug/L	1	02/21/23 19:50	EPA 8270E	
4-Chloro-3-methylphenol	ND	0.0943	0.189	ug/L	1	02/21/23 19:50	EPA 8270E	
2,4-Dichlorophenol	ND	0.0472	0.0943	ug/L	1	02/21/23 19:50	EPA 8270E	
2,4-Dimethylphenol	ND	0.0472	0.0943	ug/L	1	02/21/23 19:50	EPA 8270E	
2,4-Dinitrophenol	ND	0.236	0.472	ug/L	1	02/21/23 19:50	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	0.236	0.472	ug/L	1	02/21/23 19:50	EPA 8270E	
2-Methylphenol	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	
3+4-Methylphenol(s)	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	
2-Nitrophenol	ND	0.0943	0.189	ug/L	1	02/21/23 19:50	EPA 8270E	
4-Nitrophenol	ND	0.0943	0.189	ug/L	1	02/21/23 19:50	EPA 8270E	
Pentachlorophenol (PCP)	ND	0.0943	0.189	ug/L	1	02/21/23 19:50	EPA 8270E	
Phenol	ND	0.189	0.377	ug/L	1	02/21/23 19:50	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	0.0472	0.0943	ug/L	1	02/21/23 19:50	EPA 8270E	
2,3,5,6-Tetrachlorophenol	ND	0.0472	0.0943	ug/L	1	02/21/23 19:50	EPA 8270E	
2,4,5-Trichlorophenol	ND	0.0472	0.0943	ug/L	1	02/21/23 19:50	EPA 8270E	
2,4,6-Trichlorophenol	ND	0.0472	0.0943	ug/L	1	02/21/23 19:50	EPA 8270E	
Bis(2-ethylhexyl)phthalate	ND	0.189	0.377	ug/L	1	02/21/23 19:50	EPA 8270E	
Butyl benzyl phthalate	ND	0.189	0.377	ug/L	1	02/21/23 19:50	EPA 8270E	
Diethylphthalate	ND	0.189	0.377	ug/L	1	02/21/23 19:50	EPA 8270E	
Dimethylphthalate	ND	0.189	0.377	ug/L	1	02/21/23 19:50	EPA 8270E	
Di-n-butylphthalate	ND	0.189	0.377	ug/L	1	02/21/23 19:50	EPA 8270E	
Di-n-octyl phthalate	ND	0.189	0.377	ug/L	1	02/21/23 19:50	EPA 8270E	
N-Nitrosodimethylamine	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	
N-Nitrosodiphenylamine	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	
Bis(2-Chloroethoxy) methane	**0.0257**	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	**Ja**
Bis(2-Chloroethyl) ether	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Hexachlorobenzene	ND	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	
Hexachlorobutadiene	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	Q-30
Hexachlorocyclopentadiene	ND	0.0472	0.0943	ug/L	1	02/21/23 19:50	EPA 8270E	Q-30
Hexachloroethane	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	Q-30
2-Chloronaphthalene	**0.0206**	0.00943	0.0189	ug/L	1	02/21/23 19:50	EPA 8270E	**Q-30**
1,2,4-Trichlorobenzene	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	Q-30
4-Bromophenyl phenyl ether	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	
4-Chlorophenyl phenyl ether	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	
Aniline	ND	0.0472	0.0943	ug/L	1	02/21/23 19:50	EPA 8270E	
4-Chloroaniline	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	
2-Nitroaniline	ND	0.189	0.377	ug/L	1	02/21/23 19:50	EPA 8270E	
3-Nitroaniline	ND	0.189	0.377	ug/L	1	02/21/23 19:50	EPA 8270E	
4-Nitroaniline	ND	0.189	0.377	ug/L	1	02/21/23 19:50	EPA 8270E	
Nitrobenzene	ND	0.0943	0.189	ug/L	1	02/21/23 19:50	EPA 8270E	
2,4-Dinitrotoluene	ND	0.0943	0.189	ug/L	1	02/21/23 19:50	EPA 8270E	
2,6-Dinitrotoluene	ND	0.0943	0.189	ug/L	1	02/21/23 19:50	EPA 8270E	
Benzoic acid	ND	2.36	2.36	ug/L	1	02/21/23 19:50	EPA 8270E	
Benzyl alcohol	ND	0.0943	0.189	ug/L	1	02/21/23 19:50	EPA 8270E	
Isophorone	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	
Azobenzene (1,2-DPH)	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	0.236	0.472	ug/L	1	02/21/23 19:50	EPA 8270E	
3,3'-Dichlorobenzidine	ND	0.472	0.943	ug/L	1	02/21/23 19:50	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	0.236	0.472	ug/L	1	02/21/23 19:50	EPA 8270E	
1,3-Dinitrobenzene	ND	0.236	0.472	ug/L	1	02/21/23 19:50	EPA 8270E	
1,4-Dinitrobenzene	ND	0.236	0.472	ug/L	1	02/21/23 19:50	EPA 8270E	
Pyridine	ND	0.0943	0.189	ug/L	1	02/21/23 19:50	EPA 8270E	
1,2-Dichlorobenzene	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	Q-30
1,3-Dichlorobenzene	**0.0939**	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	**Q-30**
1,4-Dichlorobenzene	ND	0.0236	0.0472	ug/L	1	02/21/23 19:50	EPA 8270E	Q-30
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*34 %*	*Limits: 44-120 %*	*1*	*02/21/23 19:50*	*EPA 8270E*	*S-06*
2-Fluorobiphenyl (Surr)			*27 %*	*44-120 %*	*1*	*02/21/23 19:50*	*EPA 8270E*	*S-06*
Phenol-d6 (Surr)			*13 %*	*10-133 %*	*1*	*02/21/23 19:50*	*EPA 8270E*	
p-Terphenyl-d14 (Surr)			*55 %*	*50-134 %*	*1*	*02/21/23 19:50*	*EPA 8270E*	
2-Fluorophenol (Surr)			*23 %*	*19-120 %*	*1*	*02/21/23 19:50*	*EPA 8270E*	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Surrogate: 2,4,6-Tribromophenol (Surr)		*Recovery: 49 %*	*Limits: 43-140 %*		*1*	*02/21/23 19:50*	*EPA 8270E*	
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Acenaphthene	**0.0296**	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Acenaphthylene	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Anthracene	ND	0.0235	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Benz(a)anthracene	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Benzo(a)pyrene	ND	0.0176	0.0353	ug/L	1	02/21/23 20:25	EPA 8270E	
Benzo(b)fluoranthene	ND	0.0176	0.0353	ug/L	1	02/21/23 20:25	EPA 8270E	
Benzo(k)fluoranthene	ND	0.0176	0.0353	ug/L	1	02/21/23 20:25	EPA 8270E	
Benzo(g,h,i)perylene	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Chrysene	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Dibenz(a,h)anthracene	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Fluoranthene	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Fluorene	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
1-Methylnaphthalene	ND	0.0235	0.0471	ug/L	1	02/21/23 20:25	EPA 8270E	Q-30
2-Methylnaphthalene	ND	0.0235	0.0471	ug/L	1	02/21/23 20:25	EPA 8270E	Q-30
Naphthalene	ND	0.0235	0.0471	ug/L	1	02/21/23 20:25	EPA 8270E	Q-30
Phenanthrene	ND	0.0235	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Pyrene	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Carbazole	ND	0.0176	0.0353	ug/L	1	02/21/23 20:25	EPA 8270E	
Dibenzofuran	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
2-Chlorophenol	ND	0.0588	0.118	ug/L	1	02/21/23 20:25	EPA 8270E	
4-Chloro-3-methylphenol	ND	0.235	0.235	ug/L	1	02/21/23 20:25	EPA 8270E	
2,4-Dichlorophenol	ND	0.0588	0.118	ug/L	1	02/21/23 20:25	EPA 8270E	
2,4-Dimethylphenol	ND	0.0588	0.118	ug/L	1	02/21/23 20:25	EPA 8270E	
2,4-Dinitrophenol	ND	0.294	0.588	ug/L	1	02/21/23 20:25	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	0.294	0.588	ug/L	1	02/21/23 20:25	EPA 8270E	
2-Methylphenol	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
3+4-Methylphenol(s)	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
2-Nitrophenol	ND	0.118	0.235	ug/L	1	02/21/23 20:25	EPA 8270E	
4-Nitrophenol	ND	0.118	0.235	ug/L	1	02/21/23 20:25	EPA 8270E	
Pentachlorophenol (PCP)	ND	0.118	0.235	ug/L	1	02/21/23 20:25	EPA 8270E	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Phenol	ND	0.235	0.471	ug/L	1	02/21/23 20:25	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	0.0588	0.118	ug/L	1	02/21/23 20:25	EPA 8270E	
2,3,5,6-Tetrachlorophenol	ND	0.0588	0.118	ug/L	1	02/21/23 20:25	EPA 8270E	
2,4,5-Trichlorophenol	ND	0.0588	0.118	ug/L	1	02/21/23 20:25	EPA 8270E	
2,4,6-Trichlorophenol	ND	0.0588	0.118	ug/L	1	02/21/23 20:25	EPA 8270E	
Bis(2-ethylhexyl)phthalate	ND	0.235	0.471	ug/L	1	02/21/23 20:25	EPA 8270E	
Butyl benzyl phthalate	ND	0.235	0.471	ug/L	1	02/21/23 20:25	EPA 8270E	
Diethylphthalate	ND	0.235	0.471	ug/L	1	02/21/23 20:25	EPA 8270E	
Dimethylphthalate	ND	0.235	0.471	ug/L	1	02/21/23 20:25	EPA 8270E	
Di-n-butylphthalate	ND	0.235	0.471	ug/L	1	02/21/23 20:25	EPA 8270E	
Di-n-octyl phthalate	ND	0.235	0.471	ug/L	1	02/21/23 20:25	EPA 8270E	
N-Nitrosodimethylamine	ND	0.0588	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	0.0588	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
N-Nitrosodiphenylamine	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
Bis(2-Chloroethoxy) methane	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
Bis(2-Chloroethyl) ether	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
Hexachlorobenzene	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	
Hexachlorobutadiene	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	Q-30
Hexachlorocyclopentadiene	ND	0.0588	0.118	ug/L	1	02/21/23 20:25	EPA 8270E	Q-30
Hexachloroethane	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	Q-30
2-Chloronaphthalene	ND	0.0118	0.0235	ug/L	1	02/21/23 20:25	EPA 8270E	Q-30
1,2,4-Trichlorobenzene	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	Q-30
4-Bromophenyl phenyl ether	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
4-Chlorophenyl phenyl ether	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
Aniline	ND	0.0588	0.118	ug/L	1	02/21/23 20:25	EPA 8270E	
4-Chloroaniline	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
2-Nitroaniline	ND	0.235	0.471	ug/L	1	02/21/23 20:25	EPA 8270E	
3-Nitroaniline	ND	0.235	0.471	ug/L	1	02/21/23 20:25	EPA 8270E	
4-Nitroaniline	ND	0.235	0.471	ug/L	1	02/21/23 20:25	EPA 8270E	
Nitrobenzene	ND	0.118	0.235	ug/L	1	02/21/23 20:25	EPA 8270E	
2,4-Dinitrotoluene	ND	0.118	0.235	ug/L	1	02/21/23 20:25	EPA 8270E	
2,6-Dinitrotoluene	ND	0.118	0.235	ug/L	1	02/21/23 20:25	EPA 8270E	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Benzoic acid	ND	2.94	2.94	ug/L	1	02/21/23 20:25	EPA 8270E	
Benzyl alcohol	ND	0.118	0.235	ug/L	1	02/21/23 20:25	EPA 8270E	
Isophorone	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
Azobenzene (1,2-DPH)	ND	0.0588	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	0.294	0.588	ug/L	1	02/21/23 20:25	EPA 8270E	
3,3'-Dichlorobenzidine	ND	0.588	1.18	ug/L	1	02/21/23 20:25	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	0.294	0.588	ug/L	1	02/21/23 20:25	EPA 8270E	
1,3-Dinitrobenzene	ND	0.294	0.588	ug/L	1	02/21/23 20:25	EPA 8270E	
1,4-Dinitrobenzene	ND	0.294	0.588	ug/L	1	02/21/23 20:25	EPA 8270E	
Pyridine	ND	0.118	0.235	ug/L	1	02/21/23 20:25	EPA 8270E	
1,2-Dichlorobenzene	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	Q-30
1,3-Dichlorobenzene	**0.108**	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	**Q-30**
1,4-Dichlorobenzene	ND	0.0294	0.0588	ug/L	1	02/21/23 20:25	EPA 8270E	Q-30
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*63 %*	*Limits: 44-120 %*	*1*	*02/21/23 20:25*	*EPA 8270E*	
2-Fluorobiphenyl (Surr)			*46 %*	*44-120 %*	*1*	*02/21/23 20:25*	*EPA 8270E*	
Phenol-d6 (Surr)			*29 %*	*10-133 %*	*1*	*02/21/23 20:25*	*EPA 8270E*	
p-Terphenyl-d14 (Surr)			*89 %*	*50-134 %*	*1*	*02/21/23 20:25*	*EPA 8270E*	
2-Fluorophenol (Surr)			*44 %*	*19-120 %*	*1*	*02/21/23 20:25*	*EPA 8270E*	
2,4,6-Tribromophenol (Surr)			*85 %*	*43-140 %*	*1*	*02/21/23 20:25*	*EPA 8270E*	
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Acenaphthene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Acenaphthylene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Anthracene	ND	0.0247	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Benz(a)anthracene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Benzo(a)pyrene	ND	0.0185	0.0370	ug/L	1	02/21/23 21:00	EPA 8270E	
Benzo(b)fluoranthene	ND	0.0185	0.0370	ug/L	1	02/21/23 21:00	EPA 8270E	
Benzo(k)fluoranthene	ND	0.0185	0.0370	ug/L	1	02/21/23 21:00	EPA 8270E	
Benzo(g,h,i)perylene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Chrysene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Dibenz(a,h)anthracene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Fluoranthene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Fluorene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	

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Philip Nerenberg, Lab Director

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
1-Methylnaphthalene	ND	0.0247	0.0494	ug/L	1	02/21/23 21:00	EPA 8270E	Q-30
2-Methylnaphthalene	ND	0.0247	0.0494	ug/L	1	02/21/23 21:00	EPA 8270E	Q-30
Naphthalene	ND	0.0247	0.0494	ug/L	1	02/21/23 21:00	EPA 8270E	Q-30
Phenanthrene	ND	0.0247	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Pyrene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Carbazole	ND	0.0185	0.0370	ug/L	1	02/21/23 21:00	EPA 8270E	
Dibenzofuran	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
2-Chlorophenol	ND	0.0617	0.123	ug/L	1	02/21/23 21:00	EPA 8270E	
4-Chloro-3-methylphenol	ND	0.247	0.247	ug/L	1	02/21/23 21:00	EPA 8270E	
2,4-Dichlorophenol	ND	0.0617	0.123	ug/L	1	02/21/23 21:00	EPA 8270E	
2,4-Dimethylphenol	ND	0.0617	0.123	ug/L	1	02/21/23 21:00	EPA 8270E	
2,4-Dinitrophenol	ND	0.309	0.617	ug/L	1	02/21/23 21:00	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	0.309	0.617	ug/L	1	02/21/23 21:00	EPA 8270E	
2-Methylphenol	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
3+4-Methylphenol(s)	ND	0.0617	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
2-Nitrophenol	ND	0.123	0.247	ug/L	1	02/21/23 21:00	EPA 8270E	
4-Nitrophenol	ND	0.123	0.247	ug/L	1	02/21/23 21:00	EPA 8270E	
Pentachlorophenol (PCP)	ND	0.123	0.247	ug/L	1	02/21/23 21:00	EPA 8270E	
Phenol	ND	0.247	0.494	ug/L	1	02/21/23 21:00	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	0.0617	0.123	ug/L	1	02/21/23 21:00	EPA 8270E	
2,3,5,6-Tetrachlorophenol	ND	0.0617	0.123	ug/L	1	02/21/23 21:00	EPA 8270E	
2,4,5-Trichlorophenol	ND	0.0617	0.123	ug/L	1	02/21/23 21:00	EPA 8270E	
2,4,6-Trichlorophenol	ND	0.0617	0.123	ug/L	1	02/21/23 21:00	EPA 8270E	
Bis(2-ethylhexyl)phthalate	ND	0.247	0.494	ug/L	1	02/21/23 21:00	EPA 8270E	
Butyl benzyl phthalate	ND	0.247	0.494	ug/L	1	02/21/23 21:00	EPA 8270E	
Diethylphthalate	ND	0.247	0.494	ug/L	1	02/21/23 21:00	EPA 8270E	
Dimethylphthalate	ND	0.247	0.494	ug/L	1	02/21/23 21:00	EPA 8270E	
Di-n-butylphthalate	ND	0.247	0.494	ug/L	1	02/21/23 21:00	EPA 8270E	
Di-n-octyl phthalate	ND	0.247	0.494	ug/L	1	02/21/23 21:00	EPA 8270E	
N-Nitrosodimethylamine	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	0.0617	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
N-Nitrosodiphenylamine	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
Bis(2-Chloroethoxy) methane	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Bis(2-Chloroethyl) ether	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
Hexachlorobenzene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	
Hexachlorobutadiene	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	Q-30
Hexachlorocyclopentadiene	ND	0.0617	0.123	ug/L	1	02/21/23 21:00	EPA 8270E	Q-30
Hexachloroethane	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	Q-30
2-Chloronaphthalene	ND	0.0123	0.0247	ug/L	1	02/21/23 21:00	EPA 8270E	Q-30
1,2,4-Trichlorobenzene	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	Q-30
4-Bromophenyl phenyl ether	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
4-Chlorophenyl phenyl ether	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
Aniline	ND	0.0617	0.123	ug/L	1	02/21/23 21:00	EPA 8270E	
4-Chloroaniline	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
2-Nitroaniline	ND	0.247	0.494	ug/L	1	02/21/23 21:00	EPA 8270E	
3-Nitroaniline	ND	0.247	0.494	ug/L	1	02/21/23 21:00	EPA 8270E	
4-Nitroaniline	ND	0.247	0.494	ug/L	1	02/21/23 21:00	EPA 8270E	
Nitrobenzene	ND	0.123	0.247	ug/L	1	02/21/23 21:00	EPA 8270E	
2,4-Dinitrotoluene	ND	0.123	0.247	ug/L	1	02/21/23 21:00	EPA 8270E	
2,6-Dinitrotoluene	ND	0.123	0.247	ug/L	1	02/21/23 21:00	EPA 8270E	
Benzoic acid	ND	1.54	3.09	ug/L	1	02/21/23 21:00	EPA 8270E	
Benzyl alcohol	ND	0.123	0.247	ug/L	1	02/21/23 21:00	EPA 8270E	
Isophorone	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
Azobenzene (1,2-DPH)	ND	0.0617	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	0.309	0.617	ug/L	1	02/21/23 21:00	EPA 8270E	
3,3'-Dichlorobenzidine	ND	0.617	1.23	ug/L	1	02/21/23 21:00	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	0.309	0.617	ug/L	1	02/21/23 21:00	EPA 8270E	
1,3-Dinitrobenzene	ND	0.309	0.617	ug/L	1	02/21/23 21:00	EPA 8270E	
1,4-Dinitrobenzene	ND	0.309	0.617	ug/L	1	02/21/23 21:00	EPA 8270E	
Pyridine	ND	0.123	0.247	ug/L	1	02/21/23 21:00	EPA 8270E	
1,2-Dichlorobenzene	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	Q-30
1,3-Dichlorobenzene	**0.122**	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	**Q-30**
1,4-Dichlorobenzene	ND	0.0309	0.0617	ug/L	1	02/21/23 21:00	EPA 8270E	Q-30
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*63 %*	*Limits: 44-120 %*	*1*	*02/21/23 21:00*	*EPA 8270E*	
2-Fluorobiphenyl (Surr)			*48 %*	*44-120 %*	*1*	*02/21/23 21:00*	*EPA 8270E*	

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Surrogate: Phenol-d6 (Surr)		*Recovery:*	*31 %*	*Limits: 10-133 %*	*1*	*02/21/23 21:00*	*EPA 8270E*	
p-Terphenyl-d14 (Surr)			*81 %*	*50-134 %*	*1*	*02/21/23 21:00*	*EPA 8270E*	
2-Fluorophenol (Surr)			*47 %*	*19-120 %*	*1*	*02/21/23 21:00*	*EPA 8270E*	
2,4,6-Tribromophenol (Surr)			*84 %*	*43-140 %*	*1*	*02/21/23 21:00*	*EPA 8270E*	
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Acenaphthene	**0.0378**	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
Acenaphthylene	**0.0230**	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
Anthracene	ND	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
Benz(a)anthracene	ND	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
Benzo(a)pyrene	**0.0211**	0.0167	0.0333	ug/L	1	02/21/23 21:34	EPA 8270E	**Ja**
Benzo(b)fluoranthene	**0.0182**	0.0167	0.0333	ug/L	1	02/21/23 21:34	EPA 8270E	**Ja**
Benzo(k)fluoranthene	**0.0232**	0.0167	0.0333	ug/L	1	02/21/23 21:34	EPA 8270E	**Ja**
Benzo(g,h,i)perylene	ND	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
Chrysene	**0.0146**	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	**Ja**
Dibenz(a,h)anthracene	ND	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
Fluoranthene	**0.0185**	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	**Ja**
Fluorene	**0.0301**	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
1-Methylnaphthalene	ND	0.0222	0.0444	ug/L	1	02/21/23 21:34	EPA 8270E	Q-30
2-Methylnaphthalene	ND	0.0222	0.0444	ug/L	1	02/21/23 21:34	EPA 8270E	Q-30
Naphthalene	ND	0.0222	0.0444	ug/L	1	02/21/23 21:34	EPA 8270E	Q-30
Phenanthrene	**0.0239**	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
Pyrene	ND	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
Carbazole	ND	0.0333	0.0333	ug/L	1	02/21/23 21:34	EPA 8270E	
Dibenzofuran	ND	0.0222	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
2-Chlorophenol	ND	0.0556	0.111	ug/L	1	02/21/23 21:34	EPA 8270E	
4-Chloro-3-methylphenol	ND	0.222	0.222	ug/L	1	02/21/23 21:34	EPA 8270E	
2,4-Dichlorophenol	ND	0.0556	0.111	ug/L	1	02/21/23 21:34	EPA 8270E	
2,4-Dimethylphenol	ND	0.0556	0.111	ug/L	1	02/21/23 21:34	EPA 8270E	
2,4-Dinitrophenol	ND	0.278	0.556	ug/L	1	02/21/23 21:34	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	0.278	0.556	ug/L	1	02/21/23 21:34	EPA 8270E	
2-Methylphenol	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	
3+4-Methylphenol(s)	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
2-Nitrophenol	ND	0.111	0.222	ug/L	1	02/21/23 21:34	EPA 8270E	
4-Nitrophenol	ND	0.222	0.222	ug/L	1	02/21/23 21:34	EPA 8270E	
Pentachlorophenol (PCP)	ND	0.111	0.222	ug/L	1	02/21/23 21:34	EPA 8270E	
Phenol	ND	0.222	0.444	ug/L	1	02/21/23 21:34	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	0.0556	0.111	ug/L	1	02/21/23 21:34	EPA 8270E	
2,3,5,6-Tetrachlorophenol	ND	0.0556	0.111	ug/L	1	02/21/23 21:34	EPA 8270E	
2,4,5-Trichlorophenol	ND	0.0556	0.111	ug/L	1	02/21/23 21:34	EPA 8270E	
2,4,6-Trichlorophenol	ND	0.0556	0.111	ug/L	1	02/21/23 21:34	EPA 8270E	
Bis(2-ethylhexyl)phthalate	ND	0.222	0.444	ug/L	1	02/21/23 21:34	EPA 8270E	
Butyl benzyl phthalate	ND	0.222	0.444	ug/L	1	02/21/23 21:34	EPA 8270E	
Diethylphthalate	ND	0.222	0.444	ug/L	1	02/21/23 21:34	EPA 8270E	
Dimethylphthalate	ND	0.222	0.444	ug/L	1	02/21/23 21:34	EPA 8270E	
Di-n-butylphthalate	**0.347**	0.222	0.444	ug/L	1	02/21/23 21:34	EPA 8270E	**Ja**
Di-n-octyl phthalate	ND	0.222	0.444	ug/L	1	02/21/23 21:34	EPA 8270E	
N-Nitrosodimethylamine	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	
N-Nitrosodiphenylamine	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	
Bis(2-Chloroethoxy) methane	**0.0519**	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	**Ja**
Bis(2-Chloroethyl) ether	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	
Hexachlorobenzene	ND	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	
Hexachlorobutadiene	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	Q-30
Hexachlorocyclopentadiene	ND	0.0556	0.111	ug/L	1	02/21/23 21:34	EPA 8270E	Q-30
Hexachloroethane	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	Q-30
2-Chloronaphthalene	**0.0255**	0.0111	0.0222	ug/L	1	02/21/23 21:34	EPA 8270E	**Q-30**
1,2,4-Trichlorobenzene	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	Q-30
4-Bromophenyl phenyl ether	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	
4-Chlorophenyl phenyl ether	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	
Aniline	ND	0.0556	0.111	ug/L	1	02/21/23 21:34	EPA 8270E	
4-Chloroaniline	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	
2-Nitroaniline	ND	0.222	0.444	ug/L	1	02/21/23 21:34	EPA 8270E	
3-Nitroaniline	ND	0.222	0.444	ug/L	1	02/21/23 21:34	EPA 8270E	
4-Nitroaniline	ND	0.222	0.444	ug/L	1	02/21/23 21:34	EPA 8270E	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0761**		**AMEND**
Nitrobenzene	ND	0.111	0.222	ug/L	1	02/21/23 21:34	EPA 8270E	
2,4-Dinitrotoluene	ND	0.111	0.222	ug/L	1	02/21/23 21:34	EPA 8270E	
2,6-Dinitrotoluene	ND	0.111	0.222	ug/L	1	02/21/23 21:34	EPA 8270E	
Benzoic acid	ND	2.78	2.78	ug/L	1	02/21/23 21:34	EPA 8270E	
Benzyl alcohol	ND	0.111	0.222	ug/L	1	02/21/23 21:34	EPA 8270E	
Isophorone	**0.0398**	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	**Ja**
Azobenzene (1,2-DPH)	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	0.278	0.556	ug/L	1	02/21/23 21:34	EPA 8270E	
3,3'-Dichlorobenzidine	ND	0.556	1.11	ug/L	1	02/21/23 21:34	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	0.278	0.556	ug/L	1	02/21/23 21:34	EPA 8270E	
1,3-Dinitrobenzene	ND	0.278	0.556	ug/L	1	02/21/23 21:34	EPA 8270E	
1,4-Dinitrobenzene	ND	0.278	0.556	ug/L	1	02/21/23 21:34	EPA 8270E	
Pyridine	ND	0.111	0.222	ug/L	1	02/21/23 21:34	EPA 8270E	
1,2-Dichlorobenzene	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	Q-30
1,3-Dichlorobenzene	**0.0919**	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	**Q-30**
1,4-Dichlorobenzene	ND	0.0278	0.0556	ug/L	1	02/21/23 21:34	EPA 8270E	Q-30
Surrogate: 2-Fluorobiphenyl (Surr)		*Recovery:*	*47 %*	*Limits:* *44-120 %*	*1*	*02/21/23 21:34*	*EPA 8270E*	
Phenol-d6 (Surr)			*27 %*	*10-133 %*	*1*	*02/21/23 21:34*	*EPA 8270E*	
p-Terphenyl-d14 (Surr)			*76 %*	*50-134 %*	*1*	*02/21/23 21:34*	*EPA 8270E*	
2-Fluorophenol (Surr)			*22 %*	*19-120 %*	*1*	*02/21/23 21:34*	*EPA 8270E*	
2,4,6-Tribromophenol (Surr)			*55 %*	*43-140 %*	*1*	*02/21/23 21:34*	*EPA 8270E*	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: 23B0739**		
Azinphos methyl (Guthion)	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Chlorpyrifos	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Coumaphos	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Demeton O	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Demeton S	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Diazinon	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Dichlorvos	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Dimethoate	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Disulfoton	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
EPN	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Ethoprop	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Fensulfothion	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Fenthion	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Malathion	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Merphos	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Methyl parathion	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Mevinphos (Phosdrin)	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Monocrotophos	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Naled (Dibrom)	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Parathion, ethyl	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Phorate	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Ronnel (Fenchlorphos)	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Sulfotep	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Sulprofos (Bolstar)	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
TEPP	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Tetrachlorvinphos (Rabon)	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Tokuthion (Prothiofos)	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Trichloronate	ND	0.248	0.495	ug/L	1	02/20/23 20:32	EPA 8270E OPPs	
Surrogate: Tributyl phosphate (Surr)		*Recovery:*	*77 %*	*Limits:*	*56-124 %*	*1*	*02/20/23 20:32*	*EPA 8270E OPPs*
Triphenyl phosphate (Surr)			*104 %*		*58-121 %*	*1*	*02/20/23 20:32*	*EPA 8270E OPPs*
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0739**		
Azinphos methyl (Guthion)	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: 23B0739**		
Chlorpyrifos	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Coumaphos	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Demeton O	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Demeton S	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Diazinon	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Dichlorvos	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Dimethoate	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Disulfoton	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
EPN	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Ethoprop	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Fensulfothion	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Fenthion	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Malathion	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Merphos	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Methyl parathion	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Mevinphos (Phosdrin)	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Monocrotophos	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Naled (Dibrom)	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Parathion, ethyl	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Phorate	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Ronnel (Fenchlorphos)	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Sulfotep	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Sulprofos (Bolstar)	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
TEPP	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Tetrachlorvinphos (Rabon)	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Tokuthion (Prothiofos)	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Trichloronate	ND	0.248	0.495	ug/L	1	02/20/23 21:07	EPA 8270E OPPs	
Surrogate: Tributyl phosphate (Surr)		*Recovery: 91 %*		*Limits: 56-124 %*	*1*	*02/20/23 21:07*	*EPA 8270E OPPs*	
Triphenyl phosphate (Surr)			*110 %*	*58-121 %*	*1*	*02/20/23 21:07*	*EPA 8270E OPPs*	
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0739**		
Azinphos methyl (Guthion)	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Chlorpyrifos	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: 23B0739**		
Coumaphos	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Demeton O	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Demeton S	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Diazinon	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Dichlorvos	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Dimethoate	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Disulfoton	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
EPN	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Ethoprop	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Fensulfothion	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Fenthion	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Malathion	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Merphos	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Methyl parathion	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Mevinphos (Phosdrin)	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Monocrotophos	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Naled (Dibrom)	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Parathion, ethyl	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Phorate	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Ronnel (Fenchlorphos)	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Sulfotep	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Sulprofos (Bolstar)	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
TEPP	ND	0.549	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Tetrachlorvinphos (Rabon)	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Tokuthion (Prothiofos)	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Trichloronate	ND	0.275	0.549	ug/L	1	02/20/23 21:42	EPA 8270E OPPs	
Surrogate: Tributyl phosphate (Surr)		*Recovery:*	*92 %*	*Limits:*	*56-124 %*	*1*	*02/20/23 21:42*	*EPA 8270E OPPs*
Triphenyl phosphate (Surr)			*98 %*		*58-121 %*	*1*	*02/20/23 21:42*	*EPA 8270E OPPs*
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0739**		
Azinphos methyl (Guthion)	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Chlorpyrifos	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Coumaphos	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	

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Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: 23B0739**		
Demeton O	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Demeton S	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Diazinon	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Dichlorvos	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Dimethoate	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Disulfoton	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
EPN	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Ethoprop	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Fensulfothion	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Fenthion	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Malathion	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Merphos	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Methyl parathion	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Mevinphos (Phosdrin)	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Monocrotophos	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Naled (Dibrom)	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Parathion, ethyl	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Phorate	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Ronnel (Fenchlorphos)	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Sulfotep	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Sulprofos (Bolstar)	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
TEPP	ND	0.538	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Tetrachlorvinphos (Rabon)	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Tokuthion (Prothiofos)	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Trichloronate	ND	0.269	0.538	ug/L	1	02/20/23 22:18	EPA 8270E OPPs	
Surrogate: Tributyl phosphate (Surr)		*Recovery:*	*102 %*	*Limits:*	*56-124 %*	*1*	*02/20/23 22:18*	*EPA 8270E OPPs*	
Triphenyl phosphate (Surr)			*102 %*		*58-121 %*	*1*	*02/20/23 22:18*	*EPA 8270E OPPs*	
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0739**		
Azinphos methyl (Guthion)	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Chlorpyrifos	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Coumaphos	ND	0.532	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Demeton O	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: 23B0739**		
Demeton S	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Diazinon	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Dichlorvos	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Dimethoate	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Disulfoton	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
EPN	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Ethoprop	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Fensulfothion	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Fenthion	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Malathion	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Merphos	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Methyl parathion	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Mevinphos (Phosdrin)	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Monocrotophos	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Naled (Dibrom)	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Parathion, ethyl	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Phorate	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Ronnel (Fenchlorphos)	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Sulfotep	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Sulprofos (Bolstar)	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
TEPP	ND	0.532	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Tetrachlorvinphos (Rabon)	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Tokuthion (Prothiofos)	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Trichloronate	ND	0.266	0.532	ug/L	1	02/20/23 22:53	EPA 8270E OPPs	
Surrogate: Tributyl phosphate (Surr)			*Recovery: 99 %*	*Limits: 56-124 %*	*1*	*02/20/23 22:53*	*EPA 8270E OPPs*	
Triphenyl phosphate (Surr)			*96 %*	*58-121 %*	*1*	*02/20/23 22:53*	*EPA 8270E OPPs*	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**				
Batch: 23B0647								
Antimony	ND	0.500	1.00	ug/L	1	02/18/23 04:30	EPA 6020B	
Arsenic	**0.773**	0.500	1.00	ug/L	1	02/18/23 04:30	EPA 6020B	**Ja**
Barium	**70.1**	1.00	2.00	ug/L	1	02/18/23 04:30	EPA 6020B	
Beryllium	ND	0.100	0.200	ug/L	1	02/18/23 04:30	EPA 6020B	
Cadmium	ND	0.100	0.200	ug/L	1	02/18/23 04:30	EPA 6020B	
Chromium	ND	1.00	2.00	ug/L	1	02/18/23 04:30	EPA 6020B	
Copper	ND	1.00	2.00	ug/L	1	02/18/23 04:30	EPA 6020B	
Lead	ND	0.110	0.200	ug/L	1	02/18/23 04:30	EPA 6020B	
Manganese	**826**	0.500	1.00	ug/L	1	02/18/23 04:30	EPA 6020B	
Mercury	ND	0.0400	0.0800	ug/L	1	02/18/23 04:30	EPA 6020B	
Nickel	**1.21**	1.00	2.00	ug/L	1	02/18/23 04:30	EPA 6020B	**Ja**
Selenium	ND	0.500	1.00	ug/L	1	02/18/23 04:30	EPA 6020B	
Silver	ND	0.100	0.200	ug/L	1	02/18/23 04:30	EPA 6020B	
Thallium	ND	0.100	0.200	ug/L	1	02/18/23 04:30	EPA 6020B	
Zinc	ND	2.00	4.00	ug/L	1	02/18/23 04:30	EPA 6020B	
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**				
Batch: 23B0647								
Antimony	ND	0.500	1.00	ug/L	1	02/18/23 04:45	EPA 6020B	
Arsenic	**0.722**	0.500	1.00	ug/L	1	02/18/23 04:45	EPA 6020B	**Ja**
Barium	**70.9**	1.00	2.00	ug/L	1	02/18/23 04:45	EPA 6020B	
Beryllium	ND	0.100	0.200	ug/L	1	02/18/23 04:45	EPA 6020B	
Cadmium	ND	0.100	0.200	ug/L	1	02/18/23 04:45	EPA 6020B	
Chromium	ND	1.00	2.00	ug/L	1	02/18/23 04:45	EPA 6020B	
Copper	ND	1.00	2.00	ug/L	1	02/18/23 04:45	EPA 6020B	
Lead	ND	0.110	0.200	ug/L	1	02/18/23 04:45	EPA 6020B	
Manganese	**826**	0.500	1.00	ug/L	1	02/18/23 04:45	EPA 6020B	
Mercury	ND	0.0400	0.0800	ug/L	1	02/18/23 04:45	EPA 6020B	
Nickel	ND	1.00	2.00	ug/L	1	02/18/23 04:45	EPA 6020B	
Selenium	ND	0.500	1.00	ug/L	1	02/18/23 04:45	EPA 6020B	
Silver	ND	0.100	0.200	ug/L	1	02/18/23 04:45	EPA 6020B	
Thallium	ND	0.100	0.200	ug/L	1	02/18/23 04:45	EPA 6020B	
Zinc	ND	2.00	4.00	ug/L	1	02/18/23 04:45	EPA 6020B	

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**				
Batch: 23B0647								
Antimony	ND	0.500	1.00	ug/L	1	02/18/23 04:51	EPA 6020B	
Arsenic	**11.2**	0.500	1.00	ug/L	1	02/18/23 04:51	EPA 6020B	
Barium	**760**	1.00	2.00	ug/L	1	02/18/23 04:51	EPA 6020B	
Beryllium	ND	0.100	0.200	ug/L	1	02/18/23 04:51	EPA 6020B	
Cadmium	ND	0.100	0.200	ug/L	1	02/18/23 04:51	EPA 6020B	
Chromium	ND	1.00	2.00	ug/L	1	02/18/23 04:51	EPA 6020B	
Copper	ND	1.00	2.00	ug/L	1	02/18/23 04:51	EPA 6020B	
Lead	ND	0.110	0.200	ug/L	1	02/18/23 04:51	EPA 6020B	
Mercury	ND	0.0400	0.0800	ug/L	1	02/18/23 04:51	EPA 6020B	
Nickel	**2.46**	1.00	2.00	ug/L	1	02/18/23 04:51	EPA 6020B	
Selenium	ND	0.500	1.00	ug/L	1	02/18/23 04:51	EPA 6020B	
Silver	ND	0.100	0.200	ug/L	1	02/18/23 04:51	EPA 6020B	
Thallium	ND	0.100	0.200	ug/L	1	02/18/23 04:51	EPA 6020B	
Zinc	ND	2.00	4.00	ug/L	1	02/18/23 04:51	EPA 6020B	
MW5-20230214-GW-40 (A3B0522-03RE1)				**Matrix: Water**				
Batch: 23B0647								
Manganese	**6640**	25.0	50.0	ug/L	50	02/20/23 16:04	EPA 6020B	
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**				
Batch: 23B0647								
Antimony	ND	0.500	1.00	ug/L	1	02/18/23 05:07	EPA 6020B	
Arsenic	**25.8**	0.500	1.00	ug/L	1	02/18/23 05:07	EPA 6020B	
Barium	**856**	1.00	2.00	ug/L	1	02/18/23 05:07	EPA 6020B	
Beryllium	ND	0.100	0.200	ug/L	1	02/18/23 05:07	EPA 6020B	
Cadmium	ND	0.100	0.200	ug/L	1	02/18/23 05:07	EPA 6020B	
Chromium	**2.26**	1.00	2.00	ug/L	1	02/18/23 05:07	EPA 6020B	
Copper	**1.18**	1.00	2.00	ug/L	1	02/18/23 05:07	EPA 6020B	**Ja**
Lead	**0.375**	0.110	0.200	ug/L	1	02/18/23 05:07	EPA 6020B	
Mercury	ND	0.0400	0.0800	ug/L	1	02/18/23 05:07	EPA 6020B	
Nickel	**4.04**	1.00	2.00	ug/L	1	02/18/23 05:07	EPA 6020B	
Selenium	ND	0.500	1.00	ug/L	1	02/18/23 05:07	EPA 6020B	

Apex Laboratories

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**				
Silver	ND	0.100	0.200	ug/L	1	02/18/23 05:07	EPA 6020B	
Thallium	ND	0.100	0.200	ug/L	1	02/18/23 05:07	EPA 6020B	
Zinc	**3.58**	2.00	4.00	ug/L	1	02/18/23 05:07	EPA 6020B	**Ja**
MW4-20230214-GW-40 (A3B0522-04RE1)				**Matrix: Water**				
Batch: 23B0647								
Manganese	**4080**	25.0	50.0	ug/L	50	02/20/23 16:09	EPA 6020B	
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**				
Batch: 23B0647								
Antimony	ND	0.500	1.00	ug/L	1	02/18/23 05:12	EPA 6020B	
Arsenic	**27.7**	0.500	1.00	ug/L	1	02/18/23 05:12	EPA 6020B	
Barium	**617**	1.00	2.00	ug/L	1	02/18/23 05:12	EPA 6020B	
Beryllium	ND	0.100	0.200	ug/L	1	02/18/23 05:12	EPA 6020B	
Cadmium	ND	0.100	0.200	ug/L	1	02/18/23 05:12	EPA 6020B	
Chromium	**1.20**	1.00	2.00	ug/L	1	02/18/23 05:12	EPA 6020B	**Ja**
Copper	ND	1.00	2.00	ug/L	1	02/18/23 05:12	EPA 6020B	
Lead	ND	0.110	0.200	ug/L	1	02/18/23 05:12	EPA 6020B	
Mercury	ND	0.0400	0.0800	ug/L	1	02/18/23 05:12	EPA 6020B	
Nickel	**2.49**	1.00	2.00	ug/L	1	02/18/23 05:12	EPA 6020B	
Selenium	ND	0.500	1.00	ug/L	1	02/18/23 05:12	EPA 6020B	
Silver	ND	0.100	0.200	ug/L	1	02/18/23 05:12	EPA 6020B	
Thallium	ND	0.100	0.200	ug/L	1	02/18/23 05:12	EPA 6020B	
MW6-20230214-GW-40.25 (A3B0522-05RE1)				**Matrix: Water**				
Batch: 23B0647								
Manganese	**2860**	25.0	50.0	ug/L	50	02/20/23 16:14	EPA 6020B	
MW6-20230214-GW-40.25 (A3B0522-05RE2)				**Matrix: Water**				
Batch: 23B0647								
Zinc	**5.18**	2.00	4.00	ug/L	1	02/20/23 16:20	EPA 6020B	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Chlorinated Herbicides by GC/ECD

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: W3B1728**		
Batch: W3B1728								
2,4-D	ND	1.7	2.5	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
2,4-DB	ND	5.0	12	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
2,4,5-T	ND	0.70	1.2	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
2,4,5-TP (Silvex)	ND	0.70	1.2	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
3,5-Dichlorobenzoic acid	ND	1.4	6.2	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
4-Nitrophenol	ND	2.5	6.2	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
Acifluorfen	ND	1.2	2.5	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
Bentazon	ND	2.8	12	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
Dalapon	ND	0.80	2.5	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
Dicamba	ND	0.95	3.8	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
Dichloroprop	ND	1.2	5.0	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
Dinoseb	ND	0.45	2.5	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
DCPA	ND	1.0	1.2	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
MCPA	ND	200	500	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
MCPP	ND	140	500	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
Pentachlorophenol	ND	0.90	1.2	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
Picloram	ND	0.65	3.8	ug/l	5	03/02/23 07:31	EPA 8151A	M-04
Batch: W3B1728								
Surrogate: 2,4-DCAA		*Recovery: 47 %*		*Limits: 56-156 %*	*5*	*03/02/23 07:31*	*EPA 8151A*	*S-04*
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: W3B1728**		
Batch: W3B1728								
2,4-D	ND	1.7	2.5	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
2,4-DB	ND	5.0	12	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
2,4,5-T	ND	0.70	1.2	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
2,4,5-TP (Silvex)	ND	0.70	1.2	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
3,5-Dichlorobenzoic acid	ND	1.4	6.2	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
4-Nitrophenol	ND	2.5	6.2	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
Acifluorfen	ND	1.2	2.5	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
Bentazon	ND	2.8	12	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
Dalapon	ND	0.80	2.5	ug/l	5	03/02/23 08:02	EPA 8151A	M-04

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Chlorinated Herbicides by GC/ECD

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: W3B1728**		
Dicamba	ND	0.95	3.8	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
Dichloroprop	ND	1.2	5.0	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
Dinoseb	ND	0.45	2.5	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
DCPA	ND	1.0	1.2	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
MCPA	ND	200	500	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
MCPP	ND	140	500	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
Pentachlorophenol	ND	0.90	1.2	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
Picloram	ND	0.65	3.8	ug/l	5	03/02/23 08:02	EPA 8151A	M-04
Batch: W3B1728								
Surrogate: 2,4-DCAA		*Recovery: 61 %*		*Limits: 56-156 %*	*5*	*03/02/23 08:02*	*EPA 8151A*	
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: W3B1728**		
Batch: W3B1728								
2,4-D	ND	1.7	2.5	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
2,4-DB	ND	5.0	12	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
2,4,5-T	ND	0.70	1.2	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
2,4,5-TP (Silvex)	ND	0.70	1.2	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
3,5-Dichlorobenzoic acid	ND	1.4	6.2	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
4-Nitrophenol	ND	2.5	6.2	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
Acifluorfen	ND	1.2	2.5	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
Bentazon	ND	2.8	12	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
Dalapon	ND	0.80	2.5	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
Dicamba	ND	0.95	3.8	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
Dichloroprop	ND	1.2	5.0	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
Dinoseb	ND	0.45	2.5	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
DCPA	ND	1.0	1.2	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
MCPA	ND	200	500	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
MCPP	ND	140	500	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
Pentachlorophenol	ND	0.90	1.2	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
Picloram	ND	0.65	3.8	ug/l	5	03/02/23 08:33	EPA 8151A	M-04
Batch: W3B1728								
Surrogate: 2,4-DCAA		*Recovery: 82 %*		*Limits: 56-156 %*	*5*	*03/02/23 08:33*	*EPA 8151A*	

Apex Laboratories

Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Chlorinated Herbicides by GC/ECD

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: W3B1728**		
Batch: W3B1728								
2,4-D	ND	1.7	2.5	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
2,4-DB	ND	5.0	12	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
2,4,5-T	ND	0.70	1.2	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
2,4,5-TP (Silvex)	ND	0.70	1.2	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
3,5-Dichlorobenzoic acid	ND	1.4	6.2	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
4-Nitrophenol	ND	2.5	6.2	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
Acifluorfen	ND	1.2	2.5	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
Bentazon	ND	2.8	12	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
Dalapon	ND	0.80	2.5	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
Dicamba	ND	0.95	3.8	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
Dichloroprop	ND	1.2	5.0	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
Dinoseb	ND	0.45	2.5	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
DCPA	ND	1.0	1.2	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
MCPA	ND	200	500	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
MCPP	ND	140	500	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
Pentachlorophenol	ND	0.90	1.2	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
Picloram	ND	0.65	3.8	ug/l	5	03/02/23 09:04	EPA 8151A	M-04
Batch: W3B1728								
Surrogate: 2,4-DCAA		*Recovery: 76 %*		*Limits: 56-156 %*	*5*	*03/02/23 09:04*	*EPA 8151A*	
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: W3B1728**		
Batch: W3B1728								
2,4-D	ND	1.7	2.5	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
2,4-DB	ND	5.0	12	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
2,4,5-T	ND	0.70	1.2	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
2,4,5-TP (Silvex)	ND	0.70	1.2	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
3,5-Dichlorobenzoic acid	ND	1.4	6.2	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
4-Nitrophenol	ND	2.5	6.2	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
Acifluorfen	ND	1.2	2.5	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
Bentazon	ND	2.8	12	ug/l	5	03/02/23 09:36	EPA 8151A	M-04

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Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Chlorinated Herbicides by GC/ECD

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: W3B1728**		
Dalapon	ND	0.80	2.5	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
Dicamba	ND	0.95	3.8	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
Dichloroprop	ND	1.2	5.0	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
Dinoseb	ND	0.45	2.5	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
DCPA	ND	1.0	1.2	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
MCPA	ND	200	500	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
MCPP	ND	140	500	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
Pentachlorophenol	ND	0.90	1.2	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
Picloram	ND	0.65	3.8	ug/l	5	03/02/23 09:36	EPA 8151A	M-04
Batch: W3B1728								
Surrogate: 2,4-DCAA		*Recovery: 72 %*		*Limits: 56-156 %*	*5*	*03/02/23 09:36*	*EPA 8151A*	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Hexavalent Chromium by IC

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW3-20230214-GW-35 (A3B0522-01)				**Matrix: Water**		**Batch: W3B1784**		
Batch: W3B1784								
Chromium 6+	ND	0.0079	0.020	ug/l	1	02/23/23 14:38	EPA 218.6	
MW3-20230214-GW-35-DUP (A3B0522-02)				**Matrix: Water**		**Batch: W3B1784**		
Batch: W3B1784								
Chromium 6+	ND	0.0079	0.020	ug/l	1	02/23/23 14:50	EPA 218.6	
MW5-20230214-GW-40 (A3B0522-03)				**Matrix: Water**		**Batch: W3B2351**		
Batch: W3B2351								
Chromium 6+	ND	0.040	0.10	ug/l	5	02/28/23 17:44	EPA 218.6	M-05
MW4-20230214-GW-40 (A3B0522-04)				**Matrix: Water**		**Batch: W3B2351**		
Batch: W3B2351								
Chromium 6+	ND	0.040	0.10	ug/l	5	02/28/23 17:56	EPA 218.6	M-05
MW6-20230214-GW-40.25 (A3B0522-05)				**Matrix: Water**		**Batch: W3B2351**		
Batch: W3B2351								
Chromium 6+	ND	0.040	0.10	ug/l	5	02/28/23 18:08	EPA 218.6	M-05

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
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Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0986 - EPA 3510C (Fuels/Acid Ext.)									**Water**			
Blank (23B0986-BLK1)				Prepared: 02/28/23 11:48		Analyzed: 03/01/23 00:10						
NWTPH-Dx												
Diesel	ND	0.100	0.200	mg/L	1	---	---	---	---	---	---	
Oil	ND	0.200	0.400	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 83 %*	*Limits: 50-150 %*		*Dilution: 1x*						
LCS (23B0986-BS1)				Prepared: 02/28/23 11:48		Analyzed: 03/01/23 00:31						
NWTPH-Dx												
Diesel	0.708	0.100	0.200	mg/L	1	1.25	---	57	36-132%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 98 %*	*Limits: 50-150 %*		*Dilution: 1x*						
LCS Dup (23B0986-BSD1)				Prepared: 02/28/23 11:48		Analyzed: 03/01/23 00:51						**Q-19**
NWTPH-Dx												
Diesel	0.714	0.100	0.200	mg/L	1	1.25	---	57	36-132%	0.8	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 97 %*	*Limits: 50-150 %*		*Dilution: 1x*						

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ANALYTICAL REPORT

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C									Water			
Blank (23B0828-BLK1)				Prepared: 02/22/23 08:30		Analyzed: 02/22/23 11:47						
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 95 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*106 %*	*50-150 %*			*"*					
LCS (23B0828-BS2)				Prepared: 02/22/23 08:30		Analyzed: 02/22/23 10:40						
NWTPH-Gx (MS)												
Gasoline Range Organics	0.545	0.0500	0.100	mg/L	1	0.500	---	109	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 100 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*			*"*					
Duplicate (23B0828-DUP1)				Prepared: 02/22/23 11:21		Analyzed: 02/22/23 20:44						
QC Source Sample: MW3-20230214-GW-35-DUP (A3B0522-02)												
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 99 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*105 %*	*50-150 %*			*"*					
Duplicate (23B0828-DUP2)				Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:06						
QC Source Sample: Non-SDG (A3B0674-01)												
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 98 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*107 %*	*50-150 %*			*"*					

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Blank (23B0828-BLK1)			Prepared: 02/22/23 08:30		Analyzed: 02/22/23 11:47							
EPA 8260D												
Acetone	ND	10.0	20.0	ug/L	1	---	---	---	---	---	---	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Benzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Blank (23B0828-BLK1)			Prepared: 02/22/23 08:30		Analyzed: 02/22/23 11:47							
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Hexanone	ND	10.0	10.0	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	2.00	2.00	ug/L	1	---	---	---	---	---	---	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Styrene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	

Surr: 1,4-Difluorobenzene (Surr) *Recovery: 98 %* *Limits: 80-120 %* *Dilution: 1x*

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C									Water			
Blank (23B0828-BLK1)				Prepared: 02/22/23 08:30 Analyzed: 02/22/23 11:47								
Surr: Toluene-d8 (Surr)			*Recovery: 105 %*	*Limits: 80-120 %*				*Dilution: 1x*				
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*				*"*				
LCS (23B0828-BS1)				Prepared: 02/22/23 08:30 Analyzed: 02/22/23 11:02								
EPA 8260D												
Acetone	34.2	10.0	20.0	ug/L	1	40.0	---	85	80-120%	---	---	ICV-01
Acrylonitrile	16.6	1.00	2.00	ug/L	1	20.0	---	83	80-120%	---	---	
Benzene	17.8	0.100	0.200	ug/L	1	20.0	---	89	80-120%	---	---	
Bromobenzene	17.6	0.250	0.500	ug/L	1	20.0	---	88	80-120%	---	---	
Bromochloromethane	20.3	0.500	1.00	ug/L	1	20.0	---	101	80-120%	---	---	
Bromodichloromethane	21.1	0.500	1.00	ug/L	1	20.0	---	106	80-120%	---	---	
Bromoform	21.8	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
Bromomethane	26.5	5.00	5.00	ug/L	1	20.0	---	**132**	**80-120%**	---	---	Q-56
2-Butanone (MEK)	32.2	5.00	10.0	ug/L	1	40.0	---	80	80-120%	---	---	ICV-01
n-Butylbenzene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
sec-Butylbenzene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
tert-Butylbenzene	18.0	0.500	1.00	ug/L	1	20.0	---	90	80-120%	---	---	
Carbon disulfide	20.0	5.00	10.0	ug/L	1	20.0	---	100	80-120%	---	---	
Carbon tetrachloride	24.2	0.500	1.00	ug/L	1	20.0	---	**121**	**80-120%**	---	---	Q-56
Chlorobenzene	19.7	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
Chloroethane	33.8	5.00	5.00	ug/L	1	20.0	---	**169**	**80-120%**	---	---	Q-56
Chloroform	20.0	0.500	1.00	ug/L	1	20.0	---	100	80-120%	---	---	
Chloromethane	18.0	2.50	5.00	ug/L	1	20.0	---	90	80-120%	---	---	
2-Chlorotoluene	18.8	0.500	1.00	ug/L	1	20.0	---	94	80-120%	---	---	
4-Chlorotoluene	17.9	0.500	1.00	ug/L	1	20.0	---	90	80-120%	---	---	
Dibromochloromethane	21.5	0.500	1.00	ug/L	1	20.0	---	107	80-120%	---	---	
1,2-Dibromo-3-chloropropane	16.8	2.50	5.00	ug/L	1	20.0	---	84	80-120%	---	---	
1,2-Dibromoethane (EDB)	20.0	0.250	0.500	ug/L	1	20.0	---	100	80-120%	---	---	
Dibromomethane	19.8	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
1,2-Dichlorobenzene	19.7	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
1,3-Dichlorobenzene	18.8	0.250	0.500	ug/L	1	20.0	---	94	80-120%	---	---	
1,4-Dichlorobenzene	18.6	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Dichlorodifluoromethane	24.4	0.500	1.00	ug/L	1	20.0	---	**122**	**80-120%**	---	---	Q-56
1,1-Dichloroethane	18.7	0.200	0.400	ug/L	1	20.0	---	93	80-120%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
LCS (23B0828-BS1)			Prepared: 02/22/23 08:30		Analyzed: 02/22/23 11:02							
1,2-Dichloroethane (EDC)	22.5	0.200	0.400	ug/L	1	20.0	---	112	80-120%	---	---	
1,1-Dichloroethene	20.6	0.200	0.400	ug/L	1	20.0	---	103	80-120%	---	---	
cis-1,2-Dichloroethene	18.0	0.200	0.400	ug/L	1	20.0	---	90	80-120%	---	---	
trans-1,2-Dichloroethene	18.3	0.200	0.400	ug/L	1	20.0	---	92	80-120%	---	---	
1,2-Dichloropropane	17.3	0.250	0.500	ug/L	1	20.0	---	87	80-120%	---	---	
1,3-Dichloropropane	18.9	0.500	1.00	ug/L	1	20.0	---	94	80-120%	---	---	
2,2-Dichloropropane	21.5	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
1,1-Dichloropropene	18.6	0.500	1.00	ug/L	1	20.0	---	93	80-120%	---	---	
cis-1,3-Dichloropropene	19.2	0.500	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
trans-1,3-Dichloropropene	21.7	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
Ethylbenzene	19.5	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
Hexachlorobutadiene	18.8	2.50	5.00	ug/L	1	20.0	---	94	80-120%	---	---	
2-Hexanone	31.4	10.0	10.0	ug/L	1	40.0	---	**79**	**80-120%**	---	---	Q-55
Isopropylbenzene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
4-Isopropyltoluene	19.3	0.500	1.00	ug/L	1	20.0	---	97	80-120%	---	---	
Methylene chloride	18.8	5.00	10.0	ug/L	1	20.0	---	94	80-120%	---	---	
4-Methyl-2-pentanone (MiBK)	34.3	5.00	10.0	ug/L	1	40.0	---	86	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	17.2	0.500	1.00	ug/L	1	20.0	---	86	80-120%	---	---	
Naphthalene	15.0	2.00	2.00	ug/L	1	20.0	---	**75**	**80-120%**	---	---	Q-55
n-Propylbenzene	18.6	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Styrene	19.3	0.500	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
1,1,1,2-Tetrachloroethane	19.8	0.200	0.400	ug/L	1	20.0	---	99	80-120%	---	---	
1,1,2,2-Tetrachloroethane	18.6	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Tetrachloroethene (PCE)	19.3	0.200	0.400	ug/L	1	20.0	---	96	80-120%	---	---	
Toluene	19.0	0.500	1.00	ug/L	1	20.0	---	95	80-120%	---	---	
1,2,3-Trichlorobenzene	17.6	1.00	2.00	ug/L	1	20.0	---	88	80-120%	---	---	
1,2,4-Trichlorobenzene	16.4	1.00	2.00	ug/L	1	20.0	---	82	80-120%	---	---	
1,1,1-Trichloroethane	21.6	0.200	0.400	ug/L	1	20.0	---	108	80-120%	---	---	
1,1,2-Trichloroethane	19.8	0.250	0.500	ug/L	1	20.0	---	99	80-120%	---	---	
Trichloroethene (TCE)	16.7	0.200	0.400	ug/L	1	20.0	---	83	80-120%	---	---	
Trichlorofluoromethane	26.0	1.00	2.00	ug/L	1	20.0	---	**130**	**80-120%**	---	---	Q-56
1,2,3-Trichloropropane	19.5	0.500	1.00	ug/L	1	20.0	---	98	80-120%	---	---	
1,2,4-Trimethylbenzene	19.6	0.500	1.00	ug/L	1	20.0	---	98	80-120%	---	---	
1,3,5-Trimethylbenzene	18.9	0.500	1.00	ug/L	1	20.0	---	94	80-120%	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C									Water			
LCS (23B0828-BS1)			Prepared: 02/22/23 08:30		Analyzed: 02/22/23 11:02							
Vinyl chloride	22.3	0.200	0.400	ug/L	1	20.0	---	111	80-120%	---	---	
m,p-Xylene	40.9	0.500	1.00	ug/L	1	40.0	---	102	80-120%	---	---	
o-Xylene	18.5	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 93 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*88 %*		*80-120 %*				*"*			
Duplicate (23B0828-DUP1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 20:44							
QC Source Sample: MW3-20230214-GW-35-DUP (A3B0522-02)												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Duplicate (23B0828-DUP1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 20:44							
QC Source Sample: MW3-20230214-GW-35-DUP (A3B0522-02)												
1,3-Dichlorobenzene	**0.370**	0.250	0.500	ug/L	1	---	0.440	---	---	17	30%	Ja
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	10.0	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	2.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Duplicate (23B0828-DUP1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 20:44							
QC Source Sample: MW3-20230214-GW-35-DUP (A3B0522-02)												
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 99 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*104 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*100 %*		*80-120 %*		*"*					
Duplicate (23B0828-DUP2)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:06							
QC Source Sample: Non-SDG (A3B0674-01)												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							Water					
Duplicate (23B0828-DUP2)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:06							
QC Source Sample: Non-SDG (A3B0674-01)												
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	10.0	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	2.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Duplicate (23B0828-DUP2)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:06							
QC Source Sample: Non-SDG (A3B0674-01)												
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*104 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*98 %*		*80-120 %*		*"*					
Matrix Spike (23B0828-MS1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:28							
QC Source Sample: Non-SDG (A3B0730-01)												
EPA 8260D												
Acetone	41.6	10.0	20.0	ug/L	1	40.0	ND	104	39-160%	---	---	ICV-01
Acrylonitrile	16.8	1.00	2.00	ug/L	1	20.0	ND	84	63-135%	---	---	
Benzene	19.6	0.100	0.200	ug/L	1	20.0	ND	98	79-120%	---	---	
Bromobenzene	16.9	0.250	0.500	ug/L	1	20.0	ND	85	80-120%	---	---	
Bromochloromethane	20.8	0.500	1.00	ug/L	1	20.0	ND	104	78-123%	---	---	
Bromodichloromethane	22.8	0.500	1.00	ug/L	1	20.0	ND	114	79-125%	---	---	
Bromoform	23.0	0.500	1.00	ug/L	1	20.0	ND	115	66-130%	---	---	
Bromomethane	30.9	5.00	5.00	ug/L	1	20.0	ND	**155**	**53-141%**	---	---	Q-01
2-Butanone (MEK)	34.8	5.00	10.0	ug/L	1	40.0	ND	87	56-143%	---	---	ICV-01
n-Butylbenzene	12.4	0.500	1.00	ug/L	1	20.0	ND	**62**	**75-128%**	---	---	Q-01
sec-Butylbenzene	14.0	0.500	1.00	ug/L	1	20.0	ND	**70**	**77-126%**	---	---	Q-01
tert-Butylbenzene	13.8	0.500	1.00	ug/L	1	20.0	ND	**69**	**78-124%**	---	---	Q-01

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Matrix Spike (23B0828-MS1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:28							
QC Source Sample: Non-SDG (A3B0730-01)												
Carbon disulfide	22.2	5.00	10.0	ug/L	1	20.0	ND	111	64-133%	---	---	
Carbon tetrachloride	26.1	0.500	1.00	ug/L	1	20.0	ND	130	72-136%	---	---	Q-54
Chlorobenzene	19.4	0.250	0.500	ug/L	1	20.0	ND	97	80-120%	---	---	
Chloroethane	41.1	5.00	5.00	ug/L	1	20.0	ND	**205**	**60-138%**	---	---	Q-42
Chloroform	22.4	0.500	1.00	ug/L	1	20.0	0.880	107	79-124%	---	---	
Chloromethane	19.4	2.50	5.00	ug/L	1	20.0	ND	97	50-139%	---	---	
2-Chlorotoluene	16.8	0.500	1.00	ug/L	1	20.0	ND	84	79-122%	---	---	
4-Chlorotoluene	15.8	0.500	1.00	ug/L	1	20.0	ND	79	78-122%	---	---	
Dibromochloromethane	21.8	0.500	1.00	ug/L	1	20.0	ND	109	74-126%	---	---	
1,2-Dibromo-3-chloropropane	15.9	2.50	5.00	ug/L	1	20.0	ND	80	62-128%	---	---	
1,2-Dibromoethane (EDB)	19.6	0.250	0.500	ug/L	1	20.0	ND	98	77-121%	---	---	
Dibromomethane	21.4	0.500	1.00	ug/L	1	20.0	ND	107	79-123%	---	---	
1,2-Dichlorobenzene	17.7	0.250	0.500	ug/L	1	20.0	ND	88	80-120%	---	---	
1,3-Dichlorobenzene	16.9	0.250	0.500	ug/L	1	20.0	ND	84	80-120%	---	---	
1,4-Dichlorobenzene	17.0	0.250	0.500	ug/L	1	20.0	ND	85	79-120%	---	---	
Dichlorodifluoromethane	26.8	0.500	1.00	ug/L	1	20.0	ND	134	32-152%	---	---	
1,1-Dichloroethane	20.6	0.200	0.400	ug/L	1	20.0	ND	103	77-125%	---	---	
1,2-Dichloroethane (EDC)	23.4	0.200	0.400	ug/L	1	20.0	ND	117	73-128%	---	---	
1,1-Dichloroethene	23.6	0.200	0.400	ug/L	1	20.0	ND	118	71-131%	---	---	
cis-1,2-Dichloroethene	18.1	0.200	0.400	ug/L	1	20.0	ND	90	78-123%	---	---	
trans-1,2-Dichloroethene	19.0	0.200	0.400	ug/L	1	20.0	ND	95	75-124%	---	---	
1,2-Dichloropropane	18.6	0.250	0.500	ug/L	1	20.0	ND	93	78-122%	---	---	
1,3-Dichloropropane	18.9	0.500	1.00	ug/L	1	20.0	ND	95	80-120%	---	---	
2,2-Dichloropropane	20.6	0.500	1.00	ug/L	1	20.0	ND	103	60-139%	---	---	
1,1-Dichloropropene	19.9	0.500	1.00	ug/L	1	20.0	ND	100	79-125%	---	---	
cis-1,3-Dichloropropene	19.1	0.500	1.00	ug/L	1	20.0	ND	95	75-124%	---	---	
trans-1,3-Dichloropropene	21.0	0.500	1.00	ug/L	1	20.0	ND	105	73-127%	---	---	
Ethylbenzene	19.5	0.250	0.500	ug/L	1	20.0	ND	98	79-121%	---	---	
Hexachlorobutadiene	10.7	2.50	5.00	ug/L	1	20.0	ND	**54**	**66-134%**	---	---	Q-01
2-Hexanone	29.2	10.0	10.0	ug/L	1	40.0	ND	73	57-139%	---	---	
Isopropylbenzene	17.7	0.500	1.00	ug/L	1	20.0	ND	89	72-131%	---	---	
4-Isopropyltoluene	13.5	0.500	1.00	ug/L	1	20.0	ND	**68**	**77-127%**	---	---	Q-01
Methylene chloride	19.1	5.00	10.0	ug/L	1	20.0	ND	95	74-124%	---	---	

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Philip Nerenberg, Lab Director

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Matrix Spike (23B0828-MS1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:28							
QC Source Sample: Non-SDG (A3B0730-01)												
4-Methyl-2-pentanone (MiBK)	34.6	5.00	10.0	ug/L	1	40.0	ND	87	67-130%	---	---	
Methyl tert-butyl ether (MTBE)	17.3	0.500	1.00	ug/L	1	20.0	ND	87	71-124%	---	---	
Naphthalene	13.4	2.00	2.00	ug/L	1	20.0	ND	67	61-128%	---	---	Q-54b
n-Propylbenzene	16.3	0.250	0.500	ug/L	1	20.0	ND	82	76-126%	---	---	
Styrene	18.6	0.500	1.00	ug/L	1	20.0	ND	93	78-123%	---	---	
1,1,1,2-Tetrachloroethane	19.4	0.200	0.400	ug/L	1	20.0	ND	97	78-124%	---	---	
1,1,2,2-Tetrachloroethane	14.2	0.250	0.500	ug/L	1	20.0	ND	71	71-121%	---	---	
Tetrachloroethene (PCE)	19.0	0.200	0.400	ug/L	1	20.0	ND	95	74-129%	---	---	
Toluene	20.0	0.500	1.00	ug/L	1	20.0	0.500	97	80-121%	---	---	
1,2,3-Trichlorobenzene	12.6	1.00	2.00	ug/L	1	20.0	ND	**63**	**69-129%**	---	---	Q-01
1,2,4-Trichlorobenzene	10.8	1.00	2.00	ug/L	1	20.0	ND	**54**	**69-130%**	---	---	Q-01
1,1,1-Trichloroethane	23.9	0.200	0.400	ug/L	1	20.0	ND	120	74-131%	---	---	
1,1,2-Trichloroethane	19.0	0.250	0.500	ug/L	1	20.0	ND	95	80-120%	---	---	
Trichloroethene (TCE)	21.5	0.200	0.400	ug/L	1	20.0	ND	107	79-123%	---	---	
Trichlorofluoromethane	30.1	1.00	2.00	ug/L	1	20.0	ND	**151**	**65-141%**	---	---	Q-54a
1,2,3-Trichloropropane	19.1	0.500	1.00	ug/L	1	20.0	ND	95	73-122%	---	---	
1,2,4-Trimethylbenzene	18.0	0.500	1.00	ug/L	1	20.0	0.580	87	76-124%	---	---	
1,3,5-Trimethylbenzene	16.3	0.500	1.00	ug/L	1	20.0	ND	82	75-124%	---	---	
Vinyl chloride	24.1	0.200	0.400	ug/L	1	20.0	ND	121	58-137%	---	---	
m,p-Xylene	39.7	0.500	1.00	ug/L	1	40.0	0.820	97	80-121%	---	---	
o-Xylene	17.8	0.250	0.500	ug/L	1	20.0	0.280	88	78-122%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 97 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*98 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*89 %*		*80-120 %*			*"*				

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Philip Nerenberg, Lab Director

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503-718-2323
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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0743 - EPA 5030C							**Water**					
Blank (23B0743-BLK1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 15:45									
EPA 8260D SIM												
Benzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 104 %*			*Limits: 80-120 %*			*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*			*80-120 %*			*"*			
4-Bromofluorobenzene (Surr)			*99 %*			*80-120 %*			*"*			
LCS (23B0743-BS1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 14:52									
EPA 8260D SIM												
Benzene	0.227	0.0500	0.100	ug/L	1	0.200	---	114	80-120%	---	---	
Toluene	0.209	0.0500	0.100	ug/L	1	0.200	---	105	80-120%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0743 - EPA 5030C									**Water**			
LCS (23B0743-BS1)			Prepared: 02/20/23 13:10		Analyzed: 02/20/23 14:52							
Ethylbenzene	0.202	0.0500	0.100	ug/L	1	0.200	---	101	80-120%	---	---	
m,p-Xylene	0.408	0.100	0.200	ug/L	1	0.400	---	102	80-120%	---	---	
o-Xylene	0.204	0.0500	0.100	ug/L	1	0.200	---	102	80-120%	---	---	
1,2,4-Trimethylbenzene	0.207	0.0500	0.100	ug/L	1	0.200	---	104	80-120%	---	---	
1,3,5-Trimethylbenzene	0.205	0.0500	0.100	ug/L	1	0.200	---	103	80-120%	---	---	
Chloroform	0.232	0.0500	0.100	ug/L	1	0.200	---	116	80-120%	---	---	
1,2-Dibromo-3-chloropropane	0.202	0.100	0.200	ug/L	1	0.200	---	101	80-120%	---	---	
1,2-Dibromoethane (EDB)	0.199	0.0100	0.0200	ug/L	1	0.200	---	100	80-120%	---	---	
1,1-Dichloroethane	0.234	0.0100	0.0200	ug/L	1	0.200	---	117	80-120%	---	---	
1,2-Dichloroethane (EDC)	0.221	0.0100	0.0200	ug/L	1	0.200	---	111	80-120%	---	---	
1,1-Dichloroethene	0.228	0.0100	0.0200	ug/L	1	0.200	---	114	80-120%	---	---	
cis-1,2-Dichloroethene	0.235	0.0100	0.0200	ug/L	1	0.200	---	118	80-120%	---	---	
trans-1,2-Dichloroethene	0.228	0.0100	0.0200	ug/L	1	0.200	---	114	80-120%	---	---	
1,2-Dichloropropane	0.229	0.0100	0.0200	ug/L	1	0.200	---	114	80-120%	---	---	
cis-1,3-Dichloropropene	0.202	0.0100	0.0200	ug/L	1	0.200	---	101	80-120%	---	---	
trans-1,3-Dichloropropene	0.210	0.0100	0.0200	ug/L	1	0.200	---	105	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	0.223	0.0100	0.0200	ug/L	1	0.200	---	112	80-120%	---	---	
1,1,2,2-Tetrachloroethane	0.214	0.0100	0.0200	ug/L	1	0.200	---	107	80-120%	---	---	
Tetrachloroethene (PCE)	0.196	0.0100	0.0200	ug/L	1	0.200	---	98	80-120%	---	---	
Trichloroethene (TCE)	0.219	0.0100	0.0200	ug/L	1	0.200	---	110	80-120%	---	---	
1,2,3-Trichloropropane	0.196	0.0500	0.100	ug/L	1	0.200	---	98	80-120%	---	---	
Vinyl chloride	0.227	0.0100	0.0200	ug/L	1	0.200	---	113	80-120%	---	---	
1,1,2-Trichloroethane	0.204	0.0100	0.0200	ug/L	1	0.200	---	102	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 104 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*95 %*		*80-120 %*				*"*			
Duplicate (23B0743-DUP1)			Prepared: 02/20/23 13:10		Analyzed: 02/20/23 17:33							
QC Source Sample: MW3-20230214-GW-35 (A3B0522-01)												
EPA 8260D SIM												
Benzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0743 - EPA 5030C							**Water**					
Duplicate (23B0743-DUP1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 17:33									
QC Source Sample: MW3-20230214-GW-35 (A3B0522-01)												
o-Xylene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 103 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*99 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*			*"*					
Matrix Spike (23B0743-MS1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 20:14									
QC Source Sample: MW6-20230214-GW-40.25 (A3B0522-05)												
EPA 8260D SIM												
Benzene	0.192	0.0500	0.100	ug/L	1	0.200	ND	96	79-120%	---	---	
Toluene	0.166	0.0500	0.100	ug/L	1	0.200	ND	83	80-121%	---	---	
Ethylbenzene	0.147	0.0500	0.100	ug/L	1	0.200	ND	**74**	**79-121%**	---	---	Q-01
m,p-Xylene	0.285	0.100	0.200	ug/L	1	0.400	ND	**71**	**80-121%**	---	---	Q-01
o-Xylene	0.142	0.0500	0.100	ug/L	1	0.200	ND	**71**	**78-122%**	---	---	Q-01

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Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0743 - EPA 5030C							**Water**					
Matrix Spike (23B0743-MS1)			Prepared: 02/20/23 13:10 Analyzed: 02/20/23 20:14									
QC Source Sample: MW6-20230214-GW-40.25 (A3B0522-05)												
1,2,4-Trimethylbenzene	0.142	0.0500	0.100	ug/L	1	0.200	ND	**71**	**76-124%**	---	---	Q-01
1,3,5-Trimethylbenzene	0.132	0.0500	0.100	ug/L	1	0.200	ND	**66**	**75-124%**	---	---	Q-01
Chloroform	0.179	0.0500	0.100	ug/L	1	0.200	ND	90	79-124%	---	---	
1,2-Dibromo-3-chloropropane	0.134	0.100	0.200	ug/L	1	0.200	ND	67	62-128%	---	---	Ja
1,2-Dibromoethane (EDB)	0.150	0.0100	0.0200	ug/L	1	0.200	ND	**75**	**77-121%**	---	---	Q-01
1,1-Dichloroethane	0.191	0.0100	0.0200	ug/L	1	0.200	ND	95	77-125%	---	---	
1,2-Dichloroethane (EDC)	0.177	0.0100	0.0200	ug/L	1	0.200	ND	88	73-128%	---	---	
1,1-Dichloroethene	0.196	0.0100	0.0200	ug/L	1	0.200	ND	98	71-131%	---	---	
cis-1,2-Dichloroethene	0.204	0.0100	0.0200	ug/L	1	0.200	0.0212	91	78-123%	---	---	
trans-1,2-Dichloroethene	0.190	0.0100	0.0200	ug/L	1	0.200	ND	95	75-124%	---	---	
1,2-Dichloropropane	0.178	0.0100	0.0200	ug/L	1	0.200	ND	89	78-122%	---	---	
cis-1,3-Dichloropropene	0.154	0.0100	0.0200	ug/L	1	0.200	ND	77	75-124%	---	---	
trans-1,3-Dichloropropene	0.158	0.0100	0.0200	ug/L	1	0.200	ND	79	73-127%	---	---	
Methyl tert-butyl ether (MTBE)	0.178	0.0100	0.0200	ug/L	1	0.200	ND	89	71-124%	---	---	
1,1,2,2-Tetrachloroethane	0.164	0.0100	0.0200	ug/L	1	0.200	ND	82	71-121%	---	---	
Tetrachloroethene (PCE)	0.158	0.0100	0.0200	ug/L	1	0.200	ND	79	74-129%	---	---	
Trichloroethene (TCE)	0.175	0.0100	0.0200	ug/L	1	0.200	ND	87	79-123%	---	---	
1,2,3-Trichloropropane	0.154	0.0500	0.100	ug/L	1	0.200	ND	77	73-122%	---	---	
Vinyl chloride	0.227	0.0100	0.0200	ug/L	1	0.200	ND	113	58-137%	---	---	
1,1,2-Trichloroethane	0.157	0.0100	0.0200	ug/L	1	0.200	ND	**78**	**80-120%**	---	---	Q-01
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 105 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*98 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*98 %*		*80-120 %*			*"*				

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0761 - EPA 3510C (Acid/Base Neutral)							Water					
Blank (23B0761-BLK1)			Prepared: 02/21/23 06:52 Analyzed: 02/21/23 16:21									
EPA 8270E												
Acenaphthene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Acenaphthylene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Chrysene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Fluoranthene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Fluorene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	Q-30
2-Methylnaphthalene	ND	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	Q-30
Naphthalene	ND	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	Q-30
Phenanthrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Pyrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Carbazole	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Dibenzofuran	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
2-Chlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
4-Chloro-3-methylphenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,4-Dichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4-Dimethylphenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4-Dinitrophenol	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
4,6-Dinitro-2-methylphenol	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
2-Methylphenol	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
3+4-Methylphenol(s)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2-Nitrophenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Pentachlorophenol (PCP)	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Phenol	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0761 - EPA 3510C (Acid/Base Neutral)							**Water**					
Blank (23B0761-BLK1)			Prepared: 02/21/23 06:52		Analyzed: 02/21/23 16:21							
2,3,5,6-Tetrachlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Diethylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Dimethylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
Hexachlorocyclopentadiene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	Q-30
Hexachloroethane	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
2-Chloronaphthalene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	Q-30
1,2,4-Trichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
4-Bromophenyl phenyl ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
4-Chlorophenyl phenyl ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Aniline	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
4-Chloroaniline	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
3-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
4-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Nitrobenzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Benzoic acid	ND	1.25	2.50	ug/L	1	---	---	---	---	---	---	
Benzyl alcohol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Isophorone	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0761 - EPA 3510C (Acid/Base Neutral)							**Water**					
Blank (23B0761-BLK1)			Prepared: 02/21/23 06:52 Analyzed: 02/21/23 16:21									
Azobenzene (1,2-DPH)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Pyridine	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
1,3-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
1,4-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 45 %*		*Limits: 44-120 %*				*Dilution: 1x*			
2-Fluorobiphenyl (Surr)			*45 %*		*44-120 %*				*"*			
Phenol-d6 (Surr)			*19 %*		*10-133 %*				*"*			
p-Terphenyl-d14 (Surr)			*92 %*		*50-134 %*				*"*			
2-Fluorophenol (Surr)			*33 %*		*19-120 %*				*"*			
2,4,6-Tribromophenol (Surr)			*53 %*		*43-140 %*				*"*			
LCS (23B0761-BS1)			Prepared: 02/21/23 06:52 Analyzed: 02/21/23 16:55									
EPA 8270E												
Acenaphthene	1.96	0.0400	0.0800	ug/L	4	4.00	---	49	47-122%	---	---	
Acenaphthylene	2.12	0.0400	0.0800	ug/L	4	4.00	---	53	41-130%	---	---	
Anthracene	3.19	0.0400	0.0800	ug/L	4	4.00	---	80	57-123%	---	---	
Benz(a)anthracene	3.52	0.0400	0.0800	ug/L	4	4.00	---	88	58-125%	---	---	
Benzo(a)pyrene	3.47	0.0600	0.120	ug/L	4	4.00	---	87	54-128%	---	---	
Benzo(b)fluoranthene	3.69	0.0600	0.120	ug/L	4	4.00	---	92	53-131%	---	---	
Benzo(k)fluoranthene	3.55	0.0600	0.120	ug/L	4	4.00	---	89	57-129%	---	---	
Benzo(g,h,i)perylene	3.65	0.0400	0.0800	ug/L	4	4.00	---	91	50-134%	---	---	
Chrysene	3.47	0.0400	0.0800	ug/L	4	4.00	---	87	59-123%	---	---	
Dibenz(a,h)anthracene	3.40	0.0400	0.0800	ug/L	4	4.00	---	85	51-134%	---	---	
Fluoranthene	3.45	0.0400	0.0800	ug/L	4	4.00	---	86	57-128%	---	---	
Fluorene	2.56	0.0400	0.0800	ug/L	4	4.00	---	64	52-124%	---	---	
Indeno(1,2,3-cd)pyrene	3.58	0.0400	0.0800	ug/L	4	4.00	---	90	52-134%	---	---	
1-Methylnaphthalene	1.36	0.0800	0.160	ug/L	4	4.00	---	**34**	**41-120%**	---	---	Q-30
2-Methylnaphthalene	1.33	0.0800	0.160	ug/L	4	4.00	---	**33**	**40-121%**	---	---	Q-30

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0761 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS (23B0761-BS1)			Prepared: 02/21/23 06:52		Analyzed: 02/21/23 16:55							
Naphthalene	1.28	0.0800	0.160	ug/L	4	4.00	---	**32**	**40-121%**	---	---	Q-30
Phenanthrene	2.97	0.0400	0.0800	ug/L	4	4.00	---	74	59-120%	---	---	
Pyrene	3.43	0.0400	0.0800	ug/L	4	4.00	---	86	57-126%	---	---	
Carbazole	3.40	0.0600	0.120	ug/L	4	4.00	---	85	60-122%	---	---	
Dibenzofuran	2.23	0.0400	0.0800	ug/L	4	4.00	---	56	53-120%	---	---	
2-Chlorophenol	2.14	0.200	0.400	ug/L	4	4.00	---	53	38-120%	---	---	
4-Chloro-3-methylphenol	2.70	0.400	0.800	ug/L	4	4.00	---	67	52-120%	---	---	
2,4-Dichlorophenol	2.42	0.200	0.400	ug/L	4	4.00	---	61	47-121%	---	---	
2,4-Dimethylphenol	2.37	0.200	0.400	ug/L	4	4.00	---	59	31-124%	---	---	
2,4-Dinitrophenol	3.27	1.00	2.00	ug/L	4	4.00	---	82	23-143%	---	---	
4,6-Dinitro-2-methylphenol	3.50	1.00	2.00	ug/L	4	4.00	---	88	44-137%	---	---	
2-Methylphenol	1.92	0.100	0.200	ug/L	4	4.00	---	48	30-120%	---	---	
3+4-Methylphenol(s)	1.78	0.100	0.200	ug/L	4	4.00	---	45	29-120%	---	---	
2-Nitrophenol	2.42	0.400	0.800	ug/L	4	4.00	---	61	47-123%	---	---	
4-Nitrophenol	1.26	0.400	0.800	ug/L	4	4.00	---	31	10-120%	---	---	
Pentachlorophenol (PCP)	3.04	0.400	0.800	ug/L	4	4.00	---	76	35-138%	---	---	
Phenol	0.886	0.800	0.800	ug/L	4	4.00	---	22	10-120%	---	---	
2,3,4,6-Tetrachlorophenol	3.08	0.200	0.400	ug/L	4	4.00	---	77	50-128%	---	---	
2,3,5,6-Tetrachlorophenol	3.07	0.200	0.400	ug/L	4	4.00	---	77	50-121%	---	---	
2,4,5-Trichlorophenol	2.76	0.200	0.400	ug/L	4	4.00	---	69	53-123%	---	---	
2,4,6-Trichlorophenol	2.57	0.200	0.400	ug/L	4	4.00	---	64	50-125%	---	---	
Bis(2-ethylhexyl)phthalate	4.09	0.800	1.60	ug/L	4	4.00	---	102	55-135%	---	---	
Butyl benzyl phthalate	4.12	0.800	1.60	ug/L	4	4.00	---	103	53-134%	---	---	
Diethylphthalate	3.88	0.800	1.60	ug/L	4	4.00	---	97	56-125%	---	---	
Dimethylphthalate	3.45	0.800	1.60	ug/L	4	4.00	---	86	45-127%	---	---	
Di-n-butylphthalate	4.32	0.800	1.60	ug/L	4	4.00	---	108	59-127%	---	---	
Di-n-octyl phthalate	4.40	0.800	1.60	ug/L	4	4.00	---	110	51-140%	---	---	
N-Nitrosodimethylamine	1.54	0.100	0.200	ug/L	4	4.00	---	39	19-120%	---	---	
N-Nitroso-di-n-propylamine	2.41	0.100	0.200	ug/L	4	4.00	---	60	49-120%	---	---	
N-Nitrosodiphenylamine	2.66	0.100	0.200	ug/L	4	4.00	---	67	51-123%	---	---	
Bis(2-Chloroethoxy) methane	2.57	0.100	0.200	ug/L	4	4.00	---	64	48-120%	---	---	
Bis(2-Chloroethyl) ether	2.08	0.100	0.200	ug/L	4	4.00	---	52	43-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	1.93	0.100	0.200	ug/L	4	4.00	---	48	41-120%	---	---	
Hexachlorobenzene	2.67	0.0400	0.0800	ug/L	4	4.00	---	67	53-125%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0761 - EPA 3510C (Acid/Base Neutral)								**Water**				
LCS (23B0761-BS1)			Prepared: 02/21/23 06:52		Analyzed: 02/21/23 16:55							
Hexachlorobutadiene	0.599	0.100	0.200	ug/L	4	4.00	---	**15**	**22-124%**	---	---	Q-30
Hexachlorocyclopentadiene	0.436	0.200	0.400	ug/L	4	4.00	---	11	10-127%	---	---	
Hexachloroethane	0.574	0.100	0.200	ug/L	4	4.00	---	**14**	**21-120%**	---	---	Q-30
2-Chloronaphthalene	1.57	0.0400	0.0800	ug/L	4	4.00	---	**39**	**40-120%**	---	---	Q-30
1,2,4-Trichlorobenzene	0.892	0.100	0.200	ug/L	4	4.00	---	**22**	**29-120%**	---	---	Q-30
4-Bromophenyl phenyl ether	2.51	0.100	0.200	ug/L	4	4.00	---	63	55-124%	---	---	
4-Chlorophenyl phenyl ether	2.29	0.100	0.200	ug/L	4	4.00	---	57	53-121%	---	---	
Aniline	1.75	0.200	0.400	ug/L	4	4.00	---	44	10-120%	---	---	
4-Chloroaniline	2.08	0.100	0.200	ug/L	4	4.00	---	52	33-120%	---	---	Q-31
2-Nitroaniline	2.91	0.800	1.60	ug/L	4	4.00	---	73	55-127%	---	---	
3-Nitroaniline	3.04	0.800	1.60	ug/L	4	4.00	---	76	41-128%	---	---	
4-Nitroaniline	3.44	0.800	1.60	ug/L	4	4.00	---	86	25-120%	---	---	
Nitrobenzene	2.01	0.400	0.800	ug/L	4	4.00	---	50	45-121%	---	---	
2,4-Dinitrotoluene	3.40	0.400	0.800	ug/L	4	4.00	---	85	57-128%	---	---	
2,6-Dinitrotoluene	3.02	0.400	0.800	ug/L	4	4.00	---	75	57-124%	---	---	
Benzoic acid	3.76	2.00	2.00	ug/L	4	8.00	---	47	10-120%	---	---	Q-31
Benzyl alcohol	1.94	0.400	0.800	ug/L	4	4.00	---	49	31-120%	---	---	
Isophorone	2.59	0.100	0.200	ug/L	4	4.00	---	65	42-124%	---	---	
Azobenzene (1,2-DPH)	2.84	0.100	0.200	ug/L	4	4.00	---	71	61-120%	---	---	
Bis(2-Ethylhexyl) adipate	4.31	1.00	2.00	ug/L	4	4.00	---	108	63-121%	---	---	
3,3'-Dichlorobenzidine	12.7	2.00	4.00	ug/L	4	8.00	---	**159**	**27-129%**	---	---	Q-29, Q-52
1,2-Dinitrobenzene	3.16	1.00	2.00	ug/L	4	4.00	---	79	59-120%	---	---	
1,3-Dinitrobenzene	3.13	1.00	2.00	ug/L	4	4.00	---	78	49-128%	---	---	
1,4-Dinitrobenzene	3.12	1.00	2.00	ug/L	4	4.00	---	78	54-120%	---	---	
Pyridine	1.50	0.400	0.800	ug/L	4	4.00	---	38	10-120%	---	---	
1,2-Dichlorobenzene	0.771	0.100	0.200	ug/L	4	4.00	---	**19**	**32-120%**	---	---	Q-30
1,3-Dichlorobenzene	0.699	0.100	0.200	ug/L	4	4.00	---	**17**	**28-120%**	---	---	Q-30
1,4-Dichlorobenzene	0.719	0.100	0.200	ug/L	4	4.00	---	**18**	**29-120%**	---	---	Q-30

Surr: Nitrobenzene-d5 (Surr)	*Recovery: 52 %*	*Limits: 44-120 %*	*Dilution: 4x*
2-Fluorobiphenyl (Surr)	*53 %*	*44-120 %*	*"*
Phenol-d6 (Surr)	*19 %*	*10-133 %*	*"*
p-Terphenyl-d14 (Surr)	*100 %*	*50-134 %*	*"*
2-Fluorophenol (Surr)	*35 %*	*19-120 %*	*"*
2,4,6-Tribromophenol (Surr)	*76 %*	*43-140 %*	*"*

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Batch 23B0761 - EPA 3510C (Acid/Base Neutral) — **Water**

LCS Dup (23B0761-BSD1) Prepared: 02/21/23 06:52 Analyzed: 02/21/23 17:30 — **Q-19**

EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Acenaphthene	1.99	0.0400	0.0800	ug/L	4	4.00	---	50	47-122%	2	30%	
Acenaphthylene	2.19	0.0400	0.0800	ug/L	4	4.00	---	55	41-130%	3	30%	
Anthracene	3.14	0.0400	0.0800	ug/L	4	4.00	---	79	57-123%	1	30%	
Benz(a)anthracene	3.68	0.0400	0.0800	ug/L	4	4.00	---	92	58-125%	4	30%	
Benzo(a)pyrene	3.48	0.0600	0.120	ug/L	4	4.00	---	87	54-128%	0.3	30%	
Benzo(b)fluoranthene	3.64	0.0600	0.120	ug/L	4	4.00	---	91	53-131%	2	30%	
Benzo(k)fluoranthene	3.55	0.0600	0.120	ug/L	4	4.00	---	89	57-129%	0.2	30%	
Benzo(g,h,i)perylene	3.80	0.0400	0.0800	ug/L	4	4.00	---	95	50-134%	4	30%	
Chrysene	3.40	0.0400	0.0800	ug/L	4	4.00	---	85	59-123%	2	30%	
Dibenz(a,h)anthracene	3.52	0.0400	0.0800	ug/L	4	4.00	---	88	51-134%	3	30%	
Fluoranthene	3.32	0.0400	0.0800	ug/L	4	4.00	---	83	57-128%	4	30%	
Fluorene	2.59	0.0400	0.0800	ug/L	4	4.00	---	65	52-124%	1	30%	
Indeno(1,2,3-cd)pyrene	3.68	0.0400	0.0800	ug/L	4	4.00	---	92	52-134%	3	30%	
1-Methylnaphthalene	1.41	0.0800	0.160	ug/L	4	4.00	---	**35**	**41-120%**	4	30%	Q-30
2-Methylnaphthalene	1.39	0.0800	0.160	ug/L	4	4.00	---	**35**	**40-121%**	5	30%	Q-30
Naphthalene	1.39	0.0800	0.160	ug/L	4	4.00	---	**35**	**40-121%**	8	30%	Q-30
Phenanthrene	2.94	0.0400	0.0800	ug/L	4	4.00	---	73	59-120%	1	30%	
Pyrene	3.28	0.0400	0.0800	ug/L	4	4.00	---	82	57-126%	4	30%	
Carbazole	3.36	0.0600	0.120	ug/L	4	4.00	---	84	60-122%	1	30%	
Dibenzofuran	2.27	0.0400	0.0800	ug/L	4	4.00	---	57	53-120%	2	30%	
2-Chlorophenol	2.22	0.200	0.400	ug/L	4	4.00	---	55	38-120%	4	30%	
4-Chloro-3-methylphenol	2.90	0.400	0.800	ug/L	4	4.00	---	72	52-120%	7	30%	
2,4-Dichlorophenol	2.61	0.200	0.400	ug/L	4	4.00	---	65	47-121%	8	30%	
2,4-Dimethylphenol	2.52	0.200	0.400	ug/L	4	4.00	---	63	31-124%	6	30%	
2,4-Dinitrophenol	3.41	1.00	2.00	ug/L	4	4.00	---	85	23-143%	4	30%	
4,6-Dinitro-2-methylphenol	3.57	1.00	2.00	ug/L	4	4.00	---	89	44-137%	2	30%	
2-Methylphenol	1.99	0.100	0.200	ug/L	4	4.00	---	50	30-120%	4	30%	
3+4-Methylphenol(s)	1.88	0.100	0.200	ug/L	4	4.00	---	47	29-120%	5	30%	
2-Nitrophenol	2.74	0.400	0.800	ug/L	4	4.00	---	68	47-123%	12	30%	
4-Nitrophenol	1.35	0.400	0.800	ug/L	4	4.00	---	34	10-120%	7	30%	
Pentachlorophenol (PCP)	2.94	0.400	0.800	ug/L	4	4.00	---	73	35-138%	3	30%	
Phenol	0.961	0.800	0.800	ug/L	4	4.00	---	24	10-120%	8	30%	
2,3,4,6-Tetrachlorophenol	3.24	0.200	0.400	ug/L	4	4.00	---	81	50-128%	5	30%	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0522 - 05 02 23 1624

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0761 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS Dup (23B0761-BSD1)			Prepared: 02/21/23 06:52		Analyzed: 02/21/23 17:30							**Q-19**
2,3,5,6-Tetrachlorophenol	3.20	0.200	0.400	ug/L	4	4.00	---	80	50-121%	4	30%	
2,4,5-Trichlorophenol	2.99	0.200	0.400	ug/L	4	4.00	---	75	53-123%	8	30%	
2,4,6-Trichlorophenol	2.81	0.200	0.400	ug/L	4	4.00	---	70	50-125%	9	30%	
Bis(2-ethylhexyl)phthalate	4.34	0.800	1.60	ug/L	4	4.00	---	108	55-135%	6	30%	
Butyl benzyl phthalate	4.38	0.800	1.60	ug/L	4	4.00	---	109	53-134%	6	30%	
Diethylphthalate	3.98	0.800	1.60	ug/L	4	4.00	---	99	56-125%	3	30%	
Dimethylphthalate	3.55	0.800	1.60	ug/L	4	4.00	---	89	45-127%	3	30%	
Di-n-butylphthalate	4.28	0.800	1.60	ug/L	4	4.00	---	107	59-127%	1	30%	
Di-n-octyl phthalate	4.34	0.800	1.60	ug/L	4	4.00	---	109	51-140%	1	30%	
N-Nitrosodimethylamine	1.65	0.100	0.200	ug/L	4	4.00	---	41	19-120%	7	30%	
N-Nitroso-di-n-propylamine	2.56	0.100	0.200	ug/L	4	4.00	---	64	49-120%	6	30%	
N-Nitrosodiphenylamine	2.79	0.100	0.200	ug/L	4	4.00	---	70	51-123%	5	30%	
Bis(2-Chloroethoxy) methane	2.84	0.100	0.200	ug/L	4	4.00	---	71	48-120%	10	30%	
Bis(2-Chloroethyl) ether	2.26	0.100	0.200	ug/L	4	4.00	---	57	43-120%	8	30%	
2,2'-Oxybis(1-Chloropropane)	2.08	0.100	0.200	ug/L	4	4.00	---	52	41-120%	8	30%	
Hexachlorobenzene	2.52	0.0400	0.0800	ug/L	4	4.00	---	63	53-125%	6	30%	
Hexachlorobutadiene	0.594	0.100	0.200	ug/L	4	4.00	---	**15**	**22-124%**	0.9	30%	Q-30
Hexachlorocyclopentadiene	0.356	0.200	0.200	ug/L	4	4.00	---	**9**	**10-127%**	20	30%	Q-30
Hexachloroethane	0.608	0.100	0.200	ug/L	4	4.00	---	**15**	**21-120%**	6	30%	Q-30
2-Chloronaphthalene	1.58	0.0400	0.0800	ug/L	4	4.00	---	**39**	**40-120%**	0.7	30%	Q-30
1,2,4-Trichlorobenzene	0.937	0.100	0.200	ug/L	4	4.00	---	**23**	**29-120%**	5	30%	Q-30
4-Bromophenyl phenyl ether	2.45	0.100	0.200	ug/L	4	4.00	---	61	55-124%	2	30%	
4-Chlorophenyl phenyl ether	2.22	0.100	0.200	ug/L	4	4.00	---	56	53-121%	3	30%	
Aniline	1.78	0.200	0.400	ug/L	4	4.00	---	44	10-120%	1	30%	
4-Chloroaniline	2.23	0.100	0.200	ug/L	4	4.00	---	56	33-120%	7	30%	Q-31
2-Nitroaniline	3.16	0.800	1.60	ug/L	4	4.00	---	79	55-127%	8	30%	
3-Nitroaniline	3.23	0.800	1.60	ug/L	4	4.00	---	81	41-128%	6	30%	
4-Nitroaniline	3.42	0.800	1.60	ug/L	4	4.00	---	85	25-120%	0.6	30%	
Nitrobenzene	2.17	0.400	0.800	ug/L	4	4.00	---	54	45-121%	8	30%	
2,4-Dinitrotoluene	3.53	0.400	0.800	ug/L	4	4.00	---	88	57-128%	4	30%	
2,6-Dinitrotoluene	3.24	0.400	0.800	ug/L	4	4.00	---	81	57-124%	7	30%	
Benzoic acid	3.88	2.00	2.00	ug/L	4	8.00	---	48	10-120%	3	30%	Q-31
Benzyl alcohol	2.04	0.400	0.800	ug/L	4	4.00	---	51	31-120%	5	30%	
Isophorone	2.81	0.100	0.200	ug/L	4	4.00	---	70	42-124%	8	30%	

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Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0761 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS Dup (23B0761-BSD1)			Prepared: 02/21/23 06:52		Analyzed: 02/21/23 17:30							**Q-19**
Azobenzene (1,2-DPH)	2.90	0.100	0.200	ug/L	4	4.00	---	73	61-120%	2	30%	
Bis(2-Ethylhexyl) adipate	4.74	1.00	2.00	ug/L	4	4.00	---	118	63-121%	9	30%	
3,3'-Dichlorobenzidine	12.0	2.00	4.00	ug/L	4	8.00	---	**151**	**27-129%**	5	30%	Q-29, Q-52
1,2-Dinitrobenzene	3.39	1.00	2.00	ug/L	4	4.00	---	85	59-120%	7	30%	
1,3-Dinitrobenzene	3.32	1.00	2.00	ug/L	4	4.00	---	83	49-128%	6	30%	
1,4-Dinitrobenzene	3.38	1.00	2.00	ug/L	4	4.00	---	85	54-120%	8	30%	
Pyridine	1.67	0.400	0.800	ug/L	4	4.00	---	42	10-120%	10	30%	
1,2-Dichlorobenzene	0.842	0.100	0.200	ug/L	4	4.00	---	**21**	**32-120%**	9	30%	Q-30
1,3-Dichlorobenzene	0.756	0.100	0.200	ug/L	4	4.00	---	**19**	**28-120%**	8	30%	Q-30
1,4-Dichlorobenzene	0.798	0.100	0.200	ug/L	4	4.00	---	**20**	**29-120%**	10	30%	Q-30
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 55 %*		*Limits: 44-120 %*			*Dilution: 4x*				
2-Fluorobiphenyl (Surr)			*57 %*		*44-120 %*			*"*				
Phenol-d6 (Surr)			*21 %*		*10-133 %*			*"*				
p-Terphenyl-d14 (Surr)			*108 %*		*50-134 %*			*"*				
2-Fluorophenol (Surr)			*38 %*		*19-120 %*			*"*				
2,4,6-Tribromophenol (Surr)			*76 %*		*43-140 %*			*"*				

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0739 - EPA 3510C (Neutral pH)							**Water**					
Blank (23B0739-BLK1)			Prepared: 02/20/23 11:30 Analyzed: 02/20/23 18:45									
EPA 8270E OPPs												
Azinphos methyl (Guthion)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chlorpyrifos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Coumaphos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Demeton O	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Demeton S	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Diazinon	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorvos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dimethoate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Disulfoton	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
EPN	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Ethoprop	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Fensulfothion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Fenthion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Malathion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Merphos	**0.491**	0.250	0.500	ug/L	1	---	---	---	---	---	---	B-02, Ja
Methyl parathion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Mevinphos (Phosdrin)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Monocrotophos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Naled (Dibrom)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Parathion, ethyl	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Phorate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Ronnel (Fenchlorphos)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Sulfotep	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Sulprofos (Bolstar)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
TEPP	**0.346**	0.250	0.500	ug/L	1	---	---	---	---	---	---	B-02, Ja
Tetrachlorvinphos (Rabon)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tokuthion (Prothiofos)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloronate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Surr: Tributyl phosphate (Surr)			*Recovery: 96 %*		*Limits: 56-124 %*			*Dilution: 1x*				
Triphenyl phosphate (Surr)			*100 %*		*58-121 %*			*"*				
LCS (23B0739-BS1)			Prepared: 02/20/23 11:30 Analyzed: 02/20/23 19:20									
EPA 8270E OPPs												

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0739 - EPA 3510C (Neutral pH)							**Water**					
LCS (23B0739-BS1)			Prepared: 02/20/23 11:30 Analyzed: 02/20/23 19:20									
Azinphos methyl (Guthion)	4.32	0.500	1.00	ug/L	2	4.00	---	108	43-135%	---	---	
Chlorpyrifos	3.38	0.500	1.00	ug/L	2	4.00	---	84	47-133%	---	---	
Coumaphos	4.16	0.500	1.00	ug/L	2	4.00	---	104	45-135%	---	---	
Demeton O	1.55	0.500	1.00	ug/L	2	1.84	---	84	10-125%	---	---	
Demeton S	1.68	0.500	1.00	ug/L	2	1.94	---	87	21-162%	---	---	
Diazinon	4.26	0.500	1.00	ug/L	2	4.00	---	107	43-129%	---	---	
Dichlorvos	4.50	0.500	1.00	ug/L	2	4.00	---	113	39-138%	---	---	
Dimethoate	3.35	0.500	1.00	ug/L	2	4.00	---	84	26-125%	---	---	
Disulfoton	3.74	0.500	1.00	ug/L	2	4.00	---	94	36-134%	---	---	
EPN	4.29	0.500	1.00	ug/L	2	4.00	---	107	47-133%	---	---	
Ethoprop	4.14	0.500	1.00	ug/L	2	4.00	---	104	52-125%	---	---	
Fensulfothion	4.33	0.500	1.00	ug/L	2	4.00	---	108	15-141%	---	---	
Fenthion	3.66	0.500	1.00	ug/L	2	4.00	---	92	42-137%	---	---	
Malathion	3.64	0.500	1.00	ug/L	2	4.00	---	91	44-132%	---	---	
Merphos	4.52	0.500	1.00	ug/L	2	4.00	---	113	26-133%	---	---	B-02
Methyl parathion	4.32	0.500	1.00	ug/L	2	4.00	---	108	49-134%	---	---	
Mevinphos (Phosdrin)	4.03	0.500	1.00	ug/L	2	4.00	---	101	10-196%	---	---	
Monocrotophos	0.975	0.500	0.500	ug/L	2	4.00	---	24	10-159%	---	---	
Naled (Dibrom)	4.24	0.500	1.00	ug/L	2	4.00	---	106	10-146%	---	---	
Parathion, ethyl	4.21	0.500	1.00	ug/L	2	4.00	---	105	52-134%	---	---	
Phorate	4.27	0.500	1.00	ug/L	2	4.00	---	107	23-139%	---	---	
Ronnel (Fenchlorphos)	3.47	0.500	1.00	ug/L	2	4.00	---	87	42-133%	---	---	
Sulfotep	3.56	0.500	1.00	ug/L	2	4.00	---	89	47-126%	---	---	
Sulprofos (Bolstar)	3.01	0.500	1.00	ug/L	2	4.00	---	75	47-135%	---	---	
TEPP	3.48	0.500	1.00	ug/L	2	4.00	---	87	10-208%	---	---	B-02
Tetrachlorvinphos (Rabon)	4.50	0.500	1.00	ug/L	2	4.00	---	112	42-125%	---	---	
Tokuthion (Prothiofos)	3.77	0.500	1.00	ug/L	2	4.00	---	94	43-132%	---	---	
Trichloronate	3.32	0.500	1.00	ug/L	2	4.00	---	83	28-137%	---	---	
Surr: Tributyl phosphate (Surr)			*Recovery: 104 %*		*Limits: 56-124 %*			*Dilution: 2x*				
Triphenyl phosphate (Surr)			*109 %*		*58-121 %*			*"*				
LCS Dup (23B0739-BSD1)			Prepared: 02/20/23 11:30 Analyzed: 02/20/23 19:56									**Q-19**
EPA 8270E OPPs												
Azinphos methyl (Guthion)	4.31	0.500	1.00	ug/L	2	4.00	---	108	43-135%	0.4	30%	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0739 - EPA 3510C (Neutral pH)							**Water**					
LCS Dup (23B0739-BSD1)			Prepared: 02/20/23 11:30		Analyzed: 02/20/23 19:56							**Q-19**
Chlorpyrifos	3.60	0.500	1.00	ug/L	2	4.00	---	90	47-133%	7	30%	
Coumaphos	4.14	0.500	1.00	ug/L	2	4.00	---	104	45-135%	0.5	30%	
Demeton O	1.45	0.500	1.00	ug/L	2	1.84	---	79	10-125%	7	30%	
Demeton S	1.70	0.500	1.00	ug/L	2	1.94	---	88	21-162%	1	30%	
Diazinon	4.29	0.500	1.00	ug/L	2	4.00	---	107	43-129%	0.7	30%	
Dichlorvos	4.40	0.500	1.00	ug/L	2	4.00	---	110	39-138%	2	30%	
Dimethoate	3.56	0.500	1.00	ug/L	2	4.00	---	89	26-125%	6	30%	
Disulfoton	3.74	0.500	1.00	ug/L	2	4.00	---	94	36-134%	0.04	30%	
EPN	4.32	0.500	1.00	ug/L	2	4.00	---	108	47-133%	0.7	30%	
Ethoprop	3.99	0.500	1.00	ug/L	2	4.00	---	100	52-125%	4	30%	
Fensulfothion	4.22	0.500	1.00	ug/L	2	4.00	---	105	15-141%	3	30%	
Fenthion	3.67	0.500	1.00	ug/L	2	4.00	---	92	42-137%	0.3	30%	
Malathion	3.64	0.500	1.00	ug/L	2	4.00	---	91	44-132%	0.01	30%	
Merphos	4.51	0.500	1.00	ug/L	2	4.00	---	113	26-133%	0.2	30%	B-02
Methyl parathion	4.39	0.500	1.00	ug/L	2	4.00	---	110	49-134%	2	30%	
Mevinphos (Phosdrin)	4.06	0.500	1.00	ug/L	2	4.00	---	101	10-196%	0.6	30%	
Monocrotophos	0.998	0.500	0.500	ug/L	2	4.00	---	25	10-159%	2	30%	
Naled (Dibrom)	3.97	0.500	1.00	ug/L	2	4.00	---	99	10-146%	7	30%	
Parathion, ethyl	4.18	0.500	1.00	ug/L	2	4.00	---	105	52-134%	0.5	30%	
Phorate	3.96	0.500	1.00	ug/L	2	4.00	---	99	23-139%	8	30%	
Ronnel (Fenchlorphos)	3.56	0.500	1.00	ug/L	2	4.00	---	89	42-133%	2	30%	
Sulfotep	3.34	0.500	1.00	ug/L	2	4.00	---	83	47-126%	6	30%	
Sulprofos (Bolstar)	3.07	0.500	1.00	ug/L	2	4.00	---	77	47-135%	2	30%	
TEPP	3.48	0.500	1.00	ug/L	2	4.00	---	87	10-208%	0.05	30%	B-02
Tetrachlorvinphos (Rabon)	4.48	0.500	1.00	ug/L	2	4.00	---	112	42-125%	0.4	30%	
Tokuthion (Prothiofos)	4.10	0.500	1.00	ug/L	2	4.00	---	103	43-132%	8	30%	
Trichloronate	3.61	0.500	1.00	ug/L	2	4.00	---	90	28-137%	8	30%	
Surr: Tributyl phosphate (Surr)			*Recovery: 97 %*		*Limits: 56-124 %*			*Dilution: 2x*				
Triphenyl phosphate (Surr)			*110 %*		*58-121 %*			*"*				

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0647 - EPA 3015A							**Water**					
Blank (23B0647-BLK1)			Prepared: 02/16/23 15:17		Analyzed: 02/18/23 04:19							
EPA 6020B												
Antimony	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Arsenic	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Barium	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Beryllium	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Cadmium	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Chromium	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Copper	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Lead	ND	0.110	0.200	ug/L	1	---	---	---	---	---	---	
Manganese	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Mercury	ND	0.0400	0.0800	ug/L	1	---	---	---	---	---	---	
Nickel	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Selenium	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Silver	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Thallium	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Zinc	ND	2.00	4.00	ug/L	1	---	---	---	---	---	---	
LCS (23B0647-BS1)			Prepared: 02/16/23 15:17		Analyzed: 02/18/23 04:24							
EPA 6020B												
Antimony	27.2	0.500	1.00	ug/L	1	27.8	---	98	80-120%	---	---	
Arsenic	56.5	0.500	1.00	ug/L	1	55.6	---	102	80-120%	---	---	
Barium	58.8	1.00	2.00	ug/L	1	55.6	---	106	80-120%	---	---	
Beryllium	26.2	0.100	0.200	ug/L	1	27.8	---	94	80-120%	---	---	
Cadmium	56.7	0.100	0.200	ug/L	1	55.6	---	102	80-120%	---	---	
Chromium	57.2	1.00	2.00	ug/L	1	55.6	---	103	80-120%	---	---	
Copper	59.0	1.00	2.00	ug/L	1	55.6	---	106	80-120%	---	---	
Lead	57.0	0.110	0.200	ug/L	1	55.6	---	103	80-120%	---	---	
Manganese	57.5	0.500	1.00	ug/L	1	55.6	---	104	80-120%	---	---	
Mercury	1.09	0.0400	0.0800	ug/L	1	1.11	---	98	80-120%	---	---	
Nickel	58.7	1.00	2.00	ug/L	1	55.6	---	106	80-120%	---	---	
Selenium	27.0	0.500	1.00	ug/L	1	27.8	---	97	80-120%	---	---	
Silver	27.9	0.100	0.200	ug/L	1	27.8	---	100	80-120%	---	---	
Thallium	27.1	0.100	0.200	ug/L	1	27.8	---	98	80-120%	---	---	
Zinc	58.0	2.00	4.00	ug/L	1	55.6	---	104	80-120%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0647 - EPA 3015A							**Water**					
Duplicate (23B0647-DUP1)			Prepared: 02/16/23 15:17		Analyzed: 02/18/23 04:35							
QC Source Sample: MW3-20230214-GW-35 (A3B0522-01)												
EPA 6020B												
Antimony	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	20%	
Arsenic	**0.730**	0.500	1.00	ug/L	1	---	0.773	---	---	6	20%	Ja
Barium	**71.3**	1.00	2.00	ug/L	1	---	70.1	---	---	2	20%	
Beryllium	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Cadmium	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Chromium	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	20%	
Copper	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	20%	
Lead	ND	0.110	0.200	ug/L	1	---	ND	---	---	---	20%	
Manganese	**826**	0.500	1.00	ug/L	1	---	826	---	---	0.02	20%	
Mercury	ND	0.0400	0.0800	ug/L	1	---	ND	---	---	---	20%	
Nickel	ND	1.00	2.00	ug/L	1	---	1.21	---	---	***	**20%**	
Selenium	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	20%	
Silver	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Thallium	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Zinc	ND	2.00	4.00	ug/L	1	---	ND	---	---	---	20%	
Matrix Spike (23B0647-MS1)			Prepared: 02/16/23 15:17		Analyzed: 02/18/23 04:40							
QC Source Sample: MW3-20230214-GW-35 (A3B0522-01)												
EPA 6020B												
Antimony	27.5	0.500	1.00	ug/L	1	27.8	ND	99	75-125%	---	---	
Arsenic	58.8	0.500	1.00	ug/L	1	55.6	0.773	104	75-125%	---	---	
Barium	133	1.00	2.00	ug/L	1	55.6	70.1	113	75-125%	---	---	
Beryllium	26.7	0.100	0.200	ug/L	1	27.8	ND	96	75-125%	---	---	
Cadmium	59.5	0.100	0.200	ug/L	1	55.6	ND	107	75-125%	---	---	
Chromium	59.1	1.00	2.00	ug/L	1	55.6	ND	106	75-125%	---	---	
Copper	60.0	1.00	2.00	ug/L	1	55.6	ND	108	75-125%	---	---	
Lead	55.5	0.110	0.200	ug/L	1	55.6	ND	100	75-125%	---	---	
Manganese	895	0.500	1.00	ug/L	1	55.6	826	125	75-125%	---	---	
Mercury	1.07	0.0400	0.0800	ug/L	1	1.11	ND	96	75-125%	---	---	
Nickel	59.9	1.00	2.00	ug/L	1	55.6	1.21	106	75-125%	---	---	
Selenium	27.3	0.500	1.00	ug/L	1	27.8	ND	98	75-125%	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0647 - EPA 3015A							**Water**					
Matrix Spike (23B0647-MS1)			Prepared: 02/16/23 15:17		Analyzed: 02/18/23 04:40							
QC Source Sample: MW3-20230214-GW-35 (A3B0522-01)												
Silver	27.5	0.100	0.200	ug/L	1	27.8	ND	99	75-125%	---	---	
Thallium	26.5	0.100	0.200	ug/L	1	27.8	ND	95	75-125%	---	---	
Zinc	59.3	2.00	4.00	ug/L	1	55.6	ND	107	75-125%	---	---	

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Philip Nerenberg

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Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Chlorinated Herbicides by GC/ECD

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W3B1728 - EPA 3510C							**Water**					
Blank (W3B1728-BLK1)			Prepared: 02/21/23 17:01		Analyzed: 03/02/23 04:23							
EPA 8151A												
2,4-D	ND	0.34	0.50	ug/l	1	---	---	---	---	---	---	
2,4-DB	ND	0.99	2.5	ug/l	1	---	---	---	---	---	---	
2,4,5-T	ND	0.14	0.25	ug/l	1	---	---	---	---	---	---	
2,4,5-TP (Silvex)	ND	0.14	0.25	ug/l	1	---	---	---	---	---	---	
3,5-Dichlorobenzoic acid	ND	0.28	1.2	ug/l	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.50	1.2	ug/l	1	---	---	---	---	---	---	
Acifluorfen	ND	0.24	0.50	ug/l	1	---	---	---	---	---	---	
Bentazon	ND	0.55	2.5	ug/l	1	---	---	---	---	---	---	
Dalapon	ND	0.16	0.50	ug/l	1	---	---	---	---	---	---	
Dicamba	ND	0.19	0.75	ug/l	1	---	---	---	---	---	---	
Dichloroprop	ND	0.24	1.0	ug/l	1	---	---	---	---	---	---	
Dinoseb	ND	0.090	0.50	ug/l	1	---	---	---	---	---	---	
DCPA	ND	0.20	0.25	ug/l	1	---	---	---	---	---	---	
MCPA	ND	40	100	ug/l	1	---	---	---	---	---	---	
MCPP	ND	27	100	ug/l	1	---	---	---	---	---	---	
Pentachlorophenol	ND	0.18	0.25	ug/l	1	---	---	---	---	---	---	
Picloram	ND	0.13	0.75	ug/l	1	---	---	---	---	---	---	
Surr: 2,4-DCAA			*Recovery: 60 %*		*Limits: 56-156 %*				*Dilution: 1x*			
LCS (W3B1728-BS1)			Prepared: 02/21/23 17:01		Analyzed: 03/02/23 05:26							
EPA 8151A												
2,4-D	2.47	0.34	0.50	ug/l	1	3.00	---	82	56-164%	---	---	
2,4-DB	4.71	0.99	2.5	ug/l	1	6.00	---	79	27-161%	---	---	
2,4,5-T	1.15	0.14	0.25	ug/l	1	1.50	---	77	39-151%	---	---	
2,4,5-TP (Silvex)	1.23	0.14	0.25	ug/l	1	1.50	---	82	46-142%	---	---	
3,5-Dichlorobenzoic acid	2.65	0.28	1.2	ug/l	1	3.00	---	88	54-154%	---	---	
4-Nitrophenol	3.70	0.50	1.2	ug/l	1	6.00	---	62	3-105%	---	---	
Acifluorfen	1.61	0.24	0.50	ug/l	1	1.50	---	107	39-134%	---	---	
Bentazon	5.35	0.55	2.5	ug/l	1	6.00	---	89	44-139%	---	---	
Dalapon	2.27	0.16	0.50	ug/l	1	3.00	---	76	40-139%	---	---	
Dicamba	2.51	0.19	0.75	ug/l	1	3.00	---	84	46-140%	---	---	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Chlorinated Herbicides by GC/ECD

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W3B1728 - EPA 3510C							**Water**					
LCS (W3B1728-BS1)			Prepared: 02/21/23 17:01		Analyzed: 03/02/23 05:26							
Dichloroprop	2.52	0.24	1.0	ug/l	1	3.00	---	84	43-158%	---	---	
Dinoseb	1.43	0.090	0.50	ug/l	1	1.50	---	95	42-146%	---	---	
DCPA	1.31	0.20	0.25	ug/l	1	1.50	---	87	34-135%	---	---	
MCPA	242	40	100	ug/l	1	300	---	81	28-144%	---	---	
MCPP	214	27	100	ug/l	1	300	---	71	31-153%	---	---	
Pentachlorophenol	1.22	0.18	0.25	ug/l	1	1.50	---	82	37-136%	---	---	
Picloram	1.22	0.13	0.75	ug/l	1	1.50	---	82	35-138%	---	---	
Surr: 2,4-DCAA			*Recovery: 98 %*		*Limits: 56-156 %*			*Dilution: 1x*				
LCS Dup (W3B1728-BSD1)			Prepared: 02/21/23 17:01		Analyzed: 03/02/23 04:54							
EPA 8151A												
2,4-D	3.07	0.34	0.50	ug/l	1	3.00	---	102	56-164%	22	25%	
2,4-DB	5.92	0.99	2.5	ug/l	1	6.00	---	99	27-161%	23	25%	
2,4,5-T	1.31	0.14	0.25	ug/l	1	1.50	---	87	39-151%	13	25%	
2,4,5-TP (Silvex)	1.55	0.14	0.25	ug/l	1	1.50	---	103	46-142%	23	25%	
3,5-Dichlorobenzoic acid	3.26	0.28	1.2	ug/l	1	3.00	---	109	54-154%	20	25%	
4-Nitrophenol	4.50	0.50	1.2	ug/l	1	6.00	---	75	3-105%	20	25%	
Acifluorfen	2.25	0.24	0.50	ug/l	1	1.50	---	**150**	**39-134%**	**34**	**25%**	Q-08
Bentazon	6.80	0.55	2.5	ug/l	1	6.00	---	113	44-139%	24	25%	
Dalapon	2.86	0.16	0.50	ug/l	1	3.00	---	95	40-139%	23	25%	
Dicamba	3.15	0.19	0.75	ug/l	1	3.00	---	105	46-140%	22	25%	
Dichloroprop	3.00	0.24	1.0	ug/l	1	3.00	---	100	43-158%	17	25%	
Dinoseb	1.57	0.090	0.50	ug/l	1	1.50	---	105	42-146%	10	25%	
DCPA	1.63	0.20	0.25	ug/l	1	1.50	---	109	34-135%	22	25%	
MCPA	298	40	100	ug/l	1	300	---	99	28-144%	21	25%	
MCPP	270	27	100	ug/l	1	300	---	90	31-153%	23	25%	
Pentachlorophenol	1.43	0.18	0.25	ug/l	1	1.50	---	95	37-136%	15	25%	
Picloram	1.56	0.13	0.75	ug/l	1	1.50	---	104	35-138%	24	25%	
Surr: 2,4-DCAA			*Recovery: 123 %*		*Limits: 56-156 %*			*Dilution: 1x*				

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Hexavalent Chromium by IC

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W3B1784 - _NONE (LC)							**Water**					
Blank (W3B1784-BLK1)			Prepared: 02/22/23 10:36		Analyzed: 02/22/23 13:29							
EPA 218.6												
Chromium 6+	ND	0.0079	0.020	ug/l	1	---	---	---	---	---	---	
LCS (W3B1784-BS1)			Prepared: 02/22/23 10:36		Analyzed: 02/22/23 15:59							
EPA 218.6												
Chromium 6+	5.44	0.0079	0.020	ug/l	1	5.00	---	109	90-110%	---	---	
Matrix Spike (W3B1784-MS1)			Prepared: 02/22/23 10:36		Analyzed: 02/23/23 11:59							
QC Source Sample: Non-SDG (3A19008-01)												
EPA 218.6												
Chromium 6+	4.90	0.0079	0.020	ug/l	1	5.00	0.0558	97	88-112%	---	---	
Matrix Spike (W3B1784-MS2)			Prepared: 02/22/23 10:36		Analyzed: 02/23/23 12:23							
QC Source Sample: Non-SDG (3A19008-03)												
EPA 218.6												
Chromium 6+	5.51	0.0079	0.020	ug/l	1	5.00	0.191	106	88-112%	---	---	
Matrix Spike Dup (W3B1784-MSD1)			Prepared: 02/22/23 10:36		Analyzed: 02/23/23 12:11							
QC Source Sample: Non-SDG (3A19008-01)												
Chromium 6+	4.91	0.0079	0.020	ug/l	1	5.00	0.0558	97	88-112%	0.2	10%	
Matrix Spike Dup (W3B1784-MSD2)			Prepared: 02/22/23 10:36		Analyzed: 02/23/23 12:35							
QC Source Sample: Non-SDG (3A19008-03)												
Chromium 6+	5.25	0.0079	0.020	ug/l	1	5.00	0.191	101	88-112%	5	10%	

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Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Hexavalent Chromium by IC

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W3B2351 - _NONE (LC)							**Water**					
Blank (W3B2351-BLK1)			Prepared: 02/28/23 00:00		Analyzed: 02/28/23 16:56							
EPA 218.6												
Chromium 6+	ND	0.0079	0.020	ug/l	1	---	---	---	---	---	---	
LCS (W3B2351-BS1)			Prepared: 02/28/23 00:00		Analyzed: 02/28/23 17:28							
EPA 218.6												
Chromium 6+	4.90	0.0079	0.020	ug/l	1	5.00	---	98	90-110%	---	---	
Matrix Spike (W3B2351-MS1)			Prepared: 02/28/23 00:00		Analyzed: 02/28/23 18:58							
QC Source Sample: Non-SDG (3A19009-01)												
EPA 218.6												
Chromium 6+	11.6	0.0079	0.020	ug/l	1	5.00	6.53	101	88-112%	---	---	
Matrix Spike Dup (W3B2351-MSD1)			Prepared: 02/28/23 00:00		Analyzed: 02/28/23 19:10							
QC Source Sample: Non-SDG (3A19009-01)												
Chromium 6+	11.5	0.0079	0.020	ug/l	1	5.00	6.53	99	88-112%	0.9	10%	

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Project: **St. Helens Lagoon**
Project Number: **M0830.03.006**
Project Manager: **David Weatherby**

Report ID:
A3B0522 - 05 02 23 1624

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0986							
A3B0522-01	Water	NWTPH-Dx	02/14/23 10:05	02/28/23 11:48	970mL/5mL	1000mL/5mL	1.03
A3B0522-02	Water	NWTPH-Dx	02/14/23 10:05	02/28/23 11:48	930mL/5mL	1000mL/5mL	1.08
A3B0522-03	Water	NWTPH-Dx	02/14/23 12:51	02/28/23 11:48	970mL/5mL	1000mL/5mL	1.03
A3B0522-04	Water	NWTPH-Dx	02/14/23 14:37	02/28/23 11:48	940mL/5mL	1000mL/5mL	1.06
A3B0522-05	Water	NWTPH-Dx	02/14/23 16:17	02/28/23 11:48	950mL/5mL	1000mL/5mL	1.05

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0828							
A3B0522-01	Water	NWTPH-Gx (MS)	02/14/23 10:05	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0522-02	Water	NWTPH-Gx (MS)	02/14/23 10:05	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0522-03	Water	NWTPH-Gx (MS)	02/14/23 12:51	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0522-04	Water	NWTPH-Gx (MS)	02/14/23 14:37	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0522-05	Water	NWTPH-Gx (MS)	02/14/23 16:17	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00

Volatile Organic Compounds by EPA 8260D

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0828							
A3B0522-01	Water	EPA 8260D	02/14/23 10:05	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0522-02	Water	EPA 8260D	02/14/23 10:05	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0522-03	Water	EPA 8260D	02/14/23 12:51	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0522-04	Water	EPA 8260D	02/14/23 14:37	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0522-05	Water	EPA 8260D	02/14/23 16:17	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0522-07	Water	EPA 8260D	02/14/23 00:00	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00

Volatile Organic Compounds by EPA 8260D SIM

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0743							
A3B0522-01	Water	EPA 8260D SIM	02/14/23 10:05	02/20/23 13:10	5mL/5mL	5mL/5mL	1.00
A3B0522-02	Water	EPA 8260D SIM	02/14/23 10:05	02/20/23 13:10	5mL/5mL	5mL/5mL	1.00

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

Project: **St. Helens Lagoon**
Project Number: **M0830.03.006**
Project Manager: **David Weatherby**

Report ID:
A3B0522 - 05 02 23 1624

SAMPLE PREPARATION INFORMATION

Volatile Organic Compounds by EPA 8260D SIM

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A3B0522-03	Water	EPA 8260D SIM	02/14/23 12:51	02/20/23 13:10	5mL/5mL	5mL/5mL	1.00
A3B0522-04	Water	EPA 8260D SIM	02/14/23 14:37	02/20/23 13:10	5mL/5mL	5mL/5mL	1.00
A3B0522-05	Water	EPA 8260D SIM	02/14/23 16:17	02/20/23 13:10	5mL/5mL	5mL/5mL	1.00
A3B0522-07	Water	EPA 8260D SIM	02/14/23 00:00	02/20/23 13:10	5mL/5mL	5mL/5mL	1.00

Semivolatile Organic Compounds by EPA 8270E

Prep: EPA 3510C (Acid/Base Neutral)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0761							
A3B0522-01	Water	EPA 8270E	02/14/23 10:05	02/21/23 06:52	1040mL/1mL	1000mL/1mL	0.96
A3B0522-02	Water	EPA 8270E	02/14/23 10:05	02/21/23 06:52	1060mL/1mL	1000mL/1mL	0.94
A3B0522-03	Water	EPA 8270E	02/14/23 12:51	02/21/23 06:52	850mL/1mL	1000mL/1mL	1.18
A3B0522-04	Water	EPA 8270E	02/14/23 14:37	02/21/23 06:52	810mL/1mL	1000mL/1mL	1.23
A3B0522-05	Water	EPA 8270E	02/14/23 16:17	02/21/23 06:52	900mL/1mL	1000mL/1mL	1.11

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Prep: EPA 3510C (Neutral pH)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0739							
A3B0522-01	Water	EPA 8270E OPPs	02/14/23 10:05	02/20/23 11:30	1010mL/2mL	1000mL/2mL	0.99
A3B0522-02	Water	EPA 8270E OPPs	02/14/23 10:05	02/20/23 11:30	1010mL/2mL	1000mL/2mL	0.99
A3B0522-03	Water	EPA 8270E OPPs	02/14/23 12:51	02/20/23 11:30	910mL/2mL	1000mL/2mL	1.10
A3B0522-04	Water	EPA 8270E OPPs	02/14/23 14:37	02/20/23 11:30	930mL/2mL	1000mL/2mL	1.08
A3B0522-05	Water	EPA 8270E OPPs	02/14/23 16:17	02/20/23 11:30	940mL/2mL	1000mL/2mL	1.06

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0647							
A3B0522-01	Water	EPA 6020B	02/14/23 10:05	02/16/23 15:17	45mL/50mL	45mL/50mL	1.00
A3B0522-02	Water	EPA 6020B	02/14/23 10:05	02/16/23 15:17	45mL/50mL	45mL/50mL	1.00
A3B0522-03	Water	EPA 6020B	02/14/23 12:51	02/16/23 15:17	45mL/50mL	45mL/50mL	1.00
A3B0522-03RE1	Water	EPA 6020B	02/14/23 12:51	02/16/23 15:17	45mL/50mL	45mL/50mL	1.00
A3B0522-04	Water	EPA 6020B	02/14/23 14:37	02/16/23 15:17	45mL/50mL	45mL/50mL	1.00

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

SAMPLE PREPARATION INFORMATION

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A3B0522-04RE1	Water	EPA 6020B	02/14/23 14:37	02/16/23 15:17	45mL/50mL	45mL/50mL	1.00
A3B0522-05	Water	EPA 6020B	02/14/23 16:17	02/16/23 15:17	45mL/50mL	45mL/50mL	1.00
A3B0522-05RE1	Water	EPA 6020B	02/14/23 16:17	02/16/23 15:17	45mL/50mL	45mL/50mL	1.00
A3B0522-05RE2	Water	EPA 6020B	02/14/23 16:17	02/16/23 15:17	45mL/50mL	45mL/50mL	1.00

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

Project: **St. Helens Lagoon**
Project Number: **M0830.03.006**
Project Manager: **David Weatherby**

Report ID:
A3B0522 - 05 02 23 1624

Weck Laboratories, Inc.

SAMPLE PREPARATION INFORMATION

Chlorinated Herbicides by GC/ECD

Prep: EPA 3510C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: W3B1728							
A3B0522-01	Water	EPA 8151A	02/14/23 10:05	02/21/23 17:01	1051ml/10ml	1000ml/10ml	0.95
A3B0522-02	Water	EPA 8151A	02/14/23 10:05	02/21/23 17:01	1052ml/10ml	1000ml/10ml	0.95
A3B0522-03	Water	EPA 8151A	02/14/23 12:51	02/21/23 17:01	933ml/10ml	1000ml/10ml	1.07
A3B0522-04	Water	EPA 8151A	02/14/23 14:37	02/21/23 17:01	1030ml/10ml	1000ml/10ml	0.97
A3B0522-05	Water	EPA 8151A	02/14/23 16:17	02/21/23 17:01	1013ml/10ml	1000ml/10ml	0.99

Hexavalent Chromium by IC

Prep: NONE (LC)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: W3B1784							
A3B0522-01	Water	EPA 218.6	02/14/23 10:05	02/22/23 10:36	5ml/5ml	5ml/5ml	1.00
A3B0522-02	Water	EPA 218.6	02/14/23 10:05	02/22/23 10:36	5ml/5ml	5ml/5ml	1.00
Batch: W3B2351							
A3B0522-03	Water	EPA 218.6	02/14/23 12:51	02/28/23 00:00	5ml/5ml	5ml/5ml	1.00
A3B0522-04	Water	EPA 218.6	02/14/23 14:37	02/28/23 00:00	5ml/5ml	5ml/5ml	1.00
A3B0522-05	Water	EPA 218.6	02/14/23 16:17	02/28/23 00:00	5ml/5ml	5ml/5ml	1.00

Apex Laboratories

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Philip Nerenberg, Lab Director

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Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

AMEND	The Result, Reporting Level, Recovery and/or RPD has changed. Note: Batch QC marked as AMENDED may or may not have been issued prior to the change. Case Narrative included if client data is affected.
B-02	Analyte detected in an associated blank at a level between one-half the MRL and the MRL. (See Notes and Conventions below.)
ICV-01	Estimated Result. Initial Calibration Verification (ICV) failed high. There is no effect on non-detect results.
Ja	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
PRES	Incomplete field preservation. Additional preservative was added to adjust the pH within the appropriate range for this analysis.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-29	Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high.
Q-30	Recovery for Lab Control Spike (LCS) is below the lower control limit. Data may be biased low.
Q-31	Estimated Results. Recovery of Continuing Calibration Verification sample below lower control limit for this analyte. Results are likely biased low.
Q-42	Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)
Q-52	Due to known erratic recoveries, the result and reporting levels for this analyte are reported as Estimated Values. This analyte may not have passed all QC requirements for this method.
Q-54	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +1%. The results are reported as Estimated Values.
Q-54a	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +10%. The results are reported as Estimated Values.
Q-54b	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by -5%. The results are reported as Estimated Values.
Q-55	Daily CCV/LCS recovery for this analyte was below the +/-20% criteria listed in EPA 8260, however there is adequate sensitivity to ensure detection at the reporting level.
Q-56	Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260
S-06	Surrogate recovery is outside of established control limits.

Weck Laboratories, Inc.

M-04	Due to the nature of matrix interferences, sample extract was diluted prior to analysis. The MDL and MRL were raised due to the dilution.
M-05	Due to the nature of matrix interferences, sample was diluted prior to analysis. The MDL and MRL were raised due to the dilution.

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

Q-08 High bias in the QC sample does not affect sample result since analyte was not detected or below the reporting limit.

S-04 The surrogate recovery for this sample is outside of established control limits due to possible sample matrix effect.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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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'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC

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REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

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:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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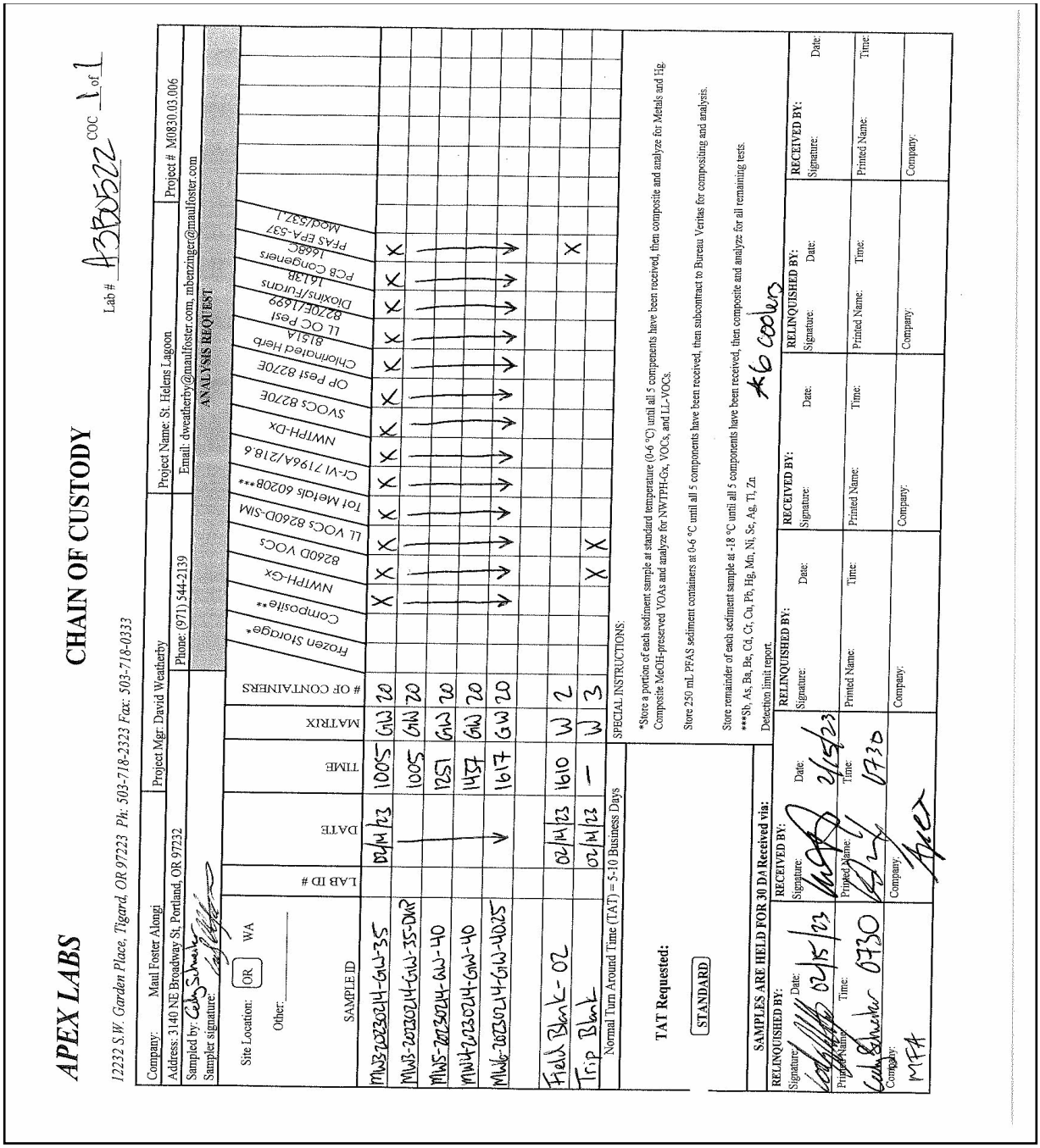
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**



APEX LABS

CHAIN OF CUSTODY

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Lab # A3B0522 COC 1 of 1

Company: Maul Foster Alongi | Project Mgr: David Weatherby | Project Name: St. Helens Lagoon | Project # M0830.03.006

Address: 3140 NE Broadway St, Portland, OR 97232 | Phone: (971) 544-2139 | Email: dweatherby@maulfoster.com; mbenzinger@maulfoster.com

Sampled by: Colin Sumner

Sampler signature:

Site Location: OR WA Other:

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	Frozen Storage*	Composite**	NWTPH-Gx	8260D VOCs	LL VOCs 8260D-SIM	Tot Metals 6020B***	Cr-VI 7196A/218.6	NWTPH-Dx	SVOCs 8270E	Org Pest 8270E	Chlorinated Herb 8151A	LL OC Pest 8270E/1629	Dioxins/Furans 1613B	PCB Congeners 1668C	PFAS EPA-537 Mod/537.1
MW3-20230214-GW-35		02/14/23	1005	GW	20		X			X	X	X	X	X	X	X	X	X	X	X
MW3-20230214-GW-35-DUP			1005	GW	20															
MW5-20230214-GW-40			1257	GW	20															
MW4-20230214-GW-40			1437	GW	20															
MW6-20230214-GW-4025		↓	1617	GW	20															
Field Blank-02		02/14/23	1610	W	2															X
Trip Blank		02/14/23	—	W	3				X	X										

Normal Turn Around Time (TAT) = 5-10 Business Days

SPECIAL INSTRUCTIONS:

*Store a portion of each sediment sample at standard temperature (0-6 °C) until all 5 components have been received, then composite and analyze for Metals and Hg.
Composite MeOH-preserved VOAs and analyze for NWTPH-Gx, VOCs, and LL-VOCs.

Store 250 mL PFAS sediment containers at 0-6 °C until all 5 components have been received, then subcontract to Bureau Veritas for compositing and analysis.

Store remainder of each sediment sample at -18 °C until all 5 components have been received, then composite and analyze for all remaining tests.
***Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Se, Ag, Tl, Zn
Detection limit report.

#6 coolers

TAT Requested:

STANDARD

SAMPLES ARE HELD FOR 30 DAYS

Received via:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:	Signature:	Signature:	Signature:	Signature:
Date:	Date: 2/15/23	Date:	Date:	Date:	Date:
Printed Name:	Printed Name:	Printed Name:	Printed Name:	Printed Name:	Printed Name:
Time:	Time: 1730	Time:	Time:	Time:	Time:
Company:	Company: MFA	Company:	Company:	Company:	Company:

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

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Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0522 - 05 02 23 1624**

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster Alongi Element WO#: A3 B0522

Project/Project #: St. Helens Lagoon / M0830.03.006

Delivery Info:

Date/time received: 2/15/23 @ 0730 By: MD

Delivered by: Apex__Client X ESS__FedEx__UPS__Radio__Morgan__SDS__Evergreen__Other__

Cooler Inspection Date/time inspected: 2/15/23 @ 0736 By: MD

Chain of Custody included? Yes X No ____

Signed/dated by client? Yes X No ____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	1.9	0.3	0.3	0.4	0.9	5.4	
Custody seals? (Y/N)	N					N	
Received on ice? (Y/N)	Y					Y	
Temp. blanks? (Y/N)	Y					Y	
Ice type: (Gel/Real/Other)	Real					real	
Condition (In/Out):	In					In	

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: 2/15/23 @ 815 By: MD

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 X NA ____

Comments ____

Water samples: pH checked: Yes X No ___ NA ___ pH appropriate? Yes X No ___ NA ____

Comments: ____

Additional information: TB# 3239.

Labeled by: JS Witness: DSS Cooler Inspected by: MD

Form Y-003 R-00

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Friday, April 21, 2023

David Weatherby
Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

RE: A3B0674 - St. Helens Lagoon - M0830.03.006

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 A3B0674, which was received by the laboratory on 2/20/2023 at 6:15:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	5.6 degC	Cooler #2	5.4 degC
Cooler #3	4.7 degC		

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW1-20230220-GW-70	**A3B0674-01**	**Water**	**02/20/23 10:26**	**02/20/23 18:15**
MW2-20230220-GW-60	**A3B0674-02**	**Water**	**02/20/23 14:41**	**02/20/23 18:15**
Trip Blank	**A3B0674-03**	**Water**	**02/20/23 00:00**	**02/20/23 18:15**

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**		**Batch: 23C0083**		
Diesel	ND	0.0980	0.196	mg/L	1	03/02/23 23:24	NWTPH-Dx	
Oil	ND	0.196	0.392	mg/L	1	03/02/23 23:24	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)			*Recovery: 87 %*	*Limits: 50-150 %*	*1*	*03/02/23 23:24*	*NWTPH-Dx*	
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23C0083**		
Diesel	ND	0.111	0.222	mg/L	1	03/02/23 23:44	NWTPH-Dx	
Oil	ND	0.222	0.444	mg/L	1	03/02/23 23:44	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)			*Recovery: 87 %*	*Limits: 50-150 %*	*1*	*03/02/23 23:44*	*NWTPH-Dx*	

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**		**Batch: 23B0828**		
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	02/22/23 18:52	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 96 %*		*Limits: 50-150 %*	*1*	*02/22/23 18:52*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*104 %*		*50-150 %*	*1*	*02/22/23 18:52*	*NWTPH-Gx (MS)*	
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23B0828**		
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	02/22/23 19:15	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 97 %*		*Limits: 50-150 %*	*1*	*02/22/23 19:15*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*106 %*		*50-150 %*	*1*	*02/22/23 19:15*	*NWTPH-Gx (MS)*	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**		**Batch: 23B0828**		
Acetone	ND	10.0	20.0	ug/L	1	02/22/23 18:52	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:52	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/22/23 18:52	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/22/23 18:52	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/22/23 18:52	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:52	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/22/23 18:52	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:52	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:52	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:52	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/22/23 18:52	EPA 8260D	
2-Hexanone	ND	10.0	10.0	ug/L	1	02/22/23 18:52	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/22/23 18:52	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/22/23 18:52	EPA 8260D	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**		**Batch: 23B0828**		
Naphthalene	ND	2.00	2.00	ug/L	1	02/22/23 18:52	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 18:52	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/22/23 18:52	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/22/23 18:52	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 18:52	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 18:52	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 18:52	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/22/23 18:52	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*99 %*	*Limits:* *80-120 %*	*1*	*02/22/23 18:52*	*EPA 8260D*	
Toluene-d8 (Surr)			*104 %*	*80-120 %*	*1*	*02/22/23 18:52*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*02/22/23 18:52*	*EPA 8260D*	
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23B0828**		
Acetone	ND	10.0	20.0	ug/L	1	02/22/23 19:15	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/22/23 19:15	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/22/23 19:15	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/22/23 19:15	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/22/23 19:15	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 19:15	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/22/23 19:15	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 19:15	EPA 8260D	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23B0828**		
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 19:15	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 19:15	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/22/23 19:15	EPA 8260D	
2-Hexanone	ND	10.0	10.0	ug/L	1	02/22/23 19:15	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/22/23 19:15	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/22/23 19:15	EPA 8260D	
Naphthalene	ND	2.00	2.00	ug/L	1	02/22/23 19:15	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 19:15	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/22/23 19:15	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/22/23 19:15	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 19:15	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 19:15	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 19:15	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/22/23 19:15	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*96 %*	*Limits: 80-120 %*	*1*	*02/22/23 19:15*	*EPA 8260D*	
Toluene-d8 (Surr)			*106 %*	*80-120 %*	*1*	*02/22/23 19:15*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*97 %*	*80-120 %*	*1*	*02/22/23 19:15*	*EPA 8260D*	
Trip Blank (A3B0674-03)				**Matrix: Water**		**Batch: 23B0828**		
Acetone	ND	10.0	20.0	ug/L	1	02/22/23 16:38	EPA 8260D	
Acrylonitrile	ND	1.00	2.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Bromobenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:38	EPA 8260D	
Bromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Bromoform	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Bromomethane	ND	5.00	5.00	ug/L	1	02/22/23 16:38	EPA 8260D	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	02/22/23 16:38	EPA 8260D	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	

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Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Trip Blank (A3B0674-03)				**Matrix: Water**		**Batch: 23B0828**		
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Carbon disulfide	ND	5.00	10.0	ug/L	1	02/22/23 16:38	EPA 8260D	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Chlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:38	EPA 8260D	
Chloroethane	ND	5.00	5.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Chloromethane	ND	2.50	5.00	ug/L	1	02/22/23 16:38	EPA 8260D	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Dibromomethane	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:38	EPA 8260D	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:38	EPA 8260D	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:38	EPA 8260D	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	02/22/23 16:38	EPA 8260D	
2-Hexanone	ND	10.0	10.0	ug/L	1	02/22/23 16:38	EPA 8260D	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Methylene chloride	ND	5.00	10.0	ug/L	1	02/22/23 16:38	EPA 8260D	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	02/22/23 16:38	EPA 8260D	
Naphthalene	ND	2.00	2.00	ug/L	1	02/22/23 16:38	EPA 8260D	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	02/22/23 16:38	EPA 8260D	
Styrene	ND	0.500	1.00	ug/L	1	02/22/23 16:38	EPA 8260D	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	02/22/23 16:38	EPA 8260D	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 16:38	EPA 8260D	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	02/22/23 16:38	EPA 8260D	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	02/22/23 16:38	EPA 8260D	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	02/22/23 16:38	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 97 %*		*Limits: 80-120 %*	*1*	*02/22/23 16:38*	*EPA 8260D*	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Trip Blank (A3B0674-03)				**Matrix: Water**		**Batch: 23B0828**		
Surrogate: Toluene-d8 (Surr)		*Recovery:*	*105 %*	*Limits: 80-120 %*	*1*	*02/22/23 16:38*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*02/22/23 16:38*	*EPA 8260D*	

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**		**Batch: 23C0033**		
Benzene	ND	0.0500	0.100	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
Toluene	ND	0.0500	0.100	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
m,p-Xylene	ND	0.100	0.200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
o-Xylene	ND	0.0500	0.100	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
Chloroform	**0.0838**	0.0500	0.100	ug/L	1	03/01/23 14:52	EPA 8260D SIM	**Ja**
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	03/01/23 14:52	EPA 8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*104 %*	*Limits: 80-120 %*	*1*	*03/01/23 14:52*	*EPA 8260D SIM*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*03/01/23 14:52*	*EPA 8260D SIM*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*03/01/23 14:52*	*EPA 8260D SIM*	
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23C0033**		
Benzene	**0.176**	0.0500	0.100	ug/L	1	03/01/23 15:46	EPA 8260D SIM	**Q-42**
Toluene	ND	0.0500	0.100	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
m,p-Xylene	ND	0.100	0.200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23C0033**		
o-Xylene	ND	0.0500	0.100	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
Chloroform	ND	0.0500	0.100	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
1,1-Dichloroethene	ND	0.0200	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	03/01/23 15:46	EPA 8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*105 %*	*Limits: 80-120 %*	*1*	*03/01/23 15:46*	*EPA 8260D SIM*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*03/01/23 15:46*	*EPA 8260D SIM*	
4-Bromofluorobenzene (Surr)			*98 %*	*80-120 %*	*1*	*03/01/23 15:46*	*EPA 8260D SIM*	
Trip Blank (A3B0674-03)				**Matrix: Water**		**Batch: 23C0033**		
Benzene	ND	0.0500	0.100	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
Toluene	ND	0.0500	0.100	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
m,p-Xylene	ND	0.100	0.200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
o-Xylene	ND	0.0500	0.100	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
Chloroform	**0.202**	0.0500	0.100	ug/L	1	03/01/23 14:25	EPA 8260D SIM	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Tigard, OR 97223
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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
Trip Blank (A3B0674-03)				**Matrix: Water**		**Batch: 23C0033**		
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
1,1-Dichloroethene	ND	0.0200	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	03/01/23 14:25	EPA 8260D SIM	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*104 %*	*Limits:* *80-120 %*	*1*	*03/01/23 14:25*	*EPA 8260D SIM*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*03/01/23 14:25*	*EPA 8260D SIM*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*03/01/23 14:25*	*EPA 8260D SIM*	

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**		**Batch: 23B0916**		
Acenaphthene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Acenaphthylene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Anthracene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Benz(a)anthracene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Benzo(a)pyrene	ND	0.0152	0.0303	ug/L	1	02/27/23 19:39	EPA 8270E	
Benzo(b)fluoranthene	ND	0.0152	0.0303	ug/L	1	02/27/23 19:39	EPA 8270E	
Benzo(k)fluoranthene	ND	0.0152	0.0303	ug/L	1	02/27/23 19:39	EPA 8270E	
Benzo(g,h,i)perylene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Chrysene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Dibenz(a,h)anthracene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Fluoranthene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Fluorene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
1-Methylnaphthalene	ND	0.0202	0.0404	ug/L	1	02/27/23 19:39	EPA 8270E	
2-Methylnaphthalene	ND	0.0202	0.0404	ug/L	1	02/27/23 19:39	EPA 8270E	
Naphthalene	ND	0.0202	0.0404	ug/L	1	02/27/23 19:39	EPA 8270E	
Phenanthrene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Pyrene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Carbazole	ND	0.0152	0.0303	ug/L	1	02/27/23 19:39	EPA 8270E	
Dibenzofuran	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
2-Chlorophenol	ND	0.0505	0.101	ug/L	1	02/27/23 19:39	EPA 8270E	
4-Chloro-3-methylphenol	ND	0.101	0.202	ug/L	1	02/27/23 19:39	EPA 8270E	
2,4-Dichlorophenol	ND	0.0505	0.101	ug/L	1	02/27/23 19:39	EPA 8270E	
2,4-Dimethylphenol	ND	0.0505	0.101	ug/L	1	02/27/23 19:39	EPA 8270E	
2,4-Dinitrophenol	ND	0.253	0.505	ug/L	1	02/27/23 19:39	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	0.253	0.505	ug/L	1	02/27/23 19:39	EPA 8270E	
2-Methylphenol	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
3+4-Methylphenol(s)	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
2-Nitrophenol	ND	0.101	0.202	ug/L	1	02/27/23 19:39	EPA 8270E	
4-Nitrophenol	ND	0.101	0.202	ug/L	1	02/27/23 19:39	EPA 8270E	
Pentachlorophenol (PCP)	ND	0.101	0.202	ug/L	1	02/27/23 19:39	EPA 8270E	
Phenol	ND	0.202	0.404	ug/L	1	02/27/23 19:39	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	0.0505	0.101	ug/L	1	02/27/23 19:39	EPA 8270E	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**		**Batch: 23B0916**		
2,3,5,6-Tetrachlorophenol	ND	0.0505	0.101	ug/L	1	02/27/23 19:39	EPA 8270E	
2,4,5-Trichlorophenol	ND	0.0505	0.101	ug/L	1	02/27/23 19:39	EPA 8270E	
2,4,6-Trichlorophenol	ND	0.0505	0.101	ug/L	1	02/27/23 19:39	EPA 8270E	
Bis(2-ethylhexyl)phthalate	ND	0.202	0.404	ug/L	1	02/27/23 19:39	EPA 8270E	
Butyl benzyl phthalate	ND	0.202	0.404	ug/L	1	02/27/23 19:39	EPA 8270E	
Diethylphthalate	ND	0.202	0.404	ug/L	1	02/27/23 19:39	EPA 8270E	
Dimethylphthalate	ND	0.202	0.404	ug/L	1	02/27/23 19:39	EPA 8270E	
Di-n-butylphthalate	ND	0.202	0.404	ug/L	1	02/27/23 19:39	EPA 8270E	
Di-n-octyl phthalate	ND	0.202	0.404	ug/L	1	02/27/23 19:39	EPA 8270E	
N-Nitrosodimethylamine	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
N-Nitrosodiphenylamine	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
Bis(2-Chloroethoxy) methane	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
Bis(2-Chloroethyl) ether	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
Hexachlorobenzene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
Hexachlorobutadiene	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	Q-30
Hexachlorocyclopentadiene	ND	0.0505	0.101	ug/L	1	02/27/23 19:39	EPA 8270E	
Hexachloroethane	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	Q-30
2-Chloronaphthalene	ND	0.0101	0.0202	ug/L	1	02/27/23 19:39	EPA 8270E	
1,2,4-Trichlorobenzene	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	Q-30
4-Bromophenyl phenyl ether	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
4-Chlorophenyl phenyl ether	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
Aniline	ND	0.0505	0.101	ug/L	1	02/27/23 19:39	EPA 8270E	
4-Chloroaniline	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
2-Nitroaniline	ND	0.202	0.404	ug/L	1	02/27/23 19:39	EPA 8270E	
3-Nitroaniline	ND	0.202	0.404	ug/L	1	02/27/23 19:39	EPA 8270E	
4-Nitroaniline	ND	0.202	0.404	ug/L	1	02/27/23 19:39	EPA 8270E	
Nitrobenzene	ND	0.101	0.202	ug/L	1	02/27/23 19:39	EPA 8270E	
2,4-Dinitrotoluene	ND	0.101	0.202	ug/L	1	02/27/23 19:39	EPA 8270E	
2,6-Dinitrotoluene	ND	0.101	0.202	ug/L	1	02/27/23 19:39	EPA 8270E	
Benzoic acid	**1.28**	1.26	2.53	ug/L	1	02/27/23 19:39	EPA 8270E	**Ja**
Benzyl alcohol	**0.264**	0.101	0.202	ug/L	1	02/27/23 19:39	EPA 8270E	

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Philip Nerenberg, Lab Director

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**		**Batch: 23B0916**		
Isophorone	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
Azobenzene (1,2-DPH)	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	0.253	0.505	ug/L	1	02/27/23 19:39	EPA 8270E	
3,3'-Dichlorobenzidine	ND	0.505	1.01	ug/L	1	02/27/23 19:39	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	0.253	0.505	ug/L	1	02/27/23 19:39	EPA 8270E	
1,3-Dinitrobenzene	ND	0.253	0.505	ug/L	1	02/27/23 19:39	EPA 8270E	
1,4-Dinitrobenzene	ND	0.253	0.505	ug/L	1	02/27/23 19:39	EPA 8270E	
Pyridine	ND	0.101	0.202	ug/L	1	02/27/23 19:39	EPA 8270E	
1,2-Dichlorobenzene	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	Q-30
1,3-Dichlorobenzene	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	Q-30
1,4-Dichlorobenzene	ND	0.0253	0.0505	ug/L	1	02/27/23 19:39	EPA 8270E	Q-30
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*73 %*	*Limits: 44-120 %*	*1*	*02/27/23 19:39*	*EPA 8270E*	*Q-41*
2-Fluorobiphenyl (Surr)			*59 %*	*44-120 %*	*1*	*02/27/23 19:39*	*EPA 8270E*	
Phenol-d6 (Surr)			*24 %*	*10-133 %*	*1*	*02/27/23 19:39*	*EPA 8270E*	
p-Terphenyl-d14 (Surr)			*83 %*	*50-134 %*	*1*	*02/27/23 19:39*	*EPA 8270E*	
2-Fluorophenol (Surr)			*39 %*	*19-120 %*	*1*	*02/27/23 19:39*	*EPA 8270E*	
2,4,6-Tribromophenol (Surr)			*74 %*	*43-140 %*	*1*	*02/27/23 19:39*	*EPA 8270E*	
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23B0916**		
Acenaphthene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Acenaphthylene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Anthracene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Benz(a)anthracene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Benzo(a)pyrene	ND	0.0160	0.0319	ug/L	1	02/27/23 20:14	EPA 8270E	
Benzo(b)fluoranthene	ND	0.0160	0.0319	ug/L	1	02/27/23 20:14	EPA 8270E	
Benzo(k)fluoranthene	ND	0.0160	0.0319	ug/L	1	02/27/23 20:14	EPA 8270E	
Benzo(g,h,i)perylene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Chrysene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Dibenz(a,h)anthracene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Fluoranthene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Fluorene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
1-Methylnaphthalene	ND	0.0213	0.0426	ug/L	1	02/27/23 20:14	EPA 8270E	
2-Methylnaphthalene	ND	0.0213	0.0426	ug/L	1	02/27/23 20:14	EPA 8270E	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23B0916**		
Naphthalene	ND	0.0213	0.0426	ug/L	1	02/27/23 20:14	EPA 8270E	
Phenanthrene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Pyrene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Carbazole	ND	0.0160	0.0319	ug/L	1	02/27/23 20:14	EPA 8270E	
Dibenzofuran	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
2-Chlorophenol	ND	0.0532	0.106	ug/L	1	02/27/23 20:14	EPA 8270E	
4-Chloro-3-methylphenol	ND	0.106	0.213	ug/L	1	02/27/23 20:14	EPA 8270E	
2,4-Dichlorophenol	ND	0.0532	0.106	ug/L	1	02/27/23 20:14	EPA 8270E	
2,4-Dimethylphenol	ND	0.0532	0.106	ug/L	1	02/27/23 20:14	EPA 8270E	
2,4-Dinitrophenol	ND	0.266	0.532	ug/L	1	02/27/23 20:14	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	0.266	0.532	ug/L	1	02/27/23 20:14	EPA 8270E	
2-Methylphenol	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
3+4-Methylphenol(s)	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
2-Nitrophenol	ND	0.106	0.213	ug/L	1	02/27/23 20:14	EPA 8270E	
4-Nitrophenol	ND	0.106	0.213	ug/L	1	02/27/23 20:14	EPA 8270E	
Pentachlorophenol (PCP)	**0.107**	0.106	0.213	ug/L	1	02/27/23 20:14	EPA 8270E	**Ja**
Phenol	ND	0.213	0.426	ug/L	1	02/27/23 20:14	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	0.0532	0.106	ug/L	1	02/27/23 20:14	EPA 8270E	
2,3,5,6-Tetrachlorophenol	ND	0.0532	0.106	ug/L	1	02/27/23 20:14	EPA 8270E	
2,4,5-Trichlorophenol	ND	0.0532	0.106	ug/L	1	02/27/23 20:14	EPA 8270E	
2,4,6-Trichlorophenol	ND	0.0532	0.106	ug/L	1	02/27/23 20:14	EPA 8270E	
Bis(2-ethylhexyl)phthalate	ND	0.213	0.426	ug/L	1	02/27/23 20:14	EPA 8270E	
Butyl benzyl phthalate	ND	0.213	0.426	ug/L	1	02/27/23 20:14	EPA 8270E	
Diethylphthalate	ND	0.213	0.426	ug/L	1	02/27/23 20:14	EPA 8270E	
Dimethylphthalate	ND	0.213	0.426	ug/L	1	02/27/23 20:14	EPA 8270E	
Di-n-butylphthalate	ND	0.213	0.426	ug/L	1	02/27/23 20:14	EPA 8270E	
Di-n-octyl phthalate	ND	0.213	0.426	ug/L	1	02/27/23 20:14	EPA 8270E	
N-Nitrosodimethylamine	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
N-Nitrosodiphenylamine	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
Bis(2-Chloroethoxy) methane	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
Bis(2-Chloroethyl) ether	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23B0916**		
Hexachlorobenzene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
Hexachlorobutadiene	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	Q-30
Hexachlorocyclopentadiene	ND	0.0532	0.106	ug/L	1	02/27/23 20:14	EPA 8270E	
Hexachloroethane	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	Q-30
2-Chloronaphthalene	ND	0.0106	0.0213	ug/L	1	02/27/23 20:14	EPA 8270E	
1,2,4-Trichlorobenzene	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	Q-30
4-Bromophenyl phenyl ether	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
4-Chlorophenyl phenyl ether	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
Aniline	ND	0.0532	0.106	ug/L	1	02/27/23 20:14	EPA 8270E	
4-Chloroaniline	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
2-Nitroaniline	ND	0.213	0.426	ug/L	1	02/27/23 20:14	EPA 8270E	
3-Nitroaniline	ND	0.213	0.426	ug/L	1	02/27/23 20:14	EPA 8270E	
4-Nitroaniline	ND	0.213	0.426	ug/L	1	02/27/23 20:14	EPA 8270E	
Nitrobenzene	ND	0.106	0.213	ug/L	1	02/27/23 20:14	EPA 8270E	
2,4-Dinitrotoluene	ND	0.106	0.213	ug/L	1	02/27/23 20:14	EPA 8270E	
2,6-Dinitrotoluene	ND	0.106	0.213	ug/L	1	02/27/23 20:14	EPA 8270E	
Benzoic acid	ND	1.33	2.66	ug/L	1	02/27/23 20:14	EPA 8270E	
Benzyl alcohol	ND	0.106	0.213	ug/L	1	02/27/23 20:14	EPA 8270E	
Isophorone	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
Azobenzene (1,2-DPH)	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	0.266	0.532	ug/L	1	02/27/23 20:14	EPA 8270E	
3,3'-Dichlorobenzidine	ND	0.532	1.06	ug/L	1	02/27/23 20:14	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	0.266	0.532	ug/L	1	02/27/23 20:14	EPA 8270E	
1,3-Dinitrobenzene	ND	0.266	0.532	ug/L	1	02/27/23 20:14	EPA 8270E	
1,4-Dinitrobenzene	ND	0.266	0.532	ug/L	1	02/27/23 20:14	EPA 8270E	
Pyridine	ND	0.106	0.213	ug/L	1	02/27/23 20:14	EPA 8270E	
1,2-Dichlorobenzene	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	Q-30
1,3-Dichlorobenzene	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	Q-30
1,4-Dichlorobenzene	ND	0.0266	0.0532	ug/L	1	02/27/23 20:14	EPA 8270E	Q-30
Surrogate: Nitrobenzene-d5 (Surr)		*Recovery:*	*63 %*	*Limits: 44-120 %*	*1*	*02/27/23 20:14*	*EPA 8270E*	*Q-41*
2-Fluorobiphenyl (Surr)			*51 %*	*44-120 %*	*1*	*02/27/23 20:14*	*EPA 8270E*	
Phenol-d6 (Surr)			*23 %*	*10-133 %*	*1*	*02/27/23 20:14*	*EPA 8270E*	
p-Terphenyl-d14 (Surr)			*77 %*	*50-134 %*	*1*	*02/27/23 20:14*	*EPA 8270E*	
2-Fluorophenol (Surr)			*36 %*	*19-120 %*	*1*	*02/27/23 20:14*	*EPA 8270E*	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23B0916**		
Surrogate: 2,4,6-Tribromophenol (Surr)		*Recovery: 69 %*		*Limits: 43-140 %*	*1*	*02/27/23 20:14*	*EPA 8270E*	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**		**Batch: 23B0917**		
Azinphos methyl (Guthion)	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Chlorpyrifos	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Coumaphos	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Demeton O	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Demeton S	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Diazinon	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Dichlorvos	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Dimethoate	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Disulfoton	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
EPN	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Ethoprop	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Fensulfothion	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Fenthion	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Malathion	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Merphos	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Methyl parathion	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Mevinphos (Phosdrin)	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Monocrotophos	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Naled (Dibrom)	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Parathion, ethyl	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Phorate	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Ronnel (Fenchlorphos)	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Sulfotep	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Sulprofos (Bolstar)	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
TEPP	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Tetrachlorvinphos (Rabon)	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Tokuthion (Prothiofos)	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Trichloronate	ND	0.260	0.521	ug/L	1	02/28/23 11:21	EPA 8270E OPPs	
Surrogate: Tributyl phosphate (Surr)		*Recovery:*	*100 %*	*Limits:*	*56-124 %*	*1*	*02/28/23 11:21*	*EPA 8270E OPPs*
Triphenyl phosphate (Surr)			*105 %*		*58-121 %*	*1*	*02/28/23 11:21*	*EPA 8270E OPPs*
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23B0917**		
Azinphos methyl (Guthion)	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	

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Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: 23B0917**		
Chlorpyrifos	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Coumaphos	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Demeton O	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Demeton S	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Diazinon	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Dichlorvos	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Dimethoate	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Disulfoton	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
EPN	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Ethoprop	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Fensulfothion	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Fenthion	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Malathion	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Merphos	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Methyl parathion	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Mevinphos (Phosdrin)	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Monocrotophos	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Naled (Dibrom)	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Parathion, ethyl	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Phorate	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Ronnel (Fenchlorphos)	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Sulfotep	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Sulprofos (Bolstar)	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
TEPP	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Tetrachlorvinphos (Rabon)	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Tokuthion (Prothiofos)	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Trichloronate	ND	0.260	0.521	ug/L	1	02/28/23 11:57	EPA 8270E OPPs	
Surrogate: Tributyl phosphate (Surr)		*Recovery:*	*98 %*	*Limits:*	*56-124 %*	*1*	*02/28/23 11:57*	*EPA 8270E OPPs*
Triphenyl phosphate (Surr)			*102 %*		*58-121 %*	*1*	*02/28/23 11:57*	*EPA 8270E OPPs*

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**				
Batch: 23B0841								
Antimony	ND	0.500	1.00	ug/L	1	02/22/23 20:28	EPA 6020B	
Arsenic	**0.519**	0.500	1.00	ug/L	1	02/22/23 20:28	EPA 6020B	**Ja**
Barium	**64.9**	1.00	2.00	ug/L	1	02/22/23 20:28	EPA 6020B	
Beryllium	ND	0.100	0.200	ug/L	1	02/22/23 20:28	EPA 6020B	
Cadmium	ND	0.100	0.200	ug/L	1	02/22/23 20:28	EPA 6020B	
Chromium	ND	1.00	2.00	ug/L	1	02/22/23 20:28	EPA 6020B	
Copper	ND	1.00	2.00	ug/L	1	02/22/23 20:28	EPA 6020B	
Lead	**0.122**	0.110	0.200	ug/L	1	02/22/23 20:28	EPA 6020B	**Ja**
Manganese	**55.1**	0.500	1.00	ug/L	1	02/22/23 20:28	EPA 6020B	
Mercury	ND	0.0400	0.0800	ug/L	1	02/22/23 20:28	EPA 6020B	
Nickel	ND	1.00	2.00	ug/L	1	02/22/23 20:28	EPA 6020B	
Selenium	ND	0.500	1.00	ug/L	1	02/22/23 20:28	EPA 6020B	
Silver	ND	0.100	0.200	ug/L	1	02/22/23 20:28	EPA 6020B	
Thallium	ND	0.100	0.200	ug/L	1	02/22/23 20:28	EPA 6020B	
Zinc	**2.21**	2.00	4.00	ug/L	1	02/22/23 20:28	EPA 6020B	**Ja**
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**				
Batch: 23B0841								
Antimony	ND	0.500	1.00	ug/L	1	02/22/23 20:33	EPA 6020B	
Arsenic	**4.59**	0.500	1.00	ug/L	1	02/22/23 20:33	EPA 6020B	
Barium	**19.6**	1.00	2.00	ug/L	1	02/22/23 20:33	EPA 6020B	
Beryllium	ND	0.100	0.200	ug/L	1	02/22/23 20:33	EPA 6020B	
Cadmium	ND	0.100	0.200	ug/L	1	02/22/23 20:33	EPA 6020B	
Chromium	ND	1.00	2.00	ug/L	1	02/22/23 20:33	EPA 6020B	
Copper	**3.12**	1.00	2.00	ug/L	1	02/22/23 20:33	EPA 6020B	
Lead	**0.619**	0.110	0.200	ug/L	1	02/22/23 20:33	EPA 6020B	
Manganese	**19.0**	0.500	1.00	ug/L	1	02/22/23 20:33	EPA 6020B	
Mercury	ND	0.0400	0.0800	ug/L	1	02/22/23 20:33	EPA 6020B	
Nickel	ND	1.00	2.00	ug/L	1	02/22/23 20:33	EPA 6020B	
Selenium	ND	0.500	1.00	ug/L	1	02/22/23 20:33	EPA 6020B	
Silver	ND	0.100	0.200	ug/L	1	02/22/23 20:33	EPA 6020B	
Thallium	ND	0.100	0.200	ug/L	1	02/22/23 20:33	EPA 6020B	
Zinc	**2.50**	2.00	4.00	ug/L	1	02/22/23 20:33	EPA 6020B	**Ja**

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Chlorinated Herbicides by GC/ECD

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**		**Batch: W3B2223**		
Batch: W3B2223								
2,4-D	ND	0.34	0.50	ug/l	1	03/22/23 21:12	EPA 8151A	
2,4-DB	ND	0.99	2.5	ug/l	1	03/22/23 21:12	EPA 8151A	
2,4,5-T	ND	0.14	0.25	ug/l	1	03/22/23 21:12	EPA 8151A	
2,4,5-TP (Silvex)	ND	0.14	0.25	ug/l	1	03/22/23 21:12	EPA 8151A	
3,5-Dichlorobenzoic acid	ND	0.28	1.2	ug/l	1	03/22/23 21:12	EPA 8151A	
4-Nitrophenol	ND	0.50	1.2	ug/l	1	03/22/23 21:12	EPA 8151A	
Acifluorfen	ND	0.24	0.50	ug/l	1	03/22/23 21:12	EPA 8151A	
Bentazon	ND	0.55	2.5	ug/l	1	03/22/23 21:12	EPA 8151A	
Dalapon	ND	0.16	0.50	ug/l	1	03/22/23 21:12	EPA 8151A	
Dicamba	ND	0.19	0.75	ug/l	1	03/22/23 21:12	EPA 8151A	
Dichloroprop	ND	0.24	1.0	ug/l	1	03/22/23 21:12	EPA 8151A	
Dinoseb	ND	0.090	0.50	ug/l	1	03/22/23 21:12	EPA 8151A	
DCPA	ND	0.20	0.25	ug/l	1	03/22/23 21:12	EPA 8151A	
MCPA	ND	40	100	ug/l	1	03/22/23 21:12	EPA 8151A	
MCPP	ND	27	100	ug/l	1	03/22/23 21:12	EPA 8151A	
Pentachlorophenol	ND	0.18	0.25	ug/l	1	03/22/23 21:12	EPA 8151A	
Picloram	ND	0.13	0.75	ug/l	1	03/22/23 21:12	EPA 8151A	
Batch: W3B2223								
Surrogate: 2,4-DCAA		*Recovery: 91 %*		*Limits: 56-156 %*	*1*	*03/22/23 21:12*	*EPA 8151A*	
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: W3B2223**		
Batch: W3B2223								
2,4-D	ND	0.34	0.50	ug/l	1	03/22/23 21:43	EPA 8151A	
2,4-DB	ND	0.99	2.5	ug/l	1	03/22/23 21:43	EPA 8151A	
2,4,5-T	ND	0.14	0.25	ug/l	1	03/22/23 21:43	EPA 8151A	
2,4,5-TP (Silvex)	ND	0.14	0.25	ug/l	1	03/22/23 21:43	EPA 8151A	
3,5-Dichlorobenzoic acid	ND	0.28	1.2	ug/l	1	03/22/23 21:43	EPA 8151A	
4-Nitrophenol	ND	0.50	1.2	ug/l	1	03/22/23 21:43	EPA 8151A	
Acifluorfen	ND	0.24	0.50	ug/l	1	03/22/23 21:43	EPA 8151A	
Bentazon	ND	0.55	2.5	ug/l	1	03/22/23 21:43	EPA 8151A	
Dalapon	ND	0.16	0.50	ug/l	1	03/22/23 21:43	EPA 8151A	

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Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

Project: **St. Helens Lagoon**
Project Number: **M0830.03.006**
Project Manager: **David Weatherby**

Report ID:
A3B0674 - 04 21 23 1031

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Chlorinated Herbicides by GC/ECD

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: W3B2223**		
Dicamba	ND	0.19	0.75	ug/l	1	03/22/23 21:43	EPA 8151A	
Dichloroprop	ND	0.24	1.0	ug/l	1	03/22/23 21:43	EPA 8151A	
Dinoseb	ND	0.090	0.50	ug/l	1	03/22/23 21:43	EPA 8151A	
DCPA	ND	0.20	0.25	ug/l	1	03/22/23 21:43	EPA 8151A	
MCPA	ND	40	100	ug/l	1	03/22/23 21:43	EPA 8151A	
MCPP	ND	27	100	ug/l	1	03/22/23 21:43	EPA 8151A	
Pentachlorophenol	ND	0.18	0.25	ug/l	1	03/22/23 21:43	EPA 8151A	
Picloram	ND	0.13	0.75	ug/l	1	03/22/23 21:43	EPA 8151A	
Batch: W3B2223								
Surrogate: 2,4-DCAA		*Recovery: 91 %*		*Limits: 56-156 %*	*1*	*03/22/23 21:43*	*EPA 8151A*	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

Weck Laboratories, Inc.

ANALYTICAL SAMPLE RESULTS (Subcontracted)

Hexavalent Chromium by IC

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW1-20230220-GW-70 (A3B0674-01)				**Matrix: Water**		**Batch: W3C0242**		
Batch: W3C0242								
Chromium 6+	ND	0.0079	0.020	ug/l	1	03/02/23 18:52	EPA 218.6	
MW2-20230220-GW-60 (A3B0674-02)				**Matrix: Water**		**Batch: W3C0242**		
Batch: W3C0242								
Chromium 6+	ND	0.0079	0.020	ug/l	1	03/02/23 19:04	EPA 218.6	

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Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23C0083 - EPA 3510C (Fuels/Acid Ext.)									**Water**			
Blank (23C0083-BLK1)				Prepared: 03/02/23 11:25		Analyzed: 03/02/23 20:19						
NWTPH-Dx												
Diesel	ND	0.100	0.200	mg/L	1	---	---	---	---	---	---	
Oil	ND	0.200	0.400	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 87 %*	*Limits: 50-150 %*		*Dilution: 1x*						
LCS (23C0083-BS1)				Prepared: 03/02/23 11:25		Analyzed: 03/02/23 20:40						
NWTPH-Dx												
Diesel	0.806	0.100	0.200	mg/L	1	1.25	---	64	36-132%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 86 %*	*Limits: 50-150 %*		*Dilution: 1x*						
LCS Dup (23C0083-BSD1)				Prepared: 03/02/23 11:25		Analyzed: 03/02/23 21:00						**Q-19**
NWTPH-Dx												
Diesel	0.812	0.100	0.200	mg/L	1	1.25	---	65	36-132%	0.7	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 88 %*	*Limits: 50-150 %*		*Dilution: 1x*						

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ANALYTICAL REPORT

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3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C									Water			
Blank (23B0828-BLK1)			Prepared: 02/22/23 08:30		Analyzed: 02/22/23 11:47							
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 95 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*106 %*		*50-150 %*				*"*			
LCS (23B0828-BS2)			Prepared: 02/22/23 08:30		Analyzed: 02/22/23 10:40							
NWTPH-Gx (MS)												
Gasoline Range Organics	0.545	0.0500	0.100	mg/L	1	0.500	---	109	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 100 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*104 %*		*50-150 %*				*"*			
Duplicate (23B0828-DUP1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 20:44							
QC Source Sample: Non-SDG (A3B0522-02)												
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 99 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*105 %*		*50-150 %*				*"*			
Duplicate (23B0828-DUP2)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:06							
QC Source Sample: MW1-20230220-GW-70 (A3B0674-01)												
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	0.0500	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 98 %*		*Limits: 50-150 %*				*Dilution: 1x*			
1,4-Difluorobenzene (Sur)			*107 %*		*50-150 %*				*"*			

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							Water					
Blank (23B0828-BLK1)			Prepared: 02/22/23 08:30 Analyzed: 02/22/23 11:47									
EPA 8260D												
Acetone	ND	10.0	20.0	ug/L	1	---	---	---	---	---	---	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Benzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	5.00	5.00	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C								Water				
Blank (23B0828-BLK1)			Prepared: 02/22/23 08:30		Analyzed: 02/22/23 11:47							
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	---	---	---	---	---	
2-Hexanone	ND	10.0	10.0	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	2.00	2.00	ug/L	1	---	---	---	---	---	---	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Styrene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	

Surr: 1,4-Difluorobenzene (Surr) *Recovery: 98 %* *Limits: 80-120 %* *Dilution: 1x*

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C									**Water**			
Blank (23B0828-BLK1)				Prepared: 02/22/23 08:30 Analyzed: 02/22/23 11:47								
Surr: Toluene-d8 (Surr)			*Recovery: 105 %*	*Limits: 80-120 %*				*Dilution: 1x*				
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*				*"*				
LCS (23B0828-BS1)				Prepared: 02/22/23 08:30 Analyzed: 02/22/23 11:02								
EPA 8260D												
Acetone	34.2	10.0	20.0	ug/L	1	40.0	---	85	80-120%	---	---	ICV-01
Acrylonitrile	16.6	1.00	2.00	ug/L	1	20.0	---	83	80-120%	---	---	
Benzene	17.8	0.100	0.200	ug/L	1	20.0	---	89	80-120%	---	---	
Bromobenzene	17.6	0.250	0.500	ug/L	1	20.0	---	88	80-120%	---	---	
Bromochloromethane	20.3	0.500	1.00	ug/L	1	20.0	---	101	80-120%	---	---	
Bromodichloromethane	21.1	0.500	1.00	ug/L	1	20.0	---	106	80-120%	---	---	
Bromoform	21.8	0.500	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
Bromomethane	26.5	5.00	5.00	ug/L	1	20.0	---	**132**	**80-120%**	---	---	Q-56
2-Butanone (MEK)	32.2	5.00	10.0	ug/L	1	40.0	---	80	80-120%	---	---	ICV-01
n-Butylbenzene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
sec-Butylbenzene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
tert-Butylbenzene	18.0	0.500	1.00	ug/L	1	20.0	---	90	80-120%	---	---	
Carbon disulfide	20.0	5.00	10.0	ug/L	1	20.0	---	100	80-120%	---	---	
Carbon tetrachloride	24.2	0.500	1.00	ug/L	1	20.0	---	**121**	**80-120%**	---	---	Q-56
Chlorobenzene	19.7	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
Chloroethane	33.8	5.00	5.00	ug/L	1	20.0	---	**169**	**80-120%**	---	---	Q-56
Chloroform	20.0	0.500	1.00	ug/L	1	20.0	---	100	80-120%	---	---	
Chloromethane	18.0	2.50	5.00	ug/L	1	20.0	---	90	80-120%	---	---	
2-Chlorotoluene	18.8	0.500	1.00	ug/L	1	20.0	---	94	80-120%	---	---	
4-Chlorotoluene	17.9	0.500	1.00	ug/L	1	20.0	---	90	80-120%	---	---	
Dibromochloromethane	21.5	0.500	1.00	ug/L	1	20.0	---	107	80-120%	---	---	
1,2-Dibromo-3-chloropropane	16.8	2.50	5.00	ug/L	1	20.0	---	84	80-120%	---	---	
1,2-Dibromoethane (EDB)	20.0	0.250	0.500	ug/L	1	20.0	---	100	80-120%	---	---	
Dibromomethane	19.8	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
1,2-Dichlorobenzene	19.7	0.250	0.500	ug/L	1	20.0	---	98	80-120%	---	---	
1,3-Dichlorobenzene	18.8	0.250	0.500	ug/L	1	20.0	---	94	80-120%	---	---	
1,4-Dichlorobenzene	18.6	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Dichlorodifluoromethane	24.4	0.500	1.00	ug/L	1	20.0	---	**122**	**80-120%**	---	---	Q-56
1,1-Dichloroethane	18.7	0.200	0.400	ug/L	1	20.0	---	93	80-120%	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
LCS (23B0828-BS1)			Prepared: 02/22/23 08:30		Analyzed: 02/22/23 11:02							
1,2-Dichloroethane (EDC)	22.5	0.200	0.400	ug/L	1	20.0	---	112	80-120%	---	---	
1,1-Dichloroethene	20.6	0.200	0.400	ug/L	1	20.0	---	103	80-120%	---	---	
cis-1,2-Dichloroethene	18.0	0.200	0.400	ug/L	1	20.0	---	90	80-120%	---	---	
trans-1,2-Dichloroethene	18.3	0.200	0.400	ug/L	1	20.0	---	92	80-120%	---	---	
1,2-Dichloropropane	17.3	0.250	0.500	ug/L	1	20.0	---	87	80-120%	---	---	
1,3-Dichloropropane	18.9	0.500	1.00	ug/L	1	20.0	---	94	80-120%	---	---	
2,2-Dichloropropane	21.5	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
1,1-Dichloropropene	18.6	0.500	1.00	ug/L	1	20.0	---	93	80-120%	---	---	
cis-1,3-Dichloropropene	19.2	0.500	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
trans-1,3-Dichloropropene	21.7	0.500	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
Ethylbenzene	19.5	0.250	0.500	ug/L	1	20.0	---	97	80-120%	---	---	
Hexachlorobutadiene	18.8	2.50	5.00	ug/L	1	20.0	---	94	80-120%	---	---	
2-Hexanone	31.4	10.0	10.0	ug/L	1	40.0	---	**79**	**80-120%**	---	---	Q-55
Isopropylbenzene	19.9	0.500	1.00	ug/L	1	20.0	---	99	80-120%	---	---	
4-Isopropyltoluene	19.3	0.500	1.00	ug/L	1	20.0	---	97	80-120%	---	---	
Methylene chloride	18.8	5.00	10.0	ug/L	1	20.0	---	94	80-120%	---	---	
4-Methyl-2-pentanone (MiBK)	34.3	5.00	10.0	ug/L	1	40.0	---	86	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	17.2	0.500	1.00	ug/L	1	20.0	---	86	80-120%	---	---	
Naphthalene	15.0	2.00	2.00	ug/L	1	20.0	---	**75**	**80-120%**	---	---	Q-55
n-Propylbenzene	18.6	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Styrene	19.3	0.500	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
1,1,1,2-Tetrachloroethane	19.8	0.200	0.400	ug/L	1	20.0	---	99	80-120%	---	---	
1,1,2,2-Tetrachloroethane	18.6	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Tetrachloroethene (PCE)	19.3	0.200	0.400	ug/L	1	20.0	---	96	80-120%	---	---	
Toluene	19.0	0.500	1.00	ug/L	1	20.0	---	95	80-120%	---	---	
1,2,3-Trichlorobenzene	17.6	1.00	2.00	ug/L	1	20.0	---	88	80-120%	---	---	
1,2,4-Trichlorobenzene	16.4	1.00	2.00	ug/L	1	20.0	---	82	80-120%	---	---	
1,1,1-Trichloroethane	21.6	0.200	0.400	ug/L	1	20.0	---	108	80-120%	---	---	
1,1,2-Trichloroethane	19.8	0.250	0.500	ug/L	1	20.0	---	99	80-120%	---	---	
Trichloroethene (TCE)	16.7	0.200	0.400	ug/L	1	20.0	---	83	80-120%	---	---	
Trichlorofluoromethane	26.0	1.00	2.00	ug/L	1	20.0	---	**130**	**80-120%**	---	---	Q-56
1,2,3-Trichloropropane	19.5	0.500	1.00	ug/L	1	20.0	---	98	80-120%	---	---	
1,2,4-Trimethylbenzene	19.6	0.500	1.00	ug/L	1	20.0	---	98	80-120%	---	---	
1,3,5-Trimethylbenzene	18.9	0.500	1.00	ug/L	1	20.0	---	94	80-120%	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C									Water			
LCS (23B0828-BS1)			Prepared: 02/22/23 08:30 Analyzed: 02/22/23 11:02									
Vinyl chloride	22.3	0.200	0.400	ug/L	1	20.0	---	111	80-120%	---	---	
m,p-Xylene	40.9	0.500	1.00	ug/L	1	40.0	---	102	80-120%	---	---	
o-Xylene	18.5	0.250	0.500	ug/L	1	20.0	---	93	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 93 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*99 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*88 %*		*80-120 %*				*"*			
Duplicate (23B0828-DUP1)			Prepared: 02/22/23 11:21 Analyzed: 02/22/23 20:44									
QC Source Sample: Non-SDG (A3B0522-02)												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC

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ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Duplicate (23B0828-DUP1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 20:44							
QC Source Sample: Non-SDG (A3B0522-02)												
1,3-Dichlorobenzene	**0.370**	0.250	0.500	ug/L	1	---	0.440	---	---	17	30%	Ja
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	10.0	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	2.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Duplicate (23B0828-DUP1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 20:44							
QC Source Sample: Non-SDG (A3B0522-02)												
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 99 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*104 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*100 %*		*80-120 %*		*"*					
Duplicate (23B0828-DUP2)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:06							
QC Source Sample: MW1-20230220-GW-70 (A3B0674-01)												
EPA 8260D												
Acetone	ND	10.0	20.0	ug/L	1	---	ND	---	---	---	30%	
Acrylonitrile	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
Benzene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
Bromobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Bromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromodichloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromoform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Bromomethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Butanone (MEK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
n-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
sec-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
tert-Butylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Carbon disulfide	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Carbon tetrachloride	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Chloroethane	ND	5.00	5.00	ug/L	1	---	ND	---	---	---	30%	
Chloroform	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Chloromethane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							Water					
Duplicate (23B0828-DUP2)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:06							
QC Source Sample: MW1-20230220-GW-70 (A3B0674-01)												
2-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Chlorotoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Dibromochloromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromo-3-chloropropane	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dibromomethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Dichlorodifluoromethane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
1,3-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
2,2-Dichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	2.50	5.00	ug/L	1	---	ND	---	---	---	30%	
2-Hexanone	ND	10.0	10.0	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
4-Isopropyltoluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Methylene chloride	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
4-Methyl-2-pentanone (MiBK)	ND	5.00	10.0	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	2.00	2.00	ug/L	1	---	ND	---	---	---	30%	
n-Propylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Styrene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1,2-Tetrachloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Duplicate (23B0828-DUP2)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:06							
QC Source Sample: MW1-20230220-GW-70 (A3B0674-01)												
1,1,2,2-Tetrachloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,1,1-Trichloroethane	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
Trichlorofluoromethane	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.200	0.400	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	
o-Xylene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*104 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*98 %*		*80-120 %*				*"*			
Matrix Spike (23B0828-MS1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:28							
QC Source Sample: Non-SDG (A3B0730-01)												
EPA 8260D												
Acetone	41.6	10.0	20.0	ug/L	1	40.0	ND	104	39-160%	---	---	ICV-01
Acrylonitrile	16.8	1.00	2.00	ug/L	1	20.0	ND	84	63-135%	---	---	
Benzene	19.6	0.100	0.200	ug/L	1	20.0	ND	98	79-120%	---	---	
Bromobenzene	16.9	0.250	0.500	ug/L	1	20.0	ND	85	80-120%	---	---	
Bromochloromethane	20.8	0.500	1.00	ug/L	1	20.0	ND	104	78-123%	---	---	
Bromodichloromethane	22.8	0.500	1.00	ug/L	1	20.0	ND	114	79-125%	---	---	
Bromoform	23.0	0.500	1.00	ug/L	1	20.0	ND	115	66-130%	---	---	
Bromomethane	30.9	5.00	5.00	ug/L	1	20.0	ND	**155**	**53-141%**	---	---	Q-01
2-Butanone (MEK)	34.8	5.00	10.0	ug/L	1	40.0	ND	87	56-143%	---	---	ICV-01
n-Butylbenzene	12.4	0.500	1.00	ug/L	1	20.0	ND	**62**	**75-128%**	---	---	Q-01
sec-Butylbenzene	14.0	0.500	1.00	ug/L	1	20.0	ND	**70**	**77-126%**	---	---	Q-01

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Matrix Spike (23B0828-MS1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:28							
QC Source Sample: Non-SDG (A3B0730-01)												
tert-Butylbenzene	13.8	0.500	1.00	ug/L	1	20.0	ND	**69**	**78-124%**	---	---	Q-01
Carbon disulfide	22.2	5.00	10.0	ug/L	1	20.0	ND	111	64-133%	---	---	
Carbon tetrachloride	26.1	0.500	1.00	ug/L	1	20.0	ND	130	72-136%	---	---	Q-54
Chlorobenzene	19.4	0.250	0.500	ug/L	1	20.0	ND	97	80-120%	---	---	
Chloroethane	41.1	5.00	5.00	ug/L	1	20.0	ND	**205**	**60-138%**	---	---	Q-42
Chloroform	22.4	0.500	1.00	ug/L	1	20.0	0.880	107	79-124%	---	---	
Chloromethane	19.4	2.50	5.00	ug/L	1	20.0	ND	97	50-139%	---	---	
2-Chlorotoluene	16.8	0.500	1.00	ug/L	1	20.0	ND	84	79-122%	---	---	
4-Chlorotoluene	15.8	0.500	1.00	ug/L	1	20.0	ND	79	78-122%	---	---	
Dibromochloromethane	21.8	0.500	1.00	ug/L	1	20.0	ND	109	74-126%	---	---	
1,2-Dibromo-3-chloropropane	15.9	2.50	5.00	ug/L	1	20.0	ND	80	62-128%	---	---	
1,2-Dibromoethane (EDB)	19.6	0.250	0.500	ug/L	1	20.0	ND	98	77-121%	---	---	
Dibromomethane	21.4	0.500	1.00	ug/L	1	20.0	ND	107	79-123%	---	---	
1,2-Dichlorobenzene	17.7	0.250	0.500	ug/L	1	20.0	ND	88	80-120%	---	---	
1,3-Dichlorobenzene	16.9	0.250	0.500	ug/L	1	20.0	ND	84	80-120%	---	---	
1,4-Dichlorobenzene	17.0	0.250	0.500	ug/L	1	20.0	ND	85	79-120%	---	---	
Dichlorodifluoromethane	26.8	0.500	1.00	ug/L	1	20.0	ND	134	32-152%	---	---	
1,1-Dichloroethane	20.6	0.200	0.400	ug/L	1	20.0	ND	103	77-125%	---	---	
1,2-Dichloroethane (EDC)	23.4	0.200	0.400	ug/L	1	20.0	ND	117	73-128%	---	---	
1,1-Dichloroethene	23.6	0.200	0.400	ug/L	1	20.0	ND	118	71-131%	---	---	
cis-1,2-Dichloroethene	18.1	0.200	0.400	ug/L	1	20.0	ND	90	78-123%	---	---	
trans-1,2-Dichloroethene	19.0	0.200	0.400	ug/L	1	20.0	ND	95	75-124%	---	---	
1,2-Dichloropropane	18.6	0.250	0.500	ug/L	1	20.0	ND	93	78-122%	---	---	
1,3-Dichloropropane	18.9	0.500	1.00	ug/L	1	20.0	ND	95	80-120%	---	---	
2,2-Dichloropropane	20.6	0.500	1.00	ug/L	1	20.0	ND	103	60-139%	---	---	
1,1-Dichloropropene	19.9	0.500	1.00	ug/L	1	20.0	ND	100	79-125%	---	---	
cis-1,3-Dichloropropene	19.1	0.500	1.00	ug/L	1	20.0	ND	95	75-124%	---	---	
trans-1,3-Dichloropropene	21.0	0.500	1.00	ug/L	1	20.0	ND	105	73-127%	---	---	
Ethylbenzene	19.5	0.250	0.500	ug/L	1	20.0	ND	98	79-121%	---	---	
Hexachlorobutadiene	10.7	2.50	5.00	ug/L	1	20.0	ND	**54**	**66-134%**	---	---	Q-01
2-Hexanone	29.2	10.0	10.0	ug/L	1	40.0	ND	73	57-139%	---	---	
Isopropylbenzene	17.7	0.500	1.00	ug/L	1	20.0	ND	89	72-131%	---	---	
4-Isopropyltoluene	13.5	0.500	1.00	ug/L	1	20.0	ND	**68**	**77-127%**	---	---	Q-01

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Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0828 - EPA 5030C							**Water**					
Matrix Spike (23B0828-MS1)			Prepared: 02/22/23 11:21		Analyzed: 02/22/23 21:28							
QC Source Sample: Non-SDG (A3B0730-01)												
Methylene chloride	19.1	5.00	10.0	ug/L	1	20.0	ND	95	74-124%	---	---	
4-Methyl-2-pentanone (MiBK)	34.6	5.00	10.0	ug/L	1	40.0	ND	87	67-130%	---	---	
Methyl tert-butyl ether (MTBE)	17.3	0.500	1.00	ug/L	1	20.0	ND	87	71-124%	---	---	
Naphthalene	13.4	2.00	2.00	ug/L	1	20.0	ND	67	61-128%	---	---	Q-54c
n-Propylbenzene	16.3	0.250	0.500	ug/L	1	20.0	ND	82	76-126%	---	---	
Styrene	18.6	0.500	1.00	ug/L	1	20.0	ND	93	78-123%	---	---	
1,1,1,2-Tetrachloroethane	19.4	0.200	0.400	ug/L	1	20.0	ND	97	78-124%	---	---	
1,1,2,2-Tetrachloroethane	14.2	0.250	0.500	ug/L	1	20.0	ND	71	71-121%	---	---	
Tetrachloroethene (PCE)	19.0	0.200	0.400	ug/L	1	20.0	ND	95	74-129%	---	---	
Toluene	20.0	0.500	1.00	ug/L	1	20.0	0.500	97	80-121%	---	---	
1,2,3-Trichlorobenzene	12.6	1.00	2.00	ug/L	1	20.0	ND	**63**	**69-129%**	---	---	Q-01
1,2,4-Trichlorobenzene	10.8	1.00	2.00	ug/L	1	20.0	ND	**54**	**69-130%**	---	---	Q-01
1,1,1-Trichloroethane	23.9	0.200	0.400	ug/L	1	20.0	ND	120	74-131%	---	---	
1,1,2-Trichloroethane	19.0	0.250	0.500	ug/L	1	20.0	ND	95	80-120%	---	---	
Trichloroethene (TCE)	21.5	0.200	0.400	ug/L	1	20.0	ND	107	79-123%	---	---	
Trichlorofluoromethane	30.1	1.00	2.00	ug/L	1	20.0	ND	**151**	**65-141%**	---	---	Q-54a
1,2,3-Trichloropropane	19.1	0.500	1.00	ug/L	1	20.0	ND	95	73-122%	---	---	
1,2,4-Trimethylbenzene	18.0	0.500	1.00	ug/L	1	20.0	0.580	87	76-124%	---	---	
1,3,5-Trimethylbenzene	16.3	0.500	1.00	ug/L	1	20.0	ND	82	75-124%	---	---	
Vinyl chloride	24.1	0.200	0.400	ug/L	1	20.0	ND	121	58-137%	---	---	
m,p-Xylene	39.7	0.500	1.00	ug/L	1	40.0	0.820	97	80-121%	---	---	
o-Xylene	17.8	0.250	0.500	ug/L	1	20.0	0.280	88	78-122%	---	---	

Surr: 1,4-Difluorobenzene (Surr)	*Recovery: 97 %*	*Limits: 80-120 %*	*Dilution: 1x*
Toluene-d8 (Surr)	*98 %*	*80-120 %*	*"*
4-Bromofluorobenzene (Surr)	*89 %*	*80-120 %*	*"*

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23C0033 - EPA 5030C							**Water**					
Blank (23C0033-BLK1)			Prepared: 03/01/23 11:36 Analyzed: 03/01/23 13:58									
EPA 8260D SIM												
Benzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 104 %*			*Limits: 80-120 %*			*Dilution: 1x*			
Toluene-d8 (Surr)			*100 %*			*80-120 %*			*"*			
4-Bromofluorobenzene (Surr)			*98 %*			*80-120 %*			*"*			
LCS (23C0033-BS1)			Prepared: 03/01/23 11:36 Analyzed: 03/01/23 13:04									
EPA 8260D SIM												
Benzene	0.215	0.0500	0.100	ug/L	1	0.200	---	108	80-120%	---	---	
Toluene	0.187	0.0500	0.100	ug/L	1	0.200	---	94	80-120%	---	---	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23C0033 - EPA 5030C								**Water**				
LCS (23C0033-BS1)			Prepared: 03/01/23 11:36 Analyzed: 03/01/23 13:04									
Ethylbenzene	0.184	0.0500	0.100	ug/L	1	0.200	---	92	80-120%	---	---	
m,p-Xylene	0.350	0.100	0.200	ug/L	1	0.400	---	88	80-120%	---	---	
o-Xylene	0.177	0.0500	0.100	ug/L	1	0.200	---	88	80-120%	---	---	
1,2,4-Trimethylbenzene	0.171	0.0500	0.100	ug/L	1	0.200	---	86	80-120%	---	---	
1,3,5-Trimethylbenzene	0.171	0.0500	0.100	ug/L	1	0.200	---	86	80-120%	---	---	
Chloroform	0.213	0.0500	0.100	ug/L	1	0.200	---	107	80-120%	---	---	
1,2-Dibromo-3-chloropropane	0.219	0.100	0.200	ug/L	1	0.200	---	110	80-120%	---	---	
1,2-Dibromoethane (EDB)	0.186	0.0100	0.0200	ug/L	1	0.200	---	93	80-120%	---	---	
1,1-Dichloroethane	0.215	0.0100	0.0200	ug/L	1	0.200	---	107	80-120%	---	---	
1,2-Dichloroethane (EDC)	0.210	0.0100	0.0200	ug/L	1	0.200	---	105	80-120%	---	---	
1,1-Dichloroethene	0.220	0.0100	0.0200	ug/L	1	0.200	---	110	80-120%	---	---	
cis-1,2-Dichloroethene	0.214	0.0100	0.0200	ug/L	1	0.200	---	107	80-120%	---	---	
trans-1,2-Dichloroethene	0.218	0.0100	0.0200	ug/L	1	0.200	---	109	80-120%	---	---	
1,2-Dichloropropane	0.214	0.0100	0.0200	ug/L	1	0.200	---	107	80-120%	---	---	
cis-1,3-Dichloropropene	0.193	0.0100	0.0200	ug/L	1	0.200	---	97	80-120%	---	---	
trans-1,3-Dichloropropene	0.194	0.0100	0.0200	ug/L	1	0.200	---	97	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	0.191	0.0100	0.0200	ug/L	1	0.200	---	96	80-120%	---	---	
1,1,2,2-Tetrachloroethane	0.252	0.0100	0.0200	ug/L	1	0.200	---	**126**	**80-120%**	---	---	Q-56
Tetrachloroethene (PCE)	0.190	0.0100	0.0200	ug/L	1	0.200	---	95	80-120%	---	---	
Trichloroethene (TCE)	0.198	0.0100	0.0200	ug/L	1	0.200	---	99	80-120%	---	---	
1,2,3-Trichloropropane	0.211	0.0500	0.100	ug/L	1	0.200	---	106	80-120%	---	---	
Vinyl chloride	0.233	0.0100	0.0200	ug/L	1	0.200	---	117	80-120%	---	---	
1,1,2-Trichloroethane	0.194	0.0100	0.0200	ug/L	1	0.200	---	97	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 102 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*99 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*97 %*		*80-120 %*			*"*				
Duplicate (23C0033-DUP1)			Prepared: 03/01/23 11:36 Analyzed: 03/01/23 15:19									
QC Source Sample: MW1-20230220-GW-70 (A3B0674-01)												
EPA 8260D SIM												
Benzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
m,p-Xylene	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23C0033 - EPA 5030C									**Water**			
Duplicate (23C0033-DUP1)			Prepared: 03/01/23 11:36 Analyzed: 03/01/23 15:19									
QC Source Sample: MW1-20230220-GW-70 (A3B0674-01)												
o-Xylene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Chloroform	**0.0780**	0.0500	0.100	ug/L	1	---	0.0838	---	---	7	30%	Ja
1,2-Dibromo-3-chloropropane	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethane	ND	0.0200	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	0.0200	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
cis-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
trans-1,2-Dichloroethene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloropropane	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
cis-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
trans-1,3-Dichloropropene	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1,2,2-Tetrachloroethane	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Tetrachloroethene (PCE)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Trichloroethene (TCE)	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,2,3-Trichloropropane	ND	0.0500	0.100	ug/L	1	---	ND	---	---	---	30%	
Vinyl chloride	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
1,1,2-Trichloroethane	ND	0.0100	0.0200	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 105 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*100 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*99 %*		*80-120 %*				*"*			
Matrix Spike (23C0033-MS1)			Prepared: 03/01/23 11:36 Analyzed: 03/01/23 16:13									
QC Source Sample: MW2-20230220-GW-60 (A3B0674-02)												
EPA 8260D SIM												
Benzene	0.446	0.0500	0.100	ug/L	1	0.200	0.176	**135**	**79-120%**	---	---	Q-01
Toluene	0.241	0.0500	0.100	ug/L	1	0.200	ND	121	80-121%	---	---	
Ethylbenzene	0.206	0.0500	0.100	ug/L	1	0.200	ND	103	79-121%	---	---	
m,p-Xylene	0.387	0.100	0.200	ug/L	1	0.400	ND	97	80-121%	---	---	
o-Xylene	0.190	0.0500	0.100	ug/L	1	0.200	ND	95	78-122%	---	---	

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Tigard, OR 97223
503-718-2323
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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23C0033 - EPA 5030C								**Water**				
Matrix Spike (23C0033-MS1)			Prepared: 03/01/23 11:36 Analyzed: 03/01/23 16:13									
QC Source Sample: MW2-20230220-GW-60 (A3B0674-02)												
1,2,4-Trimethylbenzene	0.172	0.0500	0.100	ug/L	1	0.200	ND	86	76-124%	---	---	
1,3,5-Trimethylbenzene	0.179	0.0500	0.100	ug/L	1	0.200	ND	90	75-124%	---	---	
Chloroform	0.271	0.0500	0.100	ug/L	1	0.200	ND	**136**	**79-124%**	---	---	Q-01
1,2-Dibromo-3-chloropropane	0.184	0.100	0.200	ug/L	1	0.200	ND	92	62-128%	---	---	Ja
1,2-Dibromoethane (EDB)	0.209	0.0100	0.0200	ug/L	1	0.200	ND	104	77-121%	---	---	
1,1-Dichloroethane	0.273	0.0100	0.0200	ug/L	1	0.200	ND	**136**	**77-125%**	---	---	Q-01
1,2-Dichloroethane (EDC)	0.241	0.0100	0.0200	ug/L	1	0.200	ND	121	73-128%	---	---	
1,1-Dichloroethene	0.283	0.0100	0.0200	ug/L	1	0.200	ND	**134**	**71-131%**	---	---	Q-01
cis-1,2-Dichloroethene	0.259	0.0100	0.0200	ug/L	1	0.200	ND	**129**	**78-123%**	---	---	Q-01
trans-1,2-Dichloroethene	0.267	0.0100	0.0200	ug/L	1	0.200	ND	**134**	**75-124%**	---	---	Q-01
1,2-Dichloropropane	0.256	0.0100	0.0200	ug/L	1	0.200	ND	**128**	**78-122%**	---	---	Q-01
cis-1,3-Dichloropropene	0.217	0.0100	0.0200	ug/L	1	0.200	ND	108	75-124%	---	---	
trans-1,3-Dichloropropene	0.216	0.0100	0.0200	ug/L	1	0.200	ND	108	73-127%	---	---	
Methyl tert-butyl ether (MTBE)	0.214	0.0100	0.0200	ug/L	1	0.200	ND	107	71-124%	---	---	
1,1,2,2-Tetrachloroethane	0.228	0.0100	0.0200	ug/L	1	0.200	ND	114	71-121%	---	---	Q-54b
Tetrachloroethene (PCE)	0.227	0.0100	0.0200	ug/L	1	0.200	ND	113	74-129%	---	---	
Trichloroethene (TCE)	0.241	0.0100	0.0200	ug/L	1	0.200	ND	121	79-123%	---	---	
1,2,3-Trichloropropane	0.208	0.0500	0.100	ug/L	1	0.200	ND	104	73-122%	---	---	
Vinyl chloride	0.326	0.0100	0.0200	ug/L	1	0.200	ND	**163**	**58-137%**	---	---	Q-01
1,1,2-Trichloroethane	0.212	0.0100	0.0200	ug/L	1	0.200	ND	106	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 105 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*99 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*98 %*		*80-120 %*			*"*				

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0916 - EPA 3510C (Acid/Base Neutral)							Water					
Blank (23B0916-BLK1)			Prepared: 02/27/23 07:33		Analyzed: 02/27/23 17:55							
EPA 8270E												
Acenaphthene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Acenaphthylene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Chrysene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Fluoranthene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Fluorene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	
2-Methylnaphthalene	ND	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	0.0200	0.0400	ug/L	1	---	---	---	---	---	---	
Phenanthrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Pyrene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Carbazole	ND	0.0150	0.0300	ug/L	1	---	---	---	---	---	---	
Dibenzofuran	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
2-Chlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
4-Chloro-3-methylphenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,4-Dichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4-Dimethylphenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4-Dinitrophenol	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
4,6-Dinitro-2-methylphenol	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
2-Methylphenol	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
3+4-Methylphenol(s)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2-Nitrophenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Pentachlorophenol (PCP)	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Phenol	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
2,3,4,6-Tetrachlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0916 - EPA 3510C (Acid/Base Neutral)							**Water**					
Blank (23B0916-BLK1)			Prepared: 02/27/23 07:33		Analyzed: 02/27/23 17:55							
2,3,5,6-Tetrachlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Diethylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Dimethylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
Hexachlorocyclopentadiene	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
Hexachloroethane	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
2-Chloronaphthalene	ND	0.0100	0.0200	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
4-Bromophenyl phenyl ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
4-Chlorophenyl phenyl ether	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Aniline	ND	0.0500	0.100	ug/L	1	---	---	---	---	---	---	
4-Chloroaniline	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
2-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
3-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
4-Nitroaniline	ND	0.200	0.400	ug/L	1	---	---	---	---	---	---	
Nitrobenzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Benzoic acid	ND	1.25	2.50	ug/L	1	---	---	---	---	---	---	
Benzyl alcohol	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Isophorone	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0916 - EPA 3510C (Acid/Base Neutral)							**Water**					
Blank (23B0916-BLK1)			Prepared: 02/27/23 07:33		Analyzed: 02/27/23 17:55							
Azobenzene (1,2-DPH)	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Pyridine	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
1,3-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
1,4-Dichlorobenzene	ND	0.0250	0.0500	ug/L	1	---	---	---	---	---	---	Q-30
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 66 %*		*Limits: 44-120 %*				*Dilution: 1x*			Q-41
2-Fluorobiphenyl (Surr)			*48 %*		*44-120 %*				*"*			
Phenol-d6 (Surr)			*22 %*		*10-133 %*				*"*			
p-Terphenyl-d14 (Surr)			*84 %*		*50-134 %*				*"*			
2-Fluorophenol (Surr)			*35 %*		*19-120 %*				*"*			
2,4,6-Tribromophenol (Surr)			*67 %*		*43-140 %*				*"*			
LCS (23B0916-BS1)			Prepared: 02/27/23 07:33		Analyzed: 02/27/23 18:30							
EPA 8270E												
Acenaphthene	2.53	0.0400	0.0800	ug/L	4	4.00	---	63	47-122%	---	---	
Acenaphthylene	2.85	0.0400	0.0800	ug/L	4	4.00	---	71	41-130%	---	---	
Anthracene	3.54	0.0400	0.0800	ug/L	4	4.00	---	88	57-123%	---	---	
Benz(a)anthracene	3.80	0.0400	0.0800	ug/L	4	4.00	---	95	58-125%	---	---	
Benzo(a)pyrene	3.86	0.0600	0.120	ug/L	4	4.00	---	97	54-128%	---	---	
Benzo(b)fluoranthene	3.94	0.0600	0.120	ug/L	4	4.00	---	99	53-131%	---	---	
Benzo(k)fluoranthene	3.96	0.0600	0.120	ug/L	4	4.00	---	99	57-129%	---	---	
Benzo(g,h,i)perylene	3.63	0.0400	0.0800	ug/L	4	4.00	---	91	50-134%	---	---	
Chrysene	3.65	0.0400	0.0800	ug/L	4	4.00	---	91	59-123%	---	---	
Dibenz(a,h)anthracene	3.80	0.0400	0.0800	ug/L	4	4.00	---	95	51-134%	---	---	
Fluoranthene	3.87	0.0400	0.0800	ug/L	4	4.00	---	97	57-128%	---	---	
Fluorene	3.09	0.0400	0.0800	ug/L	4	4.00	---	77	52-124%	---	---	
Indeno(1,2,3-cd)pyrene	3.83	0.0400	0.0800	ug/L	4	4.00	---	96	52-134%	---	---	
1-Methylnaphthalene	2.00	0.0800	0.160	ug/L	4	4.00	---	50	41-120%	---	---	
2-Methylnaphthalene	2.00	0.0800	0.160	ug/L	4	4.00	---	50	40-121%	---	---	

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Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0916 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS (23B0916-BS1)			Prepared: 02/27/23 07:33		Analyzed: 02/27/23 18:30							
Naphthalene	1.93	0.0800	0.160	ug/L	4	4.00	---	48	40-121%	---	---	
Phenanthrene	3.28	0.0400	0.0800	ug/L	4	4.00	---	82	59-120%	---	---	
Pyrene	3.82	0.0400	0.0800	ug/L	4	4.00	---	95	57-126%	---	---	
Carbazole	3.99	0.0600	0.120	ug/L	4	4.00	---	100	60-122%	---	---	
Dibenzofuran	2.88	0.0400	0.0800	ug/L	4	4.00	---	72	53-120%	---	---	
2-Chlorophenol	2.92	0.200	0.400	ug/L	4	4.00	---	73	38-120%	---	---	
4-Chloro-3-methylphenol	3.55	0.400	0.800	ug/L	4	4.00	---	89	52-120%	---	---	
2,4-Dichlorophenol	3.33	0.200	0.400	ug/L	4	4.00	---	83	47-121%	---	---	
2,4-Dimethylphenol	3.04	0.200	0.400	ug/L	4	4.00	---	76	31-124%	---	---	
2,4-Dinitrophenol	3.81	1.00	2.00	ug/L	4	4.00	---	95	23-143%	---	---	Q-41
4,6-Dinitro-2-methylphenol	3.83	1.00	2.00	ug/L	4	4.00	---	96	44-137%	---	---	Q-41
2-Methylphenol	2.76	0.100	0.200	ug/L	4	4.00	---	69	30-120%	---	---	
3+4-Methylphenol(s)	2.60	0.100	0.200	ug/L	4	4.00	---	65	29-120%	---	---	
2-Nitrophenol	3.75	0.400	0.800	ug/L	4	4.00	---	94	47-123%	---	---	
4-Nitrophenol	1.65	0.400	0.800	ug/L	4	4.00	---	41	10-120%	---	---	
Pentachlorophenol (PCP)	2.56	0.400	0.800	ug/L	4	4.00	---	64	35-138%	---	---	
Phenol	1.54	0.800	0.0800	ug/L	4	4.00	---	38	10-120%	---	---	Q-41
2,3,4,6-Tetrachlorophenol	3.27	0.200	0.400	ug/L	4	4.00	---	82	50-128%	---	---	
2,3,5,6-Tetrachlorophenol	3.21	0.200	0.400	ug/L	4	4.00	---	80	50-121%	---	---	
2,4,5-Trichlorophenol	3.60	0.200	0.400	ug/L	4	4.00	---	90	53-123%	---	---	
2,4,6-Trichlorophenol	3.38	0.200	0.400	ug/L	4	4.00	---	85	50-125%	---	---	
Bis(2-ethylhexyl)phthalate	3.97	0.800	1.60	ug/L	4	4.00	---	99	55-135%	---	---	
Butyl benzyl phthalate	4.14	0.800	1.60	ug/L	4	4.00	---	104	53-134%	---	---	
Diethylphthalate	3.79	0.800	1.60	ug/L	4	4.00	---	95	56-125%	---	---	
Dimethylphthalate	3.64	0.800	1.60	ug/L	4	4.00	---	91	45-127%	---	---	
Di-n-butylphthalate	4.34	0.800	1.60	ug/L	4	4.00	---	109	59-127%	---	---	
Di-n-octyl phthalate	4.88	0.800	1.60	ug/L	4	4.00	---	122	51-140%	---	---	
N-Nitrosodimethylamine	1.20	0.100	0.200	ug/L	4	4.00	---	30	19-120%	---	---	
N-Nitroso-di-n-propylamine	3.58	0.100	0.200	ug/L	4	4.00	---	89	49-120%	---	---	Q-41
N-Nitrosodiphenylamine	3.35	0.100	0.200	ug/L	4	4.00	---	84	51-123%	---	---	
Bis(2-Chloroethoxy) methane	3.33	0.100	0.200	ug/L	4	4.00	---	83	48-120%	---	---	
Bis(2-Chloroethyl) ether	3.07	0.100	0.200	ug/L	4	4.00	---	77	43-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	2.76	0.100	0.200	ug/L	4	4.00	---	69	41-120%	---	---	
Hexachlorobenzene	2.72	0.0400	0.0800	ug/L	4	4.00	---	68	53-125%	---	---	

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0916 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS (23B0916-BS1)			Prepared: 02/27/23 07:33		Analyzed: 02/27/23 18:30							
Hexachlorobutadiene	0.875	0.100	0.200	ug/L	4	4.00	---	22	22-124%	---	---	
Hexachlorocyclopentadiene	0.818	0.200	0.400	ug/L	4	4.00	---	20	10-127%	---	---	
Hexachloroethane	0.970	0.100	0.200	ug/L	4	4.00	---	24	21-120%	---	---	
2-Chloronaphthalene	2.22	0.0400	0.0800	ug/L	4	4.00	---	56	40-120%	---	---	
1,2,4-Trichlorobenzene	1.36	0.100	0.200	ug/L	4	4.00	---	34	29-120%	---	---	
4-Bromophenyl phenyl ether	2.86	0.100	0.200	ug/L	4	4.00	---	72	55-124%	---	---	
4-Chlorophenyl phenyl ether	2.76	0.100	0.200	ug/L	4	4.00	---	69	53-121%	---	---	
Aniline	2.51	0.200	0.400	ug/L	4	4.00	---	63	10-120%	---	---	
4-Chloroaniline	3.17	0.100	0.200	ug/L	4	4.00	---	79	33-120%	---	---	Q-41
2-Nitroaniline	4.04	0.800	1.60	ug/L	4	4.00	---	101	55-127%	---	---	
3-Nitroaniline	3.79	0.800	1.60	ug/L	4	4.00	---	95	41-128%	---	---	
4-Nitroaniline	3.77	0.800	1.60	ug/L	4	4.00	---	94	25-120%	---	---	
Nitrobenzene	3.30	0.400	0.800	ug/L	4	4.00	---	83	45-121%	---	---	
2,4-Dinitrotoluene	3.75	0.400	0.800	ug/L	4	4.00	---	94	57-128%	---	---	
2,6-Dinitrotoluene	3.41	0.400	0.800	ug/L	4	4.00	---	85	57-124%	---	---	
Benzoic acid	5.37	5.00	5.00	ug/L	4	8.00	---	67	10-120%	---	---	
Benzyl alcohol	2.67	0.400	0.800	ug/L	4	4.00	---	67	31-120%	---	---	
Isophorone	3.35	0.100	0.200	ug/L	4	4.00	---	84	42-124%	---	---	
Azobenzene (1,2-DPH)	3.40	0.100	0.200	ug/L	4	4.00	---	85	61-120%	---	---	
Bis(2-Ethylhexyl) adipate	4.27	1.00	2.00	ug/L	4	4.00	---	107	63-121%	---	---	
3,3'-Dichlorobenzidine	15.0	2.00	4.00	ug/L	4	8.00	---	**187**	**27-129%**	---	---	Q-29, Q-52
1,2-Dinitrobenzene	3.62	1.00	2.00	ug/L	4	4.00	---	91	59-120%	---	---	
1,3-Dinitrobenzene	3.66	1.00	2.00	ug/L	4	4.00	---	92	49-128%	---	---	
1,4-Dinitrobenzene	3.88	1.00	2.00	ug/L	4	4.00	---	97	54-120%	---	---	
Pyridine	1.48	0.400	0.800	ug/L	4	4.00	---	37	10-120%	---	---	
1,2-Dichlorobenzene	1.27	0.100	0.200	ug/L	4	4.00	---	32	32-120%	---	---	
1,3-Dichlorobenzene	1.15	0.100	0.200	ug/L	4	4.00	---	29	28-120%	---	---	
1,4-Dichlorobenzene	1.19	0.100	0.200	ug/L	4	4.00	---	30	29-120%	---	---	
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 87 %*		*Limits: 44-120 %*			*Dilution: 4x*				Q-41
2-Fluorobiphenyl (Surr)			*68 %*		*44-120 %*			*"*				
Phenol-d6 (Surr)			*30 %*		*10-133 %*			*"*				
p-Terphenyl-d14 (Surr)			*96 %*		*50-134 %*			*"*				
2-Fluorophenol (Surr)			*29 %*		*19-120 %*			*"*				
2,4,6-Tribromophenol (Surr)			*81 %*		*43-140 %*			*"*				

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Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0916 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS Dup (23B0916-BSD1)			Prepared: 02/27/23 07:33		Analyzed: 02/27/23 19:05							**Q-19**
EPA 8270E												
Acenaphthene	2.26	0.0400	0.0800	ug/L	4	4.00	---	57	47-122%	11	30%	
Acenaphthylene	2.60	0.0400	0.0800	ug/L	4	4.00	---	65	41-130%	9	30%	
Anthracene	3.32	0.0400	0.0800	ug/L	4	4.00	---	83	57-123%	6	30%	
Benz(a)anthracene	3.69	0.0400	0.0800	ug/L	4	4.00	---	92	58-125%	3	30%	
Benzo(a)pyrene	3.68	0.0600	0.120	ug/L	4	4.00	---	92	54-128%	5	30%	
Benzo(b)fluoranthene	3.91	0.0600	0.120	ug/L	4	4.00	---	98	53-131%	0.9	30%	
Benzo(k)fluoranthene	3.75	0.0600	0.120	ug/L	4	4.00	---	94	57-129%	5	30%	
Benzo(g,h,i)perylene	3.51	0.0400	0.0800	ug/L	4	4.00	---	88	50-134%	4	30%	
Chrysene	3.55	0.0400	0.0800	ug/L	4	4.00	---	89	59-123%	3	30%	
Dibenz(a,h)anthracene	3.58	0.0400	0.0800	ug/L	4	4.00	---	89	51-134%	6	30%	
Fluoranthene	3.71	0.0400	0.0800	ug/L	4	4.00	---	93	57-128%	4	30%	
Fluorene	2.83	0.0400	0.0800	ug/L	4	4.00	---	71	52-124%	9	30%	
Indeno(1,2,3-cd)pyrene	3.67	0.0400	0.0800	ug/L	4	4.00	---	92	52-134%	4	30%	
1-Methylnaphthalene	1.73	0.0800	0.160	ug/L	4	4.00	---	43	41-120%	14	30%	
2-Methylnaphthalene	1.70	0.0800	0.160	ug/L	4	4.00	---	43	40-121%	16	30%	
Naphthalene	1.70	0.0800	0.160	ug/L	4	4.00	---	42	40-121%	13	30%	
Phenanthrene	3.07	0.0400	0.0800	ug/L	4	4.00	---	77	59-120%	6	30%	
Pyrene	3.64	0.0400	0.0800	ug/L	4	4.00	---	91	57-126%	5	30%	
Carbazole	3.85	0.0600	0.120	ug/L	4	4.00	---	96	60-122%	4	30%	
Dibenzofuran	2.63	0.0400	0.0800	ug/L	4	4.00	---	66	53-120%	9	30%	
2-Chlorophenol	2.94	0.200	0.400	ug/L	4	4.00	---	73	38-120%	0.5	30%	
4-Chloro-3-methylphenol	3.49	0.400	0.800	ug/L	4	4.00	---	87	52-120%	2	30%	
2,4-Dichlorophenol	3.34	0.200	0.400	ug/L	4	4.00	---	83	47-121%	0.2	30%	
2,4-Dimethylphenol	2.92	0.200	0.400	ug/L	4	4.00	---	73	31-124%	4	30%	
2,4-Dinitrophenol	3.65	1.00	2.00	ug/L	4	4.00	---	91	23-143%	4	30%	Q-41
4,6-Dinitro-2-methylphenol	3.65	1.00	2.00	ug/L	4	4.00	---	91	44-137%	5	30%	Q-41
2-Methylphenol	2.73	0.100	0.200	ug/L	4	4.00	---	68	30-120%	1	30%	
3+4-Methylphenol(s)	2.58	0.100	0.200	ug/L	4	4.00	---	64	29-120%	0.9	30%	
2-Nitrophenol	3.78	0.400	0.800	ug/L	4	4.00	---	95	47-123%	0.7	30%	
4-Nitrophenol	1.78	0.400	0.800	ug/L	4	4.00	---	44	10-120%	7	30%	
Pentachlorophenol (PCP)	2.40	0.400	0.800	ug/L	4	4.00	---	60	35-138%	7	30%	
Phenol	1.64	0.800	1.60	ug/L	4	4.00	---	41	10-120%	6	30%	Q-41
2,3,4,6-Tetrachlorophenol	3.20	0.200	0.400	ug/L	4	4.00	---	80	50-128%	2	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0916 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS Dup (23B0916-BSD1)			Prepared: 02/27/23 07:33		Analyzed: 02/27/23 19:05							**Q-19**
2,3,5,6-Tetrachlorophenol	3.05	0.200	0.400	ug/L	4	4.00	---	76	50-121%	5	30%	
2,4,5-Trichlorophenol	3.54	0.200	0.400	ug/L	4	4.00	---	89	53-123%	2	30%	
2,4,6-Trichlorophenol	3.29	0.200	0.400	ug/L	4	4.00	---	82	50-125%	3	30%	
Bis(2-ethylhexyl)phthalate	3.88	0.800	1.60	ug/L	4	4.00	---	97	55-135%	2	30%	
Butyl benzyl phthalate	4.02	0.800	1.60	ug/L	4	4.00	---	100	53-134%	3	30%	
Diethylphthalate	3.62	0.800	1.60	ug/L	4	4.00	---	90	56-125%	5	30%	
Dimethylphthalate	3.50	0.800	1.60	ug/L	4	4.00	---	87	45-127%	4	30%	
Di-n-butylphthalate	4.07	0.800	1.60	ug/L	4	4.00	---	102	59-127%	6	30%	
Di-n-octyl phthalate	4.69	0.800	1.60	ug/L	4	4.00	---	117	51-140%	4	30%	
N-Nitrosodimethylamine	2.11	0.100	0.200	ug/L	4	4.00	---	53	19-120%	**55**	**30%**	Q-24
N-Nitroso-di-n-propylamine	3.48	0.100	0.200	ug/L	4	4.00	---	87	49-120%	3	30%	Q-41
N-Nitrosodiphenylamine	3.23	0.100	0.200	ug/L	4	4.00	---	81	51-123%	4	30%	
Bis(2-Chloroethoxy) methane	3.30	0.100	0.200	ug/L	4	4.00	---	82	48-120%	0.9	30%	
Bis(2-Chloroethyl) ether	2.96	0.100	0.200	ug/L	4	4.00	---	74	43-120%	4	30%	
2,2'-Oxybis(1-Chloropropane)	2.62	0.100	0.200	ug/L	4	4.00	---	65	41-120%	5	30%	
Hexachlorobenzene	2.40	0.0400	0.0800	ug/L	4	4.00	---	60	53-125%	13	30%	
Hexachlorobutadiene	0.675	0.100	0.200	ug/L	4	4.00	---	**17**	**22-124%**	26	30%	Q-30
Hexachlorocyclopentadiene	0.638	0.200	0.400	ug/L	4	4.00	---	16	10-127%	25	30%	
Hexachloroethane	0.734	0.100	0.200	ug/L	4	4.00	---	**18**	**21-120%**	28	30%	Q-30
2-Chloronaphthalene	1.93	0.0400	0.0800	ug/L	4	4.00	---	48	40-120%	14	30%	
1,2,4-Trichlorobenzene	1.11	0.100	0.200	ug/L	4	4.00	---	**28**	**29-120%**	20	30%	Q-30
4-Bromophenyl phenyl ether	2.54	0.100	0.200	ug/L	4	4.00	---	64	55-124%	12	30%	
4-Chlorophenyl phenyl ether	2.40	0.100	0.200	ug/L	4	4.00	---	60	53-121%	14	30%	
Aniline	2.56	0.200	0.400	ug/L	4	4.00	---	64	10-120%	2	30%	
4-Chloroaniline	3.17	0.100	0.200	ug/L	4	4.00	---	79	33-120%	0.2	30%	Q-41
2-Nitroaniline	3.89	0.800	1.60	ug/L	4	4.00	---	97	55-127%	4	30%	
3-Nitroaniline	3.69	0.800	1.60	ug/L	4	4.00	---	92	41-128%	3	30%	
4-Nitroaniline	3.78	0.800	1.60	ug/L	4	4.00	---	95	25-120%	0.3	30%	
Nitrobenzene	3.16	0.400	0.800	ug/L	4	4.00	---	79	45-121%	4	30%	
2,4-Dinitrotoluene	3.65	0.400	0.800	ug/L	4	4.00	---	91	57-128%	3	30%	
2,6-Dinitrotoluene	3.34	0.400	0.800	ug/L	4	4.00	---	83	57-124%	2	30%	
Benzoic acid	4.91	2.00	2.00	ug/L	4	8.00	---	61	10-120%	9	30%	
Benzyl alcohol	2.63	0.400	0.800	ug/L	4	4.00	---	66	31-120%	1	30%	
Isophorone	3.24	0.100	0.200	ug/L	4	4.00	---	81	42-124%	3	30%	

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Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0916 - EPA 3510C (Acid/Base Neutral)							**Water**					
LCS Dup (23B0916-BSD1)			Prepared: 02/27/23 07:33		Analyzed: 02/27/23 19:05							**Q-19**
Azobenzene (1,2-DPH)	3.24	0.100	0.200	ug/L	4	4.00	---	81	61-120%	5	30%	
Bis(2-Ethylhexyl) adipate	4.11	1.00	2.00	ug/L	4	4.00	---	103	63-121%	4	30%	
3,3'-Dichlorobenzidine	15.0	2.00	4.00	ug/L	4	8.00	---	**188**	**27-129%**	0.3	30%	Q-52, Q-29
1,2-Dinitrobenzene	3.53	1.00	2.00	ug/L	4	4.00	---	88	59-120%	3	30%	
1,3-Dinitrobenzene	3.57	1.00	2.00	ug/L	4	4.00	---	89	49-128%	3	30%	
1,4-Dinitrobenzene	3.79	1.00	2.00	ug/L	4	4.00	---	95	54-120%	2	30%	
Pyridine	2.24	0.400	0.800	ug/L	4	4.00	---	56	10-120%	**41**	**30%**	Q-24
1,2-Dichlorobenzene	1.04	0.100	0.200	ug/L	4	4.00	---	**26**	**32-120%**	20	30%	Q-30
1,3-Dichlorobenzene	0.893	0.100	0.200	ug/L	4	4.00	---	**22**	**28-120%**	25	30%	Q-30
1,4-Dichlorobenzene	0.949	0.100	0.200	ug/L	4	4.00	---	**24**	**29-120%**	22	30%	Q-30
Surr: Nitrobenzene-d5 (Surr)			*Recovery: 84 %*		*Limits: 44-120 %*		*Dilution: 4x*					Q-41
2-Fluorobiphenyl (Surr)			*68 %*		*44-120 %*		*"*					
Phenol-d6 (Surr)			*32 %*		*10-133 %*		*"*					
p-Terphenyl-d14 (Surr)			*93 %*		*50-134 %*		*"*					
2-Fluorophenol (Surr)			*48 %*		*19-120 %*		*"*					
2,4,6-Tribromophenol (Surr)			*76 %*		*43-140 %*		*"*					

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Philip Nerenberg, Lab Director

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0917 - EPA 3510C (Neutral pH)							**Water**					
Blank (23B0917-BLK1)			Prepared: 02/27/23 07:35 Analyzed: 02/28/23 09:35									
EPA 8270E OPPs												
Azinphos methyl (Guthion)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Chlorpyrifos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Coumaphos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Demeton O	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Demeton S	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Diazinon	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorvos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Dimethoate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Disulfoton	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
EPN	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Ethoprop	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Fensulfothion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Fenthion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Malathion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Merphos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Methyl parathion	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Mevinphos (Phosdrin)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Monocrotophos	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Naled (Dibrom)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Parathion, ethyl	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Phorate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Ronnel (Fenchlorphos)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Sulfotep	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Sulprofos (Bolstar)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
TEPP	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachlorvinphos (Rabon)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Tokuthion (Prothiofos)	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Trichloronate	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Surr: Tributyl phosphate (Surr)			*Recovery: 85 %*		*Limits: 56-124 %*				*Dilution: 1x*			
Triphenyl phosphate (Surr)			*92 %*		*58-121 %*				*"*			
LCS (23B0917-BS1)			Prepared: 02/27/23 07:35 Analyzed: 02/28/23 10:10									
EPA 8270E OPPs												

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Philip Nerenberg, Lab Director

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ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0917 - EPA 3510C (Neutral pH)							**Water**					
LCS (23B0917-BS1)			Prepared: 02/27/23 07:35 Analyzed: 02/28/23 10:10									
Azinphos methyl (Guthion)	4.06	0.500	1.00	ug/L	2	4.00	---	102	43-135%	---	---	
Chlorpyrifos	2.85	0.500	1.00	ug/L	2	4.00	---	71	47-133%	---	---	
Coumaphos	3.74	0.500	1.00	ug/L	2	4.00	---	93	45-135%	---	---	
Demeton O	1.38	0.500	1.00	ug/L	2	1.84	---	75	10-125%	---	---	
Demeton S	1.47	0.500	1.00	ug/L	2	1.94	---	76	21-162%	---	---	
Diazinon	3.71	0.500	1.00	ug/L	2	4.00	---	93	43-129%	---	---	
Dichlorvos	3.86	0.500	1.00	ug/L	2	4.00	---	97	39-138%	---	---	
Dimethoate	3.23	0.500	1.00	ug/L	2	4.00	---	81	26-125%	---	---	
Disulfoton	3.39	0.500	1.00	ug/L	2	4.00	---	85	36-134%	---	---	
EPN	3.71	0.500	1.00	ug/L	2	4.00	---	93	47-133%	---	---	
Ethoprop	3.65	0.500	1.00	ug/L	2	4.00	---	91	52-125%	---	---	
Fensulfothion	4.16	0.500	1.00	ug/L	2	4.00	---	104	15-141%	---	---	
Fenthion	3.39	0.500	1.00	ug/L	2	4.00	---	85	42-137%	---	---	
Malathion	3.17	0.500	1.00	ug/L	2	4.00	---	79	44-132%	---	---	
Merphos	3.80	0.500	1.00	ug/L	2	4.00	---	95	26-133%	---	---	
Methyl parathion	3.92	0.500	1.00	ug/L	2	4.00	---	98	49-134%	---	---	
Mevinphos (Phosdrin)	3.73	0.500	1.00	ug/L	2	4.00	---	93	10-196%	---	---	
Monocrotophos	0.937	0.500	0.500	ug/L	2	4.00	---	23	10-159%	---	---	
Naled (Dibrom)	3.78	0.500	1.00	ug/L	2	4.00	---	95	10-146%	---	---	
Parathion, ethyl	3.68	0.500	1.00	ug/L	2	4.00	---	92	52-134%	---	---	
Phorate	3.75	0.500	1.00	ug/L	2	4.00	---	94	23-139%	---	---	Q-41
Ronnel (Fenchlorphos)	3.10	0.500	1.00	ug/L	2	4.00	---	77	42-133%	---	---	
Sulfotep	3.24	0.500	1.00	ug/L	2	4.00	---	81	47-126%	---	---	
Sulprofos (Bolstar)	2.73	0.500	1.00	ug/L	2	4.00	---	68	47-135%	---	---	
TEPP	3.61	0.500	1.00	ug/L	2	4.00	---	90	10-208%	---	---	
Tetrachlorvinphos (Rabon)	4.00	0.500	1.00	ug/L	2	4.00	---	100	42-125%	---	---	
Tokuthion (Prothiofos)	2.96	0.500	1.00	ug/L	2	4.00	---	74	43-132%	---	---	
Trichloronate	2.70	0.500	1.00	ug/L	2	4.00	---	68	28-137%	---	---	
Surr: Tributyl phosphate (Surr)			*Recovery: 84 %*		*Limits: 56-124 %*			*Dilution: 2x*				
Triphenyl phosphate (Surr)			*94 %*		*58-121 %*			*"*				
LCS Dup (23B0917-BSD1)			Prepared: 02/27/23 07:35 Analyzed: 02/28/23 10:46									**Q-19**
EPA 8270E OPPs												
Azinphos methyl (Guthion)	4.44	0.500	1.00	ug/L	2	4.00	---	111	43-135%	9	30%	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0917 - EPA 3510C (Neutral pH)							**Water**					
LCS Dup (23B0917-BSD1)			Prepared: 02/27/23 07:35 Analyzed: 02/28/23 10:46									**Q-19**
Chlorpyrifos	3.33	0.500	1.00	ug/L	2	4.00	---	83	47-133%	15	30%	
Coumaphos	4.14	0.500	1.00	ug/L	2	4.00	---	104	45-135%	10	30%	
Demeton O	1.66	0.500	1.00	ug/L	2	1.84	---	90	10-125%	18	30%	
Demeton S	1.62	0.500	1.00	ug/L	2	1.94	---	83	21-162%	10	30%	
Diazinon	4.07	0.500	1.00	ug/L	2	4.00	---	102	43-129%	9	30%	
Dichlorvos	4.19	0.500	1.00	ug/L	2	4.00	---	105	39-138%	8	30%	
Dimethoate	3.56	0.500	1.00	ug/L	2	4.00	---	89	26-125%	10	30%	
Disulfoton	3.78	0.500	1.00	ug/L	2	4.00	---	94	36-134%	11	30%	
EPN	4.30	0.500	1.00	ug/L	2	4.00	---	108	47-133%	15	30%	
Ethoprop	4.05	0.500	1.00	ug/L	2	4.00	---	101	52-125%	10	30%	
Fensulfothion	4.74	0.500	1.00	ug/L	2	4.00	---	119	15-141%	13	30%	
Fenthion	3.72	0.500	1.00	ug/L	2	4.00	---	93	42-137%	9	30%	
Malathion	3.52	0.500	1.00	ug/L	2	4.00	---	88	44-132%	10	30%	
Merphos	4.35	0.500	1.00	ug/L	2	4.00	---	109	26-133%	14	30%	
Methyl parathion	4.31	0.500	1.00	ug/L	2	4.00	---	108	49-134%	9	30%	
Mevinphos (Phosdrin)	4.12	0.500	1.00	ug/L	2	4.00	---	103	10-196%	10	30%	
Monocrotophos	1.11	0.500	1.00	ug/L	2	4.00	---	28	10-159%	17	30%	
Naled (Dibrom)	4.34	0.500	1.00	ug/L	2	4.00	---	109	10-146%	14	30%	
Parathion, ethyl	4.07	0.500	1.00	ug/L	2	4.00	---	102	52-134%	10	30%	
Phorate	4.24	0.500	1.00	ug/L	2	4.00	---	106	23-139%	12	30%	Q-41
Ronnel (Fenchlorphos)	3.45	0.500	1.00	ug/L	2	4.00	---	86	42-133%	11	30%	
Sulfotep	3.68	0.500	1.00	ug/L	2	4.00	---	92	47-126%	13	30%	
Sulprofos (Bolstar)	3.20	0.500	1.00	ug/L	2	4.00	---	80	47-135%	16	30%	
TEPP	4.25	0.500	1.00	ug/L	2	4.00	---	106	10-208%	16	30%	
Tetrachlorvinphos (Rabon)	4.45	0.500	1.00	ug/L	2	4.00	---	111	42-125%	11	30%	
Tokuthion (Prothiofos)	3.56	0.500	1.00	ug/L	2	4.00	---	89	43-132%	18	30%	
Trichloronate	3.18	0.500	1.00	ug/L	2	4.00	---	80	28-137%	16	30%	
Surr: Tributyl phosphate (Surr)			*Recovery: 93 %*		*Limits: 56-124 %*			*Dilution: 2x*				
Triphenyl phosphate (Surr)			*96 %*		*58-121 %*			*"*				

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0841 - EPA 3015A							Water					
Blank (23B0841-BLK1)			Prepared: 02/22/23 10:27		Analyzed: 02/22/23 19:09							
EPA 6020B												
Antimony	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Arsenic	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Barium	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Beryllium	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Cadmium	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Chromium	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Copper	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Lead	ND	0.110	0.200	ug/L	1	---	---	---	---	---	---	
Manganese	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Mercury	ND	0.0400	0.0800	ug/L	1	---	---	---	---	---	---	
Nickel	ND	1.00	2.00	ug/L	1	---	---	---	---	---	---	
Selenium	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Silver	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Thallium	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Zinc	ND	2.00	4.00	ug/L	1	---	---	---	---	---	---	
LCS (23B0841-BS1)			Prepared: 02/22/23 10:27		Analyzed: 02/22/23 19:25							
EPA 6020B												
Antimony	27.2	0.500	1.00	ug/L	1	27.8	---	98	80-120%	---	---	
Arsenic	53.0	0.500	1.00	ug/L	1	55.6	---	95	80-120%	---	---	
Barium	58.5	1.00	2.00	ug/L	1	55.6	---	105	80-120%	---	---	
Beryllium	28.2	0.100	0.200	ug/L	1	27.8	---	101	80-120%	---	---	
Cadmium	52.9	0.100	0.200	ug/L	1	55.6	---	95	80-120%	---	---	
Chromium	55.2	1.00	2.00	ug/L	1	55.6	---	99	80-120%	---	---	
Copper	54.1	1.00	2.00	ug/L	1	55.6	---	97	80-120%	---	---	
Lead	53.2	0.110	0.200	ug/L	1	55.6	---	96	80-120%	---	---	
Manganese	54.8	0.500	1.00	ug/L	1	55.6	---	99	80-120%	---	---	
Mercury	1.03	0.0400	0.0800	ug/L	1	1.11	---	93	80-120%	---	---	
Nickel	56.0	1.00	2.00	ug/L	1	55.6	---	101	80-120%	---	---	
Selenium	27.4	0.500	1.00	ug/L	1	27.8	---	99	80-120%	---	---	
Silver	27.3	0.100	0.200	ug/L	1	27.8	---	98	80-120%	---	---	
Thallium	26.9	0.100	0.200	ug/L	1	27.8	---	97	80-120%	---	---	
Zinc	55.2	2.00	4.00	ug/L	1	55.6	---	99	80-120%	---	---	

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0841 - EPA 3015A							**Water**					
Duplicate (23B0841-DUP1)			Prepared: 02/22/23 10:27 Analyzed: 02/22/23 19:36									
QC Source Sample: Non-SDG (A3B0520-02)												
Antimony	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	20%	
Barium	**49.5**	1.00	2.00	ug/L	1	---	48.4	---	---	2	20%	
Beryllium	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Cadmium	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Lead	**0.427**	0.110	0.200	ug/L	1	---	0.426	---	---	0.3	20%	
Mercury	ND	0.0400	0.0800	ug/L	1	---	ND	---	---	---	20%	
Selenium	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	20%	
Silver	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Thallium	ND	0.100	0.200	ug/L	1	---	ND	---	---	---	20%	
Duplicate (23B0841-DUP2)			Prepared: 02/22/23 10:27 Analyzed: 02/25/23 21:03									
QC Source Sample: Non-SDG (A3B0520-02)												
Arsenic	**8.96**	0.500	1.00	ug/L	1	---	8.42	---	---	6	20%	Q-16
Chromium	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	20%	Q-16
Copper	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	20%	Q-16
Nickel	ND	1.00	2.00	ug/L	1	---	ND	---	---	---	20%	Q-16
Zinc	**16.0**	2.00	4.00	ug/L	1	---	15.3	---	---	5	20%	Q-16
Duplicate (23B0841-DUP3)			Prepared: 02/22/23 10:27 Analyzed: 02/25/23 21:14									
QC Source Sample: Non-SDG (A3B0520-02RE1)												
Manganese	**4690**	25.0	50.0	ug/L	50	---	4450	---	---	5	20%	Q-16
Matrix Spike (23B0841-MS1)			Prepared: 02/22/23 10:27 Analyzed: 02/22/23 19:41									
QC Source Sample: Non-SDG (A3B0520-02)												
EPA 6020B												
Antimony	27.4	0.500	1.00	ug/L	1	27.8	ND	99	75-125%	---	---	
Arsenic	62.5	0.500	1.00	ug/L	1	55.6	8.42	97	75-125%	---	---	
Barium	107	1.00	2.00	ug/L	1	55.6	48.4	106	75-125%	---	---	
Beryllium	27.5	0.100	0.200	ug/L	1	27.8	ND	99	75-125%	---	---	
Cadmium	52.6	0.100	0.200	ug/L	1	55.6	ND	95	75-125%	---	---	
Chromium	56.1	1.00	2.00	ug/L	1	55.6	ND	101	75-125%	---	---	

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Philip Nerenberg

Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23B0841 - EPA 3015A							**Water**					
Matrix Spike (23B0841-MS1)			Prepared: 02/22/23 10:27		Analyzed: 02/22/23 19:41							
QC Source Sample: Non-SDG (A3B0520-02)												
Copper	54.6	1.00	2.00	ug/L	1	55.6	ND	98	75-125%	---	---	
Lead	51.3	0.110	0.200	ug/L	1	55.6	0.426	92	75-125%	---	---	
Manganese	4750	0.500	1.00	ug/L	1	55.6	4430	**578**	**75-125%**	---	---	E, Q-65
Mercury	1.01	0.0400	0.0800	ug/L	1	1.11	ND	91	75-125%	---	---	
Nickel	55.6	1.00	2.00	ug/L	1	55.6	ND	100	75-125%	---	---	
Selenium	27.4	0.500	1.00	ug/L	1	27.8	ND	99	75-125%	---	---	
Silver	27.2	0.100	0.200	ug/L	1	27.8	ND	98	75-125%	---	---	
Thallium	25.3	0.100	0.200	ug/L	1	27.8	ND	91	75-125%	---	---	
Zinc	70.9	2.00	4.00	ug/L	1	55.6	15.3	100	75-125%	---	---	

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ANALYTICAL REPORT

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Chlorinated Herbicides by GC/ECD

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W3B2223 - EPA 3510C							**Water**					
Blank (W3B2223-BLK1)			Prepared: 02/27/23 16:15 Analyzed: 03/22/23 19:38									
EPA 8151A												
2,4-D	ND	0.34	0.50	ug/l	1	---	---	---	---	---	---	
2,4-DB	ND	0.99	2.5	ug/l	1	---	---	---	---	---	---	
2,4,5-T	ND	0.14	0.25	ug/l	1	---	---	---	---	---	---	
2,4,5-TP (Silvex)	ND	0.14	0.25	ug/l	1	---	---	---	---	---	---	
3,5-Dichlorobenzoic acid	ND	0.28	1.2	ug/l	1	---	---	---	---	---	---	
4-Nitrophenol	ND	0.50	1.2	ug/l	1	---	---	---	---	---	---	
Acifluorfen	ND	0.24	0.50	ug/l	1	---	---	---	---	---	---	
Bentazon	ND	0.55	2.5	ug/l	1	---	---	---	---	---	---	
Dalapon	ND	0.16	0.50	ug/l	1	---	---	---	---	---	---	
Dicamba	ND	0.19	0.75	ug/l	1	---	---	---	---	---	---	
Dichloroprop	ND	0.24	1.0	ug/l	1	---	---	---	---	---	---	
Dinoseb	ND	0.090	0.50	ug/l	1	---	---	---	---	---	---	
DCPA	ND	0.20	0.25	ug/l	1	---	---	---	---	---	---	
MCPA	ND	40	100	ug/l	1	---	---	---	---	---	---	
MCPP	ND	27	100	ug/l	1	---	---	---	---	---	---	
Pentachlorophenol	ND	0.18	0.25	ug/l	1	---	---	---	---	---	---	
Picloram	ND	0.13	0.75	ug/l	1	---	---	---	---	---	---	
Surr: 2,4-DCAA			*Recovery: 74 %*	*Limits: 56-156 %*			*Dilution: 1x*					
LCS (W3B2223-BS1)			Prepared: 02/27/23 16:15 Analyzed: 03/22/23 20:10									
EPA 8151A												
2,4-D	2.71	0.34	0.50	ug/l	1	3.00	---	90	56-164%	---	---	
2,4-DB	3.74	0.99	2.5	ug/l	1	6.00	---	62	27-161%	---	---	
2,4,5-T	1.52	0.14	0.25	ug/l	1	1.50	---	102	39-151%	---	---	
2,4,5-TP (Silvex)	1.36	0.14	0.25	ug/l	1	1.50	---	91	46-142%	---	---	
3,5-Dichlorobenzoic acid	2.72	0.28	1.2	ug/l	1	3.00	---	91	54-154%	---	---	
4-Nitrophenol	2.34	0.50	1.2	ug/l	1	6.00	---	39	3-105%	---	---	
Acifluorfen	1.74	0.24	0.50	ug/l	1	1.50	---	116	39-134%	---	---	
Bentazon	5.61	0.55	2.5	ug/l	1	6.00	---	94	44-139%	---	---	
Dalapon	2.48	0.16	0.50	ug/l	1	3.00	---	83	40-139%	---	---	
Dicamba	2.69	0.19	0.75	ug/l	1	3.00	---	90	46-140%	---	---	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: St. Helens Lagoon	
3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Chlorinated Herbicides by GC/ECD

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W3B2223 - EPA 3510C							**Water**					
LCS (W3B2223-BS1)			Prepared: 02/27/23 16:15 Analyzed: 03/22/23 20:10									
Dichloroprop	2.73	0.24	1.0	ug/l	1	3.00	---	91	43-158%	---	---	
Dinoseb	1.28	0.090	0.50	ug/l	1	1.50	---	85	42-146%	---	---	
DCPA	1.55	0.20	0.25	ug/l	1	1.50	---	103	34-135%	---	---	
MCPA	260	40	100	ug/l	1	300	---	87	28-144%	---	---	
MCPP	219	27	100	ug/l	1	300	---	73	31-153%	---	---	
Pentachlorophenol	1.30	0.18	0.25	ug/l	1	1.50	---	86	37-136%	---	---	
Picloram	1.30	0.13	0.75	ug/l	1	1.50	---	87	35-138%	---	---	
Surr: 2,4-DCAA			*Recovery: 92 %*	*Limits: 56-156 %*			*Dilution: 1x*					
LCS Dup (W3B2223-BSD1)			Prepared: 02/27/23 16:15 Analyzed: 03/22/23 20:41									
EPA 8151A												
2,4-D	2.64	0.34	0.50	ug/l	1	3.00	---	88	56-164%	3	25%	
2,4-DB	4.49	0.99	2.5	ug/l	1	6.00	---	75	27-161%	18	25%	
2,4,5-T	1.48	0.14	0.25	ug/l	1	1.50	---	99	39-151%	3	25%	
2,4,5-TP (Silvex)	1.32	0.14	0.25	ug/l	1	1.50	---	88	46-142%	4	25%	
3,5-Dichlorobenzoic acid	2.65	0.28	1.2	ug/l	1	3.00	---	88	54-154%	3	25%	
4-Nitrophenol	2.93	0.50	1.2	ug/l	1	6.00	---	49	3-105%	22	25%	
Acifluorfen	1.69	0.24	0.50	ug/l	1	1.50	---	112	39-134%	3	25%	
Bentazon	5.53	0.55	2.5	ug/l	1	6.00	---	92	44-139%	2	25%	
Dalapon	2.50	0.16	0.50	ug/l	1	3.00	---	83	40-139%	0.7	25%	
Dicamba	2.59	0.19	0.75	ug/l	1	3.00	---	86	46-140%	3	25%	
Dichloroprop	2.64	0.24	1.0	ug/l	1	3.00	---	88	43-158%	3	25%	
Dinoseb	1.16	0.090	0.50	ug/l	1	1.50	---	77	42-146%	10	25%	
DCPA	1.51	0.20	0.25	ug/l	1	1.50	---	101	34-135%	2	25%	
MCPA	218	40	100	ug/l	1	300	---	73	28-144%	18	25%	
MCPP	210	27	100	ug/l	1	300	---	70	31-153%	4	25%	
Pentachlorophenol	1.18	0.18	0.25	ug/l	1	1.50	---	79	37-136%	9	25%	
Picloram	1.31	0.13	0.75	ug/l	1	1.50	---	88	35-138%	0.7	25%	
Surr: 2,4-DCAA			*Recovery: 93 %*	*Limits: 56-156 %*			*Dilution: 1x*					

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AMENDED REPORT

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3140 NE Broadway Street	Project Number: M0830.03.006	Report ID:
Portland, OR 97232	Project Manager: David Weatherby	A3B0674 - 04 21 23 1031

Weck Laboratories, Inc.

QUALITY CONTROL (QC) SAMPLE RESULTS

Hexavalent Chromium by IC

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch W3C0242 - _NONE (LC)							Water					
Blank (W3C0242-BLK1)			Prepared: 03/02/23 00:00		Analyzed: 03/02/23 11:51							
EPA 218.6												
Chromium 6+	ND	0.0079	0.020	ug/l	1	---	---	---	---	---	---	
LCS (W3C0242-BS1)			Prepared: 03/02/23 00:00		Analyzed: 03/02/23 12:03							
EPA 218.6												
Chromium 6+	5.22	0.0079	0.020	ug/l	1	5.00	---	104	90-110%	---	---	
Matrix Spike (W3C0242-MS1)			Prepared: 03/02/23 00:00		Analyzed: 03/02/23 16:43							
QC Source Sample: Non-SDG (3A19163-03)												
EPA 218.6												
Chromium 6+	5.27	0.0079	0.020	ug/l	1	5.00	0.100	103	88-112%	---	---	
Matrix Spike (W3C0242-MS2)			Prepared: 03/02/23 00:00		Analyzed: 03/02/23 17:06							
QC Source Sample: Non-SDG (3A19163-04)												
EPA 218.6												
Chromium 6+	5.16	0.0079	0.020	ug/l	1	5.00	0.146	100	88-112%	---	---	
Matrix Spike Dup (W3C0242-MSD1)			Prepared: 03/02/23 00:00		Analyzed: 03/02/23 16:55							
QC Source Sample: Non-SDG (3A19163-03)												
Chromium 6+	5.22	0.0079	0.020	ug/l	1	5.00	0.100	102	88-112%	0.8	10%	
Matrix Spike Dup (W3C0242-MSD2)			Prepared: 03/02/23 00:00		Analyzed: 03/02/23 17:18							
QC Source Sample: Non-SDG (3A19163-04)												
Chromium 6+	5.29	0.0079	0.020	ug/l	1	5.00	0.146	103	88-112%	2	10%	

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23C0083							
A3B0674-01	Water	NWTPH-Dx	02/20/23 10:26	03/02/23 11:25	1020mL/5mL	1000mL/5mL	0.98
A3B0674-02	Water	NWTPH-Dx	02/20/23 14:41	03/02/23 11:25	900mL/5mL	1000mL/5mL	1.11

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0828							
A3B0674-01	Water	NWTPH-Gx (MS)	02/20/23 10:26	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0674-02	Water	NWTPH-Gx (MS)	02/20/23 14:41	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00

Volatile Organic Compounds by EPA 8260D

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0828							
A3B0674-01	Water	EPA 8260D	02/20/23 10:26	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0674-02	Water	EPA 8260D	02/20/23 14:41	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00
A3B0674-03	Water	EPA 8260D	02/20/23 00:00	02/22/23 11:21	5mL/5mL	5mL/5mL	1.00

Volatile Organic Compounds by EPA 8260D SIM

Prep: EPA 5030C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23C0033							
A3B0674-01	Water	EPA 8260D SIM	02/20/23 10:26	03/01/23 11:36	5mL/5mL	5mL/5mL	1.00
A3B0674-02	Water	EPA 8260D SIM	02/20/23 14:41	03/01/23 11:36	5mL/5mL	5mL/5mL	1.00
A3B0674-03	Water	EPA 8260D SIM	02/20/23 00:00	03/01/23 11:36	5mL/5mL	5mL/5mL	1.00

Semivolatile Organic Compounds by EPA 8270E

Prep: EPA 3510C (Acid/Base Neutral)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0916							
A3B0674-01	Water	EPA 8270E	02/20/23 10:26	02/27/23 07:33	990mL/1mL	1000mL/1mL	1.01
A3B0674-02	Water	EPA 8270E	02/20/23 14:41	02/27/23 07:33	940mL/1mL	1000mL/1mL	1.06

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

SAMPLE PREPARATION INFORMATION

Semivolatile Organic Compounds by EPA 8270E

Prep: EPA 3510C (Acid/Base Neutral)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor

Organophosphorus Pesticides (OPPs) by EPA 8270E (GC/MS)

Prep: EPA 3510C (Neutral pH)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0917							
A3B0674-01	Water	EPA 8270E OPPs	02/20/23 10:26	02/27/23 07:35	960mL/2mL	1000mL/2mL	1.04
A3B0674-02	Water	EPA 8270E OPPs	02/20/23 14:41	02/27/23 07:35	960mL/2mL	1000mL/2mL	1.04

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23B0841							
A3B0674-01	Water	EPA 6020B	02/20/23 10:26	02/22/23 10:27	45mL/50mL	45mL/50mL	1.00
A3B0674-02	Water	EPA 6020B	02/20/23 14:41	02/22/23 10:27	45mL/50mL	45mL/50mL	1.00

Apex Laboratories

Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

Project: **St. Helens Lagoon**
Project Number: **M0830.03.006**
Project Manager: **David Weatherby**

Report ID:
A3B0674 - 04 21 23 1031

Weck Laboratories, Inc.

SAMPLE PREPARATION INFORMATION

Chlorinated Herbicides by GC/ECD

Prep: EPA 3510C

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: W3B2223							
A3B0674-01	Water	EPA 8151A	02/20/23 10:26	02/27/23 16:15	988ml/10ml	1000ml/10ml	1.01
A3B0674-02	Water	EPA 8151A	02/20/23 14:41	02/27/23 16:15	1034ml/10ml	1000ml/10ml	0.97

Hexavalent Chromium by IC

Prep: NONE (LC)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: W3C0242							
A3B0674-01	Water	EPA 218.6	02/20/23 10:26	03/02/23 00:00	5ml/5ml	5ml/5ml	1.00
A3B0674-02	Water	EPA 218.6	02/20/23 14:41	03/02/23 00:00	5ml/5ml	5ml/5ml	1.00

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

E	Estimated Value. The result is above the calibration range of the instrument.
ICV-01	Estimated Result. Initial Calibration Verification (ICV) failed high. There is no effect on non-detect results.
Ja	Estimated Result. Result detected below the lowest point of the calibration curve, but above the specified MDL.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-16	Reanalysis of an original Batch QC sample.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-24	The RPD for this spike and spike duplicate is above established control limits. Recoveries for both the spike and spike duplicate are within control limits.
Q-29	Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high.
Q-30	Recovery for Lab Control Spike (LCS) is below the lower control limit. Data may be biased low.
Q-41	Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
Q-42	Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)
Q-52	Due to known erratic recoveries, the result and reporting levels for this analyte are reported as Estimated Values. This analyte may not have passed all QC requirements for this method.
Q-54	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +1%. The results are reported as Estimated Values.
Q-54a	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +10%. The results are reported as Estimated Values.
Q-54b	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by +6%. The results are reported as Estimated Values.
Q-54c	Daily Continuing Calibration Verification recovery for this analyte failed the +/-20% criteria listed in EPA method 8260/8270 by -5%. The results are reported as Estimated Values.
Q-55	Daily CCV/LCS recovery for this analyte was below the +/-20% criteria listed in EPA 8260, however there is adequate sensitivity to ensure detection at the reporting level.
Q-56	Daily CCV/LCS recovery for this analyte was above the +/-20% criteria listed in EPA 8260
Q-65	Spike recovery is estimated due to the high analyte concentration of the source sample.

Apex Laboratories

Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

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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ANALYTICAL REPORT

AMENDED REPORT

Maul Foster & Alongi, INC.	Project: **St. Helens Lagoon**	
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

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:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Philip Nerenberg, Lab Director

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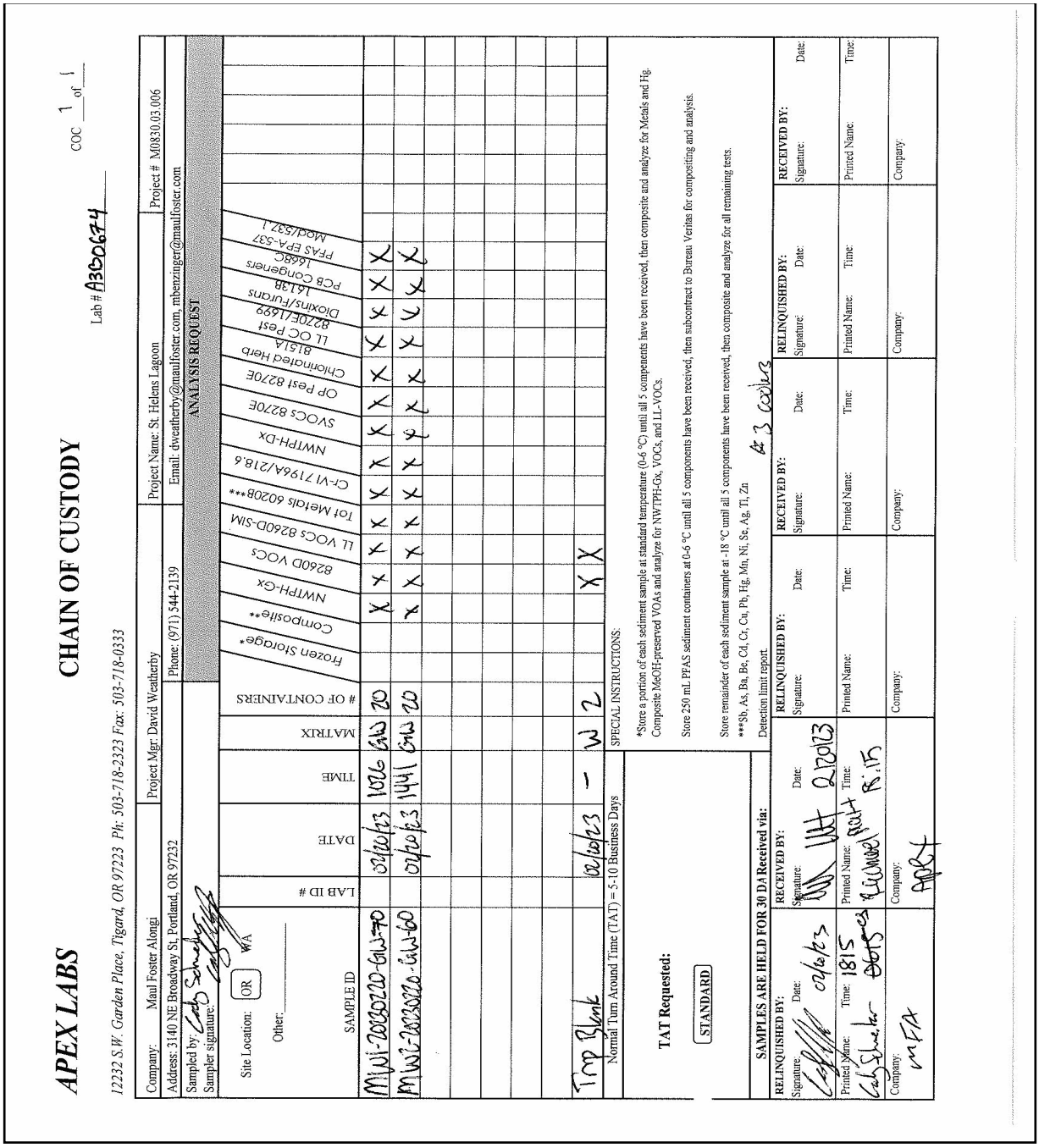
3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**



APEX LABS

CHAIN OF CUSTODY

COC 1 of 1

Lab # A3B0674

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Maul Foster Alongi | Project Mgr: David Weatherby | Project Name: St. Helens Lagoon | Project # M0830.03.006

Address: 3140 NE Broadway St, Portland, OR 97232 | Phone: (971) 544-2139 | Email: dweatherby@maulfoster.com, mbenzinger@maulfoster.com

Sampled by: Cady Schenker

Sampler signature:

Site Location: OR WA

Other:

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	Frozen Storage*	Composite**	NWTPH-Gx	8260D VOCs	LL VOCs 8260D-SIM	Tot Metals 6020B***	Cr-VI 7196A/218.6	NWTPH-Dx	SVOCs 8270E	OP Pest 8270E	Chlorinated Herb 8151A	LL OC Pest 8270E/1629	Dioxins/Furans 1613B	PCB Congeners 1668C	PFAS EPA-537 Mod/537.1							
MW-20230220-GW-20		02/20/23	1026	GW	20		X	X	X	X	X	X	X	X	X	X	X	X	X	X							
MW-20230220-GW-60		02/20/23	1141	GW	20		X	X	X	X	X	X	X	X	X	X	X	X	X	X							
Trip Blank		02/20/23	-	W	2			X	X																		

Normal Turn Around Time (TAT) = 5-10 Business Days

SPECIAL INSTRUCTIONS:

*Store a portion of each sediment sample at standard temperature (0-6 °C) until all 5 components have been received, then composite and analyze for Metals and Hg. Composite MeOH-preserved VOAs and analyze for NWTPH-Gx, VOCs, and LL-VOCs.

Store 250 mL PFAS sediment containers at 0-6 °C until all 5 components have been received, then subcontract to Bureau Veritas for compositing and analysis.

Store remainder of each sediment sample at -18 °C until all 5 components have been received, then composite and analyze for all remaining tests.

***Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Se, Ag, Tl, Zn

Detection limit report.

4 x 3 coolers

TAT Requested:

STANDARD

SAMPLES ARE HELD FOR 30 DA Received via:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:	Signature:	Signature:	Signature:	Signature:
Date: 02/20/23	Date: 2/20/23	Date:	Date:	Date:	Date:
Printed Name: Cady Schenker	Printed Name: Lucinda Berges	Printed Name:	Printed Name:	Printed Name:	Printed Name:
Time: 1815	Time: Rec. 1715	Time:	Time:	Time:	Time:
Company: MFA	Company: APEX	Company:	Company:	Company:	Company:

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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3140 NE Broadway Street	Project Number: **M0830.03.006**	**Report ID:**
Portland, OR 97232	Project Manager: **David Weatherby**	**A3B0674 - 04 21 23 1031**

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster Alongi Element WO#: A3B0674

Project/Project #: St. Helens Lagoon / M0830.03.006

Delivery Info:

Date/time received: 2/20/23 @ 18:15 By: ZAM

Delivered by: Apex__Client X ESS__FedEx__UPS__Radio__Morgan__SDS__Evergreen__Other__

Cooler Inspection Date/time inspected: 2/20/23 @ 18:15 By: ZAM

Chain of Custody included? Yes X No ____

Signed/dated by client? Yes X No ____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	5.6	5.4	4.7				
Custody seals? (Y/N)	ZAM 2/20/23 Y	Y (N)	Y (N)				
Received on ice? (Y/N)	Y	Y	Y				
Temp. blanks? (Y/N)	Y	Y	Y				
Ice type: (Gel/Real/Other)	Real	Real	Real				
Condition (In/Out):	In	In	In				

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: 2/20/23 @ 18:45 By: RMP

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 X NA ____

Comments ____

Water samples: pH checked: Yes X No ___ NA ___ pH appropriate? Yes X No ___ NA ____

Comments: ____

Additional information: TB# 3239

Labeled by: ZAM Witness: RMP Cooler Inspected by: RMP

Form Y-003 R-00

Apex Laboratories

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Philip Nerenberg

Philip Nerenberg, Lab Director

AIR

SUBCONTRACT ORDER

Apex Laboratories

08/17/22 **A2H0382**

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:

BV Labs / Maxxam
C/O FEDEX DEPOT 299 Cayuga Rd
Cheektowaga, NY 14225
Phone :(800) 668-0639
Fax: (905) 332-9169

After Processing

Sample Name: DU1-20220810-ISM-COMP-1 **Sediment** **Sampled: 08/10/22 09:15** (A2H0382-02)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	08/24/22 17:00	08/10/23 09:15	
1668C PCB Congeners (SUB)	08/24/22 17:00	08/10/23 09:15	
1699 Insecticides/Pesticides (SUB)	08/24/22 17:00	08/24/22 09:15	
Subcontract Outside	08/24/22 17:00	02/06/23 09:15	PFAS EPA-1633
Containers Supplied:	9/6/22		
(C) 8 oz Glass Jar			
(D) 250 mL Poly (WM) - Non Preserved			

Standard TAT

International Solid Sample
Heat Treat Required
High Risk material
Controlled Storage and Disposal

23-Aug-22 12:11
Lori Dufour
C2O0154
KTN ENV-624

14.2/8.2/9.2 Onice

Nocustody seal

Released By		Date	Received By	Fed Ex (Shipper)	12:11
Released By	Fed Ex (Shipper)	8/22/22 Date	Received By	Ramandeep Kaur	Date 2022/08/23
Released By		Date	Received By		Date

Temperature blank 4.3 | 3.9 | 4.1

SUBCONTRACT ORDER

Apex Laboratories

A2H0382

Additional

ACK 9/14/22

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:

BV Labs / Maxxam
C/O FEDEX DEPOT 299 Cayuga Rd
Cheektowaga, NY 14225
Phone :(800) 668-0639
Fax: (905) 332-9169

After Processing

Sample Name: DU1-20220810-ISM-COMP **Sediment** **Sampled: 08/10/22 09:15** (A2H0382-02)

Analysis	Due	Expires	Comments
1668C PCB Congeners (SUB)	08/24/22 17:00	08/10/23 09:15	
Containers Supplied: (G)2 oz Glass Jar			

* Additional volume requested for PCBs *

International Solid Sample
Heat Treat Required
High Risk material
Controlled Storage and Disposal

23-Aug-22 12:11
Lori Dufour
C2O0154
KTN ENV-624

9/14/22
Released By Date

Fed Ex (Shipper)
Released By Date

Fed Ex (Shipper)
Received By Date

NO Temp Blank

Rupinder / RUPINDER 2022/09/15 13:10
Received By Date

Page 1 of 1

Your P.O. #: A2H0382
Your Project #: A2H0382
Your C.O.C. #: n/a

Attention: Philip Nerenberg

Apex Laboratories
6700 SW Sandburg St.
Tigard, OR
USA 97223

Report Date: 2022/12/08
Report #: R7422015
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C2O0154
Received: 2022/08/23, 12:11

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dioxins/Furans in Soil (1613B) (1)	1	2022/09/03	2022/09/11	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	2022/09/03	2022/09/20	BRL SOP-00406 BRL SOP-00410	EPA M8290Am/ M1613Bm
Moisture	1	N/A	2022/08/25	CAM SOP-00445	Carter 2nd ed 51.2 m
PCB Congeners in Soil (1668C) (2)	1	2022/09/22	2022/09/30	BRL SOP-00408	EPA 1668C m
PFAS in soil by SPE/LCMS (3)	1	2022/09/06	2022/09/08	CAM SOP-00894	ASTM D7968-17a 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.
(2) Soils are reported on a dry weight basis unless otherwise specified.
(3) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.
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:
Lori Dufour, Project Manager
Email: Lori.Dufour@bureauveritas.com
Phone# (905) 817-5700

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C2O0154
Report Date: 2022/12/08

Apex Laboratories
Client Project #: A2H0382
Your P.O. #: A2H0382

RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		TNI532			
Sampling Date		2022/08/10 09:15			
COC Number		n/a			
	UNITS	**DU1-20220810-ISM-COMP**	**RDL**	**MDL**	**QC Batch**
Moisture	%	5.5	1.0	0.50	8186897

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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PERFLUOROALKYL SUBSTANCES (SOIL)

Bureau Veritas ID		TNI532			
Sampling Date		2022/08/10 09:15			
COC Number		n/a			
	UNITS	DU1-20220810-ISM-COMP	RDL	MDL	QC Batch
Perfluorobutanoic acid (PFBA)	ug/kg	0.24 U	1.0	0.24	8208220
Perfluoropentanoic acid (PFPeA)	ug/kg	0.23 U	1.0	0.23	8208220
Perfluorohexanoic acid (PFHxA)	ug/kg	2.3	1.0	0.16	8208220
Perfluoroheptanoic acid (PFHpA)	ug/kg	1.2	1.0	0.17	8208220
Perfluorooctanoic acid (PFOA)	ug/kg	2.2	1.0	0.20	8208220
Perfluorononanoic acid (PFNA)	ug/kg	2.9	1.0	0.27	8208220
Perfluorodecanoic acid (PFDA)	ug/kg	3.9	1.0	0.24	8208220
Perfluoroundecanoic acid (PFUnA)	ug/kg	6.8	1.0	0.25	8208220
Perfluorododecanoic acid (PFDoA)	ug/kg	5.5	1.0	0.19	8208220
Perfluorotridecanoic acid (PFTRDA)	ug/kg	3.9	1.0	0.22	8213841
Perfluorotetradecanoic acid(PFTEDA)	ug/kg	2.2	1.0	0.30	8213841
Perfluorobutanesulfonic acid (PFBS)	ug/kg	0.17 U	1.0	0.17	8208220
Perfluoropentanesulfonic acid PFPes	ug/kg	0.26 U	1.0	0.26	8208220
Perfluorohexanesulfonic acid(PFHxS)	ug/kg	3.5 (1)	1.0	0.30	8208220
Perfluoroheptanesulfonic acid PFHpS	ug/kg	0.17 U	1.0	0.17	8208220
Perfluorooctanesulfonic acid (PFOS)	ug/kg	2.4	1.0	0.27	8208220
Perfluorononanesulfonic acid (PFNS)	ug/kg	0.24 U	1.0	0.24	8208220
Perfluorodecanesulfonic acid (PFDS)	ug/kg	1.8	1.0	0.27	8208220
Perfluorooctane Sulfonamide (PFOSA)	ug/kg	0.20 U	1.0	0.20	8213841
EtFOSA	ug/kg	0.31 U	1.0	0.31	8213841
MeFOSA	ug/kg	0.39 U	1.0	0.39	8213841
EtFOSE	ug/kg	1.7	1.0	0.29	8213841
MeFOSE	ug/kg	3.6	1.0	0.22	8213841
EtFOSAA	ug/kg	8.8	1.0	0.40	8208220
MeFOSAA	ug/kg	10	1.0	0.32	8208220
4:2 Fluorotelomer sulfonic acid	ug/kg	0.25 U	1.0	0.25	8208220
6:2 Fluorotelomer sulfonic acid	ug/kg	0.46 J	1.0	0.30	8208220
8:2 Fluorotelomer sulfonic acid	ug/kg	1.5	1.0	0.30	8208220
Hexafluoropropyleneoxide dimer acid	ug/kg	0.19 U	1.0	0.19	8208220
4,8-Dioxa-3H-perfluorononanoic acid	ug/kg	0.28 U	1.0	0.28	8208220
9Cl-PF3ONS (F-53B Major)	ug/kg	0.21 U	1.0	0.21	8208220
11Cl-PF3OUdS (F-53B Minor)	ug/kg	0.22 U	1.0	0.22	8208220
Surrogate Recovery (%)					
13C2-4:2-Fluorotelomersulfonic Acid	%	103	N/A	N/A	8208220

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Result is estimated as analyte confirmation criteria were not met.

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PERFLUOROALKYL SUBSTANCES (SOIL)

Bureau Veritas ID		TNI532			
Sampling Date		2022/08/10 09:15			
COC Number		n/a			
	UNITS	DU1-20220810-ISM-COMP	RDL	MDL	QC Batch
13C2-6:2-Fluorotelomersulfonic Acid	%	90	N/A	N/A	8208220
13C2-8:2-Fluorotelomersulfonic Acid	%	76	N/A	N/A	8208220
13C2-Perfluorodecanoic acid	%	74	N/A	N/A	8208220
13C2-Perfluorododecanoic acid	%	62	N/A	N/A	8208220
13C2-Perfluorohexanoic acid	%	76	N/A	N/A	8208220
13C2-perfluorotetradecanoic acid	%	38 (1)	N/A	N/A	8213841
13C2-Perfluoroundecanoic acid	%	61	N/A	N/A	8208220
13C3-HFPO-DA	%	78	N/A	N/A	8208220
13C3-Perfluorobutanesulfonic acid	%	90	N/A	N/A	8208220
13C4-Perfluorobutanoic acid	%	91	N/A	N/A	8208220
13C4-Perfluoroheptanoic acid	%	83	N/A	N/A	8208220
13C4-Perfluorooctanesulfonic acid	%	77	N/A	N/A	8208220
13C4-Perfluorooctanoic acid	%	80	N/A	N/A	8208220
13C5-Perfluorononanoic acid	%	62	N/A	N/A	8208220
13C5-Perfluoropentanoic acid	%	87	N/A	N/A	8208220
13C8-Perfluorooctane Sulfonamide	%	27 (2)	N/A	N/A	8213841
18O2-Perfluorohexanesulfonic acid	%	86	N/A	N/A	8208220
D3-MeFOSA	%	23 (3)	N/A	N/A	8213841
D3-MeFOSAA	%	56	N/A	N/A	8208220
D5-EtFOSA	%	18 (4)	N/A	N/A	8213841

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

(1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked soil resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be increasing the variability of the associated native analyte result (PFTeDA, PFTrDA). Results were confirmed through re-analysis.

(2) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked soil resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be increasing the variability of the associated native analyte result (PFOSA). Results were confirmed through re-analysis.

(3) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked soil resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be increasing the variability of the associated native analyte result (MeFOSA). Results were confirmed through re-analysis.

(4) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked soil resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be increasing the variability of the associated native analyte result (EtFOSA). Results were confirmed through re-analysis.

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PERFLUOROALKYL SUBSTANCES (SOIL)

Bureau Veritas ID		TNI532			
Sampling Date		2022/08/10 09:15			
COC Number		n/a			
	UNITS	**DU1-20220810-ISM-COMP**	**RDL**	**MDL**	**QC Batch**
D5-EtFOSAA	%	56	N/A	N/A	8208220
D7-MeFOSE	%	27	N/A	N/A	8213841
D9-EtFOSE	%	17 (1)	N/A	N/A	8213841

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked soil resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be increasing the variability of the associated native analyte result (EtFOSE). Results were confirmed through re-analysis.

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DIOXINS AND FURANS BY HRMS (SOIL)

Bureau Veritas ID		TNI532							
Sampling Date		2022/08/10 09:15							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	DU1-20220810-ISM-COMP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	10.2	0.232	1.00	0.400	1.00	10.2	1	8212445
1,2,3,7,8-Penta CDD *	pg/g	5.59	0.235	5.00	0.400	1.00	5.59	1	8212445
1,2,3,4,7,8-Hexa CDD *	pg/g	2.77 J	0.198	5.00	0.400	0.100	0.277	1	8212445
1,2,3,6,7,8-Hexa CDD *	pg/g	43.8	0.194	5.00	0.400	0.100	4.38	1	8212445
1,2,3,7,8,9-Hexa CDD *	pg/g	30.2	0.205	5.00	0.400	0.100	3.02	1	8212445
1,2,3,4,6,7,8-Hepta CDD *	pg/g	259	0.216	5.00	0.400	0.0100	2.59	1	8212445
Octa CDD *	pg/g	2460	0.197	10.0	0.800	0.000300	0.738	1	8212445
Total Tetra CDD *	pg/g	135	0.232	1.00	0.400	N/A	N/A	10	8212445
Total Penta CDD *	pg/g	38.7	0.235	5.00	0.400	N/A	N/A	9	8212445
Total Hexa CDD *	pg/g	281	0.199	5.00	0.400	N/A	N/A	6	8212445
Total Hepta CDD *	pg/g	492	0.216	5.00	0.400	N/A	N/A	2	8212445
2,3,7,8-Tetra CDF **	pg/g	58.3	0.174	1.00	0.400	0.100	5.83	1	8212445
1,2,3,7,8-Penta CDF **	pg/g	4.38 J	0.238	5.00	0.400	0.0300	0.131	1	8212445
2,3,4,7,8-Penta CDF **	pg/g	3.01 J	0.210	5.00	0.400	0.300	0.903	1	8212445
1,2,3,4,7,8-Hexa CDF **	pg/g	4.87 J	0.146	5.00	0.400	0.100	0.487	1	8212445
1,2,3,6,7,8-Hexa CDF **	pg/g	2.71 J	0.142	5.00	0.400	0.100	0.271	1	8212445
2,3,4,6,7,8-Hexa CDF **	pg/g	1.86 J	0.128	5.00	0.400	0.100	0.186	1	8212445
1,2,3,7,8,9-Hexa CDF **	pg/g	0.386 U	0.386	5.00	0.400	0.100	0.0386	0	8212445
1,2,3,4,6,7,8-Hepta CDF **	pg/g	56.5	0.161	5.00	0.400	0.0100	0.565	1	8212445
1,2,3,4,7,8,9-Hepta CDF **	pg/g	2.94 J	0.189	5.00	0.400	0.0100	0.0294	1	8212445
Octa CDF **	pg/g	100	0.225	10.0	0.800	0.000300	0.0300	1	8212445
Total Tetra CDF **	pg/g	191	0.174	1.00	0.400	N/A	N/A	15	8212445
Total Penta CDF **	pg/g	54.1	0.223	5.00	0.400	N/A	N/A	13	8212445
Total Hexa CDF **	pg/g	51.1	0.143	5.00	0.400	N/A	N/A	8	8212445
Total Hepta CDF **	pg/g	124	0.174	5.00	0.400	N/A	N/A	3	8212445
Confirmation 2,3,7,8-Tetra CDF **	pg/g	59.5	N/A	1.0	0.90	0.100	5.95	N/A	8237702
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	35.4	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

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DIOXINS AND FURANS BY HRMS (SOIL)

Bureau Veritas ID		TNI532							
Sampling Date		2022/08/10 09:15							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	DU1-20220810-ISM-COMP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	90	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-1234678 HeptaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-1234678 HeptaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-123478 HexaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-123478 HexaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-1234789 HeptaCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-123678 HexaCDD *	%	81	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-123678 HexaCDF **	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-12378 PentaCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-12378 PentaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-123789 HexaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-234678 HexaCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-23478 PentaCDF **	%	97	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-2378 TetraCDD *	%	87	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-2378 TetraCDF **	%	80	N/A	N/A	N/A	N/A	N/A	N/A	8212445
C13-OCDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	8212445
Confirmation C13-2378 TetraCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8237702

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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SEMI-VOLATILE ORGANICS BY HRMS (SOIL)

Bureau Veritas ID		TNI532							
Sampling Date		2022/08/10 09:15							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	DU1-20220810-ISM-COMP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2-MonoCB-(1)	ng/g	0.163	0.069	0.099	0.0026	N/A	N/A	N/A	8239765
3-MonoCB-(2)	ng/g	0.092 J	0.060	0.099	0.0038	N/A	N/A	N/A	8239765
4-MonoCB-(3)	ng/g	0.179 J	0.068	0.25	0.0035	N/A	N/A	N/A	8239765
22'-DiCB-(4)	ng/g	0.36	0.17	0.25	0.0040	N/A	N/A	N/A	8239765
2,3-DiCB-(5)	ng/g	0.082 U	0.082	0.25	0.015	N/A	N/A	N/A	8239765
2,3'-DiCB-(6)	ng/g	0.267	0.086	0.099	0.0034	N/A	N/A	N/A	8239765
2,4-DiCB-(7)	ng/g	0.083 U	0.083	0.099	0.0064	N/A	N/A	N/A	8239765
2,4'-DiCB-(8)	ng/g	0.455	0.085	0.25	0.016	N/A	N/A	N/A	8239765
2,5-DiCB-(9)	ng/g	0.093 J	0.085	0.099	0.0019	N/A	N/A	N/A	8239765
2,6-DiCB-(10)	ng/g	0.14 U	0.14	0.25	0.0042	N/A	N/A	N/A	8239765
3,3'-DiCB-(11)	ng/g	7.10	0.086	0.50	0.034	N/A	N/A	N/A	8239765
DiCB-(12)+(13)	ng/g	0.221 J	0.084	0.25	0.011	N/A	N/A	N/A	8239765
3,5-DiCB-(14)	ng/g	0.085 U	0.085	0.099	0.0033	N/A	N/A	N/A	8239765
4,4'-DiCB-(15)	ng/g	0.81	0.11	0.25	0.0039	N/A	N/A	N/A	8239765
22'3-TriCB-(16)	ng/g	0.51	0.23	0.25	0.013	N/A	N/A	N/A	8239765
22'4-TriCB-(17)	ng/g	0.69	0.20	0.099	0.0040	N/A	N/A	N/A	8239765
TriCB-(18)+(30)	ng/g	1.10	0.16	0.25	0.0052	N/A	N/A	N/A	8239765
22'6-TriCB-(19)	ng/g	0.41	0.20	0.099	0.0052	N/A	N/A	N/A	8239765
TriCB-(20) + (28)	ng/g	2.30	0.12	0.25	0.0090	N/A	N/A	N/A	8239765
TriCB-(21)+(33)	ng/g	0.61	0.11	0.25	0.011	N/A	N/A	N/A	8239765
234'-TriCB-(22)	ng/g	0.84	0.13	0.099	0.0049	N/A	N/A	N/A	8239765
235-TriCB-(23)	ng/g	0.12 U	0.12	0.099	0.0046	N/A	N/A	N/A	8239765
236-TriCB-(24)	ng/g	0.14 U	0.14	0.099	0.0090	N/A	N/A	N/A	8239765
23'4-TriCB-(25)	ng/g	0.53	0.12	0.099	0.0064	N/A	N/A	N/A	8239765
TriCB-(26)+(29)	ng/g	0.58	0.12	0.25	0.0087	N/A	N/A	N/A	8239765
23'6-TriCB-(27)	ng/g	0.14 U	0.14	0.099	0.0065	N/A	N/A	N/A	8239765
24'5-TriCB-(31)	ng/g	2.20	0.12	0.25	0.0038	N/A	N/A	N/A	8239765
24'6-TriCB-(32)	ng/g	0.44	0.13	0.099	0.0024	N/A	N/A	N/A	8239765
23'5'-TriCB-(34)	ng/g	0.13 U	0.13	0.099	0.0060	N/A	N/A	N/A	8239765
33'4-TriCB-(35)	ng/g	0.26	0.12	0.099	0.0042	N/A	N/A	N/A	8239765

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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SEMI-VOLATILE ORGANICS BY HRMS (SOIL)

Bureau Veritas ID		TNI532							
Sampling Date		2022/08/10 09:15							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	DU1-20220810-ISM-COMP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
33'5-TriCB-(36)	ng/g	0.11 U	0.11	0.099	0.0029	N/A	N/A	N/A	8239765
344'-TriCB-(37)	ng/g	0.79	0.16	0.099	0.0029	N/A	N/A	N/A	8239765
345-TriCB-(38)	ng/g	0.12 U	0.12	0.099	0.0038	N/A	N/A	N/A	8239765
34'5-TriCB-(39)	ng/g	0.11 U	0.11	0.099	0.0052	N/A	N/A	N/A	8239765
TetraCB-(40)+(41)+(71)	ng/g	1.45	0.27	0.50	0.016	N/A	N/A	N/A	8239765
22'34'-TetraCB-(42)	ng/g	0.91	0.32	0.25	0.014	N/A	N/A	N/A	8239765
22'35-TetraCB-(43)	ng/g	0.38 U	0.38	0.25	0.019	N/A	N/A	N/A	8239765
TetraCB-(44)+(47)+(65)	ng/g	3.77	0.26	0.50	0.041	N/A	N/A	N/A	8239765
TetraCB-(45)+(51)	ng/g	0.52	0.30	0.25	0.018	N/A	N/A	N/A	8239765
22'36'-TetraCB-(46)	ng/g	0.32 U	0.32	0.099	0.0090	N/A	N/A	N/A	8239765
22'45-TetraCB-(48)	ng/g	0.60	0.29	0.25	0.0042	N/A	N/A	N/A	8239765
TetraCB-(49)+TetraCB-(69)	ng/g	2.56	0.24	0.50	0.010	N/A	N/A	N/A	8239765
TetraCB-(50)+(53)	ng/g	0.48 J	0.30	0.50	0.013	N/A	N/A	N/A	8239765
22'55'-TetraCB-(52)	ng/g	7.65	0.29	0.25	0.016	N/A	N/A	N/A	8239765
22'66'-TetraCB-(54)	ng/g	0.22 U	0.22	0.25	0.0096	N/A	N/A	N/A	8239765
233'4-TetraCB-(55)	ng/g	0.27 U	0.27	0.25	0.011	N/A	N/A	N/A	8239765
233'4'-Tetra CB(56)	ng/g	1.25	0.25	0.25	0.0051	N/A	N/A	N/A	8239765
233'5-TetraCB-(57)	ng/g	0.24 U	0.24	0.25	0.0056	N/A	N/A	N/A	8239765
233'5'-TetraCB-(58)	ng/g	0.26 U	0.26	0.25	0.011	N/A	N/A	N/A	8239765
TetraCB-(59)+(62)+(75)	ng/g	0.22 J	0.21	0.50	0.014	N/A	N/A	N/A	8239765
2344'-TetraCB -(60)	ng/g	0.54	0.23	0.25	0.0053	N/A	N/A	N/A	8239765
TetraCB-(61)+(70)+(74)+(76)	ng/g	6.91	0.23	0.99	0.022	N/A	N/A	N/A	8239765
234'5-TetraCB-(63)	ng/g	0.23 U	0.23	0.25	0.0071	N/A	N/A	N/A	8239765
234'6-TetraCB-(64)	ng/g	1.40	0.23	0.25	0.0047	N/A	N/A	N/A	8239765
23'44'-TetraCB-(66)	ng/g	2.53	0.23	0.25	0.099	N/A	N/A	N/A	8239765
23'45-TetraCB-(67)	ng/g	0.23 J	0.21	0.25	0.011	N/A	N/A	N/A	8239765
23'45'-TetraCB-(68)	ng/g	0.23 U	0.23	0.25	0.0088	N/A	N/A	N/A	8239765
23'55'-TetraCB-(72)	ng/g	0.23 U	0.23	0.25	0.0086	N/A	N/A	N/A	8239765
23'5'6-TetraCB-(73)	ng/g	0.20 U	0.20	0.25	0.019	N/A	N/A	N/A	8239765
33'44'-TetraCB-(77)	ng/g	0.57	0.27	0.25	0.0063	0.000100	0.0000570	N/A	8239765

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SEMI-VOLATILE ORGANICS BY HRMS (SOIL)

Bureau Veritas ID		TNI532							
Sampling Date		2022/08/10 09:15							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	DU1-20220810-ISM-COMP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
33'45-TetraCB-(78)	ng/g	0.24 U	0.24	0.25	0.0065	N/A	N/A	N/A	8239765
33'45'-TetraCB(79)	ng/g	0.21 U	0.21	0.25	0.0058	N/A	N/A	N/A	8239765
33'55'-TetraCB-(80)	ng/g	0.21 U	0.21	0.25	0.0061	N/A	N/A	N/A	8239765
344'5-TetraCB-(81)	ng/g	0.26 U	0.26	0.25	0.0058	0.000300	0.0000780	N/A	8239765
22'33'4-PentaCB-(82)	ng/g	1.00	0.32	0.25	0.0048	N/A	N/A	N/A	8239765
PentaCB-(83)+(99)	ng/g	5.07	0.31	0.50	0.016	N/A	N/A	N/A	8239765
22'33'6-PentaCB-(84)	ng/g	2.26	0.30	0.099	0.0077	N/A	N/A	N/A	8239765
PentaCB-(85)+(116)+(117)	ng/g	1.23	0.21	0.50	0.027	N/A	N/A	N/A	8239765
PentaCB-(86)(87)(97)(109)(119)(125)	ng/g	6.08	0.24	0.99	0.029	N/A	N/A	N/A	8239765
PentaCB-(88)+(91)	ng/g	1.21	0.29	0.25	0.013	N/A	N/A	N/A	8239765
22'346'-PentaCB-(89)	ng/g	0.31 U	0.31	0.25	0.0080	N/A	N/A	N/A	8239765
PentaCB-(90)+(101)+(113)	ng/g	9.38	0.24	0.99	0.011	N/A	N/A	N/A	8239765
22'355'-PentaCB-(92)	ng/g	1.76	0.30	0.25	0.0044	N/A	N/A	N/A	8239765
PentaCB-(93)+(98)+(100)+(102)	ng/g	0.29 U	0.29	0.99	0.024	N/A	N/A	N/A	8239765
22'356'-PentaCB-(94)	ng/g	0.30 U	0.30	0.25	0.0063	N/A	N/A	N/A	8239765
22'35'6-PentaCB-(95)	ng/g	6.31	0.28	0.25	0.0088	N/A	N/A	N/A	8239765
22'366'-PentaCB-(96)	ng/g	0.14 U	0.14	0.25	0.010	N/A	N/A	N/A	8239765
22'45'6-PentaCB-(103)	ng/g	0.27 U	0.27	0.25	0.0061	N/A	N/A	N/A	8239765
22'466'-PentaCB-(104)	ng/g	0.16 U	0.16	0.25	0.0056	N/A	N/A	N/A	8239765
233'44'-PentaCB-(105)	ng/g	3.88	0.24	0.25	0.0044	0.0000300	0.000116	N/A	8239765
233'45-PentaCB-(106)	ng/g	0.21 U	0.21	0.25	0.0036	N/A	N/A	N/A	8239765
233'4'5-PentaCB-(107)	ng/g	0.58	0.20	0.25	0.017	N/A	N/A	N/A	8239765
PentaCB-(108)+(124)	ng/g	0.37 J	0.21	0.50	0.011	N/A	N/A	N/A	8239765
PentaCB-(110)+(115)	ng/g	12.5	0.25	0.50	0.012	N/A	N/A	N/A	8239765
233'55'-PentaCB-(111)	ng/g	0.21 U	0.21	0.25	0.0056	N/A	N/A	N/A	8239765
233'56-PentaCB-(112)	ng/g	0.19 U	0.19	0.25	0.0078	N/A	N/A	N/A	8239765
2344'5-PentaCB-(114)	ng/g	0.38	0.24	0.25	0.0042	0.0000300	0.0000114	N/A	8239765
23'44'5-PentaCB-(118)	ng/g	10.1	0.23	0.50	0.0066	0.0000300	0.000303	N/A	8239765
23'455'-PentaCB-(120)	ng/g	0.20 U	0.20	0.25	0.0064	N/A	N/A	N/A	8239765
23'45'6-PentaCB-(121)	ng/g	0.21 U	0.21	0.25	0.0063	N/A	N/A	N/A	8239765

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SEMI-VOLATILE ORGANICS BY HRMS (SOIL)

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	UNITS	DU1-20220810-ISM-COMP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
233'4'5'-PentaCB-(122)	ng/g	0.24 U	0.24	0.25	0.0066	N/A	N/A	N/A	8239765
23'44'5'-PentaCB-(123)	ng/g	0.28	0.26	0.25	0.014	0.0000300	0.00000840	N/A	8239765
33'44'5-PentaCB-(126)	ng/g	0.23 U	0.23	0.25	0.0030	0.100	0.0230	N/A	8239765
33'455'-PentaCB-(127)	ng/g	0.24 U	0.24	0.25	0.0032	N/A	N/A	N/A	8239765
HexaCB-(128)+(166)	ng/g	1.84	0.43	0.50	0.021	N/A	N/A	N/A	8239765
HexaCB-(129)+(138)+(163)	ng/g	11.0	0.42	0.99	0.037	N/A	N/A	N/A	8239765
22'33'45'-HexaCB-(130)	ng/g	0.68	0.49	0.25	0.0051	N/A	N/A	N/A	8239765
22'33'46-HexaCB-(131)	ng/g	0.47 U	0.47	0.25	0.0099	N/A	N/A	N/A	8239765
22'33'46'-HexaCB-(132)	ng/g	3.15	0.44	0.25	0.0087	N/A	N/A	N/A	8239765
22'33'55'-HexaCB-(133)	ng/g	0.43 U	0.43	0.25	0.010	N/A	N/A	N/A	8239765
HexaCB-(134)+(143)	ng/g	0.53	0.49	0.50	0.017	N/A	N/A	N/A	8239765
HexaCB-(135)+(151)	ng/g	1.98	0.19	0.99	0.014	N/A	N/A	N/A	8239765
22'33'66'-HexaCB-(136)	ng/g	0.93	0.14	0.25	0.0083	N/A	N/A	N/A	8239765
22'344'5-HexaCB-(137)	ng/g	0.49 J	0.49	0.50	0.030	N/A	N/A	N/A	8239765
HexaCB-(139)+(140)	ng/g	0.37 U	0.37	0.50	0.016	N/A	N/A	N/A	8239765
22'3455'-HexaCB-(141)	ng/g	1.50	0.38	0.25	0.012	N/A	N/A	N/A	8239765
22'3456-HexaCB-(142)	ng/g	0.42 U	0.42	0.25	0.0088	N/A	N/A	N/A	8239765
22'345'6-HexaCB-(144)	ng/g	0.21 U	0.21	0.25	0.0072	N/A	N/A	N/A	8239765
22'3466'-HexaCB-(145)	ng/g	0.15 U	0.15	0.25	0.0082	N/A	N/A	N/A	8239765
22'34'55'-HexaCB-(146)	ng/g	1.09	0.36	0.25	0.010	N/A	N/A	N/A	8239765
HexaCB-(147)+(149)	ng/g	5.83	0.38	0.50	0.019	N/A	N/A	N/A	8239765
22'34'56'-HexaCB-(148)	ng/g	0.19 U	0.19	0.25	0.0084	N/A	N/A	N/A	8239765
22'34'66'-HexaCB-(150)	ng/g	0.13 U	0.13	0.25	0.0061	N/A	N/A	N/A	8239765
22'3566'-HexaCB-(152)	ng/g	0.15 U	0.15	0.25	0.013	N/A	N/A	N/A	8239765
HexaCB-(153)+(168)	ng/g	6.59	0.33	0.50	0.013	N/A	N/A	N/A	8239765
22'44'56'-HexaCB-(154)	ng/g	0.15 U	0.15	0.25	0.012	N/A	N/A	N/A	8239765
22'44'66'-HexaCB-(155)	ng/g	0.22 J	0.20	0.25	0.0087	N/A	N/A	N/A	8239765
HexaCB-(156)+(157)	ng/g	1.99	0.36	0.50	0.0086	0.0000300	0.0000597	N/A	8239765
233'44'6-HexaCB-(158)	ng/g	1.04	0.31	0.25	0.0072	N/A	N/A	N/A	8239765
233'455'-HexaCB-(159)	ng/g	0.43 U	0.43	0.25	0.0082	N/A	N/A	N/A	8239765

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	UNITS	DU1-20220810-ISM-COMP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
233'456-HexaCB-(160)	ng/g	0.35 U	0.35	0.25	0.017	N/A	N/A	N/A	8239765
233'45'6-HexaCB-(161)	ng/g	0.30 U	0.30	0.25	0.011	N/A	N/A	N/A	8239765
233'4'55'-HexaCB-(162)	ng/g	0.39 U	0.39	0.25	0.0083	N/A	N/A	N/A	8239765
233'4'5'6-HexaCB-(164)	ng/g	0.86	0.27	0.25	0.017	N/A	N/A	N/A	8239765
233'55'6-HexaCB-(165)	ng/g	0.34 U	0.34	0.25	0.010	N/A	N/A	N/A	8239765
23'44'55'-HexaCB-(167)	ng/g	0.73	0.36	0.25	0.0056	0.0000300	0.0000219	N/A	8239765
33'44'55'-HexaCB-(169)	ng/g	0.36 U	0.36	0.25	0.024	0.0300	0.0108	N/A	8239765
22'33'44'5-HeptaCB-(170)	ng/g	1.85	0.39	0.25	0.0042	N/A	N/A	N/A	8239765
HeptaCB-(171)+(173)	ng/g	0.57 U	0.57	0.50	0.011	N/A	N/A	N/A	8239765
22'33'455'-HeptaCB-(172)	ng/g	0.60 U	0.60	0.25	0.0080	N/A	N/A	N/A	8239765
22'33'456'-HeptaCB-(174)	ng/g	1.47	0.55	0.25	0.014	N/A	N/A	N/A	8239765
22'33'45'6-HeptaCB-(175)	ng/g	0.31 U	0.31	0.25	0.0092	N/A	N/A	N/A	8239765
22'33'466'-HeptaCB-(176)	ng/g	0.19 U	0.19	0.25	0.0098	N/A	N/A	N/A	8239765
22'33'45'6'-HeptaCB-(177)	ng/g	0.92	0.64	0.25	0.0078	N/A	N/A	N/A	8239765
22'33'55'6-HeptaCB-(178)	ng/g	0.30 U	0.30	0.25	0.010	N/A	N/A	N/A	8239765
22'33'566'-HeptaCB-(179)	ng/g	0.48	0.19	0.25	0.0086	N/A	N/A	N/A	8239765
HeptaCB-(180)+(193)	ng/g	3.27	0.40	0.50	0.0085	N/A	N/A	N/A	8239765
22'344'56-HeptaCB-(181)	ng/g	0.56 U	0.56	0.25	0.0080	N/A	N/A	N/A	8239765
22'344'56'-HeptaCB-(182)	ng/g	0.34 U	0.34	0.25	0.0092	N/A	N/A	N/A	8239765
22'344'5'6-HeptaCB-(183)	ng/g	1.00	0.52	0.25	0.028	N/A	N/A	N/A	8239765
22'344'66'-HeptaCB-(184)	ng/g	0.18 U	0.18	0.25	0.010	N/A	N/A	N/A	8239765
22'3455'6-HeptaCB-(185)	ng/g	0.60 U	0.60	0.25	0.022	N/A	N/A	N/A	8239765
22'34566'-HeptaCB-(186)	ng/g	0.20 U	0.20	0.25	0.0086	N/A	N/A	N/A	8239765
22'34'55'6-HeptaCB-(187)	ng/g	1.95	0.33	0.25	0.011	N/A	N/A	N/A	8239765
22'34'566'-HeptaCB-(188)	ng/g	0.30 U	0.30	0.25	0.0047	N/A	N/A	N/A	8239765
233'44'55'-HeptaCB-(189)	ng/g	0.62 U	0.62	0.25	0.0041	0.0000300	0.0000186	N/A	8239765
233'44'56-HeptaCB-(190)	ng/g	0.43 U	0.43	0.25	0.0041	N/A	N/A	N/A	8239765
233'44'5'6-HeptaCB-(191)	ng/g	0.42 U	0.42	0.25	0.0045	N/A	N/A	N/A	8239765
233'455'6-HeptaCB-(192)	ng/g	0.46 U	0.46	0.25	0.0090	N/A	N/A	N/A	8239765
22'33'44'55'-OctaCB-(194)	ng/g	0.66 U	0.66	0.25	0.0095	N/A	N/A	N/A	8239765

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Bureau Veritas ID		TNI532							
Sampling Date		2022/08/10 09:15							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	DU1-20220810-ISM-COMP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'44'56-OctaCB-(195)	ng/g	0.75 U	0.75	0.25	0.0094	N/A	N/A	N/A	8239765
22'33'44'56'-OctaCB-(196)	ng/g	0.55 U	0.55	0.25	0.016	N/A	N/A	N/A	8239765
22'33'44'66'OctaCB-(197)	ng/g	0.43 U	0.43	0.25	0.044	N/A	N/A	N/A	8239765
OctaCB-(198)+(199)	ng/g	0.83	0.51	0.50	0.014	N/A	N/A	N/A	8239765
22'33'4566'-OctaCB-(200)	ng/g	0.37 U	0.37	0.25	0.032	N/A	N/A	N/A	8239765
22'33'45'66'-OctaCB-(201)	ng/g	0.38 U	0.38	0.25	0.017	N/A	N/A	N/A	8239765
22'33'55'66'-OctaCB-(202)	ng/g	0.47 U	0.47	0.25	0.0081	N/A	N/A	N/A	8239765
22'344'55'6-OctaCB-(203)	ng/g	0.50 U	0.50	0.25	0.011	N/A	N/A	N/A	8239765
22'344'566'-OctaCB-(204)	ng/g	0.41 U	0.41	0.25	0.021	N/A	N/A	N/A	8239765
233'44'55'6-OctaCB-(205)	ng/g	0.53 U	0.53	0.25	0.0096	N/A	N/A	N/A	8239765
22'33'44'55'6-NonaCB-(206)	ng/g	0.71 U	0.71	0.25	0.0077	N/A	N/A	N/A	8239765
22'33'44'566'-NonaCB-(207)	ng/g	0.63 U	0.63	0.25	0.0081	N/A	N/A	N/A	8239765
22'33'455'66'-NonaCB-(208)	ng/g	0.73 U	0.73	0.25	0.0073	N/A	N/A	N/A	8239765
DecaCB-(209)	ng/g	0.72 U	0.72	0.25	0.012	N/A	N/A	N/A	8239765
Total PCB	ng/g	229	2.8	N/A	N/A	N/A	N/A	N/A	8239765
TOTAL TOXIC EQUIVALENCY	ng/g	N/A	N/A	N/A	N/A	N/A	0.0345	N/A	N/A
Surrogate Recovery (%)									
C13-2,44'-TriCB-(28)	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'33'44'55'6-NonaCB-(206)	%	82	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'33'44'5-HeptaCB-(170)	%	97	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'33'455'66'-NonaCB-(208)	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'33'55'66'-OctaCB-(202)	%	88	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'33'55'6-HeptaCB-(178)	%	86	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'344'55'-HeptaCB-(180)	%	101	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'34'566'-HeptaCB-(188)	%	85	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'44'66'-HexaCB-(155)	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'466'-PentaCB-(104)	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'66'-TetraCB-(54)	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'6-TriCB-(19)	%	77	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-22'-DiCB-(4)	%	69	N/A	N/A	N/A	N/A	N/A	N/A	8239765

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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SEMI-VOLATILE ORGANICS BY HRMS (SOIL)

Bureau Veritas ID		TNI532							
Sampling Date		2022/08/10 09:15							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	DU1-20220810-ISM-COMP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-233'44'55'6-OctaCB-(205)	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-233'44'55'-HeptaCB-(189)	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-233'44'-PentaCB-(105)	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-233'55'-PentaCB-(111)	%	82	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-23'44'55'-HexaCB-(167)	%	107	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-2344'5-PentaCB-(114)	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-23'44'5-PentaCB-(118)	%	99	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-2'344'5-PentaCB-(123)	%	101	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-2-MonoCB-(1)	%	79	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-33'44'55'-HexaCB-(169)	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-33'44'5-PentaCB-(126)	%	99	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-33'44'-TetraCB-(77)	%	83	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-344'5-TetraCB-(81)	%	85	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-344'-TriCB-(37)	%	102	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-44'-DiCB-(15)	%	84	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-4-MonoCB-(3)	%	78	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-DecaCB-(209)	%	80	N/A	N/A	N/A	N/A	N/A	N/A	8239765
C13-HexaCB-(156)+(157)	%	104	N/A	N/A	N/A	N/A	N/A	N/A	8239765

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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Bureau Veritas Job #: C2O0154
Report Date: 2022/12/08

Apex Laboratories
Client Project #: A2H0382
Your P.O. #: A2H0382

TEST SUMMARY

Bureau Veritas ID: TNI532
Sample ID: DU1-20220810-ISM-COMP
Matrix: Soil

Collected: 2022/08/10
Shipped:
Received: 2022/08/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	8212445	2022/09/03	2022/09/11	Angel Guerrero
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	8237702	2022/09/03	2022/09/20	Angel Guerrero
Moisture	BAL	8186897	N/A	2022/08/25	Mathew Bowles
PCB Congeners in Soil (1668C)	HRMS/MS	8239765	2022/09/22	2022/09/30	Cathy Xu
PFAS in soil by SPE/LCMS	LCMS	8208220	2022/09/06	2022/09/08	Thanh Tam Tran

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	10.5°C
Package 2	15.2°C

Revised Report (2022/12/08): Removed comments regarding OCTQ-S analysis and updated hold time comments for PFAS.

Revised Report (2022/11/16): Updated sample ID as per client request.

Samples were received with an elevated average temperature of 10.5C on ice. A temperature blank was present and the measured temperatures were 4.3C, 3.9C, and 4.1C. Client consented to proceed with analysis.

Sample TNI532 [DU1-20220810-ISM-COMP] : Per- and polyfluoroalkyl substances (PFAS): Initial analyses of the sample was performed within the method defined hold time with batch 8208220. The sample was reanalysed outside the method defined hold time (28 days) for QC purposes with batch 8213841. Due to their chemical structure, PFAS are chemically and biologically stable in the environment and resist typical environmental degradation processes. Reanalyses outside the method defined hold time should not have a significant impact on the data.

PCB1668C-S analysis: sample was re-extracted using a smaller portion due to matrix interference (see Bench Level Planned DeviationForm). Result reported is based on 10x run. Detection limits were adjusted accordingly

Sample TNI532, PFAS in soil by SPE/LCMS: Test repeated.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
8186897	MBW	RPD - Sample/Sample Dup	Moisture	2022/08/25	0		%	20
8208220	TTM	Matrix Spike	13C2-4:2-Fluorotelomersulfonic Acid	2022/09/08		91	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2022/09/08		95	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2022/09/08		97	%	50 - 150
			13C2-Perfluorodecanoic acid	2022/09/08		93	%	50 - 150
			13C2-Perfluorododecanoic acid	2022/09/08		90	%	50 - 150
			13C2-Perfluorohexanoic acid	2022/09/08		95	%	50 - 150
			13C2-Perfluoroundecanoic acid	2022/09/08		94	%	50 - 150
			13C3-HFPO-DA	2022/09/08		92	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2022/09/08		91	%	50 - 150
			13C4-Perfluorobutanoic acid	2022/09/08		95	%	50 - 150
			13C4-Perfluoroheptanoic acid	2022/09/08		94	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2022/09/08		90	%	50 - 150
			13C4-Perfluorooctanoic acid	2022/09/08		95	%	50 - 150
			13C5-Perfluorononanoic acid	2022/09/08		89	%	50 - 150
			13C5-Perfluoropentanoic acid	2022/09/08		92	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2022/09/08		89	%	50 - 150
			D3-MeFOSAA	2022/09/08		93	%	50 - 150
			D5-EtFOSAA	2022/09/08		95	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2022/09/08		97	%	70 - 130
			Perfluoropentanoic acid (PFPeA)	2022/09/08		98	%	70 - 130
			Perfluorohexanoic acid (PFHxA)	2022/09/08		95	%	70 - 130
			Perfluoroheptanoic acid (PFHpA)	2022/09/08		96	%	70 - 130
			Perfluorooctanoic acid (PFOA)	2022/09/08		99	%	70 - 130
			Perfluorononanoic acid (PFNA)	2022/09/08		99	%	70 - 130
			Perfluorodecanoic acid (PFDA)	2022/09/08		95	%	70 - 130
			Perfluoroundecanoic acid (PFUnA)	2022/09/08		95	%	70 - 130
			Perfluorododecanoic acid (PFDoA)	2022/09/08		96	%	70 - 130
			Perfluorobutanesulfonic acid (PFBS)	2022/09/08		96	%	70 - 130
			Perfluoropentanesulfonic acid PFPes	2022/09/08		97	%	70 - 130
			Perfluorohexanesulfonic acid(PFHxS)	2022/09/08		97	%	70 - 130
			Perfluoroheptanesulfonic acid PFHpS	2022/09/08		91	%	70 - 130
			Perfluorooctanesulfonic acid (PFOS)	2022/09/08		97	%	70 - 130
			Perfluorononanesulfonic acid (PFNS)	2022/09/08		92	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2022/09/08		92	%	70 - 130
			EtFOSAA	2022/09/08		94	%	70 - 130
			MeFOSAA	2022/09/08		98	%	70 - 130
			4:2 Fluorotelomer sulfonic acid	2022/09/08		95	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2022/09/08		94	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2022/09/08		98	%	70 - 130
			Hexafluoropropyleneoxide dimer acid	2022/09/08		92	%	70 - 130
			4,8-Dioxa-3H-perfluorononanoic acid	2022/09/08		95	%	70 - 130
			9Cl-PF3ONS (F-53B Major)	2022/09/08		96	%	70 - 130
			11Cl-PF3OUdS (F-53B Minor)	2022/09/08		91	%	70 - 130
8208220	TTM	Spiked Blank	13C2-4:2-Fluorotelomersulfonic Acid	2022/09/08		84	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2022/09/08		87	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2022/09/08		84	%	50 - 150
			13C2-Perfluorodecanoic acid	2022/09/08		84	%	50 - 150
			13C2-Perfluorododecanoic acid	2022/09/08		79	%	50 - 150
			13C2-Perfluorohexanoic acid	2022/09/08		86	%	50 - 150
			13C2-Perfluoroundecanoic acid	2022/09/08		83	%	50 - 150
			13C3-HFPO-DA	2022/09/08		76	%	50 - 150

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C3-Perfluorobutanesulfonic acid	2022/09/08		84	%	50 - 150
			13C4-Perfluorobutanoic acid	2022/09/08		86	%	50 - 150
			13C4-Perfluoroheptanoic acid	2022/09/08		85	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2022/09/08		82	%	50 - 150
			13C4-Perfluorooctanoic acid	2022/09/08		85	%	50 - 150
			13C5-Perfluorononanoic acid	2022/09/08		84	%	50 - 150
			13C5-Perfluoropentanoic acid	2022/09/08		83	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2022/09/08		82	%	50 - 150
			D3-MeFOSAA	2022/09/08		84	%	50 - 150
			D5-EtFOSAA	2022/09/08		80	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2022/09/08		99	%	70 - 130
			Perfluoropentanoic acid (PFPeA)	2022/09/08		101	%	70 - 130
			Perfluorohexanoic acid (PFHxA)	2022/09/08		99	%	70 - 130
			Perfluoroheptanoic acid (PFHpA)	2022/09/08		99	%	70 - 130
			Perfluorooctanoic acid (PFOA)	2022/09/08		104	%	70 - 130
			Perfluorononanoic acid (PFNA)	2022/09/08		100	%	70 - 130
			Perfluorodecanoic acid (PFDA)	2022/09/08		98	%	70 - 130
			Perfluoroundecanoic acid (PFUnA)	2022/09/08		99	%	70 - 130
			Perfluorododecanoic acid (PFDoA)	2022/09/08		99	%	70 - 130
			Perfluorobutanesulfonic acid (PFBS)	2022/09/08		99	%	70 - 130
			Perfluoropentanesulfonic acid PFPes	2022/09/08		98	%	70 - 130
			Perfluorohexanesulfonic acid(PFHxS)	2022/09/08		100	%	70 - 130
			Perfluoroheptanesulfonic acid PFHpS	2022/09/08		95	%	70 - 130
			Perfluorooctanesulfonic acid (PFOS)	2022/09/08		100	%	70 - 130
			Perfluorononanesulfonic acid (PFNS)	2022/09/08		89	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2022/09/08		94	%	70 - 130
			EtFOSAA	2022/09/08		103	%	70 - 130
			MeFOSAA	2022/09/08		97	%	70 - 130
			4:2 Fluorotelomer sulfonic acid	2022/09/08		98	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2022/09/08		99	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2022/09/08		99	%	70 - 130
			Hexafluoropropyleneoxide dimer acid	2022/09/08		104	%	70 - 130
			4,8-Dioxa-3H-perfluorononanoic acid	2022/09/08		100	%	70 - 130
			9Cl-PF3ONS (F-53B Major)	2022/09/08		97	%	70 - 130
			11Cl-PF3OUdS (F-53B Minor)	2022/09/08		95	%	70 - 130
8208220	TTM	Method Blank	13C2-4:2-Fluorotelomersulfonic Acid	2022/09/08		98	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2022/09/08		97	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2022/09/08		95	%	50 - 150
			13C2-Perfluorodecanoic acid	2022/09/08		90	%	50 - 150
			13C2-Perfluorododecanoic acid	2022/09/08		85	%	50 - 150
			13C2-Perfluorohexanoic acid	2022/09/08		93	%	50 - 150
			13C2-Perfluoroundecanoic acid	2022/09/08		92	%	50 - 150
			13C3-HFPO-DA	2022/09/08		78	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2022/09/08		91	%	50 - 150
			13C4-Perfluorobutanoic acid	2022/09/08		93	%	50 - 150
			13C4-Perfluoroheptanoic acid	2022/09/08		97	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2022/09/08		90	%	50 - 150
			13C4-Perfluorooctanoic acid	2022/09/08		94	%	50 - 150
			13C5-Perfluorononanoic acid	2022/09/08		95	%	50 - 150
			13C5-Perfluoropentanoic acid	2022/09/08		91	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2022/09/08		89	%	50 - 150
			D3-MeFOSAA	2022/09/08		89	%	50 - 150

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D5-EtFOSAA	2022/09/08		91	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2022/09/08	0.24 U, MDL=0.24		ug/kg	
			Perfluoropentanoic acid (PFPeA)	2022/09/08	0.23 U, MDL=0.23		ug/kg	
			Perfluorohexanoic acid (PFHxA)	2022/09/08	0.16 U, MDL=0.16		ug/kg	
			Perfluoroheptanoic acid (PFHpA)	2022/09/08	0.17 U, MDL=0.17		ug/kg	
			Perfluorooctanoic acid (PFOA)	2022/09/08	0.20 U, MDL=0.20		ug/kg	
			Perfluorononanoic acid (PFNA)	2022/09/08	0.27 U, MDL=0.27		ug/kg	
			Perfluorodecanoic acid (PFDA)	2022/09/08	0.24 U, MDL=0.24		ug/kg	
			Perfluoroundecanoic acid (PFUnA)	2022/09/08	0.25 U, MDL=0.25		ug/kg	
			Perfluorododecanoic acid (PFDoA)	2022/09/08	0.19 U, MDL=0.19		ug/kg	
			Perfluorobutanesulfonic acid (PFBS)	2022/09/08	0.17 U, MDL=0.17		ug/kg	
			Perfluoropentanesulfonic acid PFPes	2022/09/08	0.26 U, MDL=0.26		ug/kg	
			Perfluorohexanesulfonic acid(PFHxS)	2022/09/08	0.30 U, MDL=0.30		ug/kg	
			Perfluoroheptanesulfonic acid PFHpS	2022/09/08	0.17 U, MDL=0.17		ug/kg	
			Perfluorooctanesulfonic acid (PFOS)	2022/09/08	0.27 U, MDL=0.27		ug/kg	
			Perfluorononanesulfonic acid (PFNS)	2022/09/08	0.24 U, MDL=0.24		ug/kg	
			Perfluorodecanesulfonic acid (PFDS)	2022/09/08	0.27 U, MDL=0.27		ug/kg	
			EtFOSAA	2022/09/08	0.40 U, MDL=0.40		ug/kg	
			MeFOSAA	2022/09/08	0.32 U, MDL=0.32		ug/kg	
			4:2 Fluorotelomer sulfonic acid	2022/09/08	0.25 U, MDL=0.25		ug/kg	
			6:2 Fluorotelomer sulfonic acid	2022/09/08	0.30 U, MDL=0.30		ug/kg	
			8:2 Fluorotelomer sulfonic acid	2022/09/08	0.30 U, MDL=0.30		ug/kg	
			Hexafluoropropyleneoxide dimer acid	2022/09/08	0.19 U, MDL=0.19		ug/kg	
			4,8-Dioxa-3H-perfluorononanoic acid	2022/09/08	0.28 U, MDL=0.28		ug/kg	
			9Cl-PF3ONS (F-53B Major)	2022/09/08	0.21 U, MDL=0.21		ug/kg	
			11Cl-PF3OUdS (F-53B Minor)	2022/09/08	0.22 U, MDL=0.22		ug/kg	
8208220	TTM	RPD - Sample/Sample Dup	Perfluorobutanoic acid (PFBA)	2022/09/08	NC		%	30
			Perfluoropentanoic acid (PFPeA)	2022/09/08	NC		%	30
			Perfluorohexanoic acid (PFHxA)	2022/09/08	NC		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluoroheptanoic acid (PFHpA)	2022/09/08	NC		%	30
			Perfluorooctanoic acid (PFOA)	2022/09/08	NC		%	30
			Perfluorononanoic acid (PFNA)	2022/09/08	NC		%	30
			Perfluorodecanoic acid (PFDA)	2022/09/08	NC		%	30
			Perfluoroundecanoic acid (PFUnA)	2022/09/08	NC		%	30
			Perfluorododecanoic acid (PFDoA)	2022/09/08	NC		%	30
			Perfluorobutanesulfonic acid (PFBS)	2022/09/08	NC		%	30
			Perfluoropentanesulfonic acid PFPes	2022/09/08	NC		%	30
			Perfluorohexanesulfonic acid(PFHxS)	2022/09/08	NC		%	30
			Perfluoroheptanesulfonic acid PFHpS	2022/09/08	NC		%	30
			Perfluorooctanesulfonic acid (PFOS)	2022/09/08	NC		%	30
			Perfluorononanesulfonic acid (PFNS)	2022/09/08	NC		%	30
			Perfluorodecanesulfonic acid (PFDS)	2022/09/08	NC		%	30
			EtFOSAA	2022/09/08	NC		%	30
			MeFOSAA	2022/09/08	NC		%	30
			4:2 Fluorotelomer sulfonic acid	2022/09/08	NC		%	30
			6:2 Fluorotelomer sulfonic acid	2022/09/08	NC		%	30
			8:2 Fluorotelomer sulfonic acid	2022/09/08	NC		%	30
			Hexafluoropropyleneoxide dimer acid	2022/09/08	NC		%	30
			4,8-Dioxa-3H-perfluorononanoic acid	2022/09/08	NC		%	30
			9Cl-PF3ONS (F-53B Major)	2022/09/08	NC		%	30
			11Cl-PF3OUdS (F-53B Minor)	2022/09/08	NC		%	30
8212445	AGU	Matrix Spike	37CL4 2378 Tetra CDD	2022/09/08		77	%	35 - 197
			C13-1234678 HeptaCDD	2022/09/08		78	%	23 - 140
			C13-1234678 HeptaCDF	2022/09/08		84	%	28 - 143
			C13-123478 HexaCDD	2022/09/08		97	%	32 - 141
			C13-123478 HexaCDF	2022/09/08		76	%	26 - 152
			C13-1234789 HeptaCDF	2022/09/08		77	%	26 - 138
			C13-123678 HexaCDD	2022/09/08		107	%	28 - 130
			C13-123678 HexaCDF	2022/09/08		76	%	26 - 123
			C13-12378 PentaCDD	2022/09/08		71	%	25 - 181
			C13-12378 PentaCDF	2022/09/08		70	%	24 - 185
			C13-123789 HexaCDF	2022/09/08		98	%	29 - 147
			C13-234678 HexaCDF	2022/09/08		99	%	28 - 136
			C13-23478 PentaCDF	2022/09/08		74	%	21 - 178
			C13-2378 TetraCDD	2022/09/08		80	%	25 - 164
			C13-2378 TetraCDF	2022/09/08		80	%	24 - 169
			C13-OCDD	2022/09/08		52	%	17 - 157
			2,3,7,8-Tetra CDD	2022/09/08		99	%	67 - 158
			1,2,3,7,8-Penta CDD	2022/09/08		99	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2022/09/08		97	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2022/09/08		108	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2022/09/08		101	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2022/09/08		94	%	70 - 140
			Octa CDD	2022/09/08		105	%	78 - 144
			Total Tetra CDD	2022/09/08		N/A******	%	N/A
			Total Penta CDD	2022/09/08		N/A******	%	N/A
			Total Hexa CDD	2022/09/08		N/A******	%	N/A
			Total Hepta CDD	2022/09/08		N/A******	%	N/A
			2,3,7,8-Tetra CDF	2022/09/08		100	%	75 - 158
			1,2,3,7,8-Penta CDF	2022/09/08		101	%	80 - 134
			2,3,4,7,8-Penta CDF	2022/09/08		100	%	68 - 160

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8-Hexa CDF	2022/09/08		98	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2022/09/08		101	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2022/09/08		95	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2022/09/08		99	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2022/09/08		98	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2022/09/08		98	%	78 - 138
			Octa CDF	2022/09/08		102	%	63 - 170
			Total Tetra CDF	2022/09/08		N/A******	%	N/A
			Total Penta CDF	2022/09/08		N/A******	%	N/A
			Total Hexa CDF	2022/09/08		N/A******	%	N/A
			Total Hepta CDF	2022/09/08		N/A******	%	N/A
8212445	AGU	Spiked Blank	37CL4 2378 Tetra CDD	2022/09/08		90	%	35 - 197
			C13-1234678 HeptaCDD	2022/09/08		76	%	23 - 140
			C13-1234678 HeptaCDF	2022/09/08		85	%	28 - 143
			C13-123478 HexaCDD	2022/09/08		92	%	32 - 141
			C13-123478 HexaCDF	2022/09/08		75	%	26 - 152
			C13-1234789 HeptaCDF	2022/09/08		74	%	26 - 138
			C13-123678 HexaCDD	2022/09/08		104	%	28 - 130
			C13-123678 HexaCDF	2022/09/08		72	%	26 - 123
			C13-12378 PentaCDD	2022/09/08		75	%	25 - 181
			C13-12378 PentaCDF	2022/09/08		78	%	24 - 185
			C13-123789 HexaCDF	2022/09/08		89	%	29 - 147
			C13-234678 HexaCDF	2022/09/08		94	%	28 - 136
			C13-23478 PentaCDF	2022/09/08		77	%	21 - 178
			C13-2378 TetraCDD	2022/09/08		84	%	25 - 164
			C13-2378 TetraCDF	2022/09/08		85	%	24 - 169
			C13-OCDD	2022/09/08		51	%	17 - 157
			2,3,7,8-Tetra CDD	2022/09/08		102	%	67 - 158
			1,2,3,7,8-Penta CDD	2022/09/08		102	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2022/09/08		102	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2022/09/08		106	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2022/09/08		109	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2022/09/08		100	%	70 - 140
			Octa CDD	2022/09/08		101	%	78 - 144
			2,3,7,8-Tetra CDF	2022/09/08		100	%	75 - 158
			1,2,3,7,8-Penta CDF	2022/09/08		97	%	80 - 134
			2,3,4,7,8-Penta CDF	2022/09/08		101	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2022/09/08		99	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2022/09/08		105	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2022/09/08		93	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2022/09/08		104	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2022/09/08		99	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2022/09/08		105	%	78 - 138
			Octa CDF	2022/09/08		101	%	63 - 170
8212445	AGU	Method Blank	37CL4 2378 Tetra CDD	2022/09/08		86	%	35 - 197
			C13-1234678 HeptaCDD	2022/09/08		75	%	23 - 140
			C13-1234678 HeptaCDF	2022/09/08		92	%	28 - 143
			C13-123478 HexaCDD	2022/09/08		100	%	32 - 141
			C13-123478 HexaCDF	2022/09/08		76	%	26 - 152
			C13-1234789 HeptaCDF	2022/09/08		74	%	26 - 138
			C13-123678 HexaCDD	2022/09/08		109	%	28 - 130
			C13-123678 HexaCDF	2022/09/08		76	%	26 - 123

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-12378 PentaCDD	2022/09/08		68	%	25 - 181
			C13-12378 PentaCDF	2022/09/08		71	%	24 - 185
			C13-123789 HexaCDF	2022/09/08		102	%	29 - 147
			C13-234678 HexaCDF	2022/09/08		116	%	28 - 136
			C13-23478 PentaCDF	2022/09/08		72	%	21 - 178
			C13-2378 TetraCDD	2022/09/08		81	%	25 - 164
			C13-2378 TetraCDF	2022/09/08		79	%	24 - 169
			C13-OCDD	2022/09/08		50	%	17 - 157
			2,3,7,8-Tetra CDD	2022/09/08	0.120 U, EDL=0.120		pg/g	
			1,2,3,7,8-Penta CDD	2022/09/08	0.149 U, EDL=0.149		pg/g	
			1,2,3,4,7,8-Hexa CDD	2022/09/08	0.159 U, EDL=0.159		pg/g	
			1,2,3,6,7,8-Hexa CDD	2022/09/08	0.164 U, EDL=0.164		pg/g	
			1,2,3,7,8,9-Hexa CDD	2022/09/08	0.178 U, EDL=0.178		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2022/09/08	0.144 U, EDL=0.144		pg/g	
			Octa CDD	2022/09/08	0.132 U, EDL=0.132		pg/g	
			Total Tetra CDD	2022/09/08	0.120 U, EDL=0.120		pg/g	
			Total Penta CDD	2022/09/08	0.149 U, EDL=0.149		pg/g	
			Total Hexa CDD	2022/09/08	0.424 U, EDL=0.424 (1)		pg/g	
			Total Hepta CDD	2022/09/08	0.144 U, EDL=0.144		pg/g	
			2,3,7,8-Tetra CDF	2022/09/08	0.104 U, EDL=0.104		pg/g	
			1,2,3,7,8-Penta CDF	2022/09/08	0.151 U, EDL=0.151		pg/g	
			2,3,4,7,8-Penta CDF	2022/09/08	0.135 U, EDL=0.135		pg/g	
			1,2,3,4,7,8-Hexa CDF	2022/09/08	0.162 U, EDL=0.162		pg/g	
			1,2,3,6,7,8-Hexa CDF	2022/09/08	0.176 U, EDL=0.176		pg/g	
			2,3,4,6,7,8-Hexa CDF	2022/09/08	0.162 U, EDL=0.162		pg/g	
			1,2,3,7,8,9-Hexa CDF	2022/09/08	0.175 U, EDL=0.175		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2022/09/08	0.153 U, EDL=0.153		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2022/09/08	0.158 U, EDL=0.158		pg/g	
			Octa CDF	2022/09/08	0.137 U, EDL=0.137		pg/g	
			Total Tetra CDF	2022/09/08	0.104 U, EDL=0.104		pg/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Penta CDF	2022/09/08	0.142 U, EDL=0.142		pg/g	
			Total Hexa CDF	2022/09/08	0.169 U, EDL=0.169		pg/g	
			Total Hepta CDF	2022/09/08	0.156 U, EDL=0.156		pg/g	
8212445	AGU	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2022/09/08	NC		%	25
			1,2,3,7,8-Penta CDD	2022/09/08	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2022/09/08	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2022/09/08	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2022/09/08	NC (1)		%	25
			1,2,3,4,6,7,8-Hepta CDD	2022/09/08	NC		%	25
			Octa CDD	2022/09/08	8.4		%	25
			Total Tetra CDD	2022/09/08	4.1		%	25
			Total Penta CDD	2022/09/08	NC		%	25
			Total Hexa CDD	2022/09/08	NC		%	25
			Total Hepta CDD	2022/09/08	NC		%	25
			2,3,7,8-Tetra CDF	2022/09/08	NC		%	25
			1,2,3,7,8-Penta CDF	2022/09/08	NC		%	25
			2,3,4,7,8-Penta CDF	2022/09/08	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2022/09/08	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2022/09/08	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2022/09/08	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2022/09/08	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2022/09/08	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2022/09/08	NC		%	25
			Octa CDF	2022/09/08	NC		%	25
			Total Tetra CDF	2022/09/08	NC		%	25
			Total Penta CDF	2022/09/08	NC		%	25
			Total Hexa CDF	2022/09/08	NC		%	25
			Total Hepta CDF	2022/09/08	NC		%	25
8213841	XIN	Matrix Spike	13C2-perfluorotetradecanoic acid	2022/09/09		121	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2022/09/09		98	%	50 - 150
			D3-MeFOSA	2022/09/09		78	%	25 - 150
			D5-EtFOSA	2022/09/09		71	%	25 - 150
			D7-MeFOSE	2022/09/09		80	%	25 - 150
			D9-EtFOSE	2022/09/09		70	%	25 - 150
			Perfluorotridecanoic acid (PFTRDA)	2022/09/09		93	%	70 - 130
			Perfluorotetradecanoic acid(PFTEDA)	2022/09/09		96	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2022/09/09		93	%	70 - 130
			EtFOSA	2022/09/09		100	%	70 - 130
			MeFOSA	2022/09/09		96	%	70 - 130
			EtFOSE	2022/09/09		102	%	70 - 130
			MeFOSE	2022/09/09		103	%	70 - 130
8213841	XIN	Spiked Blank	13C2-perfluorotetradecanoic acid	2022/09/09		84	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2022/09/09		95	%	50 - 150
			D3-MeFOSA	2022/09/09		61	%	25 - 150
			D5-EtFOSA	2022/09/09		56	%	25 - 150
			D7-MeFOSE	2022/09/09		76	%	25 - 150
			D9-EtFOSE	2022/09/09		68	%	25 - 150
			Perfluorotridecanoic acid (PFTRDA)	2022/09/09		112	%	70 - 130
			Perfluorotetradecanoic acid(PFTEDA)	2022/09/09		100	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorooctane Sulfonamide (PFOSA)	2022/09/09		93	%	70 - 130
			EtFOSA	2022/09/09		98	%	70 - 130
			MeFOSA	2022/09/09		93	%	70 - 130
			EtFOSE	2022/09/09		97	%	70 - 130
			MeFOSE	2022/09/09		100	%	70 - 130
8213841	XIN	Method Blank	13C2-perfluorotetradecanoic acid	2022/09/09		90	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2022/09/09		92	%	50 - 150
			D3-MeFOSA	2022/09/09		77	%	25 - 150
			D5-EtFOSA	2022/09/09		71	%	25 - 150
			D7-MeFOSE	2022/09/09		86	%	25 - 150
			D9-EtFOSE	2022/09/09		75	%	25 - 150
			Perfluorotridecanoic acid (PFTRDA)	2022/09/09	0.22 U, MDL=0.22		ug/kg	
			Perfluorotetradecanoic acid(PFTEDA)	2022/09/09	0.30 U, MDL=0.30		ug/kg	
			Perfluorooctane Sulfonamide (PFOSA)	2022/09/09	0.20 U, MDL=0.20		ug/kg	
			EtFOSA	2022/09/09	0.31 U, MDL=0.31		ug/kg	
			MeFOSA	2022/09/09	0.39 U, MDL=0.39		ug/kg	
			EtFOSE	2022/09/09	0.29 U, MDL=0.29		ug/kg	
			MeFOSE	2022/09/09	0.22 U, MDL=0.22		ug/kg	
8213841	XIN	RPD - Sample/Sample Dup	Perfluorotridecanoic acid (PFTRDA)	2022/09/09	NC		%	30
			Perfluorotetradecanoic acid(PFTEDA)	2022/09/09	NC		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2022/09/09	NC		%	30
			EtFOSA	2022/09/09	NC		%	30
			MeFOSA	2022/09/09	NC		%	30
			EtFOSE	2022/09/09	NC		%	30
			MeFOSE	2022/09/09	NC		%	30
8237702	AGU	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2022/09/20	0.12 U, EDL=0.12		pg/g	
			Confirmation C13-2378 TetraCDF	2022/09/20		75	%	40 - 135
8239765	CXU	Matrix Spike(TNI532)	C13-2,44'-TriCB-(28)	2022/09/30		110	%	15 - 145
			C13-22'33'44'55'6-NonaCB-(206)	2022/09/30		76	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2022/09/30		89	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2022/09/30		82	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2022/09/30		77	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2022/09/30		71	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2022/09/30		85	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2022/09/30		66	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2022/09/30		74	%	40 - 145
			C13-22'466'-PentaCB-(104)	2022/09/30		76	%	40 - 145
			C13-22'66'-TetraCB-(54)	2022/09/30		70	%	15 - 145
			C13-22'6-TriCB-(19)	2022/09/30		68	%	15 - 145
			C13-22'-DiCB-(4)	2022/09/30		61	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2022/09/30		73	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2022/09/30		79	%	40 - 145
			C13-233'44'-PentaCB-(105)	2022/09/30		94	%	40 - 145
			C13-233'55'-PentaCB-(111)	2022/09/30		79	%	40 - 145
			C13-23'44'55'-HexaCB-(167)	2022/09/30		87	%	40 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-2344'5-PentaCB-(114)	2022/09/30		89	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2022/09/30		97	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2022/09/30		98	%	40 - 145
			C13-2-MonoCB-(1)	2022/09/30		77	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2022/09/30		75	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2022/09/30		91	%	40 - 145
			C13-33'44'-TetraCB-(77)	2022/09/30		86	%	40 - 145
			C13-344'5-TetraCB-(81)	2022/09/30		89	%	40 - 145
			C13-344'-TriCB-(37)	2022/09/30		95	%	15 - 145
			C13-44'-DiCB-(15)	2022/09/30		76	%	15 - 145
			C13-4-MonoCB-(3)	2022/09/30		74	%	15 - 145
			C13-DecaCB-(209)	2022/09/30		74	%	40 - 145
			C13-HexaCB-(156)+(157)	2022/09/30		85	%	40 - 145
			2-MonoCB-(1)	2022/09/30		109	%	60 - 145
			22'-DiCB-(4)	2022/09/30		114	%	60 - 145
			4,4'-DiCB-(15)	2022/09/30		114	%	60 - 145
			22'6-TriCB-(19)	2022/09/30		107	%	60 - 145
			344'-TriCB-(37)	2022/09/30		100	%	60 - 145
			22'66'-TetraCB-(54)	2022/09/30		101	%	60 - 145
			33'44'-TetraCB-(77)	2022/09/30		104	%	60 - 145
			344'5-TetraCB-(81)	2022/09/30		115	%	60 - 145
			22'466'-PentaCB-(104)	2022/09/30		111	%	60 - 145
			233'44'-PentaCB-(105)	2022/09/30		104	%	60 - 145
			2344'5-PentaCB-(114)	2022/09/30		105	%	60 - 145
			23'44'5-PentaCB-(118)	2022/09/30		104	%	60 - 145
			23'44'5'-PentaCB-(123)	2022/09/30		122	%	60 - 145
			33'44'5-PentaCB-(126)	2022/09/30		109	%	60 - 145
			22'44'66'-HexaCB-(155)	2022/09/30		106	%	60 - 145
			HexaCB-(156)+(157)	2022/09/30		97	%	N/A
			23'44'55'-HexaCB-(167)	2022/09/30		94	%	60 - 145
			33'44'55'-HexaCB-(169)	2022/09/30		113	%	60 - 145
			22'33'44'5-HeptaCB-(170)	2022/09/30		95	%	60 - 145
			HeptaCB-(180)+(193)	2022/09/30		90	%	N/A
			22'34'566'-HeptaCB-(188)	2022/09/30		116	%	60 - 145
			233'44'55'-HeptaCB-(189)	2022/09/30		116	%	60 - 145
			22'33'55'66'-OctaCB-(202)	2022/09/30		123	%	60 - 145
			233'44'55'6-OctaCB-(205)	2022/09/30		119	%	60 - 145
			22'33'44'55'6-NonaCB-(206)	2022/09/30		125	%	60 - 145
			22'33'455'66'-NonaCB-(208)	2022/09/30		120	%	60 - 145
			DecaCB-(209)	2022/09/30		111	%	60 - 145
8239765	CXU	Spiked Blank	C13-2,44'-TriCB-(28)	2022/10/03		55	%	15 - 145
			C13-22'33'44'55'6-NonaCB-(206)	2022/10/03		79	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2022/10/03		70	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2022/10/03		75	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2022/10/03		52	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2022/10/03		60	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2022/10/03		60	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2022/10/03		62	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2022/10/03		66	%	40 - 145
			C13-22'466'-PentaCB-(104)	2022/10/03		61	%	40 - 145
			C13-22'66'-TetraCB-(54)	2022/10/03		50	%	15 - 145
			C13-22'6-TriCB-(19)	2022/10/03		47	%	15 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-22'-DiCB-(4)	2022/10/03		41	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2022/10/03		83	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2022/10/03		76	%	40 - 145
			C13-233'44'-PentaCB-(105)	2022/10/03		72	%	40 - 145
			C13-233'55'-PentaCB-(111)	2022/10/03		50	%	40 - 145
			C13-23'44'55'-HexaCB-(167)	2022/10/03		90	%	40 - 145
			C13-2344'5-PentaCB-(114)	2022/10/03		66	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2022/10/03		66	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2022/10/03		65	%	40 - 145
			C13-2-MonoCB-(1)	2022/10/03		44	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2022/10/03		102	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2022/10/03		80	%	40 - 145
			C13-33'44'-TetraCB-(77)	2022/10/03		54	%	40 - 145
			C13-344'5-TetraCB-(81)	2022/10/03		55	%	40 - 145
			C13-344'-TriCB-(37)	2022/10/03		61	%	15 - 145
			C13-44'-DiCB-(15)	2022/10/03		52	%	15 - 145
			C13-4-MonoCB-(3)	2022/10/03		40	%	15 - 145
			C13-DecaCB-(209)	2022/10/03		84	%	40 - 145
			C13-HexaCB-(156)+(157)	2022/10/03		99	%	40 - 145
			2-MonoCB-(1)	2022/10/03		111	%	60 - 145
			4-MonoCB-(3)	2022/10/03		117	%	60 - 145
			22'-DiCB-(4)	2022/10/03		109	%	60 - 145
			4,4'-DiCB-(15)	2022/10/03		110	%	60 - 145
			22'6-TriCB-(19)	2022/10/03		109	%	60 - 145
			344'-TriCB-(37)	2022/10/03		105	%	60 - 145
			22'66'-TetraCB-(54)	2022/10/03		110	%	60 - 145
			33'44'-TetraCB-(77)	2022/10/03		115	%	60 - 145
			344'5-TetraCB-(81)	2022/10/03		112	%	60 - 145
			22'466'-PentaCB-(104)	2022/10/03		114	%	60 - 145
			233'44'-PentaCB-(105)	2022/10/03		109	%	60 - 145
			2344'5-PentaCB-(114)	2022/10/03		111	%	60 - 145
			23'44'5-PentaCB-(118)	2022/10/03		108	%	60 - 145
			23'44'5'-PentaCB-(123)	2022/10/03		111	%	60 - 145
			33'44'5-PentaCB-(126)	2022/10/03		110	%	60 - 145
			22'44'66'-HexaCB-(155)	2022/10/03		111	%	60 - 145
			HexaCB-(156)+(157)	2022/10/03		108	%	N/A
			23'44'55'-HexaCB-(167)	2022/10/03		103	%	60 - 145
			33'44'55'-HexaCB-(169)	2022/10/03		106	%	60 - 145
			22'33'44'5-HeptaCB-(170)	2022/10/03		106	%	60 - 145
			HeptaCB-(180)+(193)	2022/10/03		85	%	N/A
			22'34'566'-HeptaCB-(188)	2022/10/03		110	%	60 - 145
			233'44'55'-HeptaCB-(189)	2022/10/03		106	%	60 - 145
			22'33'55'66'-OctaCB-(202)	2022/10/03		106	%	60 - 145
			233'44'55'6-OctaCB-(205)	2022/10/03		102	%	60 - 145
			22'33'44'55'6-NonaCB-(206)	2022/10/03		100	%	60 - 145
			22'33'455'66'-NonaCB-(208)	2022/10/03		105	%	60 - 145
			DecaCB-(209)	2022/10/03		99	%	60 - 145
8239765	CXU	Spiked Blank DUP	C13-2,44'-TriCB-(28)	2022/10/03		60	%	15 - 145
			C13-22'33'44'55'6-NonaCB-(206)	2022/10/03		77	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2022/10/03		70	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2022/10/03		70	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2022/10/03		59	%	40 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-22'33'55'6-HeptaCB-(178)	2022/10/03		75	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2022/10/03		65	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2022/10/03		75	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2022/10/03		80	%	40 - 145
			C13-22'466'-PentaCB-(104)	2022/10/03		60	%	40 - 145
			C13-22'66'-TetraCB-(54)	2022/10/03		51	%	15 - 145
			C13-22'6-TriCB-(19)	2022/10/03		50	%	15 - 145
			C13-22'-DiCB-(4)	2022/10/03		34	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2022/10/03		85	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2022/10/03		70	%	40 - 145
			C13-233'44'-PentaCB-(105)	2022/10/03		66	%	40 - 145
			C13-233'55'-PentaCB-(111)	2022/10/03		60	%	40 - 145
			C13-23'44'55'-HexaCB-(167)	2022/10/03		86	%	40 - 145
			C13-2344'5-PentaCB-(114)	2022/10/03		65	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2022/10/03		66	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2022/10/03		66	%	40 - 145
			C13-2-MonoCB-(1)	2022/10/03		41	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2022/10/03		84	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2022/10/03		68	%	40 - 145
			C13-33'44'-TetraCB-(77)	2022/10/03		62	%	40 - 145
			C13-344'5-TetraCB-(81)	2022/10/03		62	%	40 - 145
			C13-344'-TriCB-(37)	2022/10/03		63	%	15 - 145
			C13-44'-DiCB-(15)	2022/10/03		57	%	15 - 145
			C13-4-MonoCB-(3)	2022/10/03		25	%	15 - 145
			C13-DecaCB-(209)	2022/10/03		81	%	40 - 145
			C13-HexaCB-(156)+(157)	2022/10/03		100	%	40 - 145
			2-MonoCB-(1)	2022/10/03		108	%	60 - 145
			4-MonoCB-(3)	2022/10/03		118	%	60 - 145
			22'-DiCB-(4)	2022/10/03		104	%	60 - 145
			4,4'-DiCB-(15)	2022/10/03		109	%	60 - 145
			22'6-TriCB-(19)	2022/10/03		108	%	60 - 145
			344'-TriCB-(37)	2022/10/03		104	%	60 - 145
			22'66'-TetraCB-(54)	2022/10/03		106	%	60 - 145
			33'44'-TetraCB-(77)	2022/10/03		112	%	60 - 145
			344'5-TetraCB-(81)	2022/10/03		109	%	60 - 145
			22'466'-PentaCB-(104)	2022/10/03		110	%	60 - 145
			233'44'-PentaCB-(105)	2022/10/03		105	%	60 - 145
			2344'5-PentaCB-(114)	2022/10/03		108	%	60 - 145
			23'44'5-PentaCB-(118)	2022/10/03		105	%	60 - 145
			23'44'5'-PentaCB-(123)	2022/10/03		108	%	60 - 145
			33'44'5-PentaCB-(126)	2022/10/03		109	%	60 - 145
			22'44'66'-HexaCB-(155)	2022/10/03		107	%	60 - 145
			HexaCB-(156)+(157)	2022/10/03		107	%	N/A
			23'44'55'-HexaCB-(167)	2022/10/03		102	%	60 - 145
			33'44'55'-HexaCB-(169)	2022/10/03		104	%	60 - 145
			22'33'44'5-HeptaCB-(170)	2022/10/03		103	%	60 - 145
			HeptaCB-(180)+(193)	2022/10/03		83	%	N/A
			22'34'566'-HeptaCB-(188)	2022/10/03		106	%	60 - 145
			233'44'55'-HeptaCB-(189)	2022/10/03		105	%	60 - 145
			22'33'55'66'-OctaCB-(202)	2022/10/03		104	%	60 - 145
			233'44'55'6-OctaCB-(205)	2022/10/03		98	%	60 - 145
			22'33'44'55'6-NonaCB-(206)	2022/10/03		98	%	60 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'33'455'66'-NonaCB-(208)	2022/10/03		104	%	60 - 145
			DecaCB-(209)	2022/10/03		95	%	60 - 145
8239765	CXU	RPD	2-MonoCB-(1)	2022/10/03	2.7		%	30
			4-MonoCB-(3)	2022/10/03	0.85		%	30
			22'-DiCB-(4)	2022/10/03	4.7		%	30
			4,4'-DiCB-(15)	2022/10/03	0.91		%	30
			22'6-TriCB-(19)	2022/10/03	0.92		%	30
			344'-TriCB-(37)	2022/10/03	0.96		%	30
			22'66'-TetraCB-(54)	2022/10/03	3.7		%	30
			33'44'-TetraCB-(77)	2022/10/03	2.6		%	30
			344'5-TetraCB-(81)	2022/10/03	2.7		%	30
			22'466'-PentaCB-(104)	2022/10/03	3.6		%	30
			233'44'-PentaCB-(105)	2022/10/03	3.7		%	30
			2344'5-PentaCB-(114)	2022/10/03	2.7		%	30
			23'44'5-PentaCB-(118)	2022/10/03	2.8		%	30
			23'44'5'-PentaCB-(123)	2022/10/03	2.7		%	30
			33'44'5-PentaCB-(126)	2022/10/03	0.91		%	30
			22'44'66'-HexaCB-(155)	2022/10/03	3.7		%	30
			HexaCB-(156)+(157)	2022/10/03	0.93		%	30
			23'44'55'-HexaCB-(167)	2022/10/03	0.98		%	30
			33'44'55'-HexaCB-(169)	2022/10/03	1.9		%	30
			22'33'44'5-HeptaCB-(170)	2022/10/03	2.9		%	30
			HeptaCB-(180)+(193)	2022/10/03	2.4		%	30
			22'34'566'-HeptaCB-(188)	2022/10/03	3.7		%	30
			233'44'55'-HeptaCB-(189)	2022/10/03	0.95		%	30
			22'33'55'66'-OctaCB-(202)	2022/10/03	1.9		%	30
			233'44'55'6-OctaCB-(205)	2022/10/03	4.0		%	30
			22'33'44'55'6-NonaCB-(206)	2022/10/03	2.0		%	30
			22'33'455'66'-NonaCB-(208)	2022/10/03	0.96		%	30
			DecaCB-(209)	2022/10/03	4.1		%	30
8239765	CXU	Method Blank	C13-2,44'-TriCB-(28)	2022/09/30		39	%	15 - 145
			C13-22'33'44'55'6-NonaCB-(206)	2022/09/30		76	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2022/09/30		105	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2022/09/30		87	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2022/09/30		86	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2022/09/30		66	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2022/09/30		97	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2022/09/30		58	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2022/09/30		43	%	40 - 145
			C13-22'466'-PentaCB-(104)	2022/09/30		35	%	40 - 145
			C13-22'66'-TetraCB-(54)	2022/09/30		24 (2)	%	15 - 145
			C13-22'6-TriCB-(19)	2022/09/30		30	%	15 - 145
			C13-22'-DiCB-(4)	2022/09/30		21 (2)	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2022/09/30		77	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2022/09/30		88	%	40 - 145
			C13-233'44'-PentaCB-(105)	2022/09/30		86	%	40 - 145
			C13-233'55'-PentaCB-(111)	2022/09/30		58	%	40 - 145
			C13-23'44'55'-HexaCB-(167)	2022/09/30		84	%	40 - 145
			C13-2344'5-PentaCB-(114)	2022/09/30		72	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2022/09/30		78	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2022/09/30		77	%	40 - 145
			C13-2-MonoCB-(1)	2022/09/30		22	%	15 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-33'44'55'-HexaCB-(169)	2022/09/30		77	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2022/09/30		91	%	40 - 145
			C13-33'44'-TetraCB-(77)	2022/09/30		78	%	40 - 145
			C13-344'5-TetraCB-(81)	2022/09/30		73	%	40 - 145
			C13-344'-TriCB-(37)	2022/09/30		54	%	15 - 145
			C13-44'-DiCB-(15)	2022/09/30		36	%	15 - 145
			C13-4-MonoCB-(3)	2022/09/30		21	%	15 - 145
			C13-DecaCB-(209)	2022/09/30		74	%	40 - 145
			C13-HexaCB-(156)+(157)	2022/09/30		85	%	40 - 145
			2-MonoCB-(1)	2022/09/30	0.00032 U, EDL=0.00032		ng/g	
			3-MonoCB-(2)	2022/09/30	0.00028 U, EDL=0.00028		ng/g	
			4-MonoCB-(3)	2022/09/30	0.00032 U, EDL=0.00032		ng/g	
			22'-DiCB-(4)	2022/09/30	0.00056 U, EDL=0.00056		ng/g	
			2,3-DiCB-(5)	2022/09/30	0.00019 U, EDL=0.00019		ng/g	
			2,3'-DiCB-(6)	2022/09/30	0.00019 U, EDL=0.00019		ng/g	
			2,4-DiCB-(7)	2022/09/30	0.00019 U, EDL=0.00019		ng/g	
			2,4'-DiCB-(8)	2022/09/30	0.00019 U, EDL=0.00019		ng/g	
			2,5-DiCB-(9)	2022/09/30	0.00019 U, EDL=0.00019		ng/g	
			2,6-DiCB-(10)	2022/09/30	0.00046 U, EDL=0.00046		ng/g	
			3,3'-DiCB-(11)	2022/09/30	0.00323 J, EDL=0.00020		ng/g	
			DiCB-(12)+(13)	2022/09/30	0.00019 U, EDL=0.00019		ng/g	
			3,5-DiCB-(14)	2022/09/30	0.00019 U, EDL=0.00019		ng/g	
			4,4'-DiCB-(15)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	
			22'3-TriCB-(16)	2022/09/30	0.00052 U, EDL=0.00052		ng/g	
			22'4-TriCB-(17)	2022/09/30	0.00044 U, EDL=0.00044		ng/g	
			TriCB-(18)+(30)	2022/09/30	0.00037 U, EDL=0.00037		ng/g	
			22'6-TriCB-(19)	2022/09/30	0.00045 U, EDL=0.00045		ng/g	
			TriCB-(20) + (28)	2022/09/30	0.00027 J, EDL=0.00023		ng/g	
			TriCB-(21)+(33)	2022/09/30	0.00022 U, EDL=0.00022		ng/g	
			234'-TriCB-(22)	2022/09/30	0.00025 U, EDL=0.00025		ng/g	
			235-TriCB-(23)	2022/09/30	0.00024 U, EDL=0.00024		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			236-TriCB-(24)	2022/09/30	0.00030 U, EDL=0.00030		ng/g	
			23'4-TriCB-(25)	2022/09/30	0.00023 U, EDL=0.00023		ng/g	
			TriCB-(26)+(29)	2022/09/30	0.00023 U, EDL=0.00023		ng/g	
			23'6-TriCB-(27)	2022/09/30	0.00031 U, EDL=0.00031		ng/g	
			24'5-TriCB-(31)	2022/09/30	0.00023 U, EDL=0.00023		ng/g	
			24'6-TriCB-(32)	2022/09/30	0.00030 U, EDL=0.00030		ng/g	
			23'5'-TriCB-(34)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	
			33'4-TriCB-(35)	2022/09/30	0.00024 U, EDL=0.00024		ng/g	
			33'5-TriCB-(36)	2022/09/30	0.00022 U, EDL=0.00022		ng/g	
			344'-TriCB-(37)	2022/09/30	0.00032 U, EDL=0.00032		ng/g	
			345-TriCB-(38)	2022/09/30	0.00025 U, EDL=0.00025		ng/g	
			34'5-TriCB-(39)	2022/09/30	0.00022 U, EDL=0.00022		ng/g	
			TetraCB-(40)+(41)+(71)	2022/09/30	0.00034 U, EDL=0.00034		ng/g	
			22'34'-TetraCB-(42)	2022/09/30	0.00040 U, EDL=0.00040		ng/g	
			22'35-TetraCB-(43)	2022/09/30	0.00048 U, EDL=0.00048		ng/g	
			TetraCB-(44)+(47)+(65)	2022/09/30	0.00045 J, EDL=0.00032		ng/g	
			TetraCB-(45)+(51)	2022/09/30	0.00038 U, EDL=0.00038		ng/g	
			22'36'-TetraCB-(46)	2022/09/30	0.00041 U, EDL=0.00041		ng/g	
			22'45-TetraCB-(48)	2022/09/30	0.00037 U, EDL=0.00037		ng/g	
			TetraCB-(49)+TetraCB-(69)	2022/09/30	0.00030 U, EDL=0.00030		ng/g	
			TetraCB-(50)+(53)	2022/09/30	0.00037 U, EDL=0.00037		ng/g	
			22'55'-TetraCB-(52)	2022/09/30	0.00036 U, EDL=0.00036		ng/g	
			22'66'-TetraCB-(54)	2022/09/30	0.00055 U, EDL=0.00055		ng/g	
			233'4-TetraCB-(55)	2022/09/30	0.00029 U, EDL=0.00029		ng/g	
			233'4'-Tetra CB(56)	2022/09/30	0.00027 U, EDL=0.00027		ng/g	
			233'5-TetraCB-(57)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	
			233'5'-TetraCB-(58)	2022/09/30	0.00028 U, EDL=0.00028		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			TetraCB-(59)+(62)+(75)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	
			2344'-TetraCB -(60)	2022/09/30	0.00025 U, EDL=0.00025		ng/g	
			TetraCB-(61)+(70)+(74)+(76)	2022/09/30	0.00025 U, EDL=0.00025		ng/g	
			234'5-TetraCB-(63)	2022/09/30	0.00025 U, EDL=0.00025		ng/g	
			234'6-TetraCB-(64)	2022/09/30	0.00028 U, EDL=0.00028		ng/g	
			23'44'-TetraCB-(66)	2022/09/30	0.00025 U, EDL=0.00025		ng/g	
			23'45-TetraCB-(67)	2022/09/30	0.00022 U, EDL=0.00022		ng/g	
			23'45'-TetraCB-(68)	2022/09/30	0.00025 U, EDL=0.00025		ng/g	
			23'55'-TetraCB-(72)	2022/09/30	0.00025 U, EDL=0.00025		ng/g	
			23'5'6-TetraCB-(73)	2022/09/30	0.00025 U, EDL=0.00025		ng/g	
			33'44'-TetraCB-(77)	2022/09/30	0.00029 U, EDL=0.00029		ng/g	
			33'45-TetraCB-(78)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	
			33'45'-TetraCB(79)	2022/09/30	0.00023 U, EDL=0.00023		ng/g	
			33'55'-TetraCB-(80)	2022/09/30	0.00022 U, EDL=0.00022		ng/g	
			344'5-TetraCB-(81)	2022/09/30	0.00027 U, EDL=0.00027		ng/g	
			22'33'4-PentaCB-(82)	2022/09/30	0.00031 U, EDL=0.00031		ng/g	
			PentaCB-(83)+(99)	2022/09/30	0.00030 U, EDL=0.00030		ng/g	
			22'33'6-PentaCB-(84)	2022/09/30	0.00029 U, EDL=0.00029		ng/g	
			PentaCB-(85)+(116)+(117)	2022/09/30	0.00020 U, EDL=0.00020		ng/g	
			PentaCB-(86)(87)(97)(109)(119)(125)	2022/09/30	0.00023 U, EDL=0.00023		ng/g	
			PentaCB-(88)+(91)	2022/09/30	0.00028 U, EDL=0.00028		ng/g	
			22'346'-PentaCB-(89)	2022/09/30	0.00029 U, EDL=0.00029		ng/g	
			PentaCB-(90)+(101)+(113)	2022/09/30	0.00039 J, EDL=0.00023		ng/g	
			22'355'-PentaCB-(92)	2022/09/30	0.00029 U, EDL=0.00029		ng/g	
			PentaCB-(93)+(98)+(100)+(102)	2022/09/30	0.00028 U, EDL=0.00028		ng/g	
			22'356'-PentaCB-(94)	2022/09/30	0.00029 U, EDL=0.00029		ng/g	
			22'35'6-PentaCB-(95)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'366'-PentaCB-(96)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	
			22'45'6-PentaCB-(103)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	
			22'466'-PentaCB-(104)	2022/09/30	0.00029 U, EDL=0.00029		ng/g	
			233'44'-PentaCB-(105)	2022/09/30	0.00022 U, EDL=0.00022		ng/g	
			233'45-PentaCB-(106)	2022/09/30	0.00019 U, EDL=0.00019		ng/g	
			233'4'5-PentaCB-(107)	2022/09/30	0.00018 U, EDL=0.00018		ng/g	
			PentaCB-(108)+(124)	2022/09/30	0.00020 U, EDL=0.00020		ng/g	
			PentaCB-(110)+(115)	2022/09/30	0.00032 J, EDL=0.00023		ng/g	
			233'55'-PentaCB-(111)	2022/09/30	0.00020 U, EDL=0.00020		ng/g	
			233'56-PentaCB-(112)	2022/09/30	0.00018 U, EDL=0.00018		ng/g	
			2344'5-PentaCB-(114)	2022/09/30	0.00022 U, EDL=0.00022		ng/g	
			23'44'5-PentaCB-(118)	2022/09/30	0.00033 J, EDL=0.00021		ng/g	
			23'455'-PentaCB-(120)	2022/09/30	0.00019 U, EDL=0.00019		ng/g	
			23'45'6-PentaCB-(121)	2022/09/30	0.00020 U, EDL=0.00020		ng/g	
			233'4'5'-PentaCB-(122)	2022/09/30	0.00022 U, EDL=0.00022		ng/g	
			23'44'5'-PentaCB-(123)	2022/09/30	0.00024 U, EDL=0.00024		ng/g	
			33'44'5-PentaCB-(126)	2022/09/30	0.00021 U, EDL=0.00021		ng/g	
			33'455'-PentaCB-(127)	2022/09/30	0.00022 U, EDL=0.00022		ng/g	
			HexaCB-(128)+(166)	2022/09/30	0.00032 U, EDL=0.00032		ng/g	
			HexaCB-(129)+(138)+(163)	2022/09/30	0.00053 J, EDL=0.00031		ng/g	
			22'33'45'-HexaCB-(130)	2022/09/30	0.00036 U, EDL=0.00036		ng/g	
			22'33'46-HexaCB-(131)	2022/09/30	0.00034 U, EDL=0.00034		ng/g	
			22'33'46'-HexaCB-(132)	2022/09/30	0.00033 U, EDL=0.00033		ng/g	
			22'33'55'-HexaCB-(133)	2022/09/30	0.00032 U, EDL=0.00032		ng/g	
			HexaCB-(134)+(143)	2022/09/30	0.00036 U, EDL=0.00036		ng/g	
			HexaCB-(135)+(151)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	
			22'33'66'-HexaCB-(136)	2022/09/30	0.00020 U, EDL=0.00020		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'344'5-HexaCB-(137)	2022/09/30	0.00036 U, EDL=0.00036		ng/g	
			HexaCB-(139)+(140)	2022/09/30	0.00028 U, EDL=0.00028		ng/g	
			22'3455'-HexaCB-(141)	2022/09/30	0.00028 U, EDL=0.00028		ng/g	
			22'3456-HexaCB-(142)	2022/09/30	0.00031 U, EDL=0.00031		ng/g	
			22'345'6-HexaCB-(144)	2022/09/30	0.00028 U, EDL=0.00028		ng/g	
			22'3466'-HexaCB-(145)	2022/09/30	0.00020 U, EDL=0.00020		ng/g	
			22'34'55'-HexaCB-(146)	2022/09/30	0.00027 U, EDL=0.00027		ng/g	
			HexaCB-(147)+(149)	2022/09/30	0.00031 J, EDL=0.00028		ng/g	
			22'34'56'-HexaCB-(148)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	
			22'34'66'-HexaCB-(150)	2022/09/30	0.00018 U, EDL=0.00018		ng/g	
			22'3566'-HexaCB-(152)	2022/09/30	0.00020 U, EDL=0.00020		ng/g	
			HexaCB-(153)+(168)	2022/09/30	0.00040 J, EDL=0.00025		ng/g	
			22'44'56'-HexaCB-(154)	2022/09/30	0.00021 U, EDL=0.00021		ng/g	
			22'44'66'-HexaCB-(155)	2022/09/30	0.00027 U, EDL=0.00027		ng/g	
			HexaCB-(156)+(157)	2022/09/30	0.00027 U, EDL=0.00027		ng/g	
			233'44'6-HexaCB-(158)	2022/09/30	0.00023 U, EDL=0.00023		ng/g	
			233'455'-HexaCB-(159)	2022/09/30	0.00032 U, EDL=0.00032		ng/g	
			233'456-HexaCB-(160)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	
			233'45'6-HexaCB-(161)	2022/09/30	0.00022 U, EDL=0.00022		ng/g	
			233'4'55'-HexaCB-(162)	2022/09/30	0.00029 U, EDL=0.00029		ng/g	
			233'4'5'6-HexaCB-(164)	2022/09/30	0.00020 U, EDL=0.00020		ng/g	
			233'55'6-HexaCB-(165)	2022/09/30	0.00025 U, EDL=0.00025		ng/g	
			23'44'55'-HexaCB-(167)	2022/09/30	0.00027 U, EDL=0.00027		ng/g	
			33'44'55'-HexaCB-(169)	2022/09/30	0.00027 U, EDL=0.00027		ng/g	
			22'33'44'5-HeptaCB-(170)	2022/09/30	0.00032 U, EDL=0.00032		ng/g	
			HeptaCB-(171)+(173)	2022/09/30	0.00046 U, EDL=0.00046		ng/g	
			22'33'455'-HeptaCB-(172)	2022/09/30	0.00049 U, EDL=0.00049		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'33'456'-HeptaCB-(174)	2022/09/30	0.00045 U, EDL=0.00045		ng/g	
			22'33'45'6-HeptaCB-(175)	2022/09/30	0.00030 U, EDL=0.00030		ng/g	
			22'33'466'-HeptaCB-(176)	2022/09/30	0.00019 U, EDL=0.00019		ng/g	
			22'33'45'6'-HeptaCB-(177)	2022/09/30	0.00052 U, EDL=0.00052		ng/g	
			22'33'55'6-HeptaCB-(178)	2022/09/30	0.00029 U, EDL=0.00029		ng/g	
			22'33'566'-HeptaCB-(179)	2022/09/30	0.00018 U, EDL=0.00018		ng/g	
			HeptaCB-(180)+(193)	2022/09/30	0.00032 U, EDL=0.00032		ng/g	
			22'344'56-HeptaCB-(181)	2022/09/30	0.00046 U, EDL=0.00046		ng/g	
			22'344'56'-HeptaCB-(182)	2022/09/30	0.00034 U, EDL=0.00034		ng/g	
			22'344'5'6-HeptaCB-(183)	2022/09/30	0.00042 U, EDL=0.00042		ng/g	
			22'344'66'-HeptaCB-(184)	2022/09/30	0.00018 U, EDL=0.00018		ng/g	
			22'3455'6-HeptaCB-(185)	2022/09/30	0.00049 U, EDL=0.00049		ng/g	
			22'34566'-HeptaCB-(186)	2022/09/30	0.00020 U, EDL=0.00020		ng/g	
			22'34'55'6-HeptaCB-(187)	2022/09/30	0.00032 U, EDL=0.00032		ng/g	
			22'34'566'-HeptaCB-(188)	2022/09/30	0.00029 U, EDL=0.00029		ng/g	
			233'44'55'-HeptaCB-(189)	2022/09/30	0.00038 U, EDL=0.00038		ng/g	
			233'44'56-HeptaCB-(190)	2022/09/30	0.00035 U, EDL=0.00035		ng/g	
			233'44'5'6-HeptaCB-(191)	2022/09/30	0.00034 U, EDL=0.00034		ng/g	
			233'455'6-HeptaCB-(192)	2022/09/30	0.00038 U, EDL=0.00038		ng/g	
			22'33'44'55'-OctaCB-(194)	2022/09/30	0.00051 U, EDL=0.00051		ng/g	
			22'33'44'56-OctaCB-(195)	2022/09/30	0.00058 U, EDL=0.00058		ng/g	
			22'33'44'56'-OctaCB-(196)	2022/09/30	0.00039 U, EDL=0.00039		ng/g	
			22'33'44'66'OctaCB-(197)	2022/09/30	0.00030 U, EDL=0.00030		ng/g	
			OctaCB-(198)+(199)	2022/09/30	0.00037 U, EDL=0.00037		ng/g	
			22'33'4566'-OctaCB-(200)	2022/09/30	0.00026 U, EDL=0.00026		ng/g	
			22'33'45'66'-OctaCB-(201)	2022/09/30	0.00027 U, EDL=0.00027		ng/g	
			22'33'55'66'-OctaCB-(202)	2022/09/30	0.00033 U, EDL=0.00033		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'344'55'6-OctaCB-(203)	2022/09/30	0.00035 U, EDL=0.00035		ng/g	
			22'344'566'-OctaCB-(204)	2022/09/30	0.00029 U, EDL=0.00029		ng/g	
			233'44'55'6-OctaCB-(205)	2022/09/30	0.00041 U, EDL=0.00041		ng/g	
			22'33'44'55'6-NonaCB-(206)	2022/09/30	0.00050 U, EDL=0.00050		ng/g	
			22'33'44'566'-NonaCB-(207)	2022/09/30	0.00045 U, EDL=0.00045		ng/g	
			22'33'455'66'-NonaCB-(208)	2022/09/30	0.00052 U, EDL=0.00052		ng/g	
			DecaCB-(209)	2022/09/30	0.00054 U, EDL=0.00054		ng/g	
			Total PCB	2022/09/30	2.8 U, EDL=2.8		ng/g	

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 (absolute difference <= 2x RDL).

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(2) within method criteria.

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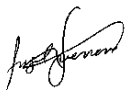
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Angel Guerrero, Supervisor, Ultra Trace Analysis, HRMS

Colm McNamara, Senior Analyst, Liquid Chromatography

Cristina Carriere, Senior Scientific Specialist

Cathy Xu, Scientific Specialist, Ultra Trace Analysis, HRMS

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Your Project #: A3B0217

Attention: Philip Nerenberg

Apex Laboratories
6700 SW Sandburg St.
Tigard, OR
USA 97223

Report Date: 2023/04/24
Report #: R7599894
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C338911
Received: 2023/02/09, 12:55

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dioxins/Furans in Water (1613B) (1)	1	2023/02/12	2023/02/21	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	2023/02/12	2023/03/02	BRL SOP-00406 BRL SOP-00410	EPA M8290Am/ M1613Bm
OC Pesticides in Water by GCTQ	1	2023/02/14	2023/02/17	BRL SOP-00014	EPA Method 1699m
PCB Congeners in Water (1668C)	1	2023/02/23	2023/03/06	BRL SOP-00408	EPA 1668C m
PFAS in water by SPE/LCMS (2)	2	2023/02/21	2023/02/22	CAM SOP-00894	EPA 537.1 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.

(2) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

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:
Lori Dufour, Project Manager
Email: Lori.Dufour@bureauveritas.com
Phone# (905) 817-5700

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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VAE871			
Sampling Date		2023/02/07 08:30			
	UNITS	MFA-B3A-20230207-GW-36.0	RDL	MDL	QC Batch
Aldrin	ng/L	0.19 U (1)	1.8	0.19	8503096
alpha-BHC	ng/L	0.073 J	0.20	0.024	8503096
delta-BHC	ng/L	0.147 J	0.20	0.029	8503096
beta-BHC	ng/L	0.13 U (1)	1.8	0.13	8503096
Lindane	ng/L	0.20	0.20	0.033	8503096
a-Chlordane	ng/L	0.103 J	0.20	0.029	8503096
g-Chlordane	ng/L	0.119 J	0.20	0.029	8503096
Oxychlordane	ng/L	0.028 U	0.20	0.028	8503096
o,p-DDD	ng/L	0.77	0.20	0.020	8503096
p,p-DDD	ng/L	1.96	0.20	0.014	8503096
o,p-DDE	ng/L	0.197 J	0.20	0.016	8503096
p,p-DDE	ng/L	1.08	0.20	0.012	8503096
o,p-DDT	ng/L	1.56	0.20	0.040	8503096
p,p-DDT	ng/L	5.71	0.20	0.050	8503096
Dieldrin	ng/L	0.090 U (1)	0.36	0.090	8503096
Endosulfan I	ng/L	2.44	0.40	0.067	8503096
Endosulfan II	ng/L	0.296 J	0.40	0.074	8503096
Endosulfan sulfate	ng/L	0.091 U (1)	0.26	0.091	8503096
Endrin	ng/L	1.93	0.20	0.045	8503096
Endrin aldehyde	ng/L	0.157 J	0.20	0.071	8503096
Endrin ketone	ng/L	0.041 J	0.20	0.034	8503096
Heptachlor	ng/L	0.029 U	0.20	0.029	8503096
Heptachlor epoxide	ng/L	0.019 J	0.20	0.015	8503096
Hexachlorobenzene	ng/L	0.10 U	0.20	0.10	8503096
Methoxychlor	ng/L	1.8 U (1)	8.9	1.8	8503096
Mirex	ng/L	0.056 J	0.20	0.021	8503096
cis-Nonachlor	ng/L	0.037 U	0.20	0.037	8503096
trans-Nonachlor	ng/L	0.055 J	0.20	0.044	8503096
Surrogate Recovery (%)					
13C10-cis Nonachlor	%	61	N/A	N/A	8503096
13C10-Heptachlor	%	113	N/A	N/A	8503096
13C10-Heptachlor Epoxide	%	81	N/A	N/A	8503096
13C10-Oxychlordane	%	84	N/A	N/A	8503096
13C10-trans Nonachlor	%	66	N/A	N/A	8503096
13C12-Endrin	%	124	N/A	N/A	8503096

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VAE871			
Sampling Date		2023/02/07 08:30			
	UNITS	MFA-B3A-20230207-GW-36.0	RDL	MDL	QC Batch
13C12-Endrin Ketone	%	75	N/A	N/A	8503096
13C6-beta BHC	%	58	N/A	N/A	8503096
13C6-d6-gamma BHC (Lindane)	%	85	N/A	N/A	8503096
13C-Methoxychlor	%	119	N/A	N/A	8503096
13C-pp-DDD	%	110	N/A	N/A	8503096
13C-pp-DDE	%	56	N/A	N/A	8503096
13C-pp-DDT	%	79	N/A	N/A	8503096
C13-Hexachlorobenzene	%	52	N/A	N/A	8503096

RDL = Reportable Detection Limit
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N/A = Not Applicable

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PERFLUOROALKYL SUBSTANCES (WATER)

Bureau Veritas ID		VAE871	VAE872			
Sampling Date		2023/02/07 08:30	2023/02/07 08:20			
	UNITS	MFA-B3A-20230207-GW-36.0	FIELD BLANK	RDL	MDL	QC Batch
Perfluorobutanoic acid (PFBA)	ug/L	0.017 J	0.0015 U	0.020	0.0015	8514543
Perfluoropentanoic acid (PFPeA)	ug/L	0.0061 J	0.0025 U	0.020	0.0025	8514543
Perfluorohexanoic acid (PFHxA)	ug/L	0.0086 J	0.0038 U	0.020	0.0038	8514543
Perfluoroheptanoic acid (PFHpA)	ug/L	0.0036 J	0.0018 U	0.020	0.0018	8514543
Perfluorooctanoic acid (PFOA)	ug/L	0.0082 J	0.0030 U	0.020	0.0030	8514543
Perfluorononanoic acid (PFNA)	ug/L	0.0021 U	0.0021 U	0.020	0.0021	8514543
Perfluorodecanoic acid (PFDA)	ug/L	0.0016 U	0.0016 U	0.020	0.0016	8514543
Perfluoroundecanoic acid (PFUnA)	ug/L	0.0024 U	0.0024 U	0.020	0.0024	8514543
Perfluorododecanoic acid (PFDoA)	ug/L	0.0029 U	0.0029 U	0.020	0.0029	8514543
Perfluorotridecanoic acid (PFTRDA)	ug/L	0.0026 U	0.0026 U	0.020	0.0026	8514543
Perfluorotetradecanoic acid(PFTEDA)	ug/L	0.0016 U	0.0016 U	0.020	0.0016	8514543
Perfluorobutanesulfonic acid (PFBS)	ug/L	0.0021 U	0.0021 U	0.020	0.0021	8514543
Perfluoropentanesulfonic acid PFPes	ug/L	0.0023 U	0.0023 U	0.020	0.0023	8514543
Perfluorohexanesulfonic acid(PFHxS)	ug/L	0.0022 J	0.0022 U	0.020	0.0022	8514543
Perfluoroheptanesulfonic acid PFHpS	ug/L	0.0039 U	0.0039 U	0.020	0.0039	8514543
Perfluorooctanesulfonic acid (PFOS)	ug/L	0.0066 J	0.0035 U	0.020	0.0035	8514543
Perfluorononanesulfonic acid (PFNS)	ug/L	0.0037 U	0.0037 U	0.020	0.0037	8514543
Perfluorodecanesulfonic acid (PFDS)	ug/L	0.0048 U	0.0048 U	0.020	0.0048	8514543
Perfluorooctane Sulfonamide (PFOSA)	ug/L	0.0034 U	0.0034 U	0.020	0.0034	8514543
EtFOSA	ug/L	0.0095 U	0.0095 U	0.020	0.0095	8514543
MeFOSA	ug/L	0.0084 U	0.0084 U	0.020	0.0084	8514543
EtFOSE	ug/L	0.0070 U	0.0070 U	0.020	0.0070	8514543
MeFOSE	ug/L	0.0073 U	0.0073 U	0.020	0.0073	8514543
EtFOSAA	ug/L	0.0046 U	0.0046 U	0.020	0.0046	8514543
MeFOSAA	ug/L	0.0045 U	0.0045 U	0.020	0.0045	8514543
4:2 Fluorotelomer sulfonic acid	ug/L	0.0033 U	0.0033 U	0.020	0.0033	8514543
6:2 Fluorotelomer sulfonic acid	ug/L	0.0015 U	0.0015 U	0.020	0.0015	8514543
8:2 Fluorotelomer sulfonic acid	ug/L	0.0031 U	0.0031 U	0.020	0.0031	8514543
Hexafluoropropyleneoxide dimer acid	ug/L	0.0052 U	0.0052 U	0.020	0.0052	8514543
4,8-Dioxa-3H-perfluorononanoic acid	ug/L	0.0027 U	0.0027 U	0.020	0.0027	8514543
9Cl-PF3ONS (F-53B Major)	ug/L	0.0043 U	0.0043 U	0.020	0.0043	8514543
11Cl-PF3OUdS (F-53B Minor)	ug/L	0.0035 U	0.0035 U	0.020	0.0035	8514543
Surrogate Recovery (%)						
13C2-4:2-Fluorotelomersulfonic Acid	%	105	102	N/A	N/A	8514543
13C2-6:2-Fluorotelomersulfonic Acid	%	108	103	N/A	N/A	8514543
13C2-8:2-Fluorotelomersulfonic Acid	%	95	99	N/A	N/A	8514543

RDL = Reportable Detection Limit
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PERFLUOROALKYL SUBSTANCES (WATER)

Bureau Veritas ID		VAE871	VAE872			
Sampling Date		2023/02/07 08:30	2023/02/07 08:20			
	UNITS	MFA-B3A-20230207-GW-36.0	FIELD BLANK	RDL	MDL	QC Batch
13C2-Perfluorodecanoic acid	%	85	91	N/A	N/A	8514543
13C2-Perfluorododecanoic acid	%	71	83	N/A	N/A	8514543
13C2-Perfluorohexanoic acid	%	96	97	N/A	N/A	8514543
13C2-perfluorotetradecanoic acid	%	46 (1)	65	N/A	N/A	8514543
13C2-Perfluoroundecanoic acid	%	80	87	N/A	N/A	8514543
13C3-HFPO-DA	%	94	99	N/A	N/A	8514543
13C3-Perfluorobutanesulfonic acid	%	92	94	N/A	N/A	8514543
13C4-Perfluorobutanoic acid	%	95	97	N/A	N/A	8514543
13C4-Perfluoroheptanoic acid	%	97	100	N/A	N/A	8514543
13C4-Perfluorooctanesulfonic acid	%	88	92	N/A	N/A	8514543
13C4-Perfluorooctanoic acid	%	94	96	N/A	N/A	8514543
13C5-Perfluorononanoic acid	%	94	96	N/A	N/A	8514543
13C5-Perfluoropentanoic acid	%	94	96	N/A	N/A	8514543
13C8-Perfluorooctane Sulfonamide	%	73	84	N/A	N/A	8514543
18O2-Perfluorohexanesulfonic acid	%	94	94	N/A	N/A	8514543
D3-MeFOSA	%	59	60	N/A	N/A	8514543
D3-MeFOSAA	%	80	83	N/A	N/A	8514543
D5-EtFOSA	%	53	54	N/A	N/A	8514543
D5-EtFOSAA	%	77	81	N/A	N/A	8514543
D7-MeFOSE	%	62	78	N/A	N/A	8514543
D9-EtFOSE	%	59	74	N/A	N/A	8514543

RDL = Reportable Detection Limit
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N/A = Not Applicable
(1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL) which may result in increased variability of the associated native analyte result (PFTeDA, PFTrDA).

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VAE871							
Sampling Date		2023/02/07 08:30				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B3A-20230207-GW-36.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	7.79 J	1.16	10.3	1.45	1.00	7.79	1	8511386
1,2,3,7,8-Penta CDD *	pg/L	4.31 J	1.23	51.5	1.86	1.00	4.31	1	8511386
1,2,3,4,7,8-Hexa CDD *	pg/L	1.55 U	1.55	51.5	2.25	0.100	0.155	0	8511386
1,2,3,6,7,8-Hexa CDD *	pg/L	69.9	1.49	51.5	1.40	0.100	6.99	1	8511386
1,2,3,7,8,9-Hexa CDD *	pg/L	40.4 J	1.43	51.5	1.13	0.100	4.04	1	8511386
1,2,3,4,6,7,8-Hepta CDD *	pg/L	79.0	1.71	51.5	1.90	0.0100	0.790	1	8511386
Octa CDD *	pg/L	545	1.42	103	3.13	0.000300	0.164	1	8511386
Total Tetra CDD *	pg/L	11.9	1.16	10.3	4.00	N/A	N/A	2	8511386
Total Penta CDD *	pg/L	31.0 J	1.23	51.5	4.00	N/A	N/A	5	8511386
Total Hexa CDD *	pg/L	436	1.49	51.5	4.00	N/A	N/A	4	8511386
Total Hepta CDD *	pg/L	142	1.71	51.5	4.00	N/A	N/A	2	8511386
2,3,7,8-Tetra CDF **	pg/L	48.6	1.02	10.3	1.68	0.100	4.86	1	8511386
1,2,3,7,8-Penta CDF **	pg/L	1.76 U	1.76	51.5	1.33	0.0300	0.0528	0	8511386
2,3,4,7,8-Penta CDF **	pg/L	1.49 U	1.49	51.5	1.23	0.300	0.447	0	8511386
1,2,3,4,7,8-Hexa CDF **	pg/L	1.05 U	1.05	51.5	1.85	0.100	0.105	0	8511386
1,2,3,6,7,8-Hexa CDF **	pg/L	1.27 U	1.27	51.5	1.52	0.100	0.127	0	8511386
2,3,4,6,7,8-Hexa CDF **	pg/L	0.948 U	0.948	51.5	1.97	0.100	0.0948	0	8511386
1,2,3,7,8,9-Hexa CDF **	pg/L	1.15 U	1.15	51.5	1.66	0.100	0.115	0	8511386
1,2,3,4,6,7,8-Hepta CDF **	pg/L	7.90 U	7.90	51.5	2.00	0.0100	0.0790	0	8511386
1,2,3,4,7,8,9-Hepta CDF **	pg/L	1.37 U	1.37	51.5	1.87	0.0100	0.0137	0	8511386
Octa CDF **	pg/L	17.7 J	1.58	103	3.99	0.000300	0.00531	1	8511386
Total Tetra CDF **	pg/L	98.3	1.02	10.3	4.00	N/A	N/A	8	8511386
Total Penta CDF **	pg/L	9.86 J	1.62	51.5	4.00	N/A	N/A	2	8511386
Total Hexa CDF **	pg/L	3.98 J	1.03	51.5	4.00	N/A	N/A	1	8511386
Total Hepta CDF **	pg/L	11.7 J	1.11	51.5	4.00	N/A	N/A	1	8511386
Confirmation 2,3,7,8-Tetra CDF **	pg/L	51.5	2.0	10	N/A	0.100	5.15	N/A	8531877
TOTAL TOXIC EQUIVALENCY	pg/L	N/A	N/A	N/A	N/A	N/A	30.4	N/A	N/A
Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	101	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-1234678 HeptaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8511386

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VAE871							
Sampling Date		2023/02/07 08:30				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B3A-20230207-GW-36.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-123478 HexaCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-123478 HexaCDF **	%	95	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-1234789 HeptaCDF **	%	84	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-123678 HexaCDD *	%	101	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-123678 HexaCDF **	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-12378 PentaCDD *	%	117	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-12378 PentaCDF **	%	107	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-123789 HexaCDF **	%	95	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-234678 HexaCDF **	%	101	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-23478 PentaCDF **	%	117	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-2378 TetraCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-2378 TetraCDF **	%	105	N/A	N/A	N/A	N/A	N/A	N/A	8511386
C13-OCDD *	%	75	N/A	N/A	N/A	N/A	N/A	N/A	8511386
Confirmation C13-2378 TetraCDF **	%	72	N/A	N/A	N/A	N/A	N/A	N/A	8531877

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The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VAE871							
Sampling Date		2023/02/07 08:30				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B3A-20230207-GW-36.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2-MonoCB-(1)	ng/L	0.12 U	0.12	0.25	0.0098	N/A	N/A	1	8533813
3-MonoCB-(2)	ng/L	0.26 U	0.26	0.25	0.0079	N/A	N/A	1	8533813
4-MonoCB-(3)	ng/L	0.094 U	0.094	0.63	0.0071	N/A	N/A	1	8533813
22'-DiCB-(4)	ng/L	0.21 U	0.21	0.63	0.017	N/A	N/A	1	8533813
2,3-DiCB-(5)	ng/L	0.13 U	0.13	0.63	0.012	N/A	N/A	1	8533813
2,3'-DiCB-(6)	ng/L	0.25 U	0.25	0.25	0.0053	N/A	N/A	1	8533813
2,4-DiCB-(7)	ng/L	0.13 U	0.13	0.25	0.0056	N/A	N/A	1	8533813
2,4'-DiCB-(8)	ng/L	0.38 U	0.38	0.63	0.017	N/A	N/A	1	8533813
2,5-DiCB-(9)	ng/L	0.13 U	0.13	0.25	0.0044	N/A	N/A	1	8533813
2,6-DiCB-(10)	ng/L	0.18 U	0.18	0.63	0.0052	N/A	N/A	1	8533813
3,3'-DiCB-(11)	ng/L	0.78 J	0.37	2.5	0.0090	N/A	N/A	1	8533813
DiCB-(12)+(13)	ng/L	0.23 U	0.23	0.63	0.015	N/A	N/A	1	8533813
3,5-DiCB-(14)	ng/L	0.13 U	0.13	0.25	0.0082	N/A	N/A	1	8533813
4,4'-DiCB-(15)	ng/L	0.25 U	0.25	0.63	0.011	N/A	N/A	1	8533813
22'3-TriCB-(16)	ng/L	0.082 U	0.082	0.63	0.0060	N/A	N/A	1	8533813
22'4-TriCB-(17)	ng/L	0.19 U	0.19	0.25	0.0091	N/A	N/A	1	8533813
TriCB-(18)+(30)	ng/L	0.17 U	0.17	0.63	0.017	N/A	N/A	1	8533813
22'6-TriCB-(19)	ng/L	0.27 U	0.27	0.25	0.0061	N/A	N/A	1	8533813
TriCB-(20) + (28)	ng/L	0.10 U	0.10	0.63	0.13	N/A	N/A	N/A	8533813
TriCB-(21)+(33)	ng/L	0.11 U	0.11	0.63	0.011	N/A	N/A	1	8533813
234'-TriCB-(22)	ng/L	0.11 U	0.11	0.25	0.0065	N/A	N/A	1	8533813
235-TriCB-(23)	ng/L	0.037 U	0.037	0.25	0.0072	N/A	N/A	1	8533813
236-TriCB-(24)	ng/L	0.052 U	0.052	0.25	0.0043	N/A	N/A	1	8533813
23'4-TriCB-(25)	ng/L	0.11 U	0.11	0.25	0.0054	N/A	N/A	1	8533813
TriCB-(26)+(29)	ng/L	0.10 U	0.10	0.63	0.013	N/A	N/A	1	8533813
23'6-TriCB-(27)	ng/L	0.14 U	0.14	0.25	0.0082	N/A	N/A	1	8533813
24'5-TriCB-(31)	ng/L	0.098 U	0.098	0.63	0.0078	N/A	N/A	1	8533813
24'6-TriCB-(32)	ng/L	0.14 U	0.14	0.25	0.0087	N/A	N/A	1	8533813
23'5'-TriCB-(34)	ng/L	0.037 U	0.037	0.25	0.0061	N/A	N/A	1	8533813
33'4-TriCB-(35)	ng/L	0.11 U	0.11	0.25	0.0042	N/A	N/A	1	8533813
33'5-TriCB-(36)	ng/L	0.031 U	0.031	0.25	0.0052	N/A	N/A	1	8533813
344'-TriCB-(37)	ng/L	0.042 U	0.042	0.25	0.0041	N/A	N/A	1	8533813

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VAE871							
Sampling Date		2023/02/07 08:30				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B3A-20230207-GW-36.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
345-TriCB-(38)	ng/L	0.035 U	0.035	0.25	0.0047	N/A	N/A	1	8533813
34'5-TriCB-(39)	ng/L	0.073 U	0.073	0.25	0.0059	N/A	N/A	1	8533813
TetraCB-(40)+(41)+(71)	ng/L	0.33 U	0.33	1.3	0.035	N/A	N/A	1	8533813
22'34'-TetraCB-(42)	ng/L	0.66 U	0.66	0.63	0.011	N/A	N/A	1	8533813
22'35-TetraCB-(43)	ng/L	0.46 U	0.46	0.63	0.015	N/A	N/A	1	8533813
TetraCB-(44)+(47)+(65)	ng/L	0.32 U	0.32	1.3	0.029	N/A	N/A	1	8533813
TetraCB-(45)+(51)	ng/L	0.35 U	0.35	0.63	0.011	N/A	N/A	1	8533813
22'36'-TetraCB-(46)	ng/L	0.59 U	0.59	0.25	0.014	N/A	N/A	1	8533813
22'45-TetraCB-(48)	ng/L	0.51 U	0.51	0.63	0.017	N/A	N/A	1	8533813
TetraCB-(49)+TetraCB-(69)	ng/L	0.30 U	0.30	1.3	0.023	N/A	N/A	1	8533813
TetraCB-(50)+(53)	ng/L	0.52 U	0.52	1.3	0.027	N/A	N/A	1	8533813
22'55'-TetraCB-(52)	ng/L	0.51 U	0.51	0.63	0.019	N/A	N/A	1	8533813
22'66'-TetraCB-(54)	ng/L	0.30 U	0.30	0.63	0.020	N/A	N/A	1	8533813
233'4-TetraCB-(55)	ng/L	0.12 U	0.12	0.63	0.015	N/A	N/A	1	8533813
233'4'-Tetra CB(56)	ng/L	0.35 U	0.35	0.63	0.018	N/A	N/A	1	8533813
233'5-TetraCB-(57)	ng/L	0.11 U	0.11	0.63	0.0097	N/A	N/A	1	8533813
233'5'-TetraCB-(58)	ng/L	0.11 U	0.11	0.63	0.020	N/A	N/A	1	8533813
TetraCB-(59)+(62)+(75)	ng/L	0.37 U	0.37	1.3	0.038	N/A	N/A	1	8533813
2344'-TetraCB -(60)	ng/L	0.34 U	0.34	0.63	0.011	N/A	N/A	1	8533813
TetraCB-(61)+(70)+(74)+(76)	ng/L	0.35 U	0.35	2.5	0.035	N/A	N/A	1	8533813
234'5-TetraCB-(63)	ng/L	0.33 U	0.33	0.63	0.0080	N/A	N/A	1	8533813
234'6-TetraCB-(64)	ng/L	0.29 U	0.29	0.63	0.0089	N/A	N/A	1	8533813
23'44'-TetraCB-(66)	ng/L	0.33 U	0.33	0.63	0.0084	N/A	N/A	1	8533813
23'45-TetraCB-(67)	ng/L	0.19 U	0.19	0.63	0.0040	N/A	N/A	1	8533813
23'45'-TetraCB-(68)	ng/L	0.11 U	0.11	0.63	0.014	N/A	N/A	1	8533813
23'55'-TetraCB-(72)	ng/L	0.11 U	0.11	0.63	0.0082	N/A	N/A	1	8533813
23'5'6-TetraCB-(73)	ng/L	0.12 U	0.12	0.63	0.023	N/A	N/A	1	8533813
33'44'-TetraCB-(77)	ng/L	0.13 U	0.13	0.63	0.011	0.000100	0.0000130	1	8533813
33'45-TetraCB-(78)	ng/L	0.12 U	0.12	0.63	0.013	N/A	N/A	1	8533813
33'45'-TetraCB(79)	ng/L	0.20 U	0.20	0.63	0.0088	N/A	N/A	1	8533813
33'55'-TetraCB-(80)	ng/L	0.19 U	0.19	0.63	0.0087	N/A	N/A	1	8533813
344'5-TetraCB-(81)	ng/L	0.11 U	0.11	0.63	0.0079	0.000300	0.0000330	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VAE871							
Sampling Date		2023/02/07 08:30				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B3A-20230207-GW-36.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'4-PentaCB-(82)	ng/L	0.31 U	0.31	0.63	0.014	N/A	N/A	1	8533813
PentaCB-(83)+(99)	ng/L	0.38 U	0.38	1.3	0.033	N/A	N/A	1	8533813
22'33'6-PentaCB-(84)	ng/L	0.41 U	0.41	0.25	0.0088	N/A	N/A	1	8533813
PentaCB-(85)+(116)+(117)	ng/L	0.30 U	0.30	1.3	0.040	N/A	N/A	1	8533813
PentaCB-(86)(87)(97)(109)(119)(125)	ng/L	0.31 U	0.31	2.5	0.080	N/A	N/A	1	8533813
PentaCB-(88)+(91)	ng/L	0.40 U	0.40	0.63	0.025	N/A	N/A	1	8533813
22'346'-PentaCB-(89)	ng/L	0.31 U	0.31	0.63	0.0040	N/A	N/A	1	8533813
PentaCB-(90)+(101)+(113)	ng/L	0.43 J	0.32	2.5	0.0080	N/A	N/A	1	8533813
22'355'-PentaCB-(92)	ng/L	0.43 U	0.43	0.63	0.010	N/A	N/A	1	8533813
PentaCB-(93)+(98)+(100)+(102)	ng/L	0.38 U	0.38	2.5	0.051	N/A	N/A	1	8533813
22'356'-PentaCB-(94)	ng/L	0.28 U	0.28	0.63	0.017	N/A	N/A	1	8533813
22'35'6-PentaCB-(95)	ng/L	0.42 U	0.42	0.63	0.011	N/A	N/A	1	8533813
22'366'-PentaCB-(96)	ng/L	0.22 U	0.22	0.63	0.014	N/A	N/A	1	8533813
22'45'6-PentaCB-(103)	ng/L	0.38 U	0.38	0.63	0.012	N/A	N/A	1	8533813
22'466'-PentaCB-(104)	ng/L	0.089 U	0.089	0.63	0.022	N/A	N/A	1	8533813
233'44'-PentaCB-(105)	ng/L	0.093 U	0.093	0.63	0.0052	0.0000300	0.00000279	1	8533813
233'45-PentaCB-(106)	ng/L	0.077 U	0.077	0.63	0.018	N/A	N/A	1	8533813
233'4'5-PentaCB-(107)	ng/L	0.19 U	0.19	0.63	0.014	N/A	N/A	1	8533813
PentaCB-(108)+(124)	ng/L	0.15 U	0.15	1.3	0.023	N/A	N/A	1	8533813
PentaCB-(110)+(115)	ng/L	0.49 J	0.30	1.3	0.022	N/A	N/A	1	8533813
233'55'-PentaCB-(111)	ng/L	0.085 U	0.085	0.63	0.012	N/A	N/A	1	8533813
233'56-PentaCB-(112)	ng/L	0.083 U	0.083	0.63	0.018	N/A	N/A	1	8533813
2344'5-PentaCB-(114)	ng/L	0.10 U	0.10	0.63	0.0084	0.0000300	0.00000300	1	8533813
23'44'5-PentaCB-(118)	ng/L	0.127 J	0.095	1.3	0.0071	0.0000300	0.00000381	1	8533813
23'455'-PentaCB-(120)	ng/L	0.090 U	0.090	0.63	0.014	N/A	N/A	1	8533813
23'45'6-PentaCB-(121)	ng/L	0.088 U	0.088	0.63	0.0040	N/A	N/A	1	8533813
233'4'5'-PentaCB-(122)	ng/L	0.29 U	0.29	0.63	0.011	N/A	N/A	1	8533813
23'44'5'-PentaCB-(123)	ng/L	0.11 U	0.11	0.63	0.014	0.0000300	0.00000330	1	8533813
33'44'5-PentaCB-(126)	ng/L	0.078 U	0.078	0.63	0.0061	0.100	0.00780	1	8533813
33'455'-PentaCB-(127)	ng/L	0.072 U	0.072	0.63	0.017	N/A	N/A	1	8533813
HexaCB-(128)+(166)	ng/L	0.33 U	0.33	1.3	0.026	N/A	N/A	1	8533813
HexaCB-(129)+(138)+(163)	ng/L	0.52 J	0.39	2.5	0.014	N/A	N/A	1	8533813

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	UNITS	MFA-B3A-20230207-GW-36.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'45'-HexaCB-(130)	ng/L	0.42 U	0.42	0.63	0.020	N/A	N/A	1	8533813
22'33'46-HexaCB-(131)	ng/L	0.53 U	0.53	0.63	0.019	N/A	N/A	1	8533813
22'33'46'-HexaCB-(132)	ng/L	0.44 U	0.44	0.63	0.019	N/A	N/A	1	8533813
22'33'55'-HexaCB-(133)	ng/L	0.44 U	0.44	0.63	0.017	N/A	N/A	1	8533813
HexaCB-(134)+(143)	ng/L	0.33 U	0.33	1.3	0.028	N/A	N/A	1	8533813
HexaCB-(135)+(151)	ng/L	0.51 U	0.51	1.3	0.038	N/A	N/A	1	8533813
22'33'66'-HexaCB-(136)	ng/L	0.37 U	0.37	0.63	0.014	N/A	N/A	1	8533813
22'344'5-HexaCB-(137)	ng/L	0.41 U	0.41	1.3	0.014	N/A	N/A	1	8533813
HexaCB-(139)+(140)	ng/L	0.37 U	0.37	1.3	0.032	N/A	N/A	1	8533813
22'3455'-HexaCB-(141)	ng/L	0.38 U	0.38	0.63	0.018	N/A	N/A	1	8533813
22'3456-HexaCB-(142)	ng/L	0.16 U	0.16	0.63	0.018	N/A	N/A	1	8533813
22'345'6-HexaCB-(144)	ng/L	0.50 U	0.50	0.63	0.011	N/A	N/A	1	8533813
22'3466'-HexaCB-(145)	ng/L	0.12 U	0.12	0.63	0.022	N/A	N/A	1	8533813
22'34'55'-HexaCB-(146)	ng/L	0.34 U	0.34	0.63	0.014	N/A	N/A	1	8533813
HexaCB-(147)+(149)	ng/L	0.36 U	0.36	1.3	0.027	N/A	N/A	1	8533813
22'34'56'-HexaCB-(148)	ng/L	0.17 U	0.17	0.63	0.013	N/A	N/A	1	8533813
22'34'66'-HexaCB-(150)	ng/L	0.12 U	0.12	0.63	0.022	N/A	N/A	1	8533813
22'3566'-HexaCB-(152)	ng/L	0.12 U	0.12	0.63	0.020	N/A	N/A	1	8533813
HexaCB-(153)+(168)	ng/L	0.32 J	0.31	1.3	0.028	N/A	N/A	1	8533813
22'44'56'-HexaCB-(154)	ng/L	0.39 U	0.39	0.63	0.014	N/A	N/A	1	8533813
22'44'66'-HexaCB-(155)	ng/L	0.093 U	0.093	0.63	0.013	N/A	N/A	1	8533813
HexaCB-(156)+(157)	ng/L	0.10 U	0.10	1.3	0.015	0.0000300	0.00000300	1	8533813
233'44'6-HexaCB-(158)	ng/L	0.25 U	0.25	0.63	0.017	N/A	N/A	1	8533813
233'455'-HexaCB-(159)	ng/L	0.14 U	0.14	0.63	0.015	N/A	N/A	1	8533813
233'456-HexaCB-(160)	ng/L	0.11 U	0.11	0.63	0.013	N/A	N/A	1	8533813
233'45'6-HexaCB-(161)	ng/L	0.10 U	0.10	0.63	0.022	N/A	N/A	1	8533813
233'4'55'-HexaCB-(162)	ng/L	0.14 U	0.14	0.63	0.016	N/A	N/A	1	8533813
233'4'5'6-HexaCB-(164)	ng/L	0.27 U	0.27	0.63	0.020	N/A	N/A	1	8533813
233'55'6-HexaCB-(165)	ng/L	0.11 U	0.11	0.63	0.022	N/A	N/A	1	8533813
23'44'55'-HexaCB-(167)	ng/L	0.095 U	0.095	0.63	0.0096	0.0000300	0.00000285	1	8533813
33'44'55'-HexaCB-(169)	ng/L	0.070 U	0.070	0.63	0.0092	0.0300	0.00210	1	8533813
22'33'44'5-HeptaCB-(170)	ng/L	0.095 U	0.095	0.63	0.011	N/A	N/A	1	8533813

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	UNITS	MFA-B3A-20230207-GW-36.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
HeptaCB-(171)+(173)	ng/L	0.20 U	0.20	1.3	0.027	N/A	N/A	1	8533813
22'33'455'-HeptaCB-(172)	ng/L	0.24 U	0.24	0.63	0.012	N/A	N/A	1	8533813
22'33'456'-HeptaCB-(174)	ng/L	0.22 U	0.22	0.63	0.017	N/A	N/A	1	8533813
22'33'45'6-HeptaCB-(175)	ng/L	0.29 U	0.29	0.63	0.0064	N/A	N/A	1	8533813
22'33'466'-HeptaCB-(176)	ng/L	0.21 U	0.21	0.63	0.0079	N/A	N/A	1	8533813
22'33'45'6'-HeptaCB-(177)	ng/L	0.24 U	0.24	0.63	0.013	N/A	N/A	1	8533813
22'33'55'6-HeptaCB-(178)	ng/L	0.30 U	0.30	0.63	0.0071	N/A	N/A	1	8533813
22'33'566'-HeptaCB-(179)	ng/L	0.21 U	0.21	0.63	0.010	N/A	N/A	1	8533813
HeptaCB-(180)+(193)	ng/L	0.12 U	0.12	1.3	0.018	N/A	N/A	1	8533813
22'344'56-HeptaCB-(181)	ng/L	0.13 U	0.13	0.63	0.015	N/A	N/A	1	8533813
22'344'56'-HeptaCB-(182)	ng/L	0.088 U	0.088	0.63	0.0066	N/A	N/A	1	8533813
22'344'5'6-HeptaCB-(183)	ng/L	0.20 U	0.20	0.63	0.017	N/A	N/A	1	8533813
22'344'66'-HeptaCB-(184)	ng/L	0.067 U	0.067	0.63	0.0065	N/A	N/A	1	8533813
22'3455'6-HeptaCB-(185)	ng/L	0.089 U	0.089	0.63	0.017	N/A	N/A	1	8533813
22'34566'-HeptaCB-(186)	ng/L	0.073 U	0.073	0.63	0.0095	N/A	N/A	1	8533813
22'34'55'6-HeptaCB-(187)	ng/L	0.27 U	0.27	0.63	0.0047	N/A	N/A	1	8533813
22'34'566'-HeptaCB-(188)	ng/L	0.066 U	0.066	0.63	0.015	N/A	N/A	1	8533813
233'44'55'-HeptaCB-(189)	ng/L	0.079 U	0.079	0.63	0.014	0.0000300	0.00000237	1	8533813
233'44'56-HeptaCB-(190)	ng/L	0.17 U	0.17	0.63	0.016	N/A	N/A	1	8533813
233'44'5'6-HeptaCB-(191)	ng/L	0.11 U	0.11	0.63	0.014	N/A	N/A	1	8533813
233'455'6-HeptaCB-(192)	ng/L	0.063 U	0.063	0.63	0.0088	N/A	N/A	1	8533813
22'33'44'55'-OctaCB-(194)	ng/L	0.21 U	0.21	0.63	0.024	N/A	N/A	1	8533813
22'33'44'56-OctaCB-(195)	ng/L	0.23 U	0.23	0.63	0.019	N/A	N/A	1	8533813
22'33'44'56'-OctaCB-(196)	ng/L	0.25 U	0.25	0.63	0.017	N/A	N/A	1	8533813
22'33'44'66'OctaCB-(197)	ng/L	0.054 U	0.054	0.63	0.033	N/A	N/A	1	8533813
OctaCB-(198)+(199)	ng/L	0.26 U	0.26	1.3	0.028	N/A	N/A	1	8533813
22'33'4566'-OctaCB-(200)	ng/L	0.12 U	0.12	0.63	0.031	N/A	N/A	1	8533813
22'33'45'66'-OctaCB-(201)	ng/L	0.13 U	0.13	0.63	0.014	N/A	N/A	1	8533813
22'33'55'66'-OctaCB-(202)	ng/L	0.076 U	0.076	0.63	0.013	N/A	N/A	1	8533813
22'344'55'6-OctaCB-(203)	ng/L	0.24 U	0.24	0.63	0.021	N/A	N/A	1	8533813
22'344'566'-OctaCB-(204)	ng/L	0.045 U	0.045	0.63	0.018	N/A	N/A	1	8533813
233'44'55'6-OctaCB-(205)	ng/L	0.053 U	0.053	0.63	0.014	N/A	N/A	1	8533813

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	UNITS	MFA-B3A-20230207-GW-36.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'44'55'6-NonaCB-(206)	ng/L	0.075 U	0.075	0.63	0.020	N/A	N/A	1	8533813
22'33'44'566'-NonaCB-(207)	ng/L	0.044 U	0.044	0.63	0.018	N/A	N/A	1	8533813
22'33'455'66'-NonaCB-(208)	ng/L	0.042 U	0.042	0.63	0.021	N/A	N/A	1	8533813
DecaCB-(209)	ng/L	0.047 U	0.047	0.63	0.015	N/A	N/A	1	8533813
TOTAL TOXIC EQUIVALENCY	ng/L	N/A	N/A	N/A	N/A	N/A	0.00997	N/A	N/A
Surrogate Recovery (%)									
C13-2,44'-TriCB-(28)	%	97	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'55'6-NonaCB-(206)	%	112	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'5-HeptaCB-(170)	%	103	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'455'66'-NonaCB-(208)	%	109	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'66'-OctaCB-(202)	%	113	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'6-HeptaCB-(178)	%	103	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'344'55'-HeptaCB-(180)	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'34'566'-HeptaCB-(188)	%	85	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'44'66'-HexaCB-(155)	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'466'-PentaCB-(104)	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'66'-TetraCB-(54)	%	41	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'6-TriCB-(19)	%	56	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'-DiCB-(4)	%	142	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'6-OctaCB-(205)	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'-HeptaCB-(189)	%	88	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'-PentaCB-(105)	%	82	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'55'-PentaCB-(111)	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'55'-HexaCB-(167)	%	75	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2344'5-PentaCB-(114)	%	73	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'5-PentaCB-(118)	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2'344'5-PentaCB-(123)	%	70	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2-MonoCB-(1)	%	107	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'55'-HexaCB-(169)	%	83	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'5-PentaCB-(126)	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'-TetraCB-(77)	%	76	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-344'5-TetraCB-(81)	%	81	N/A	N/A	N/A	N/A	N/A	N/A	8533813

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VAE871							
Sampling Date		2023/02/07 08:30				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B3A-20230207-GW-36.0	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-344'-TriCB-(37)	%	77	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-44'-DiCB-(15)	%	54	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-4-MonoCB-(3)	%	138	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-DecaCB-(209)	%	120	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-HexaCB-(156)+(157)	%	72	N/A	N/A	N/A	N/A	N/A	N/A	8533813

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
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TEST SUMMARY

Bureau Veritas ID: VAE871
Sample ID: MFA-B3A-20230207-GW-36.0
Matrix: Water

Collected: 2023/02/07
Shipped:
Received: 2023/02/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	8511386	2023/02/12	2023/02/21	Ravneet Kaur
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	8531877	2023/02/12	2023/03/02	Angel Guerrero
OC Pesticides in Water by GCTQ	GCTQ/MS	8503096	2023/02/14	2023/02/17	Chau Ting (Ruth) Chan
PCB Congeners in Water (1668C)	HRMS/MS	8533813	2023/02/23	2023/03/06	Cathy Xu
PFAS in water by SPE/LCMS	LCMS	8514543	2023/02/21	2023/02/22	Tonghui (Jenny) Chen

Bureau Veritas ID: VAE872
Sample ID: FIELD BLANK
Matrix: Water

Collected: 2023/02/07
Shipped:
Received: 2023/02/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	8514543	2023/02/21	2023/02/22	Tonghui (Jenny) Chen

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.8°C
Package 2	5.6°C
Package 3	3.9°C

Sample VAE871 [MFA-B3A-20230207-GW-36.0] : all results are taken from 10x dilution due to matrix interferences, RDL is adjusted accordingly

SEMI-VOLATILE ORGANICS BY HRMS (WATER)

PCB Congeners in Water (1668C): Worksheet Blank contains some traces of PCB congeners natives that are above the RDL. However, all samples in worksheet (8533813) shows trace concentration levels below RDL. Results should be reviewed with caution.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
8503096	CTC	Spiked Blank	13C10-cis Nonachlor	2023/02/16		74	%	36 - 139
			13C10-Heptachlor	2023/02/16		56	%	5 - 120
			13C10-Heptachlor Epoxide	2023/02/16		75	%	27 - 137
			13C10-Oxychlordane	2023/02/16		70	%	23 - 135
			13C10-trans Nonachlor	2023/02/16		73	%	14 - 136
			13C12-Endrin	2023/02/16		70	%	35 - 155
			13C12-Endrin Ketone	2023/02/16		72	%	35 - 155
			13C6-beta BHC	2023/02/16		54	%	32 - 130
			13C6-d6-gamma BHC (Lindane)	2023/02/16		65	%	11 - 120
			13C-Methoxychlor	2023/02/16		78	%	5 - 120
			13C-pp-DDD	2023/02/16		67	%	5 - 120
			13C-pp-DDE	2023/02/16		83	%	47 - 160
			13C-pp-DDT	2023/02/16		78	%	5 - 120
			C13-Hexachlorobenzene	2023/02/16		64	%	5 - 120
			Aldrin	2023/02/16		127	%	50 - 200
			alpha-BHC	2023/02/16		121	%	50 - 200
			delta-BHC	2023/02/16		138	%	50 - 200
			beta-BHC	2023/02/16		121	%	50 - 200
			Lindane	2023/02/16		119	%	50 - 200
			a-Chlordane	2023/02/16		108	%	50 - 200
			g-Chlordane	2023/02/16		106	%	50 - 200
			Oxychlordane	2023/02/16		100	%	50 - 200
			o,p-DDD	2023/02/16		112	%	50 - 200
			p,p-DDD	2023/02/16		122	%	50 - 200
			o,p-DDE	2023/02/16		101	%	50 - 200
			p,p-DDE	2023/02/16		116	%	50 - 200
			o,p-DDT	2023/02/16		107	%	50 - 200
			p,p-DDT	2023/02/16		105	%	50 - 200
			Dieldrin	2023/02/16		122	%	50 - 200
			Endosulfan I	2023/02/16		113	%	50 - 200
			Endosulfan II	2023/02/16		119	%	50 - 200
			Endosulfan sulfate	2023/02/16		110	%	50 - 200
			Endrin	2023/02/16		116	%	50 - 200
			Endrin aldehyde	2023/02/16		111	%	50 - 200
			Endrin ketone	2023/02/16		120	%	50 - 200
			Heptachlor	2023/02/16		129	%	50 - 200
			Heptachlor epoxide	2023/02/16		117	%	50 - 200
			Hexachlorobenzene	2023/02/16		110	%	50 - 200
			Methoxychlor	2023/02/16		119	%	50 - 200
			Mirex	2023/02/16		101	%	50 - 200
			cis-Nonachlor	2023/02/16		126	%	50 - 200
			trans-Nonachlor	2023/02/16		115	%	50 - 200
8503096	CTC	Spiked Blank DUP	13C10-cis Nonachlor	2023/02/16		76	%	36 - 139
			13C10-Heptachlor	2023/02/16		57	%	5 - 120
			13C10-Heptachlor Epoxide	2023/02/16		73	%	27 - 137
			13C10-Oxychlordane	2023/02/16		72	%	23 - 135
			13C10-trans Nonachlor	2023/02/16		73	%	14 - 136
			13C12-Endrin	2023/02/16		75	%	35 - 155
			13C12-Endrin Ketone	2023/02/16		64	%	35 - 155
			13C6-beta BHC	2023/02/16		62	%	32 - 130
			13C6-d6-gamma BHC (Lindane)	2023/02/16		75	%	11 - 120
			13C-Methoxychlor	2023/02/16		76	%	5 - 120
			13C-pp-DDD	2023/02/16		66	%	5 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C-pp-DDE	2023/02/16		82	%	47 - 160
			13C-pp-DDT	2023/02/16		79	%	5 - 120
			C13-Hexachlorobenzene	2023/02/16		62	%	5 - 120
			Aldrin	2023/02/16		133	%	50 - 200
			alpha-BHC	2023/02/16		121	%	50 - 200
			delta-BHC	2023/02/16		138	%	50 - 200
			beta-BHC	2023/02/16		120	%	50 - 200
			Lindane	2023/02/16		119	%	50 - 200
			a-Chlordane	2023/02/16		109	%	50 - 200
			g-Chlordane	2023/02/16		105	%	50 - 200
			Oxychlordane	2023/02/16		96	%	50 - 200
			o,p-DDD	2023/02/16		112	%	50 - 200
			p,p-DDD	2023/02/16		123	%	50 - 200
			o,p-DDE	2023/02/16		102	%	50 - 200
			p,p-DDE	2023/02/16		116	%	50 - 200
			o,p-DDT	2023/02/16		102	%	50 - 200
			p,p-DDT	2023/02/16		104	%	50 - 200
			Dieldrin	2023/02/16		132	%	50 - 200
			Endosulfan I	2023/02/16		119	%	50 - 200
			Endosulfan II	2023/02/16		119	%	50 - 200
			Endosulfan sulfate	2023/02/16		122	%	50 - 200
			Endrin	2023/02/16		106	%	50 - 200
			Endrin aldehyde	2023/02/16		120	%	50 - 200
			Endrin ketone	2023/02/16		129	%	50 - 200
			Heptachlor	2023/02/16		120	%	50 - 200
			Heptachlor epoxide	2023/02/16		117	%	50 - 200
			Hexachlorobenzene	2023/02/16		112	%	50 - 200
			Methoxychlor	2023/02/16		124	%	50 - 200
			Mirex	2023/02/16		109	%	50 - 200
			cis-Nonachlor	2023/02/16		118	%	50 - 200
			trans-Nonachlor	2023/02/16		114	%	50 - 200
8503096	CTC	RPD	Aldrin	2023/02/16	4.8		%	25
			alpha-BHC	2023/02/16	0.031		%	25
			delta-BHC	2023/02/16	0.18		%	25
			beta-BHC	2023/02/16	0.27		%	25
			Lindane	2023/02/16	0.13		%	25
			a-Chlordane	2023/02/16	0.59		%	25
			g-Chlordane	2023/02/16	1.3		%	25
			Oxychlordane	2023/02/16	3.8		%	25
			o,p-DDD	2023/02/16	0.085		%	25
			p,p-DDD	2023/02/16	0.81		%	25
			o,p-DDE	2023/02/16	1.2		%	25
			p,p-DDE	2023/02/16	0.052		%	25
			o,p-DDT	2023/02/16	4.6		%	25
			p,p-DDT	2023/02/16	0.38		%	25
			Dieldrin	2023/02/16	7.7		%	25
			Endosulfan I	2023/02/16	5.1		%	25
			Endosulfan II	2023/02/16	0.095		%	25
			Endosulfan sulfate	2023/02/16	10		%	25
			Endrin	2023/02/16	8.3		%	25
			Endrin aldehyde	2023/02/16	8.1		%	25
			Endrin ketone	2023/02/16	7.1		%	25
			Heptachlor	2023/02/16	7.2		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Heptachlor epoxide	2023/02/16	0.36		%	25
			Hexachlorobenzene	2023/02/16	2.3		%	25
			Methoxychlor	2023/02/16	4.0		%	25
			Mirex	2023/02/16	7.7		%	25
			cis-Nonachlor	2023/02/16	6.3		%	25
			trans-Nonachlor	2023/02/16	1.0		%	25
8503096	CTC	Method Blank	13C10-cis Nonachlor	2023/02/16		63	%	36 - 139
			13C10-Heptachlor	2023/02/16		64	%	5 - 120
			13C10-Heptachlor Epoxide	2023/02/16		68	%	27 - 137
			13C10-Oxychlordane	2023/02/16		64	%	23 - 135
			13C10-trans Nonachlor	2023/02/16		63	%	14 - 136
			13C12-Endrin	2023/02/16		74	%	35 - 155
			13C12-Endrin Ketone	2023/02/16		67	%	35 - 155
			13C6-beta BHC	2023/02/16		63	%	32 - 130
			13C6-d6-gamma BHC (Lindane)	2023/02/16		77	%	11 - 120
			13C-Methoxychlor	2023/02/16		73	%	5 - 120
			13C-pp-DDD	2023/02/16		56	%	5 - 120
			13C-pp-DDE	2023/02/16		82	%	47 - 160
			13C-pp-DDT	2023/02/16		75	%	5 - 120
			C13-Hexachlorobenzene	2023/02/16		62	%	5 - 120
			Aldrin	2023/02/16	0.021 U, MDL=0.021		ng/L	
			alpha-BHC	2023/02/16	0.024 U, MDL=0.024		ng/L	
			delta-BHC	2023/02/16	0.029 U, MDL=0.029		ng/L	
			beta-BHC	2023/02/16	0.014 U, MDL=0.014		ng/L	
			Lindane	2023/02/16	0.033 U, MDL=0.033		ng/L	
			a-Chlordane	2023/02/16	0.029 U, MDL=0.029		ng/L	
			g-Chlordane	2023/02/16	0.029 U, MDL=0.029		ng/L	
			Oxychlordane	2023/02/16	0.028 U, MDL=0.028		ng/L	
			o,p-DDD	2023/02/16	0.020 U, MDL=0.020		ng/L	
			p,p-DDD	2023/02/16	0.014 U, MDL=0.014		ng/L	
			o,p-DDE	2023/02/16	0.016 U, MDL=0.016		ng/L	
			p,p-DDE	2023/02/16	0.012 U, MDL=0.012		ng/L	
			o,p-DDT	2023/02/16	0.040 U, MDL=0.040		ng/L	
			p,p-DDT	2023/02/16	0.050 U, MDL=0.050		ng/L	
			Dieldrin	2023/02/16	0.050 U, MDL=0.050		ng/L	
			Endosulfan I	2023/02/16	0.067 U, MDL=0.067		ng/L	
			Endosulfan II	2023/02/16	0.074 U, MDL=0.074		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Endosulfan sulfate	2023/02/16	0.070 U, MDL=0.070		ng/L	
			Endrin	2023/02/16	0.061 J, MDL=0.045		ng/L	
			Endrin aldehyde	2023/02/16	0.071 U, MDL=0.071		ng/L	
			Endrin ketone	2023/02/16	0.034 U, MDL=0.034		ng/L	
			Heptachlor	2023/02/16	0.029 U, MDL=0.029		ng/L	
			Heptachlor epoxide	2023/02/16	0.015 U, MDL=0.015		ng/L	
			Hexachlorobenzene	2023/02/16	0.10 U, MDL=0.10		ng/L	
			Methoxychlor	2023/02/16	0.040 U, MDL=0.040		ng/L	
			Mirex	2023/02/16	0.021 U, MDL=0.021		ng/L	
			cis-Nonachlor	2023/02/16	0.037 U, MDL=0.037		ng/L	
			trans-Nonachlor	2023/02/16	0.044 U, MDL=0.044		ng/L	
8511386	RAK	Spiked Blank	37CL4 2378 Tetra CDD	2023/02/21		75	%	35 - 197
			C13-1234678 HeptaCDD	2023/02/21		91	%	23 - 140
			C13-1234678 HeptaCDF	2023/02/21		81	%	28 - 143
			C13-123478 HexaCDD	2023/02/21		88	%	32 - 141
			C13-123478 HexaCDF	2023/02/21		83	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/21		86	%	28 - 138
			C13-123678 HexaCDD	2023/02/21		89	%	28 - 130
			C13-123678 HexaCDF	2023/02/21		84	%	26 - 123
			C13-12378 PentaCDD	2023/02/21		82	%	25 - 181
			C13-12378 PentaCDF	2023/02/21		79	%	24 - 185
			C13-123789 HexaCDF	2023/02/21		86	%	29 - 147
			C13-234678 HexaCDF	2023/02/21		89	%	28 - 136
			C13-23478 PentaCDF	2023/02/21		83	%	21 - 178
			C13-2378 TetraCDD	2023/02/21		74	%	25 - 164
			C13-2378 TetraCDF	2023/02/21		83	%	24 - 169
			C13-OCDD	2023/02/21		83	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/21		116	%	67 - 158
			1,2,3,7,8-Penta CDD	2023/02/21		107	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2023/02/21		108	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2023/02/21		109	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2023/02/21		106	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2023/02/21		107	%	70 - 140
			Octa CDD	2023/02/21		117	%	78 - 144
			2,3,7,8-Tetra CDF	2023/02/21		101	%	75 - 158
			1,2,3,7,8-Penta CDF	2023/02/21		108	%	80 - 134
			2,3,4,7,8-Penta CDF	2023/02/21		107	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2023/02/21		110	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2023/02/21		106	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2023/02/21		100	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2023/02/21		107	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2023/02/21		111	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2023/02/21		108	%	78 - 138

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Octa CDF	2023/02/21		118	%	63 - 170
8511386	RAK	Spiked Blank DUP	37CL4 2378 Tetra CDD	2023/02/21		91	%	35 - 197
			C13-1234678 HeptaCDD	2023/02/21		99	%	23 - 140
			C13-1234678 HeptaCDF	2023/02/21		90	%	28 - 143
			C13-123478 HexaCDD	2023/02/21		95	%	32 - 141
			C13-123478 HexaCDF	2023/02/21		87	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/21		99	%	28 - 138
			C13-123678 HexaCDD	2023/02/21		104	%	28 - 130
			C13-123678 HexaCDF	2023/02/21		90	%	26 - 123
			C13-12378 PentaCDD	2023/02/21		93	%	25 - 181
			C13-12378 PentaCDF	2023/02/21		90	%	24 - 185
			C13-123789 HexaCDF	2023/02/21		98	%	29 - 147
			C13-234678 HexaCDF	2023/02/21		99	%	28 - 136
			C13-23478 PentaCDF	2023/02/21		99	%	21 - 178
			C13-2378 TetraCDD	2023/02/21		80	%	25 - 164
			C13-2378 TetraCDF	2023/02/21		88	%	24 - 169
			C13-OCDD	2023/02/21		95	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/21		113	%	67 - 158
			1,2,3,7,8-Penta CDD	2023/02/21		107	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2023/02/21		106	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2023/02/21		104	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2023/02/21		104	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2023/02/21		107	%	70 - 140
			Octa CDD	2023/02/21		115	%	78 - 144
			2,3,7,8-Tetra CDF	2023/02/21		99	%	75 - 158
			1,2,3,7,8-Penta CDF	2023/02/21		107	%	80 - 134
			2,3,4,7,8-Penta CDF	2023/02/21		104	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2023/02/21		110	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2023/02/21		107	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2023/02/21		100	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2023/02/21		104	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2023/02/21		109	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2023/02/21		104	%	78 - 138
			Octa CDF	2023/02/21		114	%	63 - 170
8511386	RAK	RPD	2,3,7,8-Tetra CDD	2023/02/21	2.6		%	25
			1,2,3,7,8-Penta CDD	2023/02/21	0		%	25
			1,2,3,4,7,8-Hexa CDD	2023/02/21	1.9		%	25
			1,2,3,6,7,8-Hexa CDD	2023/02/21	4.7		%	25
			1,2,3,7,8,9-Hexa CDD	2023/02/21	1.9		%	25
			1,2,3,4,6,7,8-Hepta CDD	2023/02/21	0		%	25
			Octa CDD	2023/02/21	1.7		%	25
			2,3,7,8-Tetra CDF	2023/02/21	2.0		%	25
			1,2,3,7,8-Penta CDF	2023/02/21	0.93		%	25
			2,3,4,7,8-Penta CDF	2023/02/21	2.8		%	25
			1,2,3,4,7,8-Hexa CDF	2023/02/21	0		%	25
			1,2,3,6,7,8-Hexa CDF	2023/02/21	0.94		%	25
			2,3,4,6,7,8-Hexa CDF	2023/02/21	0		%	25
			1,2,3,7,8,9-Hexa CDF	2023/02/21	2.8		%	25
			1,2,3,4,6,7,8-Hepta CDF	2023/02/21	1.8		%	25
			1,2,3,4,7,8,9-Hepta CDF	2023/02/21	3.8		%	25
			Octa CDF	2023/02/21	3.4		%	25
8511386	RAK	Method Blank	37CL4 2378 Tetra CDD	2023/02/20		93	%	35 - 197
			C13-1234678 HeptaCDD	2023/02/20		77	%	23 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-1234678 HeptaCDF	2023/02/20		74	%	28 - 143
			C13-123478 HexaCDD	2023/02/20		81	%	32 - 141
			C13-123478 HexaCDF	2023/02/20		80	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/20		75	%	28 - 138
			C13-123678 HexaCDD	2023/02/20		88	%	28 - 130
			C13-123678 HexaCDF	2023/02/20		82	%	26 - 123
			C13-12378 PentaCDD	2023/02/20		83	%	25 - 181
			C13-12378 PentaCDF	2023/02/20		83	%	24 - 185
			C13-123789 HexaCDF	2023/02/20		85	%	29 - 147
			C13-234678 HexaCDF	2023/02/20		87	%	28 - 136
			C13-23478 PentaCDF	2023/02/20		89	%	21 - 178
			C13-2378 TetraCDD	2023/02/20		74	%	25 - 164
			C13-2378 TetraCDF	2023/02/20		81	%	24 - 169
			C13-OCDD	2023/02/20		69	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/20	1.24 U, EDL=1.24		pg/L	
			1,2,3,7,8-Penta CDD	2023/02/20	1.43 U, EDL=1.43		pg/L	
			1,2,3,4,7,8-Hexa CDD	2023/02/20	1.63 U, EDL=1.63		pg/L	
			1,2,3,6,7,8-Hexa CDD	2023/02/20	1.50 U, EDL=1.50		pg/L	
			1,2,3,7,8,9-Hexa CDD	2023/02/20	1.47 U, EDL=1.47		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2023/02/20	1.81 U, EDL=1.81		pg/L	
			Octa CDD	2023/02/20	3.93 U, EDL=3.93		pg/L	
			Total Tetra CDD	2023/02/20	1.24 U, EDL=1.24		pg/L	
			Total Penta CDD	2023/02/20	1.71 U, EDL=1.71		pg/L	
			Total Hexa CDD	2023/02/20	1.53 U, EDL=1.53		pg/L	
			Total Hepta CDD	2023/02/20	1.81 U, EDL=1.81		pg/L	
			2,3,7,8-Tetra CDF	2023/02/20	1.05 U, EDL=1.05		pg/L	
			1,2,3,7,8-Penta CDF	2023/02/20	1.80 U, EDL=1.80		pg/L	
			2,3,4,7,8-Penta CDF	2023/02/20	1.55 U, EDL=1.55		pg/L	
			1,2,3,4,7,8-Hexa CDF	2023/02/20	1.08 U, EDL=1.08		pg/L	
			1,2,3,6,7,8-Hexa CDF	2023/02/20	1.04 U, EDL=1.04		pg/L	
			2,3,4,6,7,8-Hexa CDF	2023/02/20	0.965 U, EDL=0.965		pg/L	
			1,2,3,7,8,9-Hexa CDF	2023/02/20	1.13 U, EDL=1.13		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2023/02/20	1.08 U, EDL=1.08		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2023/02/20	1.22 U, EDL=1.22		pg/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Octa CDF	2023/02/20	0.965 U, EDL=0.965		pg/L	
			Total Tetra CDF	2023/02/20	1.05 U, EDL=1.05		pg/L	
			Total Penta CDF	2023/02/20	1.66 U, EDL=1.66		pg/L	
			Total Hexa CDF	2023/02/20	1.05 U, EDL=1.05		pg/L	
			Total Hepta CDF	2023/02/20	1.14 U, EDL=1.14		pg/L	
8514543	TJC	Spiked Blank	13C2-4:2-Fluorotelomersulfonic Acid	2023/02/22		100	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/02/22		98	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/02/22		96	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/02/22		98	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/02/22		93	%	50 - 150
			13C2-Perfluorohexanoic acid	2023/02/22		101	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/02/22		88	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/02/22		93	%	50 - 150
			13C3-HFPO-DA	2023/02/22		101	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/02/22		99	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/02/22		100	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/02/22		101	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/02/22		100	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/02/22		102	%	50 - 150
			13C5-Perfluorononanoic acid	2023/02/22		102	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/02/22		99	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/02/22		91	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/02/22		99	%	50 - 150
			D3-MeFOSA	2023/02/22		73	%	50 - 150
			D3-MeFOSAA	2023/02/22		88	%	50 - 150
			D5-EtFOSA	2023/02/22		67	%	50 - 150
			D5-EtFOSAA	2023/02/22		86	%	50 - 150
			D7-MeFOSE	2023/02/22		83	%	50 - 150
			D9-EtFOSE	2023/02/22		79	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2023/02/22		100	%	70 - 130
			Perfluoropentanoic acid (PFPeA)	2023/02/22		101	%	70 - 130
			Perfluorohexanoic acid (PFHxA)	2023/02/22		100	%	70 - 130
			Perfluoroheptanoic acid (PFHpA)	2023/02/22		100	%	70 - 130
			Perfluorooctanoic acid (PFOA)	2023/02/22		101	%	70 - 130
			Perfluorononanoic acid (PFNA)	2023/02/22		102	%	70 - 130
			Perfluorodecanoic acid (PFDA)	2023/02/22		103	%	70 - 130
			Perfluoroundecanoic acid (PFUnA)	2023/02/22		99	%	70 - 130
			Perfluorododecanoic acid (PFDoA)	2023/02/22		99	%	70 - 130
			Perfluorotridecanoic acid (PFTRDA)	2023/02/22		103	%	70 - 130
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/22		103	%	70 - 130
			Perfluorobutanesulfonic acid (PFBS)	2023/02/22		99	%	70 - 130
			Perfluoropentanesulfonic acid PFPes	2023/02/22		98	%	70 - 130
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/22		101	%	70 - 130
			Perfluoroheptanesulfonic acid PFHpS	2023/02/22		97	%	70 - 130
			Perfluorooctanesulfonic acid (PFOS)	2023/02/22		101	%	70 - 130
			Perfluorononanesulfonic acid (PFNS)	2023/02/22		94	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2023/02/22		95	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/22		100	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			EtFOSA	2023/02/22		107	%	70 - 130
			MeFOSA	2023/02/22		104	%	70 - 130
			EtFOSE	2023/02/22		104	%	70 - 130
			MeFOSE	2023/02/22		101	%	70 - 130
			EtFOSAA	2023/02/22		102	%	70 - 130
			MeFOSAA	2023/02/22		101	%	70 - 130
			4:2 Fluorotelomer sulfonic acid	2023/02/22		102	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2023/02/22		100	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2023/02/22		104	%	70 - 130
			Hexafluoropropyleneoxide dimer acid	2023/02/22		103	%	70 - 130
			4,8-Dioxa-3H-perfluorononanoic acid	2023/02/22		99	%	70 - 130
			9Cl-PF3ONS (F-53B Major)	2023/02/22		97	%	70 - 130
			11Cl-PF3OUdS (F-53B Minor)	2023/02/22		94	%	70 - 130
8514543	TJC	Spiked Blank DUP	13C2-4:2-Fluorotelomersulfonic Acid	2023/02/22		97	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/02/22		97	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/02/22		95	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/02/22		96	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/02/22		86	%	50 - 150
			13C2-Perfluorohexanoic acid	2023/02/22		99	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/02/22		84	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/02/22		90	%	50 - 150
			13C3-HFPO-DA	2023/02/22		100	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/02/22		98	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/02/22		99	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/02/22		99	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/02/22		97	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/02/22		100	%	50 - 150
			13C5-Perfluorononanoic acid	2023/02/22		98	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/02/22		98	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/02/22		82	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/02/22		96	%	50 - 150
			D3-MeFOSA	2023/02/22		69	%	50 - 150
			D3-MeFOSAA	2023/02/22		85	%	50 - 150
			D5-EtFOSA	2023/02/22		65	%	50 - 150
			D5-EtFOSAA	2023/02/22		82	%	50 - 150
			D7-MeFOSE	2023/02/22		78	%	50 - 150
			D9-EtFOSE	2023/02/22		78	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2023/02/22		101	%	70 - 130
			Perfluoropentanoic acid (PFPeA)	2023/02/22		100	%	70 - 130
			Perfluorohexanoic acid (PFHxA)	2023/02/22		103	%	70 - 130
			Perfluoroheptanoic acid (PFHpA)	2023/02/22		102	%	70 - 130
			Perfluorooctanoic acid (PFOA)	2023/02/22		100	%	70 - 130
			Perfluorononanoic acid (PFNA)	2023/02/22		104	%	70 - 130
			Perfluorodecanoic acid (PFDA)	2023/02/22		99	%	70 - 130
			Perfluoroundecanoic acid (PFUnA)	2023/02/22		100	%	70 - 130
			Perfluorododecanoic acid (PFDoA)	2023/02/22		102	%	70 - 130
			Perfluorotridecanoic acid (PFTRDA)	2023/02/22		103	%	70 - 130
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/22		107	%	70 - 130
			Perfluorobutanesulfonic acid (PFBS)	2023/02/22		100	%	70 - 130
			Perfluoropentanesulfonic acid PFPes	2023/02/22		98	%	70 - 130
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/22		104	%	70 - 130
			Perfluoroheptanesulfonic acid PFHpS	2023/02/22		96	%	70 - 130
			Perfluorooctanesulfonic acid (PFOS)	2023/02/22		103	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorononanesulfonic acid (PFNS)	2023/02/22		93	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2023/02/22		92	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/22		105	%	70 - 130
			EtFOSA	2023/02/22		111	%	70 - 130
			MeFOSA	2023/02/22		107	%	70 - 130
			EtFOSE	2023/02/22		101	%	70 - 130
			MeFOSE	2023/02/22		100	%	70 - 130
			EtFOSAA	2023/02/22		103	%	70 - 130
			MeFOSAA	2023/02/22		99	%	70 - 130
			4:2 Fluorotelomer sulfonic acid	2023/02/22		104	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2023/02/22		102	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2023/02/22		101	%	70 - 130
			Hexafluoropropyleneoxide dimer acid	2023/02/22		99	%	70 - 130
			4,8-Dioxa-3H-perfluorononanoic acid	2023/02/22		100	%	70 - 130
			9Cl-PF3ONS (F-53B Major)	2023/02/22		96	%	70 - 130
			11Cl-PF3OUdS (F-53B Minor)	2023/02/22		94	%	70 - 130
8514543	TJC	RPD	Perfluorobutanoic acid (PFBA)	2023/02/22	1.2		%	30
			Perfluoropentanoic acid (PFPeA)	2023/02/22	0.82		%	30
			Perfluorohexanoic acid (PFHxA)	2023/02/22	3.2		%	30
			Perfluoroheptanoic acid (PFHpA)	2023/02/22	1.2		%	30
			Perfluorooctanoic acid (PFOA)	2023/02/22	1.0		%	30
			Perfluorononanoic acid (PFNA)	2023/02/22	1.7		%	30
			Perfluorodecanoic acid (PFDA)	2023/02/22	3.0		%	30
			Perfluoroundecanoic acid (PFUnA)	2023/02/22	0.36		%	30
			Perfluorododecanoic acid (PFDoA)	2023/02/22	3.7		%	30
			Perfluorotridecanoic acid (PFTRDA)	2023/02/22	0.86		%	30
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/22	4.3		%	30
			Perfluorobutanesulfonic acid (PFBS)	2023/02/22	1.1		%	30
			Perfluoropentanesulfonic acid PFPes	2023/02/22	0.11		%	30
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/22	2.5		%	30
			Perfluoroheptanesulfonic acid PFHpS	2023/02/22	0.48		%	30
			Perfluorooctanesulfonic acid (PFOS)	2023/02/22	1.9		%	30
			Perfluorononanesulfonic acid (PFNS)	2023/02/22	1.0		%	30
			Perfluorodecanesulfonic acid (PFDS)	2023/02/22	3.3		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/22	5.4		%	30
			EtFOSA	2023/02/22	3.3		%	30
			MeFOSA	2023/02/22	2.8		%	30
			EtFOSE	2023/02/22	3.4		%	30
			MeFOSE	2023/02/22	1.0		%	30
			EtFOSAA	2023/02/22	1.2		%	30
			MeFOSAA	2023/02/22	1.1		%	30
			4:2 Fluorotelomer sulfonic acid	2023/02/22	1.7		%	30
			6:2 Fluorotelomer sulfonic acid	2023/02/22	1.4		%	30
			8:2 Fluorotelomer sulfonic acid	2023/02/22	3.2		%	30
			Hexafluoropropyleneoxide dimer acid	2023/02/22	3.5		%	30
			4,8-Dioxa-3H-perfluorononanoic acid	2023/02/22	1.2		%	30
			9Cl-PF3ONS (F-53B Major)	2023/02/22	0.28		%	30
			11Cl-PF3OUdS (F-53B Minor)	2023/02/22	0.48		%	30
8514543	TJC	Method Blank	13C2-4:2-Fluorotelomersulfonic Acid	2023/02/22		107	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/02/22		105	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/02/22		99	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/02/22		93	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/02/22		87	%	50 - 150

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C2-Perfluorohexanoic acid	2023/02/22		99	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/02/22		80	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/02/22		88	%	50 - 150
			13C3-HFPO-DA	2023/02/22		99	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/02/22		97	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/02/22		99	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/02/22		102	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/02/22		96	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/02/22		101	%	50 - 150
			13C5-Perfluorononanoic acid	2023/02/22		98	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/02/22		99	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/02/22		89	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/02/22		99	%	50 - 150
			D3-MeFOSA	2023/02/22		72	%	50 - 150
			D3-MeFOSAA	2023/02/22		84	%	50 - 150
			D5-EtFOSA	2023/02/22		66	%	50 - 150
			D5-EtFOSAA	2023/02/22		85	%	50 - 150
			D7-MeFOSE	2023/02/22		80	%	50 - 150
			D9-EtFOSE	2023/02/22		77	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2023/02/22	0.0015 U, MDL=0.0015		ug/L	
			Perfluoropentanoic acid (PFPeA)	2023/02/22	0.0025 U, MDL=0.0025		ug/L	
			Perfluorohexanoic acid (PFHxA)	2023/02/22	0.0038 U, MDL=0.0038		ug/L	
			Perfluoroheptanoic acid (PFHpA)	2023/02/22	0.0018 U, MDL=0.0018		ug/L	
			Perfluorooctanoic acid (PFOA)	2023/02/22	0.0030 U, MDL=0.0030		ug/L	
			Perfluorononanoic acid (PFNA)	2023/02/22	0.0021 U, MDL=0.0021		ug/L	
			Perfluorodecanoic acid (PFDA)	2023/02/22	0.0016 U, MDL=0.0016		ug/L	
			Perfluoroundecanoic acid (PFUnA)	2023/02/22	0.0024 U, MDL=0.0024		ug/L	
			Perfluorododecanoic acid (PFDoA)	2023/02/22	0.0029 U, MDL=0.0029		ug/L	
			Perfluorotridecanoic acid (PFTRDA)	2023/02/22	0.0026 U, MDL=0.0026		ug/L	
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/22	0.0016 U, MDL=0.0016		ug/L	
			Perfluorobutanesulfonic acid (PFBS)	2023/02/22	0.0021 U, MDL=0.0021		ug/L	
			Perfluoropentanesulfonic acid PFPes	2023/02/22	0.0023 U, MDL=0.0023		ug/L	
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/22	0.0022 U, MDL=0.0022		ug/L	
			Perfluoroheptanesulfonic acid PFHpS	2023/02/22	0.0039 U, MDL=0.0039		ug/L	
			Perfluorooctanesulfonic acid (PFOS)	2023/02/22	0.0035 U, MDL=0.0035		ug/L	
			Perfluorononanesulfonic acid (PFNS)	2023/02/22	0.0037 U, MDL=0.0037		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorodecanesulfonic acid (PFDS)	2023/02/22	0.0048 U, MDL=0.0048		ug/L	
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/22	0.0034 U, MDL=0.0034		ug/L	
			EtFOSA	2023/02/22	0.0095 U, MDL=0.0095		ug/L	
			MeFOSA	2023/02/22	0.0084 U, MDL=0.0084		ug/L	
			EtFOSE	2023/02/22	0.0070 U, MDL=0.0070		ug/L	
			MeFOSE	2023/02/22	0.0073 U, MDL=0.0073		ug/L	
			EtFOSAA	2023/02/22	0.0046 U, MDL=0.0046		ug/L	
			MeFOSAA	2023/02/22	0.0045 U, MDL=0.0045		ug/L	
			4:2 Fluorotelomer sulfonic acid	2023/02/22	0.0033 U, MDL=0.0033		ug/L	
			6:2 Fluorotelomer sulfonic acid	2023/02/22	0.0015 U, MDL=0.0015		ug/L	
			8:2 Fluorotelomer sulfonic acid	2023/02/22	0.0031 U, MDL=0.0031		ug/L	
			Hexafluoropropyleneoxide dimer acid	2023/02/22	0.0052 U, MDL=0.0052		ug/L	
			4,8-Dioxa-3H-perfluorononanoic acid	2023/02/22	0.0027 U, MDL=0.0027		ug/L	
			9Cl-PF3ONS (F-53B Major)	2023/02/22	0.0043 U, MDL=0.0043		ug/L	
			11Cl-PF3OUdS (F-53B Minor)	2023/02/22	0.0035 U, MDL=0.0035		ug/L	
8531877	AGU	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2023/03/02	1.6 U, EDL=1.6		pg/L	
			Confirmation C13-2378 TetraCDF	2023/03/02		45	%	40 - 135
8533813	CXU	Spiked Blank	C13-2,44'-TriCB-(28)	2023/04/04		80 (1)	%	30 - 170
			C13-22'33'44'55'6-NonaCB-(206)	2023/04/04		108	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/04/04		116	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/04/04		107	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/04/04		98	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2023/04/04		85	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/04/04		111	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/04/04		77	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/04/04		60	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/04/04		66	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/04/04		40	%	15 - 145
			C13-22'6-TriCB-(19)	2023/04/04		50	%	40 - 145
			C13-22'-DiCB-(4)	2023/04/04		33	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/04/04		115	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/04/04		123	%	40 - 145
			C13-233'44'-PentaCB-(105)	2023/04/04		132 (1)	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/04/04		94	%	30 - 170
			C13-23'44'55'-HexaCB-(167)	2023/04/04		109	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/04/04		121	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/04/04		126 (1)	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/04/04		127 (1)	%	40 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-2-MonoCB-(1)	2023/04/04		35	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/04/04		121	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/04/04		144 (1)	%	40 - 145
			C13-33'44'-TetraCB-(77)	2023/04/04		120	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/04/04		115	%	40 - 145
			C13-344'-TriCB-(37)	2023/04/04		98 (1)	%	40 - 145
			C13-44'-DiCB-(15)	2023/04/04		73	%	15 - 145
			C13-4-MonoCB-(3)	2023/04/04		44	%	15 - 145
			C13-DecaCB-(209)	2023/04/04		96	%	40 - 145
			C13-HexaCB-(156)+(157)	2023/04/04		114	%	40 - 145
			2-MonoCB-(1)	2023/04/04		108	%	60 - 145
			3-MonoCB-(2)	2023/04/04		118	%	N/A
			4-MonoCB-(3)	2023/04/04		107	%	60 - 145
			22'-DiCB-(4)	2023/04/04		114	%	60 - 145
			2,3-DiCB-(5)	2023/04/04		92	%	N/A
			2,3'-DiCB-(6)	2023/04/04		95	%	N/A
			2,4-DiCB-(7)	2023/04/04		89	%	N/A
			2,4'-DiCB-(8)	2023/04/04		53	%	N/A
			2,5-DiCB-(9)	2023/04/04		92	%	N/A
			2,6-DiCB-(10)	2023/04/04		71	%	N/A
			3,3'-DiCB-(11)	2023/04/04		126	%	N/A
			DiCB-(12)+(13)	2023/04/04		102	%	N/A
			3,5-DiCB-(14)	2023/04/04		106	%	N/A
			4,4'-DiCB-(15)	2023/04/04		112	%	60 - 145
			22'3-TriCB-(16)	2023/04/04		70	%	N/A
			22'4-TriCB-(17)	2023/04/04		68	%	N/A
			TriCB-(18)+(30)	2023/04/04		59	%	N/A
			22'6-TriCB-(19)	2023/04/04		105	%	60 - 145
			TriCB-(20) + (28)	2023/04/04		92	%	N/A
			TriCB-(21)+(33)	2023/04/04		100	%	N/A
			234'-TriCB-(22)	2023/04/04		101	%	N/A
			235-TriCB-(23)	2023/04/04		90	%	N/A
			236-TriCB-(24)	2023/04/04		81	%	N/A
			23'4-TriCB-(25)	2023/04/04		102	%	N/A
			TriCB-(26)+(29)	2023/04/04		91	%	N/A
			23'6-TriCB-(27)	2023/04/04		60	%	N/A
			24'5-TriCB-(31)	2023/04/04		94	%	N/A
			24'6-TriCB-(32)	2023/04/04		72	%	N/A
			23'5'-TriCB-(34)	2023/04/04		89	%	N/A
			33'4-TriCB-(35)	2023/04/04		115	%	N/A
			33'5-TriCB-(36)	2023/04/04		106	%	N/A
			344'-TriCB-(37)	2023/04/04		107	%	60 - 145
			345-TriCB-(38)	2023/04/04		109	%	N/A
			34'5-TriCB-(39)	2023/04/04		119	%	N/A
			TetraCB-(40)+(41)+(71)	2023/04/04		83	%	N/A
			22'34'-TetraCB-(42)	2023/04/04		94	%	N/A
			22'35-TetraCB-(43)	2023/04/04		84	%	N/A
			TetraCB-(44)+(47)+(65)	2023/04/04		83	%	N/A
			TetraCB-(45)+(51)	2023/04/04		69	%	N/A
			22'36'-TetraCB-(46)	2023/04/04		71	%	N/A
			22'45-TetraCB-(48)	2023/04/04		78	%	N/A
			TetraCB-(49)+TetraCB-(69)	2023/04/04		77	%	N/A
			TetraCB-(50)+(53)	2023/04/04		68	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'55'-TetraCB-(52)	2023/04/04		80	%	N/A
			22'66'-TetraCB-(54)	2023/04/04		115	%	60 - 145
			233'4-TetraCB-(55)	2023/04/04		94	%	N/A
			233'4'-Tetra CB(56)	2023/04/04		97	%	N/A
			233'5-TetraCB-(57)	2023/04/04		86	%	N/A
			233'5'-TetraCB-(58)	2023/04/04		88	%	N/A
			TetraCB-(59)+(62)+(75)	2023/04/04		78	%	N/A
			2344'-TetraCB -(60)	2023/04/04		95	%	N/A
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04		95	%	N/A
			234'5-TetraCB-(63)	2023/04/04		92	%	N/A
			234'6-TetraCB-(64)	2023/04/04		92	%	N/A
			23'44'-TetraCB-(66)	2023/04/04		96	%	N/A
			23'45-TetraCB-(67)	2023/04/04		89	%	N/A
			23'45'-TetraCB-(68)	2023/04/04		89	%	N/A
			23'55'-TetraCB-(72)	2023/04/04		84	%	N/A
			23'5'6-TetraCB-(73)	2023/04/04		69	%	N/A
			33'44'-TetraCB-(77)	2023/04/04		94	%	60 - 145
			33'45-TetraCB-(78)	2023/04/04		114	%	N/A
			33'45'-TetraCB(79)	2023/04/04		103	%	N/A
			33'55'-TetraCB-(80)	2023/04/04		92	%	N/A
			344'5-TetraCB-(81)	2023/04/04		99	%	60 - 145
			22'33'4-PentaCB-(82)	2023/04/04		104	%	N/A
			PentaCB-(83)+(99)	2023/04/04		91	%	N/A
			22'33'6-PentaCB-(84)	2023/04/04		83	%	N/A
			PentaCB-(85)+(116)+(117)	2023/04/04		88	%	N/A
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04		87	%	N/A
			PentaCB-(88)+(91)	2023/04/04		84	%	N/A
			22'346'-PentaCB-(89)	2023/04/04		98	%	N/A
			PentaCB-(90)+(101)+(113)	2023/04/04		88	%	N/A
			22'355'-PentaCB-(92)	2023/04/04		97	%	N/A
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04		78	%	N/A
			22'356'-PentaCB-(94)	2023/04/04		77	%	N/A
			22'35'6-PentaCB-(95)	2023/04/04		94	%	N/A
			22'366'-PentaCB-(96)	2023/04/04		83	%	N/A
			22'45'6-PentaCB-(103)	2023/04/04		84	%	N/A
			22'466'-PentaCB-(104)	2023/04/04		100	%	60 - 145
			233'44'-PentaCB-(105)	2023/04/04		106	%	60 - 145
			233'45-PentaCB-(106)	2023/04/04		111	%	N/A
			233'4'5-PentaCB-(107)	2023/04/04		91	%	N/A
			PentaCB-(108)+(124)	2023/04/04		98	%	N/A
			PentaCB-(110)+(115)	2023/04/04		99	%	N/A
			233'55'-PentaCB-(111)	2023/04/04		92	%	N/A
			233'56-PentaCB-(112)	2023/04/04		94	%	N/A
			2344'5-PentaCB-(114)	2023/04/04		104	%	60 - 145
			23'44'5-PentaCB-(118)	2023/04/04		97	%	60 - 145
			23'455'-PentaCB-(120)	2023/04/04		100	%	N/A
			23'45'6-PentaCB-(121)	2023/04/04		83	%	N/A
			233'4'5'-PentaCB-(122)	2023/04/04		125	%	N/A
			23'44'5'-PentaCB-(123)	2023/04/04		101	%	60 - 145
			33'44'5-PentaCB-(126)	2023/04/04		98	%	60 - 145
			33'455'-PentaCB-(127)	2023/04/04		107	%	N/A
			HexaCB-(128)+(166)	2023/04/04		92	%	N/A
			HexaCB-(129)+(138)+(163)	2023/04/04		98	%	N/A

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			22'33'45'-HexaCB-(130)	2023/04/04		91	%	N/A
			22'33'46-HexaCB-(131)	2023/04/04		105	%	N/A
			22'33'46'-HexaCB-(132)	2023/04/04		89	%	N/A
			22'33'55'-HexaCB-(133)	2023/04/04		93	%	N/A
			HexaCB-(134)+(143)	2023/04/04		94	%	N/A
			HexaCB-(135)+(151)	2023/04/04		89	%	N/A
			22'33'66'-HexaCB-(136)	2023/04/04		84	%	N/A
			22'344'5-HexaCB-(137)	2023/04/04		86	%	N/A
			HexaCB-(139)+(140)	2023/04/04		86	%	N/A
			22'3455'-HexaCB-(141)	2023/04/04		94	%	N/A
			22'3456-HexaCB-(142)	2023/04/04		94	%	N/A
			22'345'6-HexaCB-(144)	2023/04/04		96	%	N/A
			22'3466'-HexaCB-(145)	2023/04/04		82	%	N/A
			22'34'55'-HexaCB-(146)	2023/04/04		90	%	N/A
			HexaCB-(147)+(149)	2023/04/04		87	%	N/A
			22'34'56'-HexaCB-(148)	2023/04/04		86	%	N/A
			22'34'66'-HexaCB-(150)	2023/04/04		80	%	N/A
			22'3566'-HexaCB-(152)	2023/04/04		82	%	N/A
			HexaCB-(153)+(168)	2023/04/04		87	%	N/A
			22'44'56'-HexaCB-(154)	2023/04/04		85	%	N/A
			22'44'66'-HexaCB-(155)	2023/04/04		98	%	60 - 145
			HexaCB-(156)+(157)	2023/04/04		101	%	N/A
			233'44'6-HexaCB-(158)	2023/04/04		93	%	N/A
			233'455'-HexaCB-(159)	2023/04/04		91	%	N/A
			233'456-HexaCB-(160)	2023/04/04		97	%	N/A
			233'45'6-HexaCB-(161)	2023/04/04		88	%	N/A
			233'4'55'-HexaCB-(162)	2023/04/04		93	%	N/A
			233'4'5'6-HexaCB-(164)	2023/04/04		95	%	N/A
			233'55'6-HexaCB-(165)	2023/04/04		89	%	N/A
			23'44'55'-HexaCB-(167)	2023/04/04		105	%	60 - 145
			33'44'55'-HexaCB-(169)	2023/04/04		103	%	60 - 145
			22'33'44'5-HeptaCB-(170)	2023/04/04		87	%	60 - 145
			HeptaCB-(171)+(173)	2023/04/04		93	%	N/A
			22'33'455'-HeptaCB-(172)	2023/04/04		94	%	N/A
			22'33'456'-HeptaCB-(174)	2023/04/04		94	%	N/A
			22'33'45'6-HeptaCB-(175)	2023/04/04		86	%	N/A
			22'33'466'-HeptaCB-(176)	2023/04/04		84	%	N/A
			22'33'45'6'-HeptaCB-(177)	2023/04/04		90	%	N/A
			22'33'55'6-HeptaCB-(178)	2023/04/04		88	%	N/A
			22'33'566'-HeptaCB-(179)	2023/04/04		88	%	N/A
			HeptaCB-(180)+(193)	2023/04/04		99	%	N/A
			22'344'56-HeptaCB-(181)	2023/04/04		93	%	N/A
			22'344'56'-HeptaCB-(182)	2023/04/04		89	%	N/A
			22'344'5'6-HeptaCB-(183)	2023/04/04		92	%	N/A
			22'344'66'-HeptaCB-(184)	2023/04/04		82	%	N/A
			22'3455'6-HeptaCB-(185)	2023/04/04		87	%	N/A
			22'34566'-HeptaCB-(186)	2023/04/04		87	%	N/A
			22'34'55'6-HeptaCB-(187)	2023/04/04		90	%	N/A
			22'34'566'-HeptaCB-(188)	2023/04/04		100	%	60 - 145
			233'44'55'-HeptaCB-(189)	2023/04/04		100	%	60 - 145
			233'44'56-HeptaCB-(190)	2023/04/04		91	%	N/A
			233'44'5'6-HeptaCB-(191)	2023/04/04		92	%	N/A
			233'455'6-HeptaCB-(192)	2023/04/04		94	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'33'44'55'-OctaCB-(194)	2023/04/04		100	%	N/A
			22'33'44'56-OctaCB-(195)	2023/04/04		103	%	N/A
			22'33'44'56'-OctaCB-(196)	2023/04/04		97	%	N/A
			22'33'44'66'OctaCB-(197)	2023/04/04		91	%	N/A
			OctaCB-(198)+(199)	2023/04/04		98	%	N/A
			22'33'4566'-OctaCB-(200)	2023/04/04		100	%	N/A
			22'33'45'66'-OctaCB-(201)	2023/04/04		89	%	N/A
			22'33'55'66'-OctaCB-(202)	2023/04/04		92	%	60 - 145
			22'344'55'6-OctaCB-(203)	2023/04/04		101	%	N/A
			22'344'566'-OctaCB-(204)	2023/04/04		87	%	N/A
			233'44'55'6-OctaCB-(205)	2023/04/04		92	%	60 - 145
			22'33'44'55'6-NonaCB-(206)	2023/04/04		91	%	60 - 145
			22'33'44'566'-NonaCB-(207)	2023/04/04		86	%	N/A
			22'33'455'66'-NonaCB-(208)	2023/04/04		93	%	60 - 145
			DecaCB-(209)	2023/04/04		108	%	60 - 145
8533813	CXU	Spiked Blank DUP	C13-2,44'-TriCB-(28)	2023/04/04		82	%	30 - 170
			C13-22'33'44'55'6-NonaCB-(206)	2023/04/04		100	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/04/04		106	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/04/04		95	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/04/04		91	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2023/04/04		83	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/04/04		102	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/04/04		71	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/04/04		56	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/04/04		66	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/04/04		41	%	15 - 145
			C13-22'6-TriCB-(19)	2023/04/04		52	%	40 - 145
			C13-22'-DiCB-(4)	2023/04/04		37	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/04/04		107	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/04/04		111	%	40 - 145
			C13-233'44'-PentaCB-(105)	2023/04/04		125 (1)	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/04/04		92	%	30 - 170
			C13-23'44'55'-HexaCB-(167)	2023/04/04		101	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/04/04		115	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/04/04		116	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/04/04		118	%	40 - 145
			C13-2-MonoCB-(1)	2023/04/04		39	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/04/04		112	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/04/04		134 (1)	%	40 - 145
			C13-33'44'-TetraCB-(77)	2023/04/04		113	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/04/04		110	%	40 - 145
			C13-344'-TriCB-(37)	2023/04/04		96	%	40 - 145
			C13-44'-DiCB-(15)	2023/04/04		75	%	15 - 145
			C13-4-MonoCB-(3)	2023/04/04		49 (1)	%	15 - 145
			C13-DecaCB-(209)	2023/04/04		85	%	40 - 145
			C13-HexaCB-(156)+(157)	2023/04/04		103	%	40 - 145
			2-MonoCB-(1)	2023/04/04		107	%	60 - 145
			3-MonoCB-(2)	2023/04/04		116	%	N/A
			4-MonoCB-(3)	2023/04/04		106	%	60 - 145
			22'-DiCB-(4)	2023/04/04		109	%	60 - 145
			2,3-DiCB-(5)	2023/04/04		96	%	N/A
			2,3'-DiCB-(6)	2023/04/04		95	%	N/A
			2,4-DiCB-(7)	2023/04/04		90	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			2,4'-DiCB-(8)	2023/04/04		55	%	N/A
			2,5-DiCB-(9)	2023/04/04		94	%	N/A
			2,6-DiCB-(10)	2023/04/04		72	%	N/A
			3,3'-DiCB-(11)	2023/04/04		127	%	N/A
			DiCB-(12)+(13)	2023/04/04		102	%	N/A
			3,5-DiCB-(14)	2023/04/04		106	%	N/A
			4,4'-DiCB-(15)	2023/04/04		111	%	60 - 145
			22'3-TriCB-(16)	2023/04/04		77	%	N/A
			22'4-TriCB-(17)	2023/04/04		71	%	N/A
			TriCB-(18)+(30)	2023/04/04		61	%	N/A
			22'6-TriCB-(19)	2023/04/04		102	%	60 - 145
			TriCB-(20) + (28)	2023/04/04		97	%	N/A
			TriCB-(21)+(33)	2023/04/04		102	%	N/A
			234'-TriCB-(22)	2023/04/04		101	%	N/A
			235-TriCB-(23)	2023/04/04		93	%	N/A
			236-TriCB-(24)	2023/04/04		75	%	N/A
			23'4-TriCB-(25)	2023/04/04		106	%	N/A
			TriCB-(26)+(29)	2023/04/04		92	%	N/A
			23'6-TriCB-(27)	2023/04/04		66	%	N/A
			24'5-TriCB-(31)	2023/04/04		97	%	N/A
			24'6-TriCB-(32)	2023/04/04		74	%	N/A
			23'5'-TriCB-(34)	2023/04/04		90	%	N/A
			33'4-TriCB-(35)	2023/04/04		117	%	N/A
			33'5-TriCB-(36)	2023/04/04		106	%	N/A
			344'-TriCB-(37)	2023/04/04		109	%	60 - 145
			345-TriCB-(38)	2023/04/04		112	%	N/A
			34'5-TriCB-(39)	2023/04/04		120	%	N/A
			TetraCB-(40)+(41)+(71)	2023/04/04		86	%	N/A
			22'34'-TetraCB-(42)	2023/04/04		97	%	N/A
			22'35-TetraCB-(43)	2023/04/04		90	%	N/A
			TetraCB-(44)+(47)+(65)	2023/04/04		87	%	N/A
			TetraCB-(45)+(51)	2023/04/04		73	%	N/A
			22'36'-TetraCB-(46)	2023/04/04		73	%	N/A
			22'45-TetraCB-(48)	2023/04/04		82	%	N/A
			TetraCB-(49)+TetraCB-(69)	2023/04/04		80	%	N/A
			TetraCB-(50)+(53)	2023/04/04		72	%	N/A
			22'55'-TetraCB-(52)	2023/04/04		87	%	N/A
			22'66'-TetraCB-(54)	2023/04/04		116	%	60 - 145
			233'4-TetraCB-(55)	2023/04/04		97	%	N/A
			233'4'-Tetra CB(56)	2023/04/04		99	%	N/A
			233'5-TetraCB-(57)	2023/04/04		90	%	N/A
			233'5'-TetraCB-(58)	2023/04/04		91	%	N/A
			TetraCB-(59)+(62)+(75)	2023/04/04		83	%	N/A
			2344'-TetraCB -(60)	2023/04/04		98	%	N/A
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04		99	%	N/A
			234'5-TetraCB-(63)	2023/04/04		96	%	N/A
			234'6-TetraCB-(64)	2023/04/04		96	%	N/A
			23'44'-TetraCB-(66)	2023/04/04		98	%	N/A
			23'45-TetraCB-(67)	2023/04/04		91	%	N/A
			23'45'-TetraCB-(68)	2023/04/04		91	%	N/A
			23'55'-TetraCB-(72)	2023/04/04		89	%	N/A
			23'5'6-TetraCB-(73)	2023/04/04		71	%	N/A
			33'44'-TetraCB-(77)	2023/04/04		98	%	60 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			33'45-TetraCB-(78)	2023/04/04		116	%	N/A
			33'45'-TetraCB(79)	2023/04/04		105	%	N/A
			33'55'-TetraCB-(80)	2023/04/04		95	%	N/A
			344'5-TetraCB-(81)	2023/04/04		100	%	60 - 145
			22'33'4-PentaCB-(82)	2023/04/04		108	%	N/A
			PentaCB-(83)+(99)	2023/04/04		96	%	N/A
			22'33'6-PentaCB-(84)	2023/04/04		87	%	N/A
			PentaCB-(85)+(116)+(117)	2023/04/04		93	%	N/A
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04		92	%	N/A
			PentaCB-(88)+(91)	2023/04/04		89	%	N/A
			22'346'-PentaCB-(89)	2023/04/04		103	%	N/A
			PentaCB-(90)+(101)+(113)	2023/04/04		93	%	N/A
			22'355'-PentaCB-(92)	2023/04/04		101	%	N/A
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04		82	%	N/A
			22'356'-PentaCB-(94)	2023/04/04		80	%	N/A
			22'35'6-PentaCB-(95)	2023/04/04		103	%	N/A
			22'366'-PentaCB-(96)	2023/04/04		88	%	N/A
			22'45'6-PentaCB-(103)	2023/04/04		88	%	N/A
			22'466'-PentaCB-(104)	2023/04/04		102	%	60 - 145
			233'44'-PentaCB-(105)	2023/04/04		105	%	60 - 145
			233'45-PentaCB-(106)	2023/04/04		112	%	N/A
			233'4'5-PentaCB-(107)	2023/04/04		96	%	N/A
			PentaCB-(108)+(124)	2023/04/04		101	%	N/A
			PentaCB-(110)+(115)	2023/04/04		104	%	N/A
			233'55'-PentaCB-(111)	2023/04/04		96	%	N/A
			233'56-PentaCB-(112)	2023/04/04		97	%	N/A
			2344'5-PentaCB-(114)	2023/04/04		106	%	60 - 145
			23'44'5-PentaCB-(118)	2023/04/04		103	%	60 - 145
			23'455'-PentaCB-(120)	2023/04/04		105	%	N/A
			23'45'6-PentaCB-(121)	2023/04/04		88	%	N/A
			233'4'5'-PentaCB-(122)	2023/04/04		128	%	N/A
			23'44'5'-PentaCB-(123)	2023/04/04		104	%	60 - 145
			33'44'5-PentaCB-(126)	2023/04/04		100	%	60 - 145
			33'455'-PentaCB-(127)	2023/04/04		109	%	N/A
			HexaCB-(128)+(166)	2023/04/04		97	%	N/A
			HexaCB-(129)+(138)+(163)	2023/04/04		103	%	N/A
			22'33'45'-HexaCB-(130)	2023/04/04		93	%	N/A
			22'33'46-HexaCB-(131)	2023/04/04		108	%	N/A
			22'33'46'-HexaCB-(132)	2023/04/04		92	%	N/A
			22'33'55'-HexaCB-(133)	2023/04/04		96	%	N/A
			HexaCB-(134)+(143)	2023/04/04		99	%	N/A
			HexaCB-(135)+(151)	2023/04/04		94	%	N/A
			22'33'66'-HexaCB-(136)	2023/04/04		92	%	N/A
			22'344'5-HexaCB-(137)	2023/04/04		85	%	N/A
			HexaCB-(139)+(140)	2023/04/04		90	%	N/A
			22'3455'-HexaCB-(141)	2023/04/04		98	%	N/A
			22'3456-HexaCB-(142)	2023/04/04		96	%	N/A
			22'345'6-HexaCB-(144)	2023/04/04		97	%	N/A
			22'3466'-HexaCB-(145)	2023/04/04		86	%	N/A
			22'34'55'-HexaCB-(146)	2023/04/04		93	%	N/A
			HexaCB-(147)+(149)	2023/04/04		91	%	N/A
			22'34'56'-HexaCB-(148)	2023/04/04		93	%	N/A
			22'34'66'-HexaCB-(150)	2023/04/04		84	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'3566'-HexaCB-(152)	2023/04/04		87	%	N/A
			HexaCB-(153)+(168)	2023/04/04		91	%	N/A
			22'44'56'-HexaCB-(154)	2023/04/04		89	%	N/A
			22'44'66'-HexaCB-(155)	2023/04/04		103	%	60 - 145
			HexaCB-(156)+(157)	2023/04/04		105	%	N/A
			233'44'6-HexaCB-(158)	2023/04/04		96	%	N/A
			233'455'-HexaCB-(159)	2023/04/04		95	%	N/A
			233'456-HexaCB-(160)	2023/04/04		99	%	N/A
			233'45'6-HexaCB-(161)	2023/04/04		92	%	N/A
			233'4'55'-HexaCB-(162)	2023/04/04		97	%	N/A
			233'4'5'6-HexaCB-(164)	2023/04/04		104	%	N/A
			233'55'6-HexaCB-(165)	2023/04/04		91	%	N/A
			23'44'55'-HexaCB-(167)	2023/04/04		107	%	60 - 145
			33'44'55'-HexaCB-(169)	2023/04/04		106	%	60 - 145
			22'33'44'5-HeptaCB-(170)	2023/04/04		88	%	60 - 145
			HeptaCB-(171)+(173)	2023/04/04		96	%	N/A
			22'33'455'-HeptaCB-(172)	2023/04/04		98	%	N/A
			22'33'456'-HeptaCB-(174)	2023/04/04		96	%	N/A
			22'33'45'6-HeptaCB-(175)	2023/04/04		93	%	N/A
			22'33'466'-HeptaCB-(176)	2023/04/04		90	%	N/A
			22'33'45'6'-HeptaCB-(177)	2023/04/04		93	%	N/A
			22'33'55'6-HeptaCB-(178)	2023/04/04		93	%	N/A
			22'33'566'-HeptaCB-(179)	2023/04/04		94	%	N/A
			HeptaCB-(180)+(193)	2023/04/04		103	%	N/A
			22'344'56-HeptaCB-(181)	2023/04/04		96	%	N/A
			22'344'56'-HeptaCB-(182)	2023/04/04		97	%	N/A
			22'344'5'6-HeptaCB-(183)	2023/04/04		88	%	N/A
			22'344'66'-HeptaCB-(184)	2023/04/04		86	%	N/A
			22'3455'6-HeptaCB-(185)	2023/04/04		103	%	N/A
			22'34566'-HeptaCB-(186)	2023/04/04		91	%	N/A
			22'34'55'6-HeptaCB-(187)	2023/04/04		96	%	N/A
			22'34'566'-HeptaCB-(188)	2023/04/04		103	%	60 - 145
			233'44'55'-HeptaCB-(189)	2023/04/04		104	%	60 - 145
			233'44'56-HeptaCB-(190)	2023/04/04		95	%	N/A
			233'44'5'6-HeptaCB-(191)	2023/04/04		95	%	N/A
			233'455'6-HeptaCB-(192)	2023/04/04		99	%	N/A
			22'33'44'55'-OctaCB-(194)	2023/04/04		101	%	N/A
			22'33'44'56-OctaCB-(195)	2023/04/04		102	%	N/A
			22'33'44'56'-OctaCB-(196)	2023/04/04		99	%	N/A
			22'33'44'66'OctaCB-(197)	2023/04/04		94	%	N/A
			OctaCB-(198)+(199)	2023/04/04		100	%	N/A
			22'33'4566'-OctaCB-(200)	2023/04/04		104	%	N/A
			22'33'45'66'-OctaCB-(201)	2023/04/04		92	%	N/A
			22'33'55'66'-OctaCB-(202)	2023/04/04		95	%	60 - 145
			22'344'55'6-OctaCB-(203)	2023/04/04		103	%	N/A
			22'344'566'-OctaCB-(204)	2023/04/04		91	%	N/A
			233'44'55'6-OctaCB-(205)	2023/04/04		93	%	60 - 145
			22'33'44'55'6-NonaCB-(206)	2023/04/04		93	%	60 - 145
			22'33'44'566'-NonaCB-(207)	2023/04/04		90	%	N/A
			22'33'455'66'-NonaCB-(208)	2023/04/04		97	%	60 - 145
			DecaCB-(209)	2023/04/04		115	%	60 - 145
8533813	CXU	RPD	2-MonoCB-(1)	2023/04/04	1.0		%	30
			3-MonoCB-(2)	2023/04/04	1.9		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			4-MonoCB-(3)	2023/04/04	0.85		%	30
			22'-DiCB-(4)	2023/04/04	4.4		%	30
			2,3-DiCB-(5)	2023/04/04	3.6		%	30
			2,3'-DiCB-(6)	2023/04/04	0		%	30
			2,4-DiCB-(7)	2023/04/04	1.0		%	30
			2,4'-DiCB-(8)	2023/04/04	3.7		%	30
			2,5-DiCB-(9)	2023/04/04	2.3		%	30
			2,6-DiCB-(10)	2023/04/04	2.0		%	30
			3,3'-DiCB-(11)	2023/04/04	1.0		%	30
			DiCB-(12)+(13)	2023/04/04	0.29		%	30
			3,5-DiCB-(14)	2023/04/04	0.38		%	30
			4,4'-DiCB-(15)	2023/04/04	1.2		%	30
			22'3-TriCB-(16)	2023/04/04	9.8		%	30
			22'4-TriCB-(17)	2023/04/04	4.0		%	30
			TriCB-(18)+(30)	2023/04/04	2.5		%	30
			22'6-TriCB-(19)	2023/04/04	2.5		%	30
			TriCB-(20) + (28)	2023/04/04	4.3		%	30
			TriCB-(21)+(33)	2023/04/04	1.7		%	30
			234'-TriCB-(22)	2023/04/04	0.099		%	30
			235-TriCB-(23)	2023/04/04	3.2		%	30
			236-TriCB-(24)	2023/04/04	7.4		%	30
			23'4-TriCB-(25)	2023/04/04	3.3		%	30
			TriCB-(26)+(29)	2023/04/04	1.4		%	30
			23'6-TriCB-(27)	2023/04/04	9.2		%	30
			24'5-TriCB-(31)	2023/04/04	3.2		%	30
			24'6-TriCB-(32)	2023/04/04	2.3		%	30
			23'5'-TriCB-(34)	2023/04/04	1.7		%	30
			33'4-TriCB-(35)	2023/04/04	1.5		%	30
			33'5-TriCB-(36)	2023/04/04	0		%	30
			344'-TriCB-(37)	2023/04/04	2.1		%	30
			345-TriCB-(38)	2023/04/04	2.4		%	30
			34'5-TriCB-(39)	2023/04/04	1.1		%	30
			TetraCB-(40)+(41)+(71)	2023/04/04	4.3		%	30
			22'34'-TetraCB-(42)	2023/04/04	2.5		%	30
			22'35-TetraCB-(43)	2023/04/04	6.9		%	30
			TetraCB-(44)+(47)+(65)	2023/04/04	4.6		%	30
			TetraCB-(45)+(51)	2023/04/04	5.5		%	30
			22'36'-TetraCB-(46)	2023/04/04	3.7		%	30
			22'45-TetraCB-(48)	2023/04/04	5.1		%	30
			TetraCB-(49)+TetraCB-(69)	2023/04/04	4.3		%	30
			TetraCB-(50)+(53)	2023/04/04	6.2		%	30
			22'55'-TetraCB-(52)	2023/04/04	7.4		%	30
			22'66'-TetraCB-(54)	2023/04/04	1.3		%	30
			233'4-TetraCB-(55)	2023/04/04	3.1		%	30
			233'4'-Tetra CB(56)	2023/04/04	2.0		%	30
			233'5-TetraCB-(57)	2023/04/04	4.1		%	30
			233'5'-TetraCB-(58)	2023/04/04	3.5		%	30
			TetraCB-(59)+(62)+(75)	2023/04/04	6.1		%	30
			2344'-TetraCB -(60)	2023/04/04	2.9		%	30
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04	4.1		%	30
			234'5-TetraCB-(63)	2023/04/04	4.2		%	30
			234'6-TetraCB-(64)	2023/04/04	4.5		%	30
			23'44'-TetraCB-(66)	2023/04/04	1.8		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			23'45-TetraCB-(67)	2023/04/04	1.6		%	30
			23'45'-TetraCB-(68)	2023/04/04	2.8		%	30
			23'55'-TetraCB-(72)	2023/04/04	5.7		%	30
			23'5'6-TetraCB-(73)	2023/04/04	3.7		%	30
			33'44'-TetraCB-(77)	2023/04/04	3.3		%	30
			33'45-TetraCB-(78)	2023/04/04	1.7		%	30
			33'45'-TetraCB(79)	2023/04/04	2.8		%	30
			33'55'-TetraCB-(80)	2023/04/04	3.5		%	30
			344'5-TetraCB-(81)	2023/04/04	1.8		%	30
			22'33'4-PentaCB-(82)	2023/04/04	3.5		%	30
			PentaCB-(83)+(99)	2023/04/04	5.9		%	30
			22'33'6-PentaCB-(84)	2023/04/04	4.5		%	30
			PentaCB-(85)+(116)+(117)	2023/04/04	5.1		%	30
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04	5.0		%	30
			PentaCB-(88)+(91)	2023/04/04	6.0		%	30
			22'346'-PentaCB-(89)	2023/04/04	5.1		%	30
			PentaCB-(90)+(101)+(113)	2023/04/04	5.0		%	30
			22'355'-PentaCB-(92)	2023/04/04	3.6		%	30
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04	5.5		%	30
			22'356'-PentaCB-(94)	2023/04/04	3.7		%	30
			22'35'6-PentaCB-(95)	2023/04/04	8.8		%	30
			22'366'-PentaCB-(96)	2023/04/04	6.0		%	30
			22'45'6-PentaCB-(103)	2023/04/04	4.9		%	30
			22'466'-PentaCB-(104)	2023/04/04	1.6		%	30
			233'44'-PentaCB-(105)	2023/04/04	0.66		%	30
			233'45-PentaCB-(106)	2023/04/04	1.5		%	30
			233'4'5-PentaCB-(107)	2023/04/04	4.9		%	30
			PentaCB-(108)+(124)	2023/04/04	3.1		%	30
			PentaCB-(110)+(115)	2023/04/04	5.0		%	30
			233'55'-PentaCB-(111)	2023/04/04	4.0		%	30
			233'56-PentaCB-(112)	2023/04/04	4.0		%	30
			2344'5-PentaCB-(114)	2023/04/04	2.1		%	30
			23'44'5-PentaCB-(118)	2023/04/04	6.1		%	30
			23'455'-PentaCB-(120)	2023/04/04	5.4		%	30
			23'45'6-PentaCB-(121)	2023/04/04	6.6		%	30
			233'4'5'-PentaCB-(122)	2023/04/04	2.0		%	30
			23'44'5'-PentaCB-(123)	2023/04/04	3.4		%	30
			33'44'5-PentaCB-(126)	2023/04/04	2.3		%	30
			33'455'-PentaCB-(127)	2023/04/04	1.5		%	30
			HexaCB-(128)+(166)	2023/04/04	6.0		%	30
			HexaCB-(129)+(138)+(163)	2023/04/04	5.1		%	30
			22'33'45'-HexaCB-(130)	2023/04/04	2.4		%	30
			22'33'46-HexaCB-(131)	2023/04/04	2.8		%	30
			22'33'46'-HexaCB-(132)	2023/04/04	3.3		%	30
			22'33'55'-HexaCB-(133)	2023/04/04	2.7		%	30
			HexaCB-(134)+(143)	2023/04/04	4.9		%	30
			HexaCB-(135)+(151)	2023/04/04	5.0		%	30
			22'33'66'-HexaCB-(136)	2023/04/04	8.6		%	30
			22'344'5-HexaCB-(137)	2023/04/04	0.47		%	30
			HexaCB-(139)+(140)	2023/04/04	4.0		%	30
			22'3455'-HexaCB-(141)	2023/04/04	4.7		%	30
			22'3456-HexaCB-(142)	2023/04/04	2.2		%	30
			22'345'6-HexaCB-(144)	2023/04/04	1.8		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'3466'-HexaCB-(145)	2023/04/04	4.7		%	30
			22'34'55'-HexaCB-(146)	2023/04/04	3.7		%	30
			HexaCB-(147)+(149)	2023/04/04	5.2		%	30
			22'34'56'-HexaCB-(148)	2023/04/04	7.8		%	30
			22'34'66'-HexaCB-(150)	2023/04/04	4.1		%	30
			22'3566'-HexaCB-(152)	2023/04/04	6.5		%	30
			HexaCB-(153)+(168)	2023/04/04	4.8		%	30
			22'44'56'-HexaCB-(154)	2023/04/04	5.4		%	30
			22'44'66'-HexaCB-(155)	2023/04/04	5.3		%	30
			HexaCB-(156)+(157)	2023/04/04	3.4		%	30
			233'44'6-HexaCB-(158)	2023/04/04	3.6		%	30
			233'455'-HexaCB-(159)	2023/04/04	4.4		%	30
			233'456-HexaCB-(160)	2023/04/04	2.2		%	30
			233'45'6-HexaCB-(161)	2023/04/04	4.2		%	30
			233'4'55'-HexaCB-(162)	2023/04/04	4.3		%	30
			233'4'5'6-HexaCB-(164)	2023/04/04	9.2		%	30
			233'55'6-HexaCB-(165)	2023/04/04	2.3		%	30
			23'44'55'-HexaCB-(167)	2023/04/04	1.2		%	30
			33'44'55'-HexaCB-(169)	2023/04/04	2.3		%	30
			22'33'44'5-HeptaCB-(170)	2023/04/04	1.4		%	30
			HeptaCB-(171)+(173)	2023/04/04	3.9		%	30
			22'33'455'-HeptaCB-(172)	2023/04/04	4.6		%	30
			22'33'456'-HeptaCB-(174)	2023/04/04	1.9		%	30
			22'33'45'6-HeptaCB-(175)	2023/04/04	7.6		%	30
			22'33'466'-HeptaCB-(176)	2023/04/04	7.6		%	30
			22'33'45'6'-HeptaCB-(177)	2023/04/04	3.2		%	30
			22'33'55'6-HeptaCB-(178)	2023/04/04	5.2		%	30
			22'33'566'-HeptaCB-(179)	2023/04/04	6.6		%	30
			HeptaCB-(180)+(193)	2023/04/04	3.9		%	30
			22'344'56-HeptaCB-(181)	2023/04/04	3.9		%	30
			22'344'56'-HeptaCB-(182)	2023/04/04	8.6		%	30
			22'344'5'6-HeptaCB-(183)	2023/04/04	4.2		%	30
			22'344'66'-HeptaCB-(184)	2023/04/04	5.0		%	30
			22'3455'6-HeptaCB-(185)	2023/04/04	17		%	30
			22'34566'-HeptaCB-(186)	2023/04/04	4.4		%	30
			22'34'55'6-HeptaCB-(187)	2023/04/04	6.8		%	30
			22'34'566'-HeptaCB-(188)	2023/04/04	3.3		%	30
			233'44'55'-HeptaCB-(189)	2023/04/04	3.4		%	30
			233'44'56-HeptaCB-(190)	2023/04/04	4.3		%	30
			233'44'5'6-HeptaCB-(191)	2023/04/04	3.0		%	30
			233'455'6-HeptaCB-(192)	2023/04/04	5.1		%	30
			22'33'44'55'-OctaCB-(194)	2023/04/04	1.5		%	30
			22'33'44'56-OctaCB-(195)	2023/04/04	0.098		%	30
			22'33'44'56'-OctaCB-(196)	2023/04/04	2.2		%	30
			22'33'44'66'OctaCB-(197)	2023/04/04	2.5		%	30
			OctaCB-(198)+(199)	2023/04/04	1.7		%	30
			22'33'4566'-OctaCB-(200)	2023/04/04	3.6		%	30
			22'33'45'66'-OctaCB-(201)	2023/04/04	2.5		%	30
			22'33'55'66'-OctaCB-(202)	2023/04/04	3.6		%	30
			22'344'55'6-OctaCB-(203)	2023/04/04	2.2		%	30
			22'344'566'-OctaCB-(204)	2023/04/04	3.8		%	30
			233'44'55'6-OctaCB-(205)	2023/04/04	0.86		%	30
			22'33'44'55'6-NonaCB-(206)	2023/04/04	2.2		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'33'44'566'-NonaCB-(207)	2023/04/04	4.3		%	30
			22'33'455'66'-NonaCB-(208)	2023/04/04	4.9		%	30
			DecaCB-(209)	2023/04/04	6.0		%	30
8533813	CXU	Method Blank	C13-2,44'-TriCB-(28)	2023/03/03		109	%	30 - 170
			C13-22'33'44'55'6-NonaCB-(206)	2023/03/03		89	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/03/03		118	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/03/03		94	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/03/03		94	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2023/03/03		76	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/03/03		110	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/03/03		69	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/03/03		48	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/03/03		67	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/03/03		56	%	15 - 145
			C13-22'6-TriCB-(19)	2023/03/03		52	%	40 - 145
			C13-22'-DiCB-(4)	2023/03/03		37	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/03/03		109	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/03/03		113	%	40 - 145
			C13-233'44'-PentaCB-(105)	2023/03/03		146 (1)	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/03/03		98	%	30 - 170
			C13-23'44'55'-HexaCB-(167)	2023/03/03		96	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/03/03		139	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/03/03		143	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/03/03		143	%	40 - 145
			C13-2-MonoCB-(1)	2023/03/03		39	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/03/03		101	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/03/03		151 (1)	%	40 - 145
			C13-33'44'-TetraCB-(77)	2023/03/03		86	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/03/03		82	%	40 - 145
			C13-344'-TriCB-(37)	2023/03/03		80	%	40 - 145
			C13-44'-DiCB-(15)	2023/03/03		82	%	15 - 145
			C13-4-MonoCB-(3)	2023/03/03		49	%	15 - 145
			C13-DecaCB-(209)	2023/03/03		69	%	40 - 145
			C13-HexaCB-(156)+(157)	2023/03/03		96	%	40 - 145
			2-MonoCB-(1)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			3-MonoCB-(2)	2023/03/03	0.0087 U, EDL=0.0087		ng/L	
			4-MonoCB-(3)	2023/03/03	0.0083 U, EDL=0.0083		ng/L	
			22'-DiCB-(4)	2023/03/03	0.029 U, EDL=0.029		ng/L	
			2,3-DiCB-(5)	2023/03/03	0.0053 U, EDL=0.0053		ng/L	
			2,3'-DiCB-(6)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			2,4-DiCB-(7)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			2,4'-DiCB-(8)	2023/03/03	0.0062 J, EDL=0.0051		ng/L	
			2,5-DiCB-(9)	2023/03/03	0.0055 U, EDL=0.0055		ng/L	
			2,6-DiCB-(10)	2023/03/03	0.0097 U, EDL=0.0097		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			3,3'-DiCB-(11)	2023/03/03	0.0834 J, EDL=0.0052		ng/L	
			DiCB-(12)+(13)	2023/03/03	0.0051 U, EDL=0.0051		ng/L	
			3,5-DiCB-(14)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			4,4'-DiCB-(15)	2023/03/03	0.0110 J, EDL=0.0053		ng/L	
			22'3-TriCB-(16)	2023/03/03	0.0279 J, EDL=0.0081		ng/L	
			22'4-TriCB-(17)	2023/03/03	0.0179 J, EDL=0.0061		ng/L	
			TriCB-(18)+(30)	2023/03/03	0.0176 J, EDL=0.0053		ng/L	
			22'6-TriCB-(19)	2023/03/03	0.0081 U, EDL=0.0081		ng/L	
			TriCB-(20) + (28)	2023/03/03	0.0548, EDL=0.0027		ng/L	
			TriCB-(21)+(33)	2023/03/03	0.0405 J, EDL=0.0029		ng/L	
			234'-TriCB-(22)	2023/03/03	0.0213, EDL=0.0029		ng/L	
			235-TriCB-(23)	2023/03/03	0.0028 U, EDL=0.0028		ng/L	
			236-TriCB-(24)	2023/03/03	0.0048 U, EDL=0.0048		ng/L	
			23'4-TriCB-(25)	2023/03/03	0.0050 U, EDL=0.0050		ng/L	
			TriCB-(26)+(29)	2023/03/03	0.0111 J, EDL=0.0022		ng/L	
			23'6-TriCB-(27)	2023/03/03	0.0046 U, EDL=0.0046		ng/L	
			24'5-TriCB-(31)	2023/03/03	0.0613, EDL=0.0026		ng/L	
			24'6-TriCB-(32)	2023/03/03	0.0157 J, EDL=0.0043		ng/L	
			23'5'-TriCB-(34)	2023/03/03	0.0029 U, EDL=0.0029		ng/L	
			33'4-TriCB-(35)	2023/03/03	0.0030 U, EDL=0.0030		ng/L	
			33'5-TriCB-(36)	2023/03/03	0.0025 U, EDL=0.0025		ng/L	
			344'-TriCB-(37)	2023/03/03	0.0127 J, EDL=0.0031		ng/L	
			345-TriCB-(38)	2023/03/03	0.0029 U, EDL=0.0029		ng/L	
			34'5-TriCB-(39)	2023/03/03	0.0030 U, EDL=0.0030		ng/L	
			TetraCB-(40)+(41)+(71)	2023/03/03	0.029 J, EDL=0.015		ng/L	
			22'34'-TetraCB-(42)	2023/03/03	0.020 U, EDL=0.020		ng/L	
			22'35-TetraCB-(43)	2023/03/03	0.018 U, EDL=0.018		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			TetraCB-(44)+(47)+(65)	2023/03/03	0.057 U, EDL=0.057 (2)		ng/L	
			TetraCB-(45)+(51)	2023/03/03	0.015 U, EDL=0.015		ng/L	
			22'36'-TetraCB-(46)	2023/03/03	0.017 U, EDL=0.017		ng/L	
			22'45-TetraCB-(48)	2023/03/03	0.015 U, EDL=0.015		ng/L	
			TetraCB-(49)+TetraCB-(69)	2023/03/03	0.051 J, EDL=0.013		ng/L	
			TetraCB-(50)+(53)	2023/03/03	0.014 U, EDL=0.014		ng/L	
			22'55'-TetraCB-(52)	2023/03/03	0.150, EDL=0.015		ng/L	
			22'66'-TetraCB-(54)	2023/03/03	0.025 U, EDL=0.025		ng/L	
			233'4-TetraCB-(55)	2023/03/03	0.0095 U, EDL=0.0095		ng/L	
			233'4'-Tetra CB(56)	2023/03/03	0.0176 J, EDL=0.0097		ng/L	
			233'5-TetraCB-(57)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			233'5'-TetraCB-(58)	2023/03/03	0.0094 U, EDL=0.0094		ng/L	
			TetraCB-(59)+(62)+(75)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			2344'-TetraCB -(60)	2023/03/03	0.0121 J, EDL=0.0092		ng/L	
			TetraCB-(61)+(70)+(74)+(76)	2023/03/03	0.115 J, EDL=0.0086		ng/L	
			234'5-TetraCB-(63)	2023/03/03	0.0091 U, EDL=0.0091		ng/L	
			234'6-TetraCB-(64)	2023/03/03	0.028 J, EDL=0.013		ng/L	
			23'44'-TetraCB-(66)	2023/03/03	0.0394 J, EDL=0.0086		ng/L	
			23'45-TetraCB-(67)	2023/03/03	0.0080 U, EDL=0.0080		ng/L	
			23'45'-TetraCB-(68)	2023/03/03	0.0085 U, EDL=0.0085		ng/L	
			23'55'-TetraCB-(72)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			23'5'6-TetraCB-(73)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			33'44'-TetraCB-(77)	2023/03/03	0.0098 U, EDL=0.0098		ng/L	
			33'45-TetraCB-(78)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			33'45'-TetraCB(79)	2023/03/03	0.0084 U, EDL=0.0084		ng/L	
			33'55'-TetraCB-(80)	2023/03/03	0.0077 U, EDL=0.0077		ng/L	
			344'5-TetraCB-(81)	2023/03/03	0.010 U, EDL=0.010		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'33'4-PentaCB-(82)	2023/03/03	0.017 U, EDL=0.017		ng/L	
			PentaCB-(83)+(99)	2023/03/03	0.059 J, EDL=0.014		ng/L	
			22'33'6-PentaCB-(84)	2023/03/03	0.024, EDL=0.014		ng/L	
			PentaCB-(85)+(116)+(117)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/03/03	0.068 J, EDL=0.011		ng/L	
			PentaCB-(88)+(91)	2023/03/03	0.012 U, EDL=0.012		ng/L	
			22'346'-PentaCB-(89)	2023/03/03	0.016 U, EDL=0.016		ng/L	
			PentaCB-(90)+(101)+(113)	2023/03/03	0.206, EDL=0.011		ng/L	
			22'355'-PentaCB-(92)	2023/03/03	0.035 J, EDL=0.015		ng/L	
			PentaCB-(93)+(98)+(100)+(102)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			22'356'-PentaCB-(94)	2023/03/03	0.014 U, EDL=0.014		ng/L	
			22'35'6-PentaCB-(95)	2023/03/03	0.210, EDL=0.015		ng/L	
			22'366'-PentaCB-(96)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			22'45'6-PentaCB-(103)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			22'466'-PentaCB-(104)	2023/03/03	0.017 U, EDL=0.017		ng/L	
			233'44'-PentaCB-(105)	2023/03/03	0.0276 J, EDL=0.0052		ng/L	
			233'45-PentaCB-(106)	2023/03/03	0.0057 U, EDL=0.0057		ng/L	
			233'4'5-PentaCB-(107)	2023/03/03	0.0081 J, EDL=0.0043		ng/L	
			PentaCB-(108)+(124)	2023/03/03	0.0053 U, EDL=0.0053		ng/L	
			PentaCB-(110)+(115)	2023/03/03	0.122, EDL=0.011		ng/L	
			233'55'-PentaCB-(111)	2023/03/03	0.0092 U, EDL=0.0092		ng/L	
			233'56-PentaCB-(112)	2023/03/03	0.0091 U, EDL=0.0091		ng/L	
			2344'5-PentaCB-(114)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			23'44'5-PentaCB-(118)	2023/03/03	0.0962 J, EDL=0.0048		ng/L	
			23'455'-PentaCB-(120)	2023/03/03	0.0097 U, EDL=0.0097		ng/L	
			23'45'6-PentaCB-(121)	2023/03/03	0.0092 U, EDL=0.0092		ng/L	
			233'4'5'-PentaCB-(122)	2023/03/03	0.0070 U, EDL=0.0070		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			23'44'5'-PentaCB-(123)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			33'44'5-PentaCB-(126)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			33'455'-PentaCB-(127)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			HexaCB-(128)+(166)	2023/03/03	0.0124 J, EDL=0.0057		ng/L	
			HexaCB-(129)+(138)+(163)	2023/03/03	0.201, EDL=0.0064		ng/L	
			22'33'45'-HexaCB-(130)	2023/03/03	0.0072 J, EDL=0.0069		ng/L	
			22'33'46-HexaCB-(131)	2023/03/03	0.0083 U, EDL=0.0083		ng/L	
			22'33'46'-HexaCB-(132)	2023/03/03	0.0682, EDL=0.0069		ng/L	
			22'33'55'-HexaCB-(133)	2023/03/03	0.0071 U, EDL=0.0071		ng/L	
			HexaCB-(134)+(143)	2023/03/03	0.0135 J, EDL=0.0076		ng/L	
			HexaCB-(135)+(151)	2023/03/03	0.143, EDL=0.013		ng/L	
			22'33'66'-HexaCB-(136)	2023/03/03	0.0455 J, EDL=0.0099		ng/L	
			22'344'5-HexaCB-(137)	2023/03/03	0.0065 U, EDL=0.0065		ng/L	
			HexaCB-(139)+(140)	2023/03/03	0.0060 U, EDL=0.0060		ng/L	
			22'3455'-HexaCB-(141)	2023/03/03	0.0545, EDL=0.0062		ng/L	
			22'3456-HexaCB-(142)	2023/03/03	0.0074 U, EDL=0.0074		ng/L	
			22'345'6-HexaCB-(144)	2023/03/03	0.022 J, EDL=0.013		ng/L	
			22'3466'-HexaCB-(145)	2023/03/03	0.0093 U, EDL=0.0093		ng/L	
			22'34'55'-HexaCB-(146)	2023/03/03	0.0310 J, EDL=0.0058		ng/L	
			HexaCB-(147)+(149)	2023/03/03	0.274, EDL=0.0055		ng/L	
			22'34'56'-HexaCB-(148)	2023/03/03	0.014 U, EDL=0.014		ng/L	
			22'34'66'-HexaCB-(150)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			22'3566'-HexaCB-(152)	2023/03/03	0.0094 U, EDL=0.0094		ng/L	
			HexaCB-(153)+(168)	2023/03/03	0.237, EDL=0.0050		ng/L	
			22'44'56'-HexaCB-(154)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			22'44'66'-HexaCB-(155)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			HexaCB-(156)+(157)	2023/03/03	0.0088 J, EDL=0.0035		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			233'44'6-HexaCB-(158)	2023/03/03	0.0167 J, EDL=0.0042		ng/L	
			233'455'-HexaCB-(159)	2023/03/03	0.0033 U, EDL=0.0033		ng/L	
			233'456-HexaCB-(160)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			233'45'6-HexaCB-(161)	2023/03/03	0.0048 U, EDL=0.0048		ng/L	
			233'4'55'-HexaCB-(162)	2023/03/03	0.0032 U, EDL=0.0032		ng/L	
			233'4'5'6-HexaCB-(164)	2023/03/03	0.0103 J, EDL=0.0046		ng/L	
			233'55'6-HexaCB-(165)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			23'44'55'-HexaCB-(167)	2023/03/03	0.0041 J, EDL=0.0035		ng/L	
			33'44'55'-HexaCB-(169)	2023/03/03	0.0038 U, EDL=0.0038		ng/L	
			22'33'44'5-HeptaCB-(170)	2023/03/03	0.0208 J, EDL=0.0054		ng/L	
			HeptaCB-(171)+(173)	2023/03/03	0.013 U, EDL=0.013 (2)		ng/L	
			22'33'455'-HeptaCB-(172)	2023/03/03	0.0060 U, EDL=0.0060		ng/L	
			22'33'456'-HeptaCB-(174)	2023/03/03	0.0523, EDL=0.0054		ng/L	
			22'33'45'6-HeptaCB-(175)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			22'33'466'-HeptaCB-(176)	2023/03/03	0.0140 J, EDL=0.0076		ng/L	
			22'33'45'6'-HeptaCB-(177)	2023/03/03	0.0308 J, EDL=0.0059		ng/L	
			22'33'55'6-HeptaCB-(178)	2023/03/03	0.014 J, EDL=0.011		ng/L	
			22'33'566'-HeptaCB-(179)	2023/03/03	0.0419 J, EDL=0.0074		ng/L	
			HeptaCB-(180)+(193)	2023/03/03	0.0737 J, EDL=0.0047		ng/L	
			22'344'56-HeptaCB-(181)	2023/03/03	0.0056 U, EDL=0.0056		ng/L	
			22'344'56'-HeptaCB-(182)	2023/03/03	0.0098 U, EDL=0.0098		ng/L	
			22'344'5'6-HeptaCB-(183)	2023/03/03	0.0419 J, EDL=0.0048		ng/L	
			22'344'66'-HeptaCB-(184)	2023/03/03	0.0073 U, EDL=0.0073		ng/L	
			22'3455'6-HeptaCB-(185)	2023/03/03	0.0058 U, EDL=0.0058		ng/L	
			22'34566'-HeptaCB-(186)	2023/03/03	0.0079 U, EDL=0.0079		ng/L	
			22'34'55'6-HeptaCB-(187)	2023/03/03	0.085, EDL=0.010		ng/L	
			22'34'566'-HeptaCB-(188)	2023/03/03	0.0080 U, EDL=0.0080		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			233'44'55'-HeptaCB-(189)	2023/03/03	0.0039 U, EDL=0.0039		ng/L	
			233'44'56-HeptaCB-(190)	2023/03/03	0.0049 J, EDL=0.0043		ng/L	
			233'44'5'6-HeptaCB-(191)	2023/03/03	0.0042 U, EDL=0.0042		ng/L	
			233'455'6-HeptaCB-(192)	2023/03/03	0.0047 U, EDL=0.0047		ng/L	
			22'33'44'55'-OctaCB-(194)	2023/03/03	0.0078 U, EDL=0.0078		ng/L	
			22'33'44'56-OctaCB-(195)	2023/03/03	0.0084 U, EDL=0.0084		ng/L	
			22'33'44'56'-OctaCB-(196)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			22'33'44'66'OctaCB-(197)	2023/03/03	0.0081 U, EDL=0.0081		ng/L	
			OctaCB-(198)+(199)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			22'33'4566'-OctaCB-(200)	2023/03/03	0.0082 U, EDL=0.0082		ng/L	
			22'33'45'66'-OctaCB-(201)	2023/03/03	0.0076 U, EDL=0.0076		ng/L	
			22'33'55'66'-OctaCB-(202)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			22'344'55'6-OctaCB-(203)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			22'344'566'-OctaCB-(204)	2023/03/03	0.0075 U, EDL=0.0075		ng/L	
			233'44'55'6-OctaCB-(205)	2023/03/03	0.0060 U, EDL=0.0060		ng/L	
			22'33'44'55'6-NonaCB-(206)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			22'33'44'566'-NonaCB-(207)	2023/03/03	0.0076 U, EDL=0.0076		ng/L	
			22'33'455'66'-NonaCB-(208)	2023/03/03	0.0079 U, EDL=0.0079		ng/L	
			DecaCB-(209)	2023/03/03	0.012 U, EDL=0.012		ng/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.

(1) The extracted internal standard analyte exhibited high recovery and as such, may not have allowed for accurate recovery correction of the associated native compound. For results that were not detected (ND), this potential high bias has no impact.

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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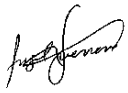
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Angel Guerrero, Supervisor, Ultra Trace Analysis, HRMS and SVOC

Colm McNamara, Senior Analyst, Liquid Chromatography

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SUBCONTRACT ORDER

Apex Laboratories

02/27/23 **A3B0217**

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Apex Laboratories	BV Labs / Maxxam
6700 S.W. Sandburg Street	C/O FEDEX DEPOT 299 Cayuga Rd
Tigard, OR 97223	Cheektowaga, NY 14225
Phone: (503) 718-2323	Phone :(800) 668-0639
Fax: (503) 336-0745	Fax: (905) 332-9169
Project Manager: Philip Nerenberg	

AKK 2/8/23

Sample Name: MFA-B3A-20230207-GW-36.0 **Water** **Sampled: 02/07/23 08:30** (A3B0217-01)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	02/20/23 17:00	02/07/24 08:30	
1668C PCB Congeners (SUB)	02/20/23 17:00	02/07/24 08:30	
1699 Insecticides/Pesticides (SUB)	02/20/23 17:00	02/14/23 08:30	waters
537M - PFOAs (SUB)	02/20/23 17:00	02/14/23 08:30	
Containers Supplied:			
(H)Other-Non Preserved			
(I)Other-Non Preserved			
(Q)1 L Amber Glass - Non Preserved			
(R)1 L Amber Glass - Non Preserved			
(S)1 L Amber Glass - Non Preserved			
(U)1 L Amber Glass - Non Preserved			

09-Feb-23 12:55
Lori Dufour
C338911
AJH ENV-713

Sample Name: Field Blank **Water** **Sampled: 02/07/23 08:20** (A3B0217-02)

Analysis	Due	Expires	Comments
537M - PFOAs (SUB)	02/20/23 17:00	02/14/23 08:20	
Containers Supplied:			
(A)Other-Non Preserved			
(B)Other-Non Preserved			

Standard TAT

Temp. Blank - 1.4/1.6/1.2, 1.6/1.7/1.4, 4.3/4.4/4.3

	2-8-23		Fed Ex (Shipper)	Temp. - Refer to ACTK	
Released By	Date		Received By	Date	
Fed Ex (Shipper)			Kelji KALGI SOLADHARA	2023/02/09	12:55
Released By	Date		Received By	Date	

Page 1 of 1

Your Project #: A3A1010

Attention: Philip Nerenberg

Apex Laboratories
6700 SW Sandburg St.
Tigard, OR
USA 97223

Report Date: 2023/04/20
Report #: R7596014
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C338927
Received: 2023/02/09, 12:55

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Moisture	1	N/A	2023/02/21	CAM SOP-00445	Carter 2nd ed 51.2 m
PFAS in soil by SPE/LCMS (1)	1	2023/02/24	2023/02/26	CAM SOP-00894	ASTM D7968-17a 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) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

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:
Lori Dufour, Project Manager
Email: Lori.Dufour@bureauveritas.com
Phone# (905) 817-5700

==========

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RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		VBK409			
Sampling Date		2023/01/31			
	UNITS	MFA-B1-B5-COMP-SL	RDL	MDL	QC Batch
Moisture	%	3.8	1.0	0.50	8513637

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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PERFLUOROALKYL SUBSTANCES (SOIL)

Bureau Veritas ID		VBK409			
Sampling Date		2023/01/31			
	UNITS	MFA-B1-B5-COMP-SL	RDL	MDL	QC Batch
Perfluorobutanoic acid (PFBA)	ug/kg	0.14 U	1.0	0.14	8521318
Perfluoropentanoic acid (PFPeA)	ug/kg	0.17 U	1.0	0.17	8521318
Perfluorohexanoic acid (PFHxA)	ug/kg	0.72 J	1.0	0.15	8521318
Perfluoroheptanoic acid (PFHpA)	ug/kg	0.51 J	1.0	0.17	8521318
Perfluorooctanoic acid (PFOA)	ug/kg	0.95 J	1.0	0.17	8521318
Perfluorononanoic acid (PFNA)	ug/kg	0.76 J	1.0	0.14	8521318
Perfluorodecanoic acid (PFDA)	ug/kg	1.5	1.0	0.13	8521318
Perfluoroundecanoic acid (PFUnA)	ug/kg	1.3	1.0	0.22	8521318
Perfluorododecanoic acid (PFDoA)	ug/kg	1.2	1.0	0.16	8521318
Perfluorotridecanoic acid (PFTRDA)	ug/kg	0.61 J	1.0	0.12	8521318
Perfluorotetradecanoic acid(PFTEDA)	ug/kg	0.46 J	1.0	0.13	8521318
Perfluorobutanesulfonic acid (PFBS)	ug/kg	0.15 U	1.0	0.15	8521318
Perfluoropentanesulfonic acid PFPes	ug/kg	0.34 U	1.0	0.34	8521318
Perfluorohexanesulfonic acid(PFHxS)	ug/kg	2.2 (1)	1.0	0.12	8521318
Perfluoroheptanesulfonic acid PFHpS	ug/kg	0.21 U	1.0	0.21	8521318
Perfluorooctanesulfonic acid (PFOS)	ug/kg	0.57 J	1.0	0.36	8521318
Perfluorononanesulfonic acid (PFNS)	ug/kg	0.18 U	1.0	0.18	8521318
Perfluorodecanesulfonic acid (PFDS)	ug/kg	0.92 J	1.0	0.21	8521318
Perfluorooctane Sulfonamide (PFOSA)	ug/kg	0.10 U	1.0	0.10	8521318
EtFOSA	ug/kg	0.38 U	1.0	0.38	8521318
MeFOSA	ug/kg	0.45 U	1.0	0.45	8521318
EtFOSE	ug/kg	0.37 U	1.0	0.37	8521318
MeFOSE	ug/kg	0.34 U	1.0	0.34	8521318
EtFOSAA	ug/kg	7.0	1.0	0.16	8521318
MeFOSAA	ug/kg	4.3	1.0	0.24	8521318
4:2 Fluorotelomer sulfonic acid	ug/kg	0.10 U	1.0	0.10	8521318
6:2 Fluorotelomer sulfonic acid	ug/kg	0.24 U	1.0	0.24	8521318
8:2 Fluorotelomer sulfonic acid	ug/kg	0.26 U	1.0	0.26	8521318
Hexafluoropropyleneoxide dimer acid	ug/kg	0.16 U	1.0	0.16	8521318
4,8-Dioxa-3H-perfluorononanoic acid	ug/kg	0.15 U	1.0	0.15	8521318
9Cl-PF3ONS (F-53B Major)	ug/kg	0.10 U	1.0	0.10	8521318
11Cl-PF3OUdS (F-53B Minor)	ug/kg	0.28 U	1.0	0.28	8521318
Surrogate Recovery (%)					
13C2-4:2-Fluorotelomersulfonic Acid	%	62	N/A	N/A	8521318
13C2-6:2-Fluorotelomersulfonic Acid	%	68	N/A	N/A	8521318
13C2-8:2-Fluorotelomersulfonic Acid	%	64	N/A	N/A	8521318

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Result is estimated as analyte confirmation criteria (ion ratio) were not met.

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PERFLUOROALKYL SUBSTANCES (SOIL)

Bureau Veritas ID		VBK409			
Sampling Date		2023/01/31			
	UNITS	MFA-B1-B5-COMP-SL	RDL	MDL	QC Batch
13C2-Perfluorodecanoic acid	%	47 (1)	N/A	N/A	8521318
13C2-Perfluorododecanoic acid	%	52	N/A	N/A	8521318
13C2-Perfluorohexanoic acid	%	59	N/A	N/A	8521318
13C2-perfluorotetradecanoic acid	%	37 (2)	N/A	N/A	8521318
13C2-Perfluoroundecanoic acid	%	57	N/A	N/A	8521318
13C3-HFPO-DA	%	57	N/A	N/A	8521318
13C3-Perfluorobutanesulfonic acid	%	64	N/A	N/A	8521318
13C4-Perfluorobutanoic acid	%	69	N/A	N/A	8521318
13C4-Perfluoroheptanoic acid	%	63	N/A	N/A	8521318
13C4-Perfluorooctanesulfonic acid	%	62	N/A	N/A	8521318
13C4-Perfluorooctanoic acid	%	57	N/A	N/A	8521318
13C5-Perfluorononanoic acid	%	57	N/A	N/A	8521318
13C5-Perfluoropentanoic acid	%	66	N/A	N/A	8521318
13C8-Perfluorooctane Sulfonamide	%	56	N/A	N/A	8521318
18O2-Perfluorohexanesulfonic acid	%	61	N/A	N/A	8521318
D3-MeFOSA	%	36	N/A	N/A	8521318
D3-MeFOSAA	%	61	N/A	N/A	8521318
D5-EtFOSA	%	29	N/A	N/A	8521318
D5-EtFOSAA	%	62	N/A	N/A	8521318
D7-MeFOSE	%	35	N/A	N/A	8521318
D9-EtFOSE	%	31	N/A	N/A	8521318

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL) which may result in increased variability of the associated native analyte result (PFDA, PFDS).
(2) Extracted internal standard analyte recovery was below the defined lower control limit (LCL) which may result in increased variability of the associated native analyte result (PFTeDA, PFTrDA).

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TEST SUMMARY

Bureau Veritas ID: VBK409
Sample ID: MFA-B1-B5-COMP-SL
Matrix: Soil

Collected: 2023/01/31
Shipped:
Received: 2023/02/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	8513637	N/A	2023/02/21	Joe Thomas
PFAS in soil by SPE/LCMS	LCMS	8521318	2023/02/24	2023/02/26	Adnan Khan

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.8°C
Package 2	5.6°C
Package 3	3.9°C

Revised Report (2023/4/20): Updated footnote comment (1) to reflect correct EIS and native analytes.

Sample VBK409 was air dried prior to analysis for moisture and extraction and analysed for PFAS as per client request.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
8513637	SB3	RPD - Sample/Sample Dup	Moisture	2023/02/21	4.2		%	20
8521318	AKH	Matrix Spike	13C2-4:2-Fluorotelomersulfonic Acid	2023/02/26		86	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/02/26		83	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/02/26		86	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/02/26		81	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/02/26		71	%	50 - 150
			13C2-Perfluorohexanoic acid	2023/02/26		86	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/02/26		57	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/02/26		77	%	50 - 150
			13C3-HFPO-DA	2023/02/26		87	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/02/26		86	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/02/26		90	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/02/26		87	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/02/26		83	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/02/26		88	%	50 - 150
			13C5-Perfluorononanoic acid	2023/02/26		86	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/02/26		90	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/02/26		74	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/02/26		85	%	50 - 150
			D3-MeFOSA	2023/02/26		55	%	25 - 150
			D3-MeFOSAA	2023/02/26		69	%	50 - 150
			D5-EtFOSA	2023/02/26		50	%	25 - 150
			D5-EtFOSAA	2023/02/26		68	%	50 - 150
			D7-MeFOSE	2023/02/26		61	%	25 - 150
			D9-EtFOSE	2023/02/26		58	%	25 - 150
			Perfluorobutanoic acid (PFBA)	2023/02/26		110	%	70 - 130
			Perfluoropentanoic acid (PFPeA)	2023/02/26		106	%	70 - 130
			Perfluorohexanoic acid (PFHxA)	2023/02/26		110	%	70 - 130
			Perfluoroheptanoic acid (PFHpA)	2023/02/26		111	%	70 - 130
			Perfluorooctanoic acid (PFOA)	2023/02/26		108	%	70 - 130
			Perfluorononanoic acid (PFNA)	2023/02/26		109	%	70 - 130
			Perfluorodecanoic acid (PFDA)	2023/02/26		112	%	70 - 130
			Perfluoroundecanoic acid (PFUnA)	2023/02/26		110	%	70 - 130
			Perfluorododecanoic acid (PFDoA)	2023/02/26		112	%	70 - 130
			Perfluorotridecanoic acid (PFTRDA)	2023/02/26		123	%	70 - 130
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/26		108	%	70 - 130
			Perfluorobutanesulfonic acid (PFBS)	2023/02/26		110	%	70 - 130
			Perfluoropentanesulfonic acid PFPes	2023/02/26		106	%	70 - 130
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/26		107	%	70 - 130
			Perfluoroheptanesulfonic acid PFHpS	2023/02/26		106	%	70 - 130
			Perfluorooctanesulfonic acid (PFOS)	2023/02/26		113	%	70 - 130
			Perfluorononanesulfonic acid (PFNS)	2023/02/26		100	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2023/02/26		109	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/26		108	%	70 - 130
			EtFOSA	2023/02/26		108	%	70 - 130
			MeFOSA	2023/02/26		103	%	70 - 130
			EtFOSE	2023/02/26		107	%	70 - 130
			MeFOSE	2023/02/26		112	%	70 - 130
			EtFOSAA	2023/02/26		111	%	70 - 130
			MeFOSAA	2023/02/26		112	%	70 - 130
			4:2 Fluorotelomer sulfonic acid	2023/02/26		110	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2023/02/26		112	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2023/02/26		110	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Hexafluoropropyleneoxide dimer acid	2023/02/26		111	%	70 - 130
			4,8-Dioxa-3H-perfluorononanoic acid	2023/02/26		109	%	70 - 130
			9Cl-PF3ONS (F-53B Major)	2023/02/26		105	%	70 - 130
			11Cl-PF3OUdS (F-53B Minor)	2023/02/26		105	%	70 - 130
8521318	AKH	Spiked Blank	13C2-4:2-Fluorotelomersulfonic Acid	2023/02/26		85	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/02/26		84	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/02/26		80	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/02/26		82	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/02/26		72	%	50 - 150
			13C2-Perfluorohexanoic acid	2023/02/26		84	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/02/26		56	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/02/26		82	%	50 - 150
			13C3-HFPO-DA	2023/02/26		81	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/02/26		84	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/02/26		87	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/02/26		84	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/02/26		80	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/02/26		86	%	50 - 150
			13C5-Perfluorononanoic acid	2023/02/26		84	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/02/26		87	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/02/26		76	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/02/26		84	%	50 - 150
			D3-MeFOSA	2023/02/26		42	%	25 - 150
			D3-MeFOSAA	2023/02/26		78	%	50 - 150
			D5-EtFOSA	2023/02/26		38	%	25 - 150
			D5-EtFOSAA	2023/02/26		80	%	50 - 150
			D7-MeFOSE	2023/02/26		60	%	25 - 150
			D9-EtFOSE	2023/02/26		59	%	25 - 150
			Perfluorobutanoic acid (PFBA)	2023/02/26		109	%	70 - 130
			Perfluoropentanoic acid (PFPeA)	2023/02/26		106	%	70 - 130
			Perfluorohexanoic acid (PFHxA)	2023/02/26		107	%	70 - 130
			Perfluoroheptanoic acid (PFHpA)	2023/02/26		109	%	70 - 130
			Perfluorooctanoic acid (PFOA)	2023/02/26		104	%	70 - 130
			Perfluorononanoic acid (PFNA)	2023/02/26		106	%	70 - 130
			Perfluorodecanoic acid (PFDA)	2023/02/26		107	%	70 - 130
			Perfluoroundecanoic acid (PFUnA)	2023/02/26		104	%	70 - 130
			Perfluorododecanoic acid (PFDoA)	2023/02/26		105	%	70 - 130
			Perfluorotridecanoic acid (PFTRDA)	2023/02/26		117	%	70 - 130
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/26		107	%	70 - 130
			Perfluorobutanesulfonic acid (PFBS)	2023/02/26		107	%	70 - 130
			Perfluoropentanesulfonic acid PFPes	2023/02/26		103	%	70 - 130
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/26		107	%	70 - 130
			Perfluoroheptanesulfonic acid PFHpS	2023/02/26		106	%	70 - 130
			Perfluorooctanesulfonic acid (PFOS)	2023/02/26		111	%	70 - 130
			Perfluorononanesulfonic acid (PFNS)	2023/02/26		98	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2023/02/26		103	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/26		109	%	70 - 130
			EtFOSA	2023/02/26		108	%	70 - 130
			MeFOSA	2023/02/26		100	%	70 - 130
			EtFOSE	2023/02/26		109	%	70 - 130
			MeFOSE	2023/02/26		109	%	70 - 130
			EtFOSAA	2023/02/26		108	%	70 - 130
			MeFOSAA	2023/02/26		109	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			4:2 Fluorotelomer sulfonic acid	2023/02/26		107	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2023/02/26		107	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2023/02/26		112	%	70 - 130
			Hexafluoropropyleneoxide dimer acid	2023/02/26		113	%	70 - 130
			4,8-Dioxa-3H-perfluorononanoic acid	2023/02/26		110	%	70 - 130
			9Cl-PF3ONS (F-53B Major)	2023/02/26		101	%	70 - 130
			11Cl-PF3OUdS (F-53B Minor)	2023/02/26		103	%	70 - 130
8521318	AKH	Method Blank	13C2-4:2-Fluorotelomersulfonic Acid	2023/02/26		90	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/02/26		83	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/02/26		80	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/02/26		75	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/02/26		70	%	50 - 150
			13C2-Perfluorohexanoic acid	2023/02/26		82	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/02/26		52	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/02/26		77	%	50 - 150
			13C3-HFPO-DA	2023/02/26		80	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/02/26		80	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/02/26		86	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/02/26		85	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/02/26		75	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/02/26		82	%	50 - 150
			13C5-Perfluorononanoic acid	2023/02/26		79	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/02/26		86	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/02/26		68	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/02/26		80	%	50 - 150
			D3-MeFOSA	2023/02/26		31	%	25 - 150
			D3-MeFOSAA	2023/02/26		72	%	50 - 150
			D5-EtFOSA	2023/02/26		27	%	25 - 150
			D5-EtFOSAA	2023/02/26		77	%	50 - 150
			D7-MeFOSE	2023/02/26		52	%	25 - 150
			D9-EtFOSE	2023/02/26		56	%	25 - 150
			Perfluorobutanoic acid (PFBA)	2023/02/26	0.14 U, MDL=0.14		ug/kg	
			Perfluoropentanoic acid (PFPeA)	2023/02/26	0.17 U, MDL=0.17		ug/kg	
			Perfluorohexanoic acid (PFHxA)	2023/02/26	0.15 U, MDL=0.15		ug/kg	
			Perfluoroheptanoic acid (PFHpA)	2023/02/26	0.17 U, MDL=0.17		ug/kg	
			Perfluorooctanoic acid (PFOA)	2023/02/26	0.17 U, MDL=0.17		ug/kg	
			Perfluorononanoic acid (PFNA)	2023/02/26	0.14 U, MDL=0.14		ug/kg	
			Perfluorodecanoic acid (PFDA)	2023/02/26	0.13 U, MDL=0.13		ug/kg	
			Perfluoroundecanoic acid (PFUnA)	2023/02/26	0.22 U, MDL=0.22		ug/kg	
			Perfluorododecanoic acid (PFDoA)	2023/02/26	0.16 U, MDL=0.16		ug/kg	
			Perfluorotridecanoic acid (PFTRDA)	2023/02/26	0.12 U, MDL=0.12		ug/kg	
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/26	0.13 U, MDL=0.13		ug/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorobutanesulfonic acid (PFBS)	2023/02/26	0.15 U, MDL=0.15		ug/kg	
			Perfluoropentanesulfonic acid PFPes	2023/02/26	0.34 U, MDL=0.34		ug/kg	
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/26	0.12 U, MDL=0.12		ug/kg	
			Perfluoroheptanesulfonic acid PFHpS	2023/02/26	0.21 U, MDL=0.21		ug/kg	
			Perfluorooctanesulfonic acid (PFOS)	2023/02/26	0.36 U, MDL=0.36		ug/kg	
			Perfluorononanesulfonic acid (PFNS)	2023/02/26	0.18 U, MDL=0.18		ug/kg	
			Perfluorodecanesulfonic acid (PFDS)	2023/02/26	0.21 U, MDL=0.21		ug/kg	
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/26	0.10 U, MDL=0.10		ug/kg	
			EtFOSA	2023/02/26	0.38 U, MDL=0.38		ug/kg	
			MeFOSA	2023/02/26	0.45 U, MDL=0.45		ug/kg	
			EtFOSE	2023/02/26	0.37 U, MDL=0.37		ug/kg	
			MeFOSE	2023/02/26	0.34 U, MDL=0.34		ug/kg	
			EtFOSAA	2023/02/26	0.16 U, MDL=0.16		ug/kg	
			MeFOSAA	2023/02/26	0.24 U, MDL=0.24		ug/kg	
			4:2 Fluorotelomer sulfonic acid	2023/02/26	0.10 U, MDL=0.10		ug/kg	
			6:2 Fluorotelomer sulfonic acid	2023/02/26	0.24 U, MDL=0.24		ug/kg	
			8:2 Fluorotelomer sulfonic acid	2023/02/26	0.26 U, MDL=0.26		ug/kg	
			Hexafluoropropyleneoxide dimer acid	2023/02/26	0.16 U, MDL=0.16		ug/kg	
			4,8-Dioxa-3H-perfluorononanoic acid	2023/02/26	0.15 U, MDL=0.15		ug/kg	
			9Cl-PF3ONS (F-53B Major)	2023/02/26	0.10 U, MDL=0.10		ug/kg	
			11Cl-PF3OUdS (F-53B Minor)	2023/02/26	0.28 U, MDL=0.28		ug/kg	
8521318	AKH	RPD - Sample/Sample Dup	Perfluorobutanoic acid (PFBA)	2023/02/26	NC		%	30
			Perfluoropentanoic acid (PFPeA)	2023/02/26	NC		%	30
			Perfluorohexanoic acid (PFHxA)	2023/02/26	NC		%	30
			Perfluoroheptanoic acid (PFHpA)	2023/02/26	NC		%	30
			Perfluorooctanoic acid (PFOA)	2023/02/26	NC		%	30
			Perfluorononanoic acid (PFNA)	2023/02/26	NC		%	30
			Perfluorodecanoic acid (PFDA)	2023/02/26	NC		%	30
			Perfluoroundecanoic acid (PFUnA)	2023/02/26	NC		%	30
			Perfluorododecanoic acid (PFDoA)	2023/02/26	NC		%	30
			Perfluorotridecanoic acid (PFTRDA)	2023/02/26	NC		%	30
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/26	NC		%	30
			Perfluorobutanesulfonic acid (PFBS)	2023/02/26	NC		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluoropentanesulfonic acid PFPes	2023/02/26	NC		%	30
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/26	NC		%	30
			Perfluoroheptanesulfonic acid PFHpS	2023/02/26	NC		%	30
			Perfluorooctanesulfonic acid (PFOS)	2023/02/26	NC		%	30
			Perfluorononanesulfonic acid (PFNS)	2023/02/26	NC		%	30
			Perfluorodecanesulfonic acid (PFDS)	2023/02/26	NC		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/26	NC		%	30
			4:2 Fluorotelomer sulfonic acid	2023/02/26	NC		%	30
			6:2 Fluorotelomer sulfonic acid	2023/02/26	NC		%	30
			8:2 Fluorotelomer sulfonic acid	2023/02/26	NC		%	30

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 (absolute difference <= 2x RDL).

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Colm McNamara, Senior Analyst, Liquid Chromatography

Cristina Carriere, Senior Scientific Specialist

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09-Feb-23 12:55

Lori Dufour

C338927

SUBCONTRACT ORDER

Apex Laboratories

A3A1010

HCK 2/8/23

AJH ENV-1272

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:

BV Labs / Maxxam
C/O FEDEX DEPOT 299 Cayuga Rd
Cheektowaga, NY 14225
Phone :(800) 668-0639
Fax: (905) 332-9169

International Solic
Sample
Heat Treat Required
High Risk material
Controlled Storage and Disposal

HCK 2/8/23

Sample Name: MFA-B1-2023013-21.9 **Sediment** **Sampled: 01/30/23 16:00** (A3A1010-01)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/09/23 16:00	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

Sample Name: MFA-B3-20230131-31.0 **Sediment** **Sampled: 01/31/23 10:50** (A3A1010-02)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/10/23 10:50	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

Sample Name: MFA-B2-20230131-23.0 **Sediment** **Sampled: 01/31/23 09:00** (A3A1010-03)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/10/23 09:00	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

Sample Name: MFA-B4-20230202-SL-26.5 **Sediment** **Sampled: 02/02/23 09:10** (A3A1010-04)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/12/23 09:10	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

Standard TAT

Temp. Blank- 1.6/1.7/1.4, 1.4/1.6/1.2
4.3/4.4/4

Released By	Date	Received By	Date
	2-8-23	Fed Ex (Shipper)	
Fed Ex (Shipper)		KALGI SOLADHARA	2023/02/09 12:55
Released By	Date	Received By	Date

Temp - Refer to ACTR

Page 1 of 2

SUBCONTRACT ORDER

Apex Laboratories

AKK 218723

A3A1010

AKK 218723

Sample Name: MFA-B5-20230203-SL-27.0 **Sediment** **Sampled: 02/03/23 15:00** (A3A1010-05)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/13/23 15:00	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

As Received Composite of -01,-02,-03,-04,-05

Sample Name: MFA-SL-Composite **Sediment** **Sampled: 01/30/23 16:00** (A3A1010-06)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB) AKK 218723	02/13/23 17:00	01/30/24 16:00	will send next week!
1668C PCB Congeners (SUB)	02/13/23 17:00	01/30/24 16:00	
Subcontract Outside	02/23/23 17:00	07/29/23 16:00	PFAS EPA-1633
Containers Supplied: (C)250 mL Poly (WM) - Non Preserved			

Standard TAT

Released By	Date	Received By	Date
	2-8-23	Fed Ex (Shipper)	
Fed Ex (Shipper)		See Page 1	
Released By	Date	Received By	Date

Page 2 of 2

Your Project #: A3A1010
Your C.O.C. #: n/a

Attention: Philip Nerenberg

Apex Laboratories
6700 SW Sandburg St.
Tigard, OR
USA 97223

Report Date: 2023/06/06
Report #: R7659013
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C347690
Received: 2023/02/17, 12:20

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dioxins/Furans in Soil (1613B) (1)	1	2023/02/22	2023/02/24	BRL SOP-00410	EPA 1613B m
2378TCDF Confirmation (M8290A/M1613)	1	2023/02/22	2023/03/02	BRL SOP-00406 BRL SOP-00410	EPA M8290Am/ M1613Bm
PCB Congeners in Soil (1668C) (2)	1	2023/03/28	2023/04/07	BRL SOP-00408	EPA 1668C 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.
(2) Soils are reported on a dry weight basis unless otherwise specified.
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:
Lori Dufour, Project Manager
Email: Lori.Dufour@bureauveritas.com
Phone# (905) 817-5700

==========

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DIOXINS AND FURANS BY HRMS (SOIL)

Bureau Veritas ID		VBZ186							
Sampling Date		2023/01/30 16:00							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B1-B5- COMP-SL-PRO	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/g	77.1	0.126	1.00	0.227	1.00	77.1	1	8520730
1,2,3,7,8-Penta CDD *	pg/g	37.8	0.132	5.00	0.258	1.00	37.8	1	8520730
1,2,3,4,7,8-Hexa CDD *	pg/g	7.73	0.142	5.00	0.204	0.100	0.773	1	8520730
1,2,3,6,7,8-Hexa CDD *	pg/g	610	0.120	5.00	0.173	0.100	61.0	1	8520730
1,2,3,7,8,9-Hexa CDD *	pg/g	312	0.126	5.00	0.179	0.100	31.2	1	8520730
1,2,3,4,6,7,8-Hepta CDD *	pg/g	474	0.140	5.00	0.743	0.0100	4.74	1	8520730
Octa CDD *	pg/g	2230	0.154	10.0	0.800	0.000300	0.669	1	8520730
Total Tetra CDD *	pg/g	144	0.126	1.00	0.400	N/A	N/A	10	8520730
Total Penta CDD *	pg/g	251	0.132	5.00	0.400	N/A	N/A	10	8520730
Total Hexa CDD *	pg/g	3910	0.129	5.00	0.400	N/A	N/A	6	8520730
Total Hepta CDD *	pg/g	820	0.140	5.00	0.400	N/A	N/A	2	8520730
2,3,7,8-Tetra CDF **	pg/g	498	0.0995	1.00	0.181	0.100	49.8	1	8520730
1,2,3,7,8-Penta CDF **	pg/g	11.0	0.155	5.00	0.242	0.0300	0.330	1	8520730
2,3,4,7,8-Penta CDF **	pg/g	8.20	0.142	5.00	0.211	0.300	2.46	1	8520730
1,2,3,4,7,8-Hexa CDF **	pg/g	6.77	0.157	5.00	0.228	0.100	0.677	1	8520730
1,2,3,6,7,8-Hexa CDF **	pg/g	2.64 J	0.141	5.00	0.203	0.100	0.264	1	8520730
2,3,4,6,7,8-Hexa CDF **	pg/g	2.96 J	0.148	5.00	0.177	0.100	0.296	1	8520730
1,2,3,7,8,9-Hexa CDF **	pg/g	0.453 U (1)	0.453	5.00	0.185	0.100	0.0453	0	8520730
1,2,3,4,6,7,8-Hepta CDF **	pg/g	50.9	0.110	5.00	0.185	0.0100	0.509	1	8520730
1,2,3,4,7,8,9-Hepta CDF **	pg/g	3.56 J	0.115	5.00	0.194	0.0100	0.0356	1	8520730
Octa CDF **	pg/g	108	0.144	10.0	0.919	0.000300	0.0324	1	8520730
Total Tetra CDF **	pg/g	1110	0.0995	1.00	0.400	N/A	N/A	16	8520730
Total Penta CDF **	pg/g	130	0.148	5.00	0.400	N/A	N/A	13	8520730
Total Hexa CDF **	pg/g	67.4	0.153	5.00	0.400	N/A	N/A	9	8520730
Total Hepta CDF **	pg/g	137	0.112	5.00	0.400	N/A	N/A	3	8520730
Confirmation 2,3,7,8-Tetra CDF **	pg/g	440 (2)	0.52	5.0	0.090	0.100	44.0	N/A	8531857
TOTAL TOXIC EQUIVALENCY	pg/g	N/A	N/A	N/A	N/A	N/A	262	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.
(2) results reported from 5x dilution

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DIOXINS AND FURANS BY HRMS (SOIL)

Bureau Veritas ID		VBZ186							
Sampling Date		2023/01/30 16:00							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B1-B5- COMP-SL-PRO	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-1234678 HeptaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-1234678 HeptaCDF **	%	79	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-123478 HexaCDD *	%	81	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-123478 HexaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-1234789 HeptaCDF **	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-123678 HexaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-123678 HexaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-12378 PentaCDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-12378 PentaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-123789 HexaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-234678 HexaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-23478 PentaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-2378 TetraCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-2378 TetraCDF **	%	97	N/A	N/A	N/A	N/A	N/A	N/A	8520730
C13-OCDD *	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8520730
Confirmation C13-2378 TetraCDF **	%	46	N/A	N/A	N/A	N/A	N/A	N/A	8531857

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
N/A = Not Applicable
** CDF = Chloro Dibenzo-p-Furan

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SEMI-VOLATILE ORGANICS BY HRMS (SOIL)

Bureau Veritas ID		VBZ186							
Sampling Date		2023/01/30 16:00							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B1-B5-COMP-SL-PRO	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
4,4'-DiCB-(15)	ng/g	5.16	0.0069	0.0050	0.0039	N/A	N/A	1	8576352
22'3-TriCB-(16)	ng/g	0.020 U	0.020	0.0050	0.013	N/A	N/A	1	8576352
22'4-TriCB-(17)	ng/g	0.031 U	0.031	0.0020	0.0040	N/A	N/A	1	8576352
TriCB-(18)+(30)	ng/g	1.10	0.027	0.0050	0.0052	N/A	N/A	1	8576352
22'6-TriCB-(19)	ng/g	0.034 U	0.034	0.0020	0.0052	N/A	N/A	1	8576352
TriCB-(20) + (28)	ng/g	3.24	0.015	0.050	0.0090	N/A	N/A	1	8576352
TriCB-(21)+(33)	ng/g	0.693	0.0082	0.0050	0.011	N/A	N/A	1	8576352
234'-TriCB-(22)	ng/g	1.00	0.016	0.0020	0.0049	N/A	N/A	1	8576352
235-TriCB-(23)	ng/g	0.0082 U	0.0082	0.0020	0.0046	N/A	N/A	1	8576352
236-TriCB-(24)	ng/g	0.012 U	0.012	0.0020	0.0090	N/A	N/A	1	8576352
23'4-TriCB-(25)	ng/g	0.0083 U	0.0083	0.0020	0.0064	N/A	N/A	1	8576352
TriCB-(26)+(29)	ng/g	0.480	0.015	0.0050	0.0087	N/A	N/A	1	8576352
23'6-TriCB-(27)	ng/g	0.012 U	0.012	0.0020	0.0065	N/A	N/A	1	8576352
24'5-TriCB-(31)	ng/g	2.73	0.015	0.0050	0.0038	N/A	N/A	1	8576352
24'6-TriCB-(32)	ng/g	0.022 U	0.022	0.0020	0.0024	N/A	N/A	1	8576352
23'5'-TriCB-(34)	ng/g	0.0079 U	0.0079	0.0020	0.0060	N/A	N/A	1	8576352
33'4-TriCB-(35)	ng/g	0.562	0.016	0.0020	0.0042	N/A	N/A	1	8576352
33'5-TriCB-(36)	ng/g	0.0075 U	0.0075	0.0020	0.0029	N/A	N/A	1	8576352
344'-TriCB-(37)	ng/g	0.374	0.0078	0.0020	0.0029	N/A	N/A	1	8576352
345-TriCB-(38)	ng/g	0.0080 U	0.0080	0.0020	0.0038	N/A	N/A	1	8576352
34'5-TriCB-(39)	ng/g	0.0082 U	0.0082	0.0020	0.0052	N/A	N/A	1	8576352
TetraCB-(40)+(41)+(71)	ng/g	0.021 U	0.021	0.010	0.016	N/A	N/A	1	8576352
22'34'-TetraCB-(42)	ng/g	0.056 U	0.056	0.0050	0.014	N/A	N/A	1	8576352
22'35-TetraCB-(43)	ng/g	0.028 U	0.028	0.0050	0.019	N/A	N/A	1	8576352
TetraCB-(44)+(47)+(65)	ng/g	7.84	0.040	0.010	0.041	N/A	N/A	1	8576352
TetraCB-(45)+(51)	ng/g	0.022 U	0.022	0.0050	0.018	N/A	N/A	1	8576352
22'36'-TetraCB-(46)	ng/g	0.024 U	0.024	0.0020	0.0090	N/A	N/A	1	8576352
22'45-TetraCB-(48)	ng/g	0.042 U	0.042	0.0050	0.0042	N/A	N/A	1	8576352
TetraCB-(49)+TetraCB-(69)	ng/g	6.53	0.037	0.010	0.010	N/A	N/A	1	8576352
TetraCB-(50)+(53)	ng/g	0.043 U	0.043	0.010	0.013	N/A	N/A	1	8576352
22'55'-TetraCB-(52)	ng/g	19.2	0.042	0.0050	0.016	N/A	N/A	1	8576352

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TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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SEMI-VOLATILE ORGANICS BY HRMS (SOIL)

Bureau Veritas ID		VBZ186							
Sampling Date		2023/01/30 16:00							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B1-B5-COMP-SL-PRO	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'66'-TetraCB-(54)	ng/g	0.044 U	0.044	0.0050	0.0096	N/A	N/A	1	8576352
233'4-TetraCB-(55)	ng/g	0.014 U	0.014	0.0050	0.011	N/A	N/A	1	8576352
233'4'-Tetra CB(56)	ng/g	1.11	0.014	0.0050	0.0051	N/A	N/A	1	8576352
233'5-TetraCB-(57)	ng/g	0.014 U	0.014	0.0050	0.0056	N/A	N/A	1	8576352
233'5'-TetraCB-(58)	ng/g	0.014 U	0.014	0.0050	0.011	N/A	N/A	1	8576352
TetraCB-(59)+(62)+(75)	ng/g	0.015 U	0.015	0.010	0.014	N/A	N/A	1	8576352
2344'-TetraCB -(60)	ng/g	0.014 U	0.014	0.0050	0.0053	N/A	N/A	1	8576352
TetraCB-(61)+(70)+(74)+(76)	ng/g	17.9	0.028	0.020	0.022	N/A	N/A	1	8576352
234'5-TetraCB-(63)	ng/g	0.013 U	0.013	0.0050	0.0071	N/A	N/A	1	8576352
234'6-TetraCB-(64)	ng/g	3.11	0.036	0.0050	0.0047	N/A	N/A	1	8576352
23'44'-TetraCB-(66)	ng/g	6.60	0.027	0.0050	0.099	N/A	N/A	1	8576352
23'45-TetraCB-(67)	ng/g	0.012 U	0.012	0.0050	0.011	N/A	N/A	1	8576352
23'45'-TetraCB-(68)	ng/g	0.013 U	0.013	0.0050	0.0088	N/A	N/A	1	8576352
23'55'-TetraCB-(72)	ng/g	0.013 U	0.013	0.0050	0.0086	N/A	N/A	1	8576352
23'5'6-TetraCB-(73)	ng/g	0.014 U	0.014	0.0050	0.019	N/A	N/A	1	8576352
33'44'-TetraCB-(77)	ng/g	0.015 U	0.015	0.0050	0.0063	0.000100	0.00000150	1	8576352
33'45-TetraCB-(78)	ng/g	0.015 U	0.015	0.0050	0.0065	N/A	N/A	1	8576352
33'45'-TetraCB(79)	ng/g	0.012 U	0.012	0.0050	0.0058	N/A	N/A	1	8576352
33'55'-TetraCB-(80)	ng/g	0.011 U	0.011	0.0050	0.0061	N/A	N/A	1	8576352
344'5-TetraCB-(81)	ng/g	0.013 U	0.013	0.0050	0.0058	0.000300	0.00000390	1	8576352
22'33'4-PentaCB-(82)	ng/g	0.027 U	0.027	0.0050	0.0048	N/A	N/A	1	8576352
PentaCB-(83)+(99)	ng/g	15.8	0.048	0.010	0.016	N/A	N/A	1	8576352
22'33'6-PentaCB-(84)	ng/g	5.86	0.050	0.0020	0.0077	N/A	N/A	1	8576352
PentaCB-(85)+(116)+(117)	ng/g	4.02	0.037	0.010	0.027	N/A	N/A	1	8576352
PentaCB-(86)(87)(97)(109)(119)(125)	ng/g	20.3	0.040	0.020	0.029	N/A	N/A	1	8576352
PentaCB-(88)+(91)	ng/g	1.84	0.025	0.0050	0.013	N/A	N/A	1	8576352
22'346'-PentaCB-(89)	ng/g	0.030 U	0.030	0.0050	0.0080	N/A	N/A	1	8576352
PentaCB-(90)+(101)+(113)	ng/g	32.8	0.041	0.020	0.011	N/A	N/A	1	8576352
22'355'-PentaCB-(92)	ng/g	3.27	0.027	0.0050	0.0044	N/A	N/A	1	8576352
PentaCB-(93)+(98)+(100)+(102)	ng/g	0.024 U	0.024	0.020	0.024	N/A	N/A	1	8576352

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SEMI-VOLATILE ORGANICS BY HRMS (SOIL)

Bureau Veritas ID		VBZ186							
Sampling Date		2023/01/30 16:00							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B1-B5-COMP-SL-PRO	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'356'-PentaCB-(94)	ng/g	0.027 U	0.027	0.0050	0.0063	N/A	N/A	1	8576352
22'35'6-PentaCB-(95)	ng/g	23.2	0.055	0.0050	0.0088	N/A	N/A	1	8576352
22'366'-PentaCB-(96)	ng/g	0.024 U	0.024	0.0050	0.010	N/A	N/A	1	8576352
22'45'6-PentaCB-(103)	ng/g	0.025 U	0.025	0.0050	0.0061	N/A	N/A	1	8576352
22'466'-PentaCB-(104)	ng/g	0.023 U	0.023	0.0050	0.0056	N/A	N/A	1	8576352
233'44'-PentaCB-(105)	ng/g	6.49	0.013	0.0050	0.0044	0.0000300	0.000195	1	8576352
233'45-PentaCB-(106)	ng/g	0.011 U	0.011	0.0050	0.0036	N/A	N/A	1	8576352
233'4'5-PentaCB-(107)	ng/g	2.29	0.017	0.0050	0.017	N/A	N/A	1	8576352
PentaCB-(108)+(124)	ng/g	1.28	0.021	0.010	0.011	N/A	N/A	1	8576352
PentaCB-(110)+(115)	ng/g	37.2	0.037	0.010	0.012	N/A	N/A	1	8576352
233'55'-PentaCB-(111)	ng/g	0.016 U	0.016	0.0050	0.0056	N/A	N/A	1	8576352
233'56-PentaCB-(112)	ng/g	0.016 U	0.016	0.0050	0.0078	N/A	N/A	1	8576352
2344'5-PentaCB-(114)	ng/g	0.011 U	0.011	0.0050	0.0042	0.0000300	0.000000330	1	8576352
23'44'5-PentaCB-(118)	ng/g	17.8	0.010	0.010	0.0066	0.0000300	0.000534	1	8576352
23'455'-PentaCB-(120)	ng/g	0.017 U	0.017	0.0050	0.0064	N/A	N/A	1	8576352
23'45'6-PentaCB-(121)	ng/g	0.017 U	0.017	0.0050	0.0063	N/A	N/A	1	8576352
233'4'5'-PentaCB-(122)	ng/g	0.013 U	0.013	0.0050	0.0066	N/A	N/A	1	8576352
23'44'5'-PentaCB-(123)	ng/g	0.011 U	0.011	0.0050	0.014	0.0000300	0.000000330	1	8576352
33'44'5-PentaCB-(126)	ng/g	0.013 U	0.013	0.0050	0.0030	0.100	0.00130	1	8576352
33'455'-PentaCB-(127)	ng/g	0.010 U	0.010	0.0050	0.0032	N/A	N/A	1	8576352
HexaCB-(128)+(166)	ng/g	3.64	0.028	0.010	0.021	N/A	N/A	1	8576352
HexaCB-(129)+(138)+(163)	ng/g	25.3	0.033	0.020	0.037	N/A	N/A	1	8576352
22'33'45'-HexaCB-(130)	ng/g	1.52	0.036	0.0050	0.0051	N/A	N/A	1	8576352
22'33'46-HexaCB-(131)	ng/g	0.022 U	0.022	0.0050	0.0099	N/A	N/A	1	8576352
22'33'46'-HexaCB-(132)	ng/g	7.64	0.037	0.0050	0.0087	N/A	N/A	1	8576352
22'33'55'-HexaCB-(133)	ng/g	0.019 U	0.019	0.0050	0.010	N/A	N/A	1	8576352
HexaCB-(134)+(143)	ng/g	1.36	0.040	0.010	0.017	N/A	N/A	1	8576352
HexaCB-(135)+(151)	ng/g	6.22	0.068	0.020	0.014	N/A	N/A	1	8576352
22'33'66'-HexaCB-(136)	ng/g	2.76	0.052	0.0050	0.0083	N/A	N/A	1	8576352
22'344'5-HexaCB-(137)	ng/g	0.016 U	0.016	0.010	0.030	N/A	N/A	1	8576352

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SEMI-VOLATILE ORGANICS BY HRMS (SOIL)

Bureau Veritas ID		VBZ186							
Sampling Date		2023/01/30 16:00							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B1-B5-COMP-SL-PRO	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
HexaCB-(139)+(140)	ng/g	0.015 U	0.015	0.010	0.016	N/A	N/A	1	8576352
22'3455'-HexaCB-(141)	ng/g	3.20	0.030	0.0050	0.012	N/A	N/A	1	8576352
22'3456-HexaCB-(142)	ng/g	0.020 U	0.020	0.0050	0.0088	N/A	N/A	1	8576352
22'345'6-HexaCB-(144)	ng/g	0.036 U	0.036	0.0050	0.0072	N/A	N/A	1	8576352
22'3466'-HexaCB-(145)	ng/g	0.025 U	0.025	0.0050	0.0082	N/A	N/A	1	8576352
22'34'55'-HexaCB-(146)	ng/g	2.46	0.029	0.0050	0.010	N/A	N/A	1	8576352
HexaCB-(147)+(149)	ng/g	11.9	0.027	0.010	0.019	N/A	N/A	1	8576352
22'34'56'-HexaCB-(148)	ng/g	0.034 U	0.034	0.0050	0.0084	N/A	N/A	1	8576352
22'34'66'-HexaCB-(150)	ng/g	0.024 U	0.024	0.0050	0.0061	N/A	N/A	1	8576352
22'3566'-HexaCB-(152)	ng/g	0.027 U	0.027	0.0050	0.013	N/A	N/A	1	8576352
HexaCB-(153)+(168)	ng/g	15.4	0.025	0.010	0.013	N/A	N/A	1	8576352
22'44'56'-HexaCB-(154)	ng/g	0.027 U	0.027	0.0050	0.012	N/A	N/A	1	8576352
22'44'66'-HexaCB-(155)	ng/g	0.024 U	0.024	0.0050	0.0087	N/A	N/A	1	8576352
HexaCB-(156)+(157)	ng/g	3.36	0.011	0.010	0.0086	0.0000300	0.000101	1	8576352
233'44'6-HexaCB-(158)	ng/g	2.47	0.021	0.0050	0.0072	N/A	N/A	1	8576352
233'455'-HexaCB-(159)	ng/g	0.0085 U	0.0085	0.0050	0.0082	N/A	N/A	1	8576352
233'456-HexaCB-(160)	ng/g	0.013 U	0.013	0.0050	0.017	N/A	N/A	1	8576352
233'45'6-HexaCB-(161)	ng/g	0.012 U	0.012	0.0050	0.011	N/A	N/A	1	8576352
233'4'55'-HexaCB-(162)	ng/g	0.0083 U	0.0083	0.0050	0.0083	N/A	N/A	1	8576352
233'4'5'6-HexaCB-(164)	ng/g	0.012 U	0.012	0.0050	0.017	N/A	N/A	1	8576352
233'55'6-HexaCB-(165)	ng/g	0.013 U	0.013	0.0050	0.010	N/A	N/A	1	8576352
23'44'55'-HexaCB-(167)	ng/g	1.06	0.012	0.0050	0.0056	0.0000300	0.0000318	1	8576352
33'44'55'-HexaCB-(169)	ng/g	0.010 U	0.010	0.0050	0.024	0.0300	0.000300	1	8576352
22'33'44'5-HeptaCB-(170)	ng/g	2.23	0.024	0.0050	0.0042	N/A	N/A	1	8576352
HeptaCB-(171)+(173)	ng/g	0.041 U	0.041	0.010	0.011	N/A	N/A	1	8576352
22'33'455'-HeptaCB-(172)	ng/g	0.020 U	0.020	0.0050	0.0080	N/A	N/A	1	8576352
22'33'456'-HeptaCB-(174)	ng/g	3.00	0.037	0.0050	0.014	N/A	N/A	1	8576352
22'33'45'6-HeptaCB-(175)	ng/g	0.031 U	0.031	0.0050	0.0092	N/A	N/A	1	8576352
22'33'466'-HeptaCB-(176)	ng/g	0.024 U	0.024	0.0050	0.0098	N/A	N/A	1	8576352
22'33'45'6'-HeptaCB-(177)	ng/g	1.57	0.041	0.0050	0.0078	N/A	N/A	1	8576352

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SEMI-VOLATILE ORGANICS BY HRMS (SOIL)

Bureau Veritas ID		VBZ186							
Sampling Date		2023/01/30 16:00							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B1-B5-COMP-SL-PRO	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'55'6-HeptaCB-(178)	ng/g	0.034 U	0.034	0.0050	0.010	N/A	N/A	1	8576352
22'33'566'-HeptaCB-(179)	ng/g	0.047 U	0.047	0.0050	0.0086	N/A	N/A	1	8576352
HeptaCB-(180)+(193)	ng/g	8.67	0.032	0.010	0.0085	N/A	N/A	1	8576352
22'344'56-HeptaCB-(181)	ng/g	0.019 U	0.019	0.0050	0.0080	N/A	N/A	1	8576352
22'344'56'-HeptaCB-(182)	ng/g	0.029 U	0.029	0.0050	0.0092	N/A	N/A	1	8576352
22'344'5'6-HeptaCB-(183)	ng/g	1.84	0.034	0.0050	0.028	N/A	N/A	1	8576352
22'344'66'-HeptaCB-(184)	ng/g	0.022 U	0.022	0.0050	0.010	N/A	N/A	1	8576352
22'3455'6-HeptaCB-(185)	ng/g	0.020 U	0.020	0.0050	0.022	N/A	N/A	1	8576352
22'34566'-HeptaCB-(186)	ng/g	0.024 U	0.024	0.0050	0.0086	N/A	N/A	1	8576352
22'34'55'6-HeptaCB-(187)	ng/g	3.19	0.059	0.0050	0.011	N/A	N/A	1	8576352
22'34'566'-HeptaCB-(188)	ng/g	0.029 U	0.029	0.0050	0.0047	N/A	N/A	1	8576352
233'44'55'-HeptaCB-(189)	ng/g	0.013 U	0.013	0.0050	0.0041	0.0000300	0.000000390	1	8576352
233'44'56-HeptaCB-(190)	ng/g	0.029 U	0.029	0.0050	0.0041	N/A	N/A	1	8576352
233'44'5'6-HeptaCB-(191)	ng/g	0.014 U	0.014	0.0050	0.0045	N/A	N/A	1	8576352
233'455'6-HeptaCB-(192)	ng/g	0.016 U	0.016	0.0050	0.0090	N/A	N/A	1	8576352
22'33'44'55'-OctaCB-(194)	ng/g	0.026 U	0.026	0.0050	0.0095	N/A	N/A	1	8576352
22'33'44'56-OctaCB-(195)	ng/g	0.027 U	0.027	0.0050	0.0094	N/A	N/A	1	8576352
22'33'44'56'-OctaCB-(196)	ng/g	0.067 U	0.067	0.0050	0.016	N/A	N/A	1	8576352
22'33'44'66'OctaCB-(197)	ng/g	0.024 U	0.024	0.0050	0.044	N/A	N/A	1	8576352
OctaCB-(198)+(199)	ng/g	0.036 U	0.036	0.010	0.014	N/A	N/A	1	8576352
22'33'4566'-OctaCB-(200)	ng/g	0.054 U	0.054	0.0050	0.032	N/A	N/A	1	8576352
22'33'45'66'-OctaCB-(201)	ng/g	0.023 U	0.023	0.0050	0.017	N/A	N/A	1	8576352
22'33'55'66'-OctaCB-(202)	ng/g	0.027 U	0.027	0.0050	0.0081	N/A	N/A	1	8576352
22'344'55'6-OctaCB-(203)	ng/g	0.067 U	0.067	0.0050	0.011	N/A	N/A	1	8576352
22'344'566'-OctaCB-(204)	ng/g	0.024 U	0.024	0.0050	0.021	N/A	N/A	1	8576352
233'44'55'6-OctaCB-(205)	ng/g	0.019 U	0.019	0.0050	0.0096	N/A	N/A	1	8576352
22'33'44'55'6-NonaCB-(206)	ng/g	0.019 U	0.019	0.0050	0.0077	N/A	N/A	1	8576352
22'33'44'566'-NonaCB-(207)	ng/g	0.016 U	0.016	0.0050	0.0081	N/A	N/A	1	8576352
22'33'455'66'-NonaCB-(208)	ng/g	0.019 U	0.019	0.0050	0.0073	N/A	N/A	1	8576352
DecaCB-(209)	ng/g	0.019 U	0.019	0.0050	0.012	N/A	N/A	1	8576352

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SEMI-VOLATILE ORGANICS BY HRMS (SOIL)

Bureau Veritas ID		VBZ186							
Sampling Date		2023/01/30 16:00							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B1-B5-COMP-SL-PRO	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Total PCB	ng/g	0 (1)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
TOTAL TOXIC EQUIVALENCY	ng/g	N/A	N/A	N/A	N/A	N/A	0.00247	N/A	N/A
Surrogate Recovery (%)									
C13-2,44'-TriCB-(28)	%	22	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'33'44'55'6-NonaCB-(206)	%	30 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'33'44'5-HeptaCB-(170)	%	31 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'33'455'66'-NonaCB-(208)	%	26 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'33'55'66'-OctaCB-(202)	%	28 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'33'55'6-HeptaCB-(178)	%	12 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'344'55'-HeptaCB-(180)	%	25 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'34'566'-HeptaCB-(188)	%	26 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'44'66'-HexaCB-(155)	%	26 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'466'-PentaCB-(104)	%	22 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'66'-TetraCB-(54)	%	15	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'6-TriCB-(19)	%	22	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-22'-DiCB-(4)	%	5.0 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-233'44'55'6-OctaCB-(205)	%	31 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-233'44'55'-HeptaCB-(189)	%	39 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-233'44'-PentaCB-(105)	%	35 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-233'55'-PentaCB-(111)	%	11 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-23'44'55'-HexaCB-(167)	%	38 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-2344'5-PentaCB-(114)	%	38 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-23'44'5-PentaCB-(118)	%	39 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-2'344'5-PentaCB-(123)	%	34 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-2-MonoCB-(1)	%	5.0 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-33'44'55'-HexaCB-(169)	%	42	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-33'44'5-PentaCB-(126)	%	31 (2)	N/A	N/A	N/A	N/A	N/A	N/A	8576352

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(1) Due to Mono, Di and Tetra Channels failing to report Totals, Total PCBs cannot be calculated. Sum of Tri, Penta - Deca Totals is approximately 291.1364.

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Bureau Veritas ID		VBZ186							
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COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MFA-B1-B5-COMP-SL-PRO	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-33'44'-TetraCB-(77)	%	36 (1)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-344'5-TetraCB-(81)	%	37 (1)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-344'-TriCB-(37)	%	49	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-44'-DiCB-(15)	%	36	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-4-MonoCB-(3)	%	19	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-DecaCB-(209)	%	28 (1)	N/A	N/A	N/A	N/A	N/A	N/A	8576352
C13-HexaCB-(156)+(157)	%	40	N/A	N/A	N/A	N/A	N/A	N/A	8576352

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TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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TEST SUMMARY

Bureau Veritas ID: VBZ186
Sample ID: MFA-B1-B5- COMP-SL-PRO
Matrix: Soil

Collected: 2023/01/30
Shipped:
Received: 2023/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Soil (1613B)	HRMS/MS	8520730	2023/02/22	2023/02/24	Yan Qin
2378TCDF Confirmation (M8290A/M1613)	HRMS/MS	8531857	2023/02/22	2023/03/02	Angel Guerrero
PCB Congeners in Soil (1668C)	HRMS/MS	8576352	2023/03/28	2023/04/07	Cathy Xu

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.4°C

Revised Report (2023/6/6): Corrected sample ID to MFA-B1-B5-COMP-SL-PRO and added temperature blank records in general comments. Updated results for PCB 77.

Temperature Blank Record: 4.2C, 4.8C. 4.2C.

Sample VBZ186 [MFA-B1-B5- COMP-SL-PRO] : Recoveries are low due to matrix inferences in the sample. No results available for PCB 1 to PCB 10. Results should be reviewed with caution.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
8520730	YQI	Matrix Spike	37CL4 2378 Tetra CDD	2023/02/27		103	%	35 - 197
			C13-1234678 HeptaCDD	2023/02/27		128	%	23 - 140
			C13-1234678 HeptaCDF	2023/02/27		113	%	28 - 143
			C13-123478 HexaCDD	2023/02/27		139	%	32 - 141
			C13-123478 HexaCDF	2023/02/27		144	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/27		121	%	26 - 138
			C13-123678 HexaCDD	2023/02/27		137 (1)	%	28 - 130
			C13-123678 HexaCDF	2023/02/27		125 (1)	%	26 - 123
			C13-12378 PentaCDD	2023/02/27		96	%	25 - 181
			C13-12378 PentaCDF	2023/02/27		90	%	24 - 185
			C13-123789 HexaCDF	2023/02/27		136	%	29 - 147
			C13-234678 HexaCDF	2023/02/27		121	%	28 - 136
			C13-23478 PentaCDF	2023/02/27		91	%	21 - 178
			C13-2378 TetraCDD	2023/02/27		100	%	25 - 164
			C13-2378 TetraCDF	2023/02/27		103	%	24 - 169
			C13-OCDD	2023/02/27		109	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/27		108	%	67 - 158
			1,2,3,7,8-Penta CDD	2023/02/27		98	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2023/02/27		106 (2)	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2023/02/27		96 (2)	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2023/02/27		69 (2)	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2023/02/27		101 (2)	%	70 - 140
			Octa CDD	2023/02/27		105 (2)	%	78 - 144
			2,3,7,8-Tetra CDF	2023/02/27		107	%	75 - 158
			1,2,3,7,8-Penta CDF	2023/02/27		100	%	80 - 134
			2,3,4,7,8-Penta CDF	2023/02/27		96	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2023/02/27		93 (2)	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2023/02/27		98 (2)	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2023/02/27		94 (2)	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2023/02/27		101 (2)	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2023/02/27		104 (2)	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2023/02/27		98 (2)	%	78 - 138
			Octa CDF	2023/02/27		103 (2)	%	63 - 170
8520730	YQI	Spiked Blank	37CL4 2378 Tetra CDD	2023/02/24		93	%	35 - 197
			C13-1234678 HeptaCDD	2023/02/24		86	%	23 - 140
			C13-1234678 HeptaCDF	2023/02/24		77	%	28 - 143
			C13-123478 HexaCDD	2023/02/24		83	%	32 - 141
			C13-123478 HexaCDF	2023/02/24		77	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/24		86	%	26 - 138
			C13-123678 HexaCDD	2023/02/24		92	%	28 - 130
			C13-123678 HexaCDF	2023/02/24		89	%	26 - 123
			C13-12378 PentaCDD	2023/02/24		97	%	25 - 181
			C13-12378 PentaCDF	2023/02/24		86	%	24 - 185
			C13-123789 HexaCDF	2023/02/24		84	%	29 - 147
			C13-234678 HexaCDF	2023/02/24		90	%	28 - 136
			C13-23478 PentaCDF	2023/02/24		92	%	21 - 178
			C13-2378 TetraCDD	2023/02/24		86	%	25 - 164
			C13-2378 TetraCDF	2023/02/24		91	%	24 - 169
			C13-OCDD	2023/02/24		87	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/24		105	%	67 - 158
			1,2,3,7,8-Penta CDD	2023/02/24		95	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2023/02/24		100	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2023/02/24		99	%	76 - 134

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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	2023/02/24		99	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2023/02/24		102	%	70 - 140
			Octa CDD	2023/02/24		100	%	78 - 144
			2,3,7,8-Tetra CDF	2023/02/24		101	%	75 - 158
			1,2,3,7,8-Penta CDF	2023/02/24		97	%	80 - 134
			2,3,4,7,8-Penta CDF	2023/02/24		92	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2023/02/24		103	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2023/02/24		102	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2023/02/24		95	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2023/02/24		101	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2023/02/24		110	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2023/02/24		103	%	78 - 138
			Octa CDF	2023/02/24		91	%	63 - 170
8520730	YQI	Method Blank	37CL4 2378 Tetra CDD	2023/02/24		101	%	35 - 197
			C13-1234678 HeptaCDD	2023/02/24		104	%	23 - 140
			C13-1234678 HeptaCDF	2023/02/24		92	%	28 - 143
			C13-123478 HexaCDD	2023/02/24		88	%	32 - 141
			C13-123478 HexaCDF	2023/02/24		84	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/24		109	%	26 - 138
			C13-123678 HexaCDD	2023/02/24		109	%	28 - 130
			C13-123678 HexaCDF	2023/02/24		91	%	26 - 123
			C13-12378 PentaCDD	2023/02/24		117	%	25 - 181
			C13-12378 PentaCDF	2023/02/24		98	%	24 - 185
			C13-123789 HexaCDF	2023/02/24		99	%	29 - 147
			C13-234678 HexaCDF	2023/02/24		98	%	28 - 136
			C13-23478 PentaCDF	2023/02/24		110	%	21 - 178
			C13-2378 TetraCDD	2023/02/24		99	%	25 - 164
			C13-2378 TetraCDF	2023/02/24		102	%	24 - 169
			C13-OCDD	2023/02/24		123	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/24	0.0992 U, EDL=0.0992		pg/g	
			1,2,3,7,8-Penta CDD	2023/02/24	0.178 U, EDL=0.178		pg/g	
			1,2,3,4,7,8-Hexa CDD	2023/02/24	0.119 U, EDL=0.119		pg/g	
			1,2,3,6,7,8-Hexa CDD	2023/02/24	0.0960 U, EDL=0.0960		pg/g	
			1,2,3,7,8,9-Hexa CDD	2023/02/24	0.110 U, EDL=0.110		pg/g	
			1,2,3,4,6,7,8-Hepta CDD	2023/02/24	0.201 U, EDL=0.201 (3)		pg/g	
			Octa CDD	2023/02/24	0.514 J, EDL=0.131		pg/g	
			Total Tetra CDD	2023/02/24	0.0992 U, EDL=0.0992		pg/g	
			Total Penta CDD	2023/02/24	0.178 U, EDL=0.178		pg/g	
			Total Hexa CDD	2023/02/24	0.112 U, EDL=0.112		pg/g	
			Total Hepta CDD	2023/02/24	0.145 U, EDL=0.145		pg/g	
			2,3,7,8-Tetra CDF	2023/02/24	0.105 U, EDL=0.105		pg/g	

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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-Penta CDF	2023/02/24	0.141 U, EDL=0.141		pg/g	
			2,3,4,7,8-Penta CDF	2023/02/24	0.0820 U, EDL=0.0820		pg/g	
			1,2,3,4,7,8-Hexa CDF	2023/02/24	0.110 U, EDL=0.110		pg/g	
			1,2,3,6,7,8-Hexa CDF	2023/02/24	0.125 U, EDL=0.125		pg/g	
			2,3,4,6,7,8-Hexa CDF	2023/02/24	0.119 U, EDL=0.119		pg/g	
			1,2,3,7,8,9-Hexa CDF	2023/02/24	0.165 U, EDL=0.165		pg/g	
			1,2,3,4,6,7,8-Hepta CDF	2023/02/24	0.187 U, EDL=0.187		pg/g	
			1,2,3,4,7,8,9-Hepta CDF	2023/02/24	0.0900 U, EDL=0.0900		pg/g	
			Octa CDF	2023/02/24	0.268 J, EDL=0.125		pg/g	
			Total Tetra CDF	2023/02/24	0.105 U, EDL=0.105		pg/g	
			Total Penta CDF	2023/02/24	0.128 U, EDL=0.128		pg/g	
			Total Hexa CDF	2023/02/24	0.148 U, EDL=0.148		pg/g	
			Total Hepta CDF	2023/02/24	0.195 U, EDL=0.195		pg/g	
8520730	YQI	RPD - Sample/Sample Dup	2,3,7,8-Tetra CDD	2023/02/24	NC		%	25
			1,2,3,7,8-Penta CDD	2023/02/24	NC		%	25
			1,2,3,4,7,8-Hexa CDD	2023/02/24	NC		%	25
			1,2,3,6,7,8-Hexa CDD	2023/02/24	NC		%	25
			1,2,3,7,8,9-Hexa CDD	2023/02/24	NC		%	25
			1,2,3,4,6,7,8-Hepta CDD	2023/02/24	NC		%	25
			Octa CDD	2023/02/24	NC		%	25
			Total Tetra CDD	2023/02/24	NC		%	25
			Total Penta CDD	2023/02/24	NC		%	25
			Total Hexa CDD	2023/02/24	NC		%	25
			Total Hepta CDD	2023/02/24	NC		%	25
			2,3,7,8-Tetra CDF	2023/02/24	NC		%	25
			1,2,3,7,8-Penta CDF	2023/02/24	NC		%	25
			2,3,4,7,8-Penta CDF	2023/02/24	NC		%	25
			1,2,3,4,7,8-Hexa CDF	2023/02/24	NC		%	25
			1,2,3,6,7,8-Hexa CDF	2023/02/24	NC		%	25
			2,3,4,6,7,8-Hexa CDF	2023/02/24	NC		%	25
			1,2,3,7,8,9-Hexa CDF	2023/02/24	NC		%	25
			1,2,3,4,6,7,8-Hepta CDF	2023/02/24	NC		%	25
			1,2,3,4,7,8,9-Hepta CDF	2023/02/24	NC		%	25
			Octa CDF	2023/02/24	NC (3)		%	25
			Total Tetra CDF	2023/02/24	NC		%	25
			Total Penta CDF	2023/02/24	NC		%	25
			Total Hexa CDF	2023/02/24	NC		%	25
			Total Hepta CDF	2023/02/24	NC		%	25
8531857	AGU	Method Blank	Confirmation 2,3,7,8-Tetra CDF	2023/03/02	0.16 U, EDL=0.16		pg/g	
			Confirmation C13-2378 TetraCDF	2023/03/02		45	%	40 - 135

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
8576352	CXU	Spiked Blank	C13-2,44'-TriCB-(28)	2023/04/04		63	%	15 - 145
			C13-22'33'44'55'6-NonaCB-(206)	2023/04/04		99	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/04/04		97	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/04/04		91	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/04/04		83	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2023/04/04		73	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/04/04		92	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/04/04		62	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/04/04		49	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/04/04		53	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/04/04		38	%	15 - 145
			C13-22'6-TriCB-(19)	2023/04/04		45	%	15 - 145
			C13-22'-DiCB-(4)	2023/04/04		36	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/04/04		99	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/04/04		100	%	40 - 145
			C13-233'44'-PentaCB-(105)	2023/04/04		101	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/04/04		81	%	40 - 145
			C13-23'44'55'-HexaCB-(167)	2023/04/04		87	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/04/04		94	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/04/04		97	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/04/04		94	%	40 - 145
			C13-2-MonoCB-(1)	2023/04/04		38	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/04/04		98	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/04/04		110	%	40 - 145
			C13-33'44'-TetraCB-(77)	2023/04/04		91	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/04/04		86	%	40 - 145
			C13-344'-TriCB-(37)	2023/04/04		68	%	15 - 145
			C13-44'-DiCB-(15)	2023/04/04		57	%	15 - 145
			C13-4-MonoCB-(3)	2023/04/04		42	%	15 - 145
			C13-DecaCB-(209)	2023/04/04		85	%	40 - 145
			C13-HexaCB-(156)+(157)	2023/04/04		93	%	40 - 145
			4,4'-DiCB-(15)	2023/04/04		124	%	60 - 145
			22'3-TriCB-(16)	2023/04/04		83	%	N/A
			22'4-TriCB-(17)	2023/04/04		94	%	N/A
			TriCB-(18)+(30)	2023/04/04		91	%	N/A
			22'6-TriCB-(19)	2023/04/04		114	%	60 - 145
			TriCB-(20) + (28)	2023/04/04		103	%	N/A
			TriCB-(21)+(33)	2023/04/04		112	%	N/A
			234'-TriCB-(22)	2023/04/04		110	%	N/A
			235-TriCB-(23)	2023/04/04		104	%	N/A
			236-TriCB-(24)	2023/04/04		102	%	N/A
			23'4-TriCB-(25)	2023/04/04		117	%	N/A
			TriCB-(26)+(29)	2023/04/04		100	%	N/A
			23'6-TriCB-(27)	2023/04/04		94	%	N/A
			24'5-TriCB-(31)	2023/04/04		103	%	N/A
			24'6-TriCB-(32)	2023/04/04		97	%	N/A
			23'5'-TriCB-(34)	2023/04/04		100	%	N/A
			33'4-TriCB-(35)	2023/04/04		123	%	N/A
			33'5-TriCB-(36)	2023/04/04		116	%	N/A
			344'-TriCB-(37)	2023/04/04		119	%	60 - 145
			345-TriCB-(38)	2023/04/04		119	%	N/A
			34'5-TriCB-(39)	2023/04/04		128	%	N/A
			TetraCB-(40)+(41)+(71)	2023/04/04		89	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'34'-TetraCB-(42)	2023/04/04		101	%	N/A
			22'35-TetraCB-(43)	2023/04/04		93	%	N/A
			TetraCB-(44)+(47)+(65)	2023/04/04		89	%	N/A
			TetraCB-(45)+(51)	2023/04/04		78	%	N/A
			22'36'-TetraCB-(46)	2023/04/04		78	%	N/A
			22'45-TetraCB-(48)	2023/04/04		84	%	N/A
			TetraCB-(49)+TetraCB-(69)	2023/04/04		85	%	N/A
			TetraCB-(50)+(53)	2023/04/04		76	%	N/A
			22'55'-TetraCB-(52)	2023/04/04		87	%	N/A
			22'66'-TetraCB-(54)	2023/04/04		121	%	60 - 145
			233'4-TetraCB-(55)	2023/04/04		99	%	N/A
			233'4'-Tetra CB(56)	2023/04/04		103	%	N/A
			233'5-TetraCB-(57)	2023/04/04		93	%	N/A
			233'5'-TetraCB-(58)	2023/04/04		95	%	N/A
			TetraCB-(59)+(62)+(75)	2023/04/04		86	%	N/A
			2344'-TetraCB -(60)	2023/04/04		100	%	N/A
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04		100	%	N/A
			234'5-TetraCB-(63)	2023/04/04		99	%	N/A
			234'6-TetraCB-(64)	2023/04/04		100	%	N/A
			23'44'-TetraCB-(66)	2023/04/04		101	%	N/A
			23'45-TetraCB-(67)	2023/04/04		95	%	N/A
			23'45'-TetraCB-(68)	2023/04/04		93	%	N/A
			23'55'-TetraCB-(72)	2023/04/04		92	%	N/A
			23'5'6-TetraCB-(73)	2023/04/04		74	%	N/A
			33'44'-TetraCB-(77)	2023/04/04		103	%	60 - 145
			33'45-TetraCB-(78)	2023/04/04		121	%	N/A
			33'45'-TetraCB(79)	2023/04/04		112	%	N/A
			33'55'-TetraCB-(80)	2023/04/04		99	%	N/A
			344'5-TetraCB-(81)	2023/04/04		109	%	60 - 145
			22'33'4-PentaCB-(82)	2023/04/04		122	%	N/A
			PentaCB-(83)+(99)	2023/04/04		105	%	N/A
			22'33'6-PentaCB-(84)	2023/04/04		96	%	N/A
			PentaCB-(85)+(116)+(117)	2023/04/04		103	%	N/A
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04		103	%	N/A
			PentaCB-(88)+(91)	2023/04/04		96	%	N/A
			22'346'-PentaCB-(89)	2023/04/04		112	%	N/A
			PentaCB-(90)+(101)+(113)	2023/04/04		102	%	N/A
			22'355'-PentaCB-(92)	2023/04/04		109	%	N/A
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04		90	%	N/A
			22'356'-PentaCB-(94)	2023/04/04		93	%	N/A
			22'35'6-PentaCB-(95)	2023/04/04		108	%	N/A
			22'366'-PentaCB-(96)	2023/04/04		95	%	N/A
			22'45'6-PentaCB-(103)	2023/04/04		97	%	N/A
			22'466'-PentaCB-(104)	2023/04/04		110	%	60 - 145
			233'44'-PentaCB-(105)	2023/04/04		115	%	60 - 145
			233'45-PentaCB-(106)	2023/04/04		118	%	N/A
			233'4'5-PentaCB-(107)	2023/04/04		105	%	N/A
			PentaCB-(108)+(124)	2023/04/04		109	%	N/A
			PentaCB-(110)+(115)	2023/04/04		113	%	N/A
			233'55'-PentaCB-(111)	2023/04/04		107	%	N/A
			233'56-PentaCB-(112)	2023/04/04		106	%	N/A
			2344'5-PentaCB-(114)	2023/04/04		114	%	60 - 145
			23'44'5-PentaCB-(118)	2023/04/04		109	%	60 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			23'455'-PentaCB-(120)	2023/04/04		118	%	N/A
			23'45'6-PentaCB-(121)	2023/04/04		95	%	N/A
			233'4'5'-PentaCB-(122)	2023/04/04		141	%	N/A
			23'44'5'-PentaCB-(123)	2023/04/04		114	%	60 - 145
			33'44'5-PentaCB-(126)	2023/04/04		111	%	60 - 145
			33'455'-PentaCB-(127)	2023/04/04		118	%	N/A
			HexaCB-(128)+(166)	2023/04/04		105	%	N/A
			HexaCB-(129)+(138)+(163)	2023/04/04		110	%	N/A
			22'33'45'-HexaCB-(130)	2023/04/04		100	%	N/A
			22'33'46-HexaCB-(131)	2023/04/04		115	%	N/A
			22'33'46'-HexaCB-(132)	2023/04/04		95	%	N/A
			22'33'55'-HexaCB-(133)	2023/04/04		102	%	N/A
			HexaCB-(134)+(143)	2023/04/04		106	%	N/A
			HexaCB-(135)+(151)	2023/04/04		100	%	N/A
			22'33'66'-HexaCB-(136)	2023/04/04		98	%	N/A
			22'344'5-HexaCB-(137)	2023/04/04		90	%	N/A
			HexaCB-(139)+(140)	2023/04/04		95	%	N/A
			22'3455'-HexaCB-(141)	2023/04/04		110	%	N/A
			22'3456-HexaCB-(142)	2023/04/04		100	%	N/A
			22'345'6-HexaCB-(144)	2023/04/04		106	%	N/A
			22'3466'-HexaCB-(145)	2023/04/04		93	%	N/A
			22'34'55'-HexaCB-(146)	2023/04/04		100	%	N/A
			HexaCB-(147)+(149)	2023/04/04		95	%	N/A
			22'34'56'-HexaCB-(148)	2023/04/04		98	%	N/A
			22'34'66'-HexaCB-(150)	2023/04/04		92	%	N/A
			22'3566'-HexaCB-(152)	2023/04/04		93	%	N/A
			HexaCB-(153)+(168)	2023/04/04		97	%	N/A
			22'44'56'-HexaCB-(154)	2023/04/04		97	%	N/A
			22'44'66'-HexaCB-(155)	2023/04/04		111	%	60 - 145
			HexaCB-(156)+(157)	2023/04/04		113	%	N/A
			233'44'6-HexaCB-(158)	2023/04/04		103	%	N/A
			233'455'-HexaCB-(159)	2023/04/04		102	%	N/A
			233'456-HexaCB-(160)	2023/04/04		108	%	N/A
			233'45'6-HexaCB-(161)	2023/04/04		100	%	N/A
			233'4'55'-HexaCB-(162)	2023/04/04		103	%	N/A
			233'4'5'6-HexaCB-(164)	2023/04/04		110	%	N/A
			233'55'6-HexaCB-(165)	2023/04/04		100	%	N/A
			23'44'55'-HexaCB-(167)	2023/04/04		119	%	60 - 145
			33'44'55'-HexaCB-(169)	2023/04/04		116	%	60 - 145
			22'33'44'5-HeptaCB-(170)	2023/04/04		96	%	60 - 145
			HeptaCB-(171)+(173)	2023/04/04		102	%	N/A
			22'33'455'-HeptaCB-(172)	2023/04/04		102	%	N/A
			22'33'456'-HeptaCB-(174)	2023/04/04		104	%	N/A
			22'33'45'6-HeptaCB-(175)	2023/04/04		99	%	N/A
			22'33'466'-HeptaCB-(176)	2023/04/04		95	%	N/A
			22'33'45'6'-HeptaCB-(177)	2023/04/04		100	%	N/A
			22'33'55'6-HeptaCB-(178)	2023/04/04		101	%	N/A
			22'33'566'-HeptaCB-(179)	2023/04/04		99	%	N/A
			HeptaCB-(180)+(193)	2023/04/04		111	%	N/A
			22'344'56-HeptaCB-(181)	2023/04/04		105	%	N/A
			22'344'56'-HeptaCB-(182)	2023/04/04		104	%	N/A
			22'344'5'6-HeptaCB-(183)	2023/04/04		93	%	N/A
			22'344'66'-HeptaCB-(184)	2023/04/04		98	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'3455'6-HeptaCB-(185)	2023/04/04		110	%	N/A
			22'34566'-HeptaCB-(186)	2023/04/04		101	%	N/A
			22'34'55'6-HeptaCB-(187)	2023/04/04		105	%	N/A
			22'34'566'-HeptaCB-(188)	2023/04/04		114	%	60 - 145
			233'44'55'-HeptaCB-(189)	2023/04/04		114	%	60 - 145
			233'44'56-HeptaCB-(190)	2023/04/04		104	%	N/A
			233'44'5'6-HeptaCB-(191)	2023/04/04		102	%	N/A
			233'455'6-HeptaCB-(192)	2023/04/04		106	%	N/A
			22'33'44'55'-OctaCB-(194)	2023/04/04		111	%	N/A
			22'33'44'56-OctaCB-(195)	2023/04/04		110	%	N/A
			22'33'44'56'-OctaCB-(196)	2023/04/04		110	%	N/A
			22'33'44'66'OctaCB-(197)	2023/04/04		104	%	N/A
			OctaCB-(198)+(199)	2023/04/04		112	%	N/A
			22'33'4566'-OctaCB-(200)	2023/04/04		110	%	N/A
			22'33'45'66'-OctaCB-(201)	2023/04/04		101	%	N/A
			22'33'55'66'-OctaCB-(202)	2023/04/04		102	%	60 - 145
			22'344'55'6-OctaCB-(203)	2023/04/04		115	%	N/A
			22'344'566'-OctaCB-(204)	2023/04/04		104	%	N/A
			233'44'55'6-OctaCB-(205)	2023/04/04		102	%	60 - 145
			22'33'44'55'6-NonaCB-(206)	2023/04/04		101	%	60 - 145
			22'33'44'566'-NonaCB-(207)	2023/04/04		97	%	N/A
			22'33'455'66'-NonaCB-(208)	2023/04/04		104	%	60 - 145
			DecaCB-(209)	2023/04/04		123	%	60 - 145
8576352	CXU	Spiked Blank DUP	C13-2,44'-TriCB-(28)	2023/04/04		45	%	15 - 145
			C13-22'33'44'55'6-NonaCB-(206)	2023/04/04		84	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/04/04		84	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/04/04		79	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/04/04		74	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2023/04/04		70	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/04/04		80	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/04/04		57	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/04/04		40	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/04/04		43	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/04/04		25	%	15 - 145
			C13-22'6-TriCB-(19)	2023/04/04		29	%	15 - 145
			C13-22'-DiCB-(4)	2023/04/04		24	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/04/04		87	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/04/04		88	%	40 - 145
			C13-233'44'-PentaCB-(105)	2023/04/04		89	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/04/04		69	%	40 - 145
			C13-23'44'55'-HexaCB-(167)	2023/04/04		76	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/04/04		83	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/04/04		88	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/04/04		87	%	40 - 145
			C13-2-MonoCB-(1)	2023/04/04		24	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/04/04		86	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/04/04		98	%	40 - 145
			C13-33'44'-TetraCB-(77)	2023/04/04		77	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/04/04		81	%	40 - 145
			C13-344'-TriCB-(37)	2023/04/04		59	%	15 - 145
			C13-44'-DiCB-(15)	2023/04/04		38	%	15 - 145
			C13-4-MonoCB-(3)	2023/04/04		26	%	15 - 145
			C13-DecaCB-(209)	2023/04/04		74	%	40 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-HexaCB-(156)+(157)	2023/04/04		79	%	40 - 145
			4,4'-DiCB-(15)	2023/04/04		122	%	60 - 145
			22'3-TriCB-(16)	2023/04/04		75	%	N/A
			22'4-TriCB-(17)	2023/04/04		75	%	N/A
			TriCB-(18)+(30)	2023/04/04		72	%	N/A
			22'6-TriCB-(19)	2023/04/04		108	%	60 - 145
			TriCB-(20) + (28)	2023/04/04		91	%	N/A
			TriCB-(21)+(33)	2023/04/04		98	%	N/A
			234'-TriCB-(22)	2023/04/04		97	%	N/A
			235-TriCB-(23)	2023/04/04		86	%	N/A
			236-TriCB-(24)	2023/04/04		78	%	N/A
			23'4-TriCB-(25)	2023/04/04		102	%	N/A
			TriCB-(26)+(29)	2023/04/04		87	%	N/A
			23'6-TriCB-(27)	2023/04/04		77	%	N/A
			24'5-TriCB-(31)	2023/04/04		92	%	N/A
			24'6-TriCB-(32)	2023/04/04		79	%	N/A
			23'5'-TriCB-(34)	2023/04/04		86	%	N/A
			33'4-TriCB-(35)	2023/04/04		121	%	N/A
			33'5-TriCB-(36)	2023/04/04		110	%	N/A
			344'-TriCB-(37)	2023/04/04		113	%	60 - 145
			345-TriCB-(38)	2023/04/04		111	%	N/A
			34'5-TriCB-(39)	2023/04/04		123	%	N/A
			TetraCB-(40)+(41)+(71)	2023/04/04		93	%	N/A
			22'34'-TetraCB-(42)	2023/04/04		93	%	N/A
			22'35-TetraCB-(43)	2023/04/04		79	%	N/A
			TetraCB-(44)+(47)+(65)	2023/04/04		81	%	N/A
			TetraCB-(45)+(51)	2023/04/04		64	%	N/A
			22'36'-TetraCB-(46)	2023/04/04		67	%	N/A
			22'45-TetraCB-(48)	2023/04/04		75	%	N/A
			TetraCB-(49)+TetraCB-(69)	2023/04/04		75	%	N/A
			TetraCB-(50)+(53)	2023/04/04		63	%	N/A
			22'55'-TetraCB-(52)	2023/04/04		77	%	N/A
			22'66'-TetraCB-(54)	2023/04/04		126	%	60 - 145
			233'4-TetraCB-(55)	2023/04/04		94	%	N/A
			233'4'-Tetra CB(56)	2023/04/04		99	%	N/A
			233'5-TetraCB-(57)	2023/04/04		87	%	N/A
			233'5'-TetraCB-(58)	2023/04/04		89	%	N/A
			TetraCB-(59)+(62)+(75)	2023/04/04		76	%	N/A
			2344'-TetraCB -(60)	2023/04/04		97	%	N/A
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04		96	%	N/A
			234'5-TetraCB-(63)	2023/04/04		93	%	N/A
			234'6-TetraCB-(64)	2023/04/04		92	%	N/A
			23'44'-TetraCB-(66)	2023/04/04		95	%	N/A
			23'45-TetraCB-(67)	2023/04/04		89	%	N/A
			23'45'-TetraCB-(68)	2023/04/04		88	%	N/A
			23'55'-TetraCB-(72)	2023/04/04		86	%	N/A
			23'5'6-TetraCB-(73)	2023/04/04		67	%	N/A
			33'44'-TetraCB-(77)	2023/04/04		101	%	60 - 145
			33'45-TetraCB-(78)	2023/04/04		120	%	N/A
			33'45'-TetraCB(79)	2023/04/04		113	%	N/A
			33'55'-TetraCB-(80)	2023/04/04		97	%	N/A
			344'5-TetraCB-(81)	2023/04/04		105	%	60 - 145
			22'33'4-PentaCB-(82)	2023/04/04		125	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			PentaCB-(83)+(99)	2023/04/04		99	%	N/A
			22'33'6-PentaCB-(84)	2023/04/04		88	%	N/A
			PentaCB-(85)+(116)+(117)	2023/04/04		97	%	N/A
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04		96	%	N/A
			PentaCB-(88)+(91)	2023/04/04		89	%	N/A
			22'346'-PentaCB-(89)	2023/04/04		107	%	N/A
			PentaCB-(90)+(101)+(113)	2023/04/04		96	%	N/A
			22'355'-PentaCB-(92)	2023/04/04		104	%	N/A
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04		81	%	N/A
			22'356'-PentaCB-(94)	2023/04/04		82	%	N/A
			22'35'6-PentaCB-(95)	2023/04/04		100	%	N/A
			22'366'-PentaCB-(96)	2023/04/04		84	%	N/A
			22'45'6-PentaCB-(103)	2023/04/04		88	%	N/A
			22'466'-PentaCB-(104)	2023/04/04		107	%	60 - 145
			233'44'-PentaCB-(105)	2023/04/04		115	%	60 - 145
			233'45-PentaCB-(106)	2023/04/04		118	%	N/A
			233'4'5-PentaCB-(107)	2023/04/04		102	%	N/A
			PentaCB-(108)+(124)	2023/04/04		106	%	N/A
			PentaCB-(110)+(115)	2023/04/04		110	%	N/A
			233'55'-PentaCB-(111)	2023/04/04		103	%	N/A
			233'56-PentaCB-(112)	2023/04/04		102	%	N/A
			2344'5-PentaCB-(114)	2023/04/04		112	%	60 - 145
			23'44'5-PentaCB-(118)	2023/04/04		106	%	60 - 145
			23'455'-PentaCB-(120)	2023/04/04		114	%	N/A
			23'45'6-PentaCB-(121)	2023/04/04		89	%	N/A
			233'4'5'-PentaCB-(122)	2023/04/04		138	%	N/A
			23'44'5'-PentaCB-(123)	2023/04/04		108	%	60 - 145
			33'44'5-PentaCB-(126)	2023/04/04		108	%	60 - 145
			33'455'-PentaCB-(127)	2023/04/04		118	%	N/A
			HexaCB-(128)+(166)	2023/04/04		13	%	N/A
			HexaCB-(129)+(138)+(163)	2023/04/04		110	%	N/A
			22'33'45'-HexaCB-(130)	2023/04/04		100	%	N/A
			22'33'46-HexaCB-(131)	2023/04/04		113	%	N/A
			22'33'46'-HexaCB-(132)	2023/04/04		94	%	N/A
			22'33'55'-HexaCB-(133)	2023/04/04		103	%	N/A
			HexaCB-(134)+(143)	2023/04/04		105	%	N/A
			HexaCB-(135)+(151)	2023/04/04		99	%	N/A
			22'33'66'-HexaCB-(136)	2023/04/04		94	%	N/A
			22'344'5-HexaCB-(137)	2023/04/04		97	%	N/A
			HexaCB-(139)+(140)	2023/04/04		94	%	N/A
			22'3455'-HexaCB-(141)	2023/04/04		104	%	N/A
			22'3456-HexaCB-(142)	2023/04/04		102	%	N/A
			22'345'6-HexaCB-(144)	2023/04/04		13	%	N/A
			22'3466'-HexaCB-(145)	2023/04/04		90	%	N/A
			22'34'55'-HexaCB-(146)	2023/04/04		98	%	N/A
			HexaCB-(147)+(149)	2023/04/04		95	%	N/A
			22'34'56'-HexaCB-(148)	2023/04/04		95	%	N/A
			22'34'66'-HexaCB-(150)	2023/04/04		85	%	N/A
			22'3566'-HexaCB-(152)	2023/04/04		91	%	N/A
			HexaCB-(153)+(168)	2023/04/04		98	%	N/A
			22'44'56'-HexaCB-(154)	2023/04/04		96	%	N/A
			22'44'66'-HexaCB-(155)	2023/04/04		110	%	60 - 145
			HexaCB-(156)+(157)	2023/04/04		112	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			233'44'6-HexaCB-(158)	2023/04/04		106	%	N/A
			233'455'-HexaCB-(159)	2023/04/04		102	%	N/A
			233'456-HexaCB-(160)	2023/04/04		110	%	N/A
			233'45'6-HexaCB-(161)	2023/04/04		101	%	N/A
			233'4'55'-HexaCB-(162)	2023/04/04		100	%	N/A
			233'4'5'6-HexaCB-(164)	2023/04/04		104	%	N/A
			233'55'6-HexaCB-(165)	2023/04/04		97	%	N/A
			23'44'55'-HexaCB-(167)	2023/04/04		115	%	60 - 145
			33'44'55'-HexaCB-(169)	2023/04/04		112	%	60 - 145
			22'33'44'5-HeptaCB-(170)	2023/04/04		94	%	60 - 145
			HeptaCB-(171)+(173)	2023/04/04		99	%	N/A
			22'33'455'-HeptaCB-(172)	2023/04/04		102	%	N/A
			22'33'456'-HeptaCB-(174)	2023/04/04		104	%	N/A
			22'33'45'6-HeptaCB-(175)	2023/04/04		99	%	N/A
			22'33'466'-HeptaCB-(176)	2023/04/04		97	%	N/A
			22'33'45'6'-HeptaCB-(177)	2023/04/04		97	%	N/A
			22'33'55'6-HeptaCB-(178)	2023/04/04		102	%	N/A
			22'33'566'-HeptaCB-(179)	2023/04/04		97	%	N/A
			HeptaCB-(180)+(193)	2023/04/04		108	%	N/A
			22'344'56-HeptaCB-(181)	2023/04/04		1.7	%	N/A
			22'344'56'-HeptaCB-(182)	2023/04/04		101	%	N/A
			22'344'5'6-HeptaCB-(183)	2023/04/04		98	%	N/A
			22'344'66'-HeptaCB-(184)	2023/04/04		96	%	N/A
			22'3455'6-HeptaCB-(185)	2023/04/04		99	%	N/A
			22'34566'-HeptaCB-(186)	2023/04/04		99	%	N/A
			22'34'55'6-HeptaCB-(187)	2023/04/04		102	%	N/A
			22'34'566'-HeptaCB-(188)	2023/04/04		106	%	60 - 145
			233'44'55'-HeptaCB-(189)	2023/04/04		110	%	60 - 145
			233'44'56-HeptaCB-(190)	2023/04/04		101	%	N/A
			233'44'5'6-HeptaCB-(191)	2023/04/04		99	%	N/A
			233'455'6-HeptaCB-(192)	2023/04/04		105	%	N/A
			22'33'44'55'-OctaCB-(194)	2023/04/04		108	%	N/A
			22'33'44'56-OctaCB-(195)	2023/04/04		107	%	N/A
			22'33'44'56'-OctaCB-(196)	2023/04/04		107	%	N/A
			22'33'44'66'OctaCB-(197)	2023/04/04		109	%	N/A
			OctaCB-(198)+(199)	2023/04/04		108	%	N/A
			22'33'4566'-OctaCB-(200)	2023/04/04		107	%	N/A
			22'33'45'66'-OctaCB-(201)	2023/04/04		98	%	N/A
			22'33'55'66'-OctaCB-(202)	2023/04/04		100	%	60 - 145
			22'344'55'6-OctaCB-(203)	2023/04/04		110	%	N/A
			22'344'566'-OctaCB-(204)	2023/04/04		101	%	N/A
			233'44'55'6-OctaCB-(205)	2023/04/04		99	%	60 - 145
			22'33'44'55'6-NonaCB-(206)	2023/04/04		100	%	60 - 145
			22'33'44'566'-NonaCB-(207)	2023/04/04		96	%	N/A
			22'33'455'66'-NonaCB-(208)	2023/04/04		102	%	60 - 145
			DecaCB-(209)	2023/04/04		121	%	60 - 145
8576352	CXU	RPD	4,4'-DiCB-(15)	2023/04/04	1.8		%	30
			22'3-TriCB-(16)	2023/04/04	11		%	30
			22'4-TriCB-(17)	2023/04/04	22		%	30
			TriCB-(18)+(30)	2023/04/04	23		%	30
			22'6-TriCB-(19)	2023/04/04	5.4		%	30
			TriCB-(20) + (28)	2023/04/04	12		%	30
			TriCB-(21)+(33)	2023/04/04	14		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			234'-TriCB-(22)	2023/04/04	12		%	30
			235-TriCB-(23)	2023/04/04	18		%	30
			236-TriCB-(24)	2023/04/04	26		%	30
			23'4-TriCB-(25)	2023/04/04	14		%	30
			TriCB-(26)+(29)	2023/04/04	14		%	30
			23'6-TriCB-(27)	2023/04/04	20		%	30
			24'5-TriCB-(31)	2023/04/04	11		%	30
			24'6-TriCB-(32)	2023/04/04	20		%	30
			23'5'-TriCB-(34)	2023/04/04	15		%	30
			33'4-TriCB-(35)	2023/04/04	2.1		%	30
			33'5-TriCB-(36)	2023/04/04	5.0		%	30
			344'-TriCB-(37)	2023/04/04	5.7		%	30
			345-TriCB-(38)	2023/04/04	6.6		%	30
			34'5-TriCB-(39)	2023/04/04	4.2		%	30
			TetraCB-(40)+(41)+(71)	2023/04/04	4.6		%	30
			22'34'-TetraCB-(42)	2023/04/04	8.5		%	30
			22'35-TetraCB-(43)	2023/04/04	17		%	30
			TetraCB-(44)+(47)+(65)	2023/04/04	10		%	30
			TetraCB-(45)+(51)	2023/04/04	19		%	30
			22'36'-TetraCB-(46)	2023/04/04	15		%	30
			22'45-TetraCB-(48)	2023/04/04	11		%	30
			TetraCB-(49)+TetraCB-(69)	2023/04/04	14		%	30
			TetraCB-(50)+(53)	2023/04/04	18		%	30
			22'55'-TetraCB-(52)	2023/04/04	11		%	30
			22'66'-TetraCB-(54)	2023/04/04	3.3		%	30
			233'4-TetraCB-(55)	2023/04/04	5.0		%	30
			233'4'-Tetra CB(56)	2023/04/04	3.4		%	30
			233'5-TetraCB-(57)	2023/04/04	6.0		%	30
			233'5'-TetraCB-(58)	2023/04/04	7.0		%	30
			TetraCB-(59)+(62)+(75)	2023/04/04	11		%	30
			2344'-TetraCB -(60)	2023/04/04	3.3		%	30
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04	4.5		%	30
			234'5-TetraCB-(63)	2023/04/04	5.5		%	30
			234'6-TetraCB-(64)	2023/04/04	7.6		%	30
			23'44'-TetraCB-(66)	2023/04/04	5.6		%	30
			23'45-TetraCB-(67)	2023/04/04	6.3		%	30
			23'45'-TetraCB-(68)	2023/04/04	5.0		%	30
			23'55'-TetraCB-(72)	2023/04/04	6.8		%	30
			23'5'6-TetraCB-(73)	2023/04/04	10		%	30
			33'44'-TetraCB-(77)	2023/04/04	2.2		%	30
			33'45-TetraCB-(78)	2023/04/04	0.83		%	30
			33'45'-TetraCB(79)	2023/04/04	0.62		%	30
			33'55'-TetraCB-(80)	2023/04/04	1.5		%	30
			344'5-TetraCB-(81)	2023/04/04	3.9		%	30
			22'33'4-PentaCB-(82)	2023/04/04	2.1		%	30
			PentaCB-(83)+(99)	2023/04/04	5.9		%	30
			22'33'6-PentaCB-(84)	2023/04/04	8.6		%	30
			PentaCB-(85)+(116)+(117)	2023/04/04	5.8		%	30
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04	6.5		%	30
			PentaCB-(88)+(91)	2023/04/04	7.7		%	30
			22'346'-PentaCB-(89)	2023/04/04	4.9		%	30
			PentaCB-(90)+(101)+(113)	2023/04/04	6.6		%	30
			22'355'-PentaCB-(92)	2023/04/04	5.2		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04	11		%	30
			22'356'-PentaCB-(94)	2023/04/04	12		%	30
			22'35'6-PentaCB-(95)	2023/04/04	8.0		%	30
			22'366'-PentaCB-(96)	2023/04/04	12		%	30
			22'45'6-PentaCB-(103)	2023/04/04	9.8		%	30
			22'466'-PentaCB-(104)	2023/04/04	3.3		%	30
			233'44'-PentaCB-(105)	2023/04/04	0.087		%	30
			233'45-PentaCB-(106)	2023/04/04	0.51		%	30
			233'4'5-PentaCB-(107)	2023/04/04	2.6		%	30
			PentaCB-(108)+(124)	2023/04/04	2.1		%	30
			PentaCB-(110)+(115)	2023/04/04	3.4		%	30
			233'55'-PentaCB-(111)	2023/04/04	3.9		%	30
			233'56-PentaCB-(112)	2023/04/04	3.9		%	30
			2344'5-PentaCB-(114)	2023/04/04	1.4		%	30
			23'44'5-PentaCB-(118)	2023/04/04	2.7		%	30
			23'455'-PentaCB-(120)	2023/04/04	3.6		%	30
			23'45'6-PentaCB-(121)	2023/04/04	5.8		%	30
			233'4'5'-PentaCB-(122)	2023/04/04	1.9		%	30
			23'44'5'-PentaCB-(123)	2023/04/04	4.8		%	30
			33'44'5-PentaCB-(126)	2023/04/04	2.6		%	30
			33'455'-PentaCB-(127)	2023/04/04	0.25		%	30
			HexaCB-(128)+(166)	2023/04/04	157 (4)		%	30
			HexaCB-(129)+(138)+(163)	2023/04/04	0.64		%	30
			22'33'45'-HexaCB-(130)	2023/04/04	0.30		%	30
			22'33'46-HexaCB-(131)	2023/04/04	1.8		%	30
			22'33'46'-HexaCB-(132)	2023/04/04	0.32		%	30
			22'33'55'-HexaCB-(133)	2023/04/04	1.1		%	30
			HexaCB-(134)+(143)	2023/04/04	0.48		%	30
			HexaCB-(135)+(151)	2023/04/04	1.5		%	30
			22'33'66'-HexaCB-(136)	2023/04/04	4.0		%	30
			22'344'5-HexaCB-(137)	2023/04/04	8.0		%	30
			HexaCB-(139)+(140)	2023/04/04	1.0		%	30
			22'3455'-HexaCB-(141)	2023/04/04	5.2		%	30
			22'3456-HexaCB-(142)	2023/04/04	2.0		%	30
			22'345'6-HexaCB-(144)	2023/04/04	156 (4)		%	30
			22'3466'-HexaCB-(145)	2023/04/04	2.4		%	30
			22'34'55'-HexaCB-(146)	2023/04/04	2.0		%	30
			HexaCB-(147)+(149)	2023/04/04	0.11		%	30
			22'34'56'-HexaCB-(148)	2023/04/04	2.5		%	30
			22'34'66'-HexaCB-(150)	2023/04/04	7.1		%	30
			22'3566'-HexaCB-(152)	2023/04/04	2.0		%	30
			HexaCB-(153)+(168)	2023/04/04	1.3		%	30
			22'44'56'-HexaCB-(154)	2023/04/04	0.93		%	30
			22'44'66'-HexaCB-(155)	2023/04/04	0.99		%	30
			HexaCB-(156)+(157)	2023/04/04	0.76		%	30
			233'44'6-HexaCB-(158)	2023/04/04	2.5		%	30
			233'455'-HexaCB-(159)	2023/04/04	0.59		%	30
			233'456-HexaCB-(160)	2023/04/04	1.4		%	30
			233'45'6-HexaCB-(161)	2023/04/04	0.60		%	30
			233'4'55'-HexaCB-(162)	2023/04/04	2.9		%	30
			233'4'5'6-HexaCB-(164)	2023/04/04	5.5		%	30
			233'55'6-HexaCB-(165)	2023/04/04	2.8		%	30
			23'44'55'-HexaCB-(167)	2023/04/04	3.3		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			33'44'55'-HexaCB-(169)	2023/04/04	3.0		%	30
			22'33'44'5-HeptaCB-(170)	2023/04/04	2.3		%	30
			HeptaCB-(171)+(173)	2023/04/04	3.0		%	30
			22'33'455'-HeptaCB-(172)	2023/04/04	0.39		%	30
			22'33'456'-HeptaCB-(174)	2023/04/04	0		%	30
			22'33'45'6-HeptaCB-(175)	2023/04/04	0.41		%	30
			22'33'466'-HeptaCB-(176)	2023/04/04	2.3		%	30
			22'33'45'6'-HeptaCB-(177)	2023/04/04	3.0		%	30
			22'33'55'6-HeptaCB-(178)	2023/04/04	0.30		%	30
			22'33'566'-HeptaCB-(179)	2023/04/04	2.2		%	30
			HeptaCB-(180)+(193)	2023/04/04	1.9		%	30
			22'344'56-HeptaCB-(181)	2023/04/04	194 (4)		%	30
			22'344'56'-HeptaCB-(182)	2023/04/04	3.1		%	30
			22'344'5'6-HeptaCB-(183)	2023/04/04	4.7		%	30
			22'344'66'-HeptaCB-(184)	2023/04/04	1.4		%	30
			22'3455'6-HeptaCB-(185)	2023/04/04	11		%	30
			22'34566'-HeptaCB-(186)	2023/04/04	1.9		%	30
			22'34'55'6-HeptaCB-(187)	2023/04/04	2.0		%	30
			22'34'566'-HeptaCB-(188)	2023/04/04	7.2		%	30
			233'44'55'-HeptaCB-(189)	2023/04/04	3.7		%	30
			233'44'56-HeptaCB-(190)	2023/04/04	2.3		%	30
			233'44'5'6-HeptaCB-(191)	2023/04/04	2.9		%	30
			233'455'6-HeptaCB-(192)	2023/04/04	1.0		%	30
			22'33'44'55'-OctaCB-(194)	2023/04/04	2.8		%	30
			22'33'44'56-OctaCB-(195)	2023/04/04	2.9		%	30
			22'33'44'56'-OctaCB-(196)	2023/04/04	3.1		%	30
			22'33'44'66'OctaCB-(197)	2023/04/04	5.1		%	30
			OctaCB-(198)+(199)	2023/04/04	3.6		%	30
			22'33'4566'-OctaCB-(200)	2023/04/04	3.2		%	30
			22'33'45'66'-OctaCB-(201)	2023/04/04	3.7		%	30
			22'33'55'66'-OctaCB-(202)	2023/04/04	2.3		%	30
			22'344'55'6-OctaCB-(203)	2023/04/04	4.1		%	30
			22'344'566'-OctaCB-(204)	2023/04/04	2.8		%	30
			233'44'55'6-OctaCB-(205)	2023/04/04	2.1		%	30
			22'33'44'55'6-NonaCB-(206)	2023/04/04	0.99		%	30
			22'33'44'566'-NonaCB-(207)	2023/04/04	1.9		%	30
			22'33'455'66'-NonaCB-(208)	2023/04/04	1.7		%	30
			DecaCB-(209)	2023/04/04	1.9		%	30
8576352	CXU	Method Blank	C13-2,44'-TriCB-(28)	2023/04/05		46	%	15 - 145
			C13-22'33'44'55'6-NonaCB-(206)	2023/04/05		87	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/04/05		85	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/04/05		80	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/04/05		74	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2023/04/05		60	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/04/05		81	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/04/05		51	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/04/05		37 (5)	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/04/05		45	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/04/05		27	%	15 - 145
			C13-22'6-TriCB-(19)	2023/04/05		35	%	15 - 145
			C13-22'-DiCB-(4)	2023/04/05		26	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/04/05		84	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/04/05		69	%	40 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-233'44'-PentaCB-(105)	2023/04/05		88	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/04/05		68	%	40 - 145
			C13-23'44'55'-HexaCB-(167)	2023/04/05		60	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/04/05		79	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/04/05		85	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/04/05		84	%	40 - 145
			C13-2-MonoCB-(1)	2023/04/05		27	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/04/05		68	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/04/05		95	%	40 - 145
			C13-33'44'-TetraCB-(77)	2023/04/05		82	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/04/05		77	%	40 - 145
			C13-344'-TriCB-(37)	2023/04/05		55	%	15 - 145
			C13-44'-DiCB-(15)	2023/04/05		46	%	15 - 145
			C13-4-MonoCB-(3)	2023/04/05		30	%	15 - 145
			C13-DecaCB-(209)	2023/04/05		73	%	40 - 145
			C13-HexaCB-(156)+(157)	2023/04/05		63	%	40 - 145
			4,4'-DiCB-(15)	2023/04/05	0.00021 U, EDL=0.00021		ng/g	
			22'3-TriCB-(16)	2023/04/05	0.00043 U, EDL=0.00043		ng/g	
			22'4-TriCB-(17)	2023/04/05	0.00035 U, EDL=0.00035		ng/g	
			TriCB-(18)+(30)	2023/04/05	0.00030 U, EDL=0.00030		ng/g	
			22'6-TriCB-(19)	2023/04/05	0.00061 U, EDL=0.00061		ng/g	
			TriCB-(20) + (28)	2023/04/05	0.00020 J, EDL=0.00018		ng/g	
			TriCB-(21)+(33)	2023/04/05	0.00020 U, EDL=0.00020		ng/g	
			234'-TriCB-(22)	2023/04/05	0.00019 U, EDL=0.00019		ng/g	
			235-TriCB-(23)	2023/04/05	0.00020 U, EDL=0.00020		ng/g	
			236-TriCB-(24)	2023/04/05	0.00027 U, EDL=0.00027		ng/g	
			23'4-TriCB-(25)	2023/04/05	0.00020 U, EDL=0.00020		ng/g	
			TriCB-(26)+(29)	2023/04/05	0.00018 U, EDL=0.00018		ng/g	
			23'6-TriCB-(27)	2023/04/05	0.00025 U, EDL=0.00025		ng/g	
			24'5-TriCB-(31)	2023/04/05	0.00020 J, EDL=0.00018		ng/g	
			24'6-TriCB-(32)	2023/04/05	0.00024 U, EDL=0.00024		ng/g	
			23'5'-TriCB-(34)	2023/04/05	0.00019 U, EDL=0.00019		ng/g	
			33'4-TriCB-(35)	2023/04/05	0.00020 U, EDL=0.00020		ng/g	
			33'5-TriCB-(36)	2023/04/05	0.00017 U, EDL=0.00017		ng/g	
			344'-TriCB-(37)	2023/04/05	0.00018 U, EDL=0.00018		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			345-TriCB-(38)	2023/04/05	0.00020 U, EDL=0.00020		ng/g	
			34'5-TriCB-(39)	2023/04/05	0.00020 U, EDL=0.00020		ng/g	
			TetraCB-(40)+(41)+(71)	2023/04/05	0.00045 U, EDL=0.00045		ng/g	
			22'34'-TetraCB-(42)	2023/04/05	0.00059 U, EDL=0.00059		ng/g	
			22'35-TetraCB-(43)	2023/04/05	0.00063 U, EDL=0.00063		ng/g	
			TetraCB-(44)+(47)+(65)	2023/04/05	0.00050 J, EDL=0.00044		ng/g	
			TetraCB-(45)+(51)	2023/04/05	0.00048 U, EDL=0.00048		ng/g	
			22'36'-TetraCB-(46)	2023/04/05	0.00051 U, EDL=0.00051		ng/g	
			22'45-TetraCB-(48)	2023/04/05	0.00046 U, EDL=0.00046		ng/g	
			TetraCB-(49)+TetraCB-(69)	2023/04/05	0.00040 U, EDL=0.00040		ng/g	
			TetraCB-(50)+(53)	2023/04/05	0.00047 U, EDL=0.00047		ng/g	
			22'55'-TetraCB-(52)	2023/04/05	0.00045 U, EDL=0.00045		ng/g	
			22'66'-TetraCB-(54)	2023/04/05	0.0014 U, EDL=0.0014		ng/g	
			233'4-TetraCB-(55)	2023/04/05	0.00031 U, EDL=0.00031		ng/g	
			233'4'-Tetra CB(56)	2023/04/05	0.00030 U, EDL=0.00030		ng/g	
			233'5-TetraCB-(57)	2023/04/05	0.00030 U, EDL=0.00030		ng/g	
			233'5'-TetraCB-(58)	2023/04/05	0.00029 U, EDL=0.00029		ng/g	
			TetraCB-(59)+(62)+(75)	2023/04/05	0.00033 U, EDL=0.00033		ng/g	
			2344'-TetraCB -(60)	2023/04/05	0.00030 U, EDL=0.00030		ng/g	
			TetraCB-(61)+(70)+(74)+(76)	2023/04/05	0.00030 U, EDL=0.00030		ng/g	
			234'5-TetraCB-(63)	2023/04/05	0.00029 U, EDL=0.00029		ng/g	
			234'6-TetraCB-(64)	2023/04/05	0.00038 U, EDL=0.00038		ng/g	
			23'44'-TetraCB-(66)	2023/04/05	0.00029 U, EDL=0.00029		ng/g	
			23'45-TetraCB-(67)	2023/04/05	0.00025 U, EDL=0.00025		ng/g	
			23'45'-TetraCB-(68)	2023/04/05	0.00027 U, EDL=0.00027		ng/g	
			23'55'-TetraCB-(72)	2023/04/05	0.00029 U, EDL=0.00029		ng/g	
			23'5'6-TetraCB-(73)	2023/04/05	0.00031 U, EDL=0.00031		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			33'44'-TetraCB-(77)	2023/04/05	0.00027 U, EDL=0.00027		ng/g	
			33'45-TetraCB-(78)	2023/04/05	0.00033 U, EDL=0.00033		ng/g	
			33'45'-TetraCB(79)	2023/04/05	0.00026 U, EDL=0.00026		ng/g	
			33'55'-TetraCB-(80)	2023/04/05	0.00024 U, EDL=0.00024		ng/g	
			344'5-TetraCB-(81)	2023/04/05	0.00029 U, EDL=0.00029		ng/g	
			22'33'4-PentaCB-(82)	2023/04/05	0.0012 U, EDL=0.0012		ng/g	
			PentaCB-(83)+(99)	2023/04/05	0.00099 U, EDL=0.00099		ng/g	
			22'33'6-PentaCB-(84)	2023/04/05	0.0011 U, EDL=0.0011		ng/g	
			PentaCB-(85)+(116)+(117)	2023/04/05	0.00075 U, EDL=0.00075		ng/g	
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/05	0.00080 U, EDL=0.00080		ng/g	
			PentaCB-(88)+(91)	2023/04/05	0.0010 U, EDL=0.0010		ng/g	
			22'346'-PentaCB-(89)	2023/04/05	0.0012 U, EDL=0.0012		ng/g	
			PentaCB-(90)+(101)+(113)	2023/04/05	0.00082 U, EDL=0.00082		ng/g	
			22'355'-PentaCB-(92)	2023/04/05	0.0011 U, EDL=0.0011		ng/g	
			PentaCB-(93)+(98)+(100)+(102)	2023/04/05	0.00098 U, EDL=0.00098		ng/g	
			22'356'-PentaCB-(94)	2023/04/05	0.0010 U, EDL=0.0010		ng/g	
			22'35'6-PentaCB-(95)	2023/04/05	0.0011 U, EDL=0.0011		ng/g	
			22'366'-PentaCB-(96)	2023/04/05	0.0010 U, EDL=0.0010		ng/g	
			22'45'6-PentaCB-(103)	2023/04/05	0.00097 U, EDL=0.00097		ng/g	
			22'466'-PentaCB-(104)	2023/04/05	0.0012 U, EDL=0.0012		ng/g	
			233'44'-PentaCB-(105)	2023/04/05	0.00038 U, EDL=0.00038		ng/g	
			233'45-PentaCB-(106)	2023/04/05	0.00045 U, EDL=0.00045		ng/g	
			233'4'5-PentaCB-(107)	2023/04/05	0.00035 U, EDL=0.00035		ng/g	
			PentaCB-(108)+(124)	2023/04/05	0.00044 U, EDL=0.00044		ng/g	
			PentaCB-(110)+(115)	2023/04/05	0.00076 U, EDL=0.00076		ng/g	
			233'55'-PentaCB-(111)	2023/04/05	0.00066 U, EDL=0.00066		ng/g	
			233'56-PentaCB-(112)	2023/04/05	0.00064 U, EDL=0.00064		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			2344'5-PentaCB-(114)	2023/04/05	0.00041 U, EDL=0.00041		ng/g	
			23'44'5-PentaCB-(118)	2023/04/05	0.00040 J, EDL=0.00037		ng/g	
			23'455'-PentaCB-(120)	2023/04/05	0.00069 U, EDL=0.00069		ng/g	
			23'45'6-PentaCB-(121)	2023/04/05	0.00069 U, EDL=0.00069		ng/g	
			233'4'5'-PentaCB-(122)	2023/04/05	0.00057 U, EDL=0.00057		ng/g	
			23'44'5'-PentaCB-(123)	2023/04/05	0.00041 U, EDL=0.00041		ng/g	
			33'44'5-PentaCB-(126)	2023/04/05	0.00038 U, EDL=0.00038		ng/g	
			33'455'-PentaCB-(127)	2023/04/05	0.00045 U, EDL=0.00045		ng/g	
			HexaCB-(128)+(166)	2023/04/05	0.00025 U, EDL=0.00025		ng/g	
			HexaCB-(129)+(138)+(163)	2023/04/05	0.00160 J, EDL=0.00028		ng/g	
			22'33'45'-HexaCB-(130)	2023/04/05	0.00032 U, EDL=0.00032		ng/g	
			22'33'46-HexaCB-(131)	2023/04/05	0.00040 U, EDL=0.00040		ng/g	
			22'33'46'-HexaCB-(132)	2023/04/05	0.00040 J, EDL=0.00031		ng/g	
			22'33'55'-HexaCB-(133)	2023/04/05	0.00032 U, EDL=0.00032		ng/g	
			HexaCB-(134)+(143)	2023/04/05	0.00035 U, EDL=0.00035		ng/g	
			HexaCB-(135)+(151)	2023/04/05	0.00071 U, EDL=0.00071		ng/g	
			22'33'66'-HexaCB-(136)	2023/04/05	0.00051 U, EDL=0.00051		ng/g	
			22'344'5-HexaCB-(137)	2023/04/05	0.00030 U, EDL=0.00030		ng/g	
			HexaCB-(139)+(140)	2023/04/05	0.00027 U, EDL=0.00027		ng/g	
			22'3455'-HexaCB-(141)	2023/04/05	0.00030 J, EDL=0.00027		ng/g	
			22'3456-HexaCB-(142)	2023/04/05	0.00034 U, EDL=0.00034		ng/g	
			22'345'6-HexaCB-(144)	2023/04/05	0.00069 U, EDL=0.00069		ng/g	
			22'3466'-HexaCB-(145)	2023/04/05	0.00051 U, EDL=0.00051		ng/g	
			22'34'55'-HexaCB-(146)	2023/04/05	0.00025 U, EDL=0.00025		ng/g	
			HexaCB-(147)+(149)	2023/04/05	0.00100 J, EDL=0.00024		ng/g	
			22'34'56'-HexaCB-(148)	2023/04/05	0.00070 U, EDL=0.00070		ng/g	
			22'34'66'-HexaCB-(150)	2023/04/05	0.00047 U, EDL=0.00047		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'3566'-HexaCB-(152)	2023/04/05	0.00053 U, EDL=0.00053		ng/g	
			HexaCB-(153)+(168)	2023/04/05	0.00110 J, EDL=0.00023		ng/g	
			22'44'56'-HexaCB-(154)	2023/04/05	0.00054 U, EDL=0.00054		ng/g	
			22'44'66'-HexaCB-(155)	2023/04/05	0.00059 U, EDL=0.00059		ng/g	
			HexaCB-(156)+(157)	2023/04/05	0.00019 U, EDL=0.00019		ng/g	
			233'44'6-HexaCB-(158)	2023/04/05	0.00019 U, EDL=0.00019		ng/g	
			233'455'-HexaCB-(159)	2023/04/05	0.00019 U, EDL=0.00019		ng/g	
			233'456-HexaCB-(160)	2023/04/05	0.00023 U, EDL=0.00023		ng/g	
			233'45'6-HexaCB-(161)	2023/04/05	0.00022 U, EDL=0.00022		ng/g	
			233'4'55'-HexaCB-(162)	2023/04/05	0.00018 U, EDL=0.00018		ng/g	
			233'4'5'6-HexaCB-(164)	2023/04/05	0.00020 U, EDL=0.00020		ng/g	
			233'55'6-HexaCB-(165)	2023/04/05	0.00023 U, EDL=0.00023		ng/g	
			23'44'55'-HexaCB-(167)	2023/04/05	0.00020 U, EDL=0.00020		ng/g	
			33'44'55'-HexaCB-(169)	2023/04/05	0.00020 U, EDL=0.00020		ng/g	
			22'33'44'5-HeptaCB-(170)	2023/04/05	0.00050 J, EDL=0.00025		ng/g	
			HeptaCB-(171)+(173)	2023/04/05	0.00029 U, EDL=0.00029		ng/g	
			22'33'455'-HeptaCB-(172)	2023/04/05	0.00029 U, EDL=0.00029		ng/g	
			22'33'456'-HeptaCB-(174)	2023/04/05	0.00050 J, EDL=0.00026		ng/g	
			22'33'45'6-HeptaCB-(175)	2023/04/05	0.00044 U, EDL=0.00044		ng/g	
			22'33'466'-HeptaCB-(176)	2023/04/05	0.00033 U, EDL=0.00033		ng/g	
			22'33'45'6'-HeptaCB-(177)	2023/04/05	0.00029 U, EDL=0.00029		ng/g	
			22'33'55'6-HeptaCB-(178)	2023/04/05	0.00047 U, EDL=0.00047		ng/g	
			22'33'566'-HeptaCB-(179)	2023/04/05	0.00032 U, EDL=0.00032		ng/g	
			HeptaCB-(180)+(193)	2023/04/05	0.00130 J, EDL=0.00025		ng/g	
			22'344'56-HeptaCB-(181)	2023/04/05	0.00027 U, EDL=0.00027		ng/g	
			22'344'56'-HeptaCB-(182)	2023/04/05	0.00041 U, EDL=0.00041		ng/g	
			22'344'5'6-HeptaCB-(183)	2023/04/05	0.00023 U, EDL=0.00023		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'344'66'-HeptaCB-(184)	2023/04/05	0.00031 U, EDL=0.00031		ng/g	
			22'3455'6-HeptaCB-(185)	2023/04/05	0.00029 U, EDL=0.00029		ng/g	
			22'34566'-HeptaCB-(186)	2023/04/05	0.00033 U, EDL=0.00033		ng/g	
			22'34'55'6-HeptaCB-(187)	2023/04/05	0.00060 J, EDL=0.00042		ng/g	
			22'34'566'-HeptaCB-(188)	2023/04/05	0.00040 U, EDL=0.00040		ng/g	
			233'44'55'-HeptaCB-(189)	2023/04/05	0.00021 U, EDL=0.00021		ng/g	
			233'44'56-HeptaCB-(190)	2023/04/05	0.00021 U, EDL=0.00021		ng/g	
			233'44'5'6-HeptaCB-(191)	2023/04/05	0.00020 U, EDL=0.00020		ng/g	
			233'455'6-HeptaCB-(192)	2023/04/05	0.00022 U, EDL=0.00022		ng/g	
			22'33'44'55'-OctaCB-(194)	2023/04/05	0.00029 U, EDL=0.00029		ng/g	
			22'33'44'56-OctaCB-(195)	2023/04/05	0.00032 U, EDL=0.00032		ng/g	
			22'33'44'56'-OctaCB-(196)	2023/04/05	0.00037 U, EDL=0.00037		ng/g	
			22'33'44'66'OctaCB-(197)	2023/04/05	0.00025 U, EDL=0.00025		ng/g	
			OctaCB-(198)+(199)	2023/04/05	0.00039 U, EDL=0.00039		ng/g	
			22'33'4566'-OctaCB-(200)	2023/04/05	0.00029 U, EDL=0.00029		ng/g	
			22'33'45'66'-OctaCB-(201)	2023/04/05	0.00026 U, EDL=0.00026		ng/g	
			22'33'55'66'-OctaCB-(202)	2023/04/05	0.00031 U, EDL=0.00031		ng/g	
			22'344'55'6-OctaCB-(203)	2023/04/05	0.00036 U, EDL=0.00036		ng/g	
			22'344'566'-OctaCB-(204)	2023/04/05	0.00026 U, EDL=0.00026		ng/g	
			233'44'55'6-OctaCB-(205)	2023/04/05	0.00021 U, EDL=0.00021		ng/g	
			22'33'44'55'6-NonaCB-(206)	2023/04/05	0.00047 U, EDL=0.00047		ng/g	
			22'33'44'566'-NonaCB-(207)	2023/04/05	0.00035 U, EDL=0.00035		ng/g	
			22'33'455'66'-NonaCB-(208)	2023/04/05	0.00037 U, EDL=0.00037		ng/g	
			DecaCB-(209)	2023/04/05	0.00019 U, EDL=0.00019		ng/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total PCB	2023/04/05	0.0108, EDL=0.0014		ng/g	

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 (absolute difference <= 2x RDL).

(1) Recovery outside method acceptance criteria due to matrix effects

(2) Result from 5x dilution due to matrix interference

(3) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(4) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(5) Within criteria.

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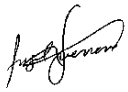
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Angel Guerrero, Supervisor, Ultra Trace Analysis, HRMS and SVOC

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SUBCONTRACT ORDER

Apex Laboratories

A3A1010

AKK 2/15/23 RMP 2/6/23

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:

BV Labs / Maxxam
C/O FEDEX DEPOT 299 Cayuga Rd
Cheektowaga, NY 14225
Phone :(800) 668-0639
Fax: (905) 332-9169

Received 1/31/23@1008 by ESJ akk 2/15/23

Sample Name: MFA-B1-2023013-21.9 **Sediment** **Sampled: 01/30/23 16:00** (A3A1010-01)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/09/23 16:00	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

Received 2/1/23@1200 by SAT

Sample Name: MFA-B3-20230131-31.0 **Sediment** **Sampled: 01/31/23 10:50** (A3A1010-02)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/10/23 10:50	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

Received 2/1/23@1200 by SAT

Sample Name: MFA-B2-20230131-23.0 **Sediment** **Sampled: 01/31/23 09:00** (A3A1010-03)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/10/23 09:00	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

Received 2/3/23@1120 by SAT

Sample Name: MFA-B4-20230202-SL-26.5 **Sediment** **Sampled: 02/02/23 09:10** (A3A1010-04)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/12/23 09:10	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved	Already Received		

17-Feb-23 12:20
Lori Dufour

C347690

Released By: 2-16-23 Date | Received By: Fed Ex (Shipper) | Date: AK0 ENV-1367

Released By: Fed Ex (Shipper) Date | Received By: JAGDEEP KAUR | Date: 2023/02/17 12:20

7.2|7.2|7.8 ice temp blnk n/a 4.2|4.8|4.2 JDK 2023/02/17

Page 1 of 2

SUBCONTRACT ORDER

Apex Laboratories

A3A1010

AKK 2/15/23

Received 2/6/23@1205 by AJM AKK 2/15/23

Sample Name: MFA-B5-20230203-SL-27.0 **Sediment** **Sampled: 02/03/23 15:00** (A3A1010-05)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/13/23 15:00	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

As Received Composite of -01,-02,-03,-04,-05

Sample Name: MFA-B1-B5-COMP-SL **Sediment** **Sampled: 01/30/23 16:00** (A3A1010-06)

Analysis	Due	Expires	Comments
Subcontract Outside	02/23/23 17:00	07/29/23 16:00	PFAS EPA-1633
Containers Supplied: (C)250 mL Poly (WM) - Non Preserved	Already Received		

After Processing

Sample Name: MFA-SL-Composite After Processing **Sediment** **Sampled: 01/30/23 16:00** (A3A1010-07)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	02/28/23 17:00	01/30/24 16:00	10g - Use L container
1668C PCB Congeners (SUB)	02/28/23 17:00	01/30/24 16:00	10g - Use M container
Containers Supplied: (L)40 mL VOA - Non Preserved			
(M)40 mL VOA - Non Preserved			

Standard TAT

* See Analysis comments for volume provided *

JDK 2023/02/17
~~Ambient blank~~
JDK 2023/02/17
~~13.0/13.2/13.2~~
No custody seal

Released By	Date	Received By	Date
	2-16-23	Fed Ex (Shipper)	
Fed Ex (Shipper)			
Released By	Date	Received By	Date
		Jagdeep Kaur	2023/02/17 12:20

SUBCONTRACT ORDER

Apex Laboratories

A3A1010

17-Feb-23 12:20

Lori Dufour

C347690

AIR 1/30/23

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:

BV Labs / Maxxam
C/O FEDEX DEPOT 299 Cayuga Rd
Cheektowaga, NY 14225
Phone :(800) 668-0639
Fax: (905) 332-9169

KO ENV-1367

International Solid Sample
Heat Treat Required
High Risk material
Controlled Storage and Disposal

Received 1/31/23@1008 by ESJ AKK 3/20/23

Sample Name: MFA-B1-2023013-21.9 **Sediment** **Sampled: 01/30/23 16:00** (A3A1010-01)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/09/23 16:00	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

Received 2/1/23@1200 by SAT

Sample Name: MFA-B3-20230131-31.0 **Sediment** **Sampled: 01/31/23 10:50** (A3A1010-02)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/10/23 10:50	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

Received 2/1/23@1200 by SAT

Sample Name: MFA-B2-20230131-23.0 **Sediment** **Sampled: 01/31/23 09:00** (A3A1010-03)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/10/23 09:00	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

Received 2/3/23@1120 by SAT

Sample Name: MFA-B4-20230202-SL-26.5 **Sediment** **Sampled: 02/02/23 09:10** (A3A1010-04)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/12/23 09:10	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

Already Received

Standard TAT

Released By	Date	Received By	Date
	3/2/23 1255	Fed Ex (Shipper)	2023/02/22
Fed Ex (Shipper)		Ashitha Sukumaran	11:45
Released By	Date	Received By	Date

REFER TO AKK

SUBCONTRACT ORDER

Apex Laboratories

A3A1010

Received 2/6/23@1205 by AJM

Sample Name: MFA-B5-20230203-SL-27.0 **Sediment** **Sampled: 02/03/23 15:00** (A3A1010-05)

Analysis	Due	Expires	Comments
Sample Compositing2	02/01/23 17:00	05/13/23 15:00	BV for PFAS EPA-1633: Composite -01, -02, -03, -04, -05 into -06
Containers Supplied: (E)250 mL Poly (WM) - Non Preserved			

As Received Composite of -01,-02,-03,-04,-05

Sample Name: MFA-B1-B5-COMP-SL **Sediment** **Sampled: 01/30/23 16:00** (A3A1010-06)

Analysis	Due	Expires	Comments
Subcontract Outside	02/23/23 17:00	07/29/23 16:00	PFAS EPA-1633
Containers Supplied: (C)250 mL Poly (WM) - Non Preserved			Already Received

After Processing

Sample Name: MFA-SL-Composite After Processing **Sediment** **Sampled: 01/30/23 16:00** (A3A1010-07)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	02/28/23 17:00	01/30/24 16:00	10g - Use L container
1668C PCB Congeners (SUB)	02/28/23 17:00	01/30/24 16:00	10g - Use M, P containers
Containers Supplied: (L)40 mL VOA - Non Preserved			Already Received
(M)40 mL VOA - Non Preserved			
(P)40 mL VOA - Non Preserved			Additional volume for PCB Cong.

Standard TAT

Released By Date Received By Date

Fed Ex (Shipper) 3/21/23 1255

Released By Date Received By Date

Fed Ex (Shipper) Sue Pugel

Your Project #: A3B0522

Attention: Philip Nerenberg

Apex Laboratories
6700 SW Sandburg St.
Tigard, OR
USA 97223

Report Date: 2023/05/17
Report #: R7632656
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C347713
Received: 2023/02/17, 12:20

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dioxins/Furans in Water (1613B) (1)	5	2023/02/24	2023/02/28	BRL SOP-00410	EPA 1613B m
OC Pesticides in Water by GCTQ	5	2023/02/21	2023/02/24	BRL SOP-00014	EPA Method 1699m
PCB Congeners in Water (1668C)	4	2023/02/23	2023/03/05	BRL SOP-00408	EPA 1668C m
PCB Congeners in Water (1668C)	1	2023/02/23	2023/03/06	BRL SOP-00408	EPA 1668C m
PFAS in water by SPE/LCMS (2)	6	2023/02/23	2023/02/25	CAM SOP-00894	EPA 537.1 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.

(2) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

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:
Lori Dufour, Project Manager
Email: Lori.Dufour@bureauveritas.com
Phone# (905) 817-5700

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VBZ249	VBZ250	VBZ251			
Sampling Date		2023/02/14 10:05	2023/02/14 10:05	2023/02/14 12:51			
	UNITS	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW5-20230214-GW-40	RDL	MDL	QC Batch
Aldrin	ng/L	0.021 U	0.021 U	0.021 U	0.20	0.021	8513671
alpha-BHC	ng/L	0.024 U	0.024 U	0.024 U	0.20	0.024	8513671
delta-BHC	ng/L	0.029 U	0.029 U	0.114 J	0.20	0.029	8513671
beta-BHC	ng/L	0.029 J	0.021 J	0.095 J	0.20	0.014	8513671
Lindane	ng/L	0.033 U	0.033 U	0.033 U	0.20	0.033	8513671
a-Chlordane	ng/L	0.029 U	0.029 U	0.029 U	0.20	0.029	8513671
g-Chlordane	ng/L	0.029 U	0.029 U	0.029 U	0.20	0.029	8513671
Oxychlordane	ng/L	0.028 U	0.028 U	0.028 U	0.20	0.028	8513671
o,p-DDD	ng/L	0.020 U	0.020 U	0.020 U	0.20	0.020	8513671
p,p-DDD	ng/L	0.020 J	0.060 J	0.039 J	0.20	0.014	8513671
o,p-DDE	ng/L	0.016 U	0.016 U	0.016 U	0.20	0.016	8513671
p,p-DDE	ng/L	0.012 U	0.012 U	0.012 J	0.20	0.012	8513671
o,p-DDT	ng/L	0.040 U	0.040 U	0.040 U	0.20	0.040	8513671
p,p-DDT	ng/L	0.050 U	0.050 U	0.084 J	0.20	0.050	8513671
Dieldrin	ng/L	0.050 U	0.050 U	0.061 J	0.20	0.050	8513671
Endosulfan I	ng/L	0.071 J	0.115 J	0.067 U	0.40	0.067	8513671
Endosulfan II	ng/L	0.074 U	0.074 U	0.089 J	0.40	0.074	8513671
Endosulfan sulfate	ng/L	0.070 U	0.070 U	0.070 U	0.20	0.070	8513671
Endrin	ng/L	0.048 J	0.045 U	0.189 J	0.20	0.045	8513671
Endrin aldehyde	ng/L	0.071 U	0.071 U	0.071 U	0.20	0.071	8513671
Endrin ketone	ng/L	0.034 U	0.034 U	0.034 U	0.20	0.034	8513671
Heptachlor	ng/L	0.029 U	0.029 U	0.036 J	0.20	0.029	8513671
Heptachlor epoxide	ng/L	0.015 U	0.015 U	0.015 U	0.20	0.015	8513671
Hexachlorobenzene	ng/L	0.10 U	0.10 U	0.10 U	0.20	0.10	8513671
Methoxychlor	ng/L	0.085 J	0.065 J	0.079 J	0.20	0.040	8513671
Mirex	ng/L	0.021 U	0.021 U	0.032 J	0.20	0.021	8513671
cis-Nonachlor	ng/L	0.037 U	0.037 U	0.037 U	0.20	0.037	8513671
trans-Nonachlor	ng/L	0.044 U	0.044 U	0.044 U	0.20	0.044	8513671
Surrogate Recovery (%)							
13C10-cis Nonachlor	%	76	85	62	N/A	N/A	8513671
13C10-Heptachlor	%	164 (1)	160 (1)	116	N/A	N/A	8513671
13C10-Heptachlor Epoxide	%	105	102	89	N/A	N/A	8513671
13C10-Oxychlordane	%	97	100	81	N/A	N/A	8513671
13C10-trans Nonachlor	%	90	85	76	N/A	N/A	8513671

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) The extracted internal standard analyte exhibited high recovery and as such, may not have allowed for accurate recovery correction of the associated native compound. For results that were not detected (ND), this potential high bias has no impact.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VBZ249	VBZ250	VBZ251			
Sampling Date		2023/02/14 10:05	2023/02/14 10:05	2023/02/14 12:51			
	UNITS	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW5-20230214-GW-40	RDL	MDL	QC Batch
13C12-Endrin	%	115	107	87	N/A	N/A	8513671
13C12-Endrin Ketone	%	69	61	58	N/A	N/A	8513671
13C6-beta BHC	%	70	74	46	N/A	N/A	8513671
13C6-d6-gamma BHC (Lindane	%	79	84	89	N/A	N/A	8513671
13C-Methoxychlor	%	140 (1)	140 (1)	106	N/A	N/A	8513671
13C-pp-DDD	%	93	87	74	N/A	N/A	8513671
13C-pp-DDE	%	81	78	71	N/A	N/A	8513671
13C-pp-DDT	%	78	71	49	N/A	N/A	8513671
C13-Hexachlorobenzene	%	76	74	60	N/A	N/A	8513671

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) The extracted internal standard analyte exhibited high recovery and as such, may not have allowed for accurate recovery correction of the associated native compound. For results that were not detected (ND), this potential high bias has no impact.

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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VBZ251	VBZ252	VBZ253			
Sampling Date		2023/02/14 12:51	2023/02/14 14:37	2023/02/14 16:17			
	UNITS	MW5-20230214-GW-40 Lab-Dup	MW4-20230214-GW-40	MW6-20230214-GW-40.25	RDL	MDL	QC Batch
Aldrin	ng/L	0.054 J	0.021 U	0.034 J	0.20	0.021	8513671
alpha-BHC	ng/L	0.024 U	0.038 J	0.039 J	0.20	0.024	8513671
delta-BHC	ng/L	0.044 J	0.106 J	0.029 U	0.20	0.029	8513671
beta-BHC	ng/L	0.078 J	0.115 J	0.014 U	0.20	0.014	8513671
Lindane	ng/L	0.033 U	0.033 U	0.084 J	0.20	0.033	8513671
a-Chlordane	ng/L	0.029 U	0.029 U	0.029 U	0.20	0.029	8513671
g-Chlordane	ng/L	0.029 U	0.029 U	0.079 J	0.20	0.029	8513671
Oxychlordane	ng/L	0.028 U	0.028 U	0.028 U	0.20	0.028	8513671
o,p-DDD	ng/L	0.020 U	0.043 J	0.089 J	0.20	0.020	8513671
p,p-DDD	ng/L	0.044 J	0.064 J	0.071 J	0.20	0.014	8513671
o,p-DDE	ng/L	0.016 U	0.016 U	0.016 U	0.20	0.016	8513671
p,p-DDE	ng/L	0.018 J	0.012 J	0.019 J	0.20	0.012	8513671
o,p-DDT	ng/L	0.040 U	0.122 J	0.095 J	0.20	0.040	8513671
p,p-DDT	ng/L	0.050 U	0.104 J	0.050 U	0.20	0.050	8513671
Dieldrin	ng/L	0.050 U	0.050 U	0.050 U	0.20	0.050	8513671
Endosulfan I	ng/L	0.067 U	0.075 J	0.124 J	0.40	0.067	8513671
Endosulfan II	ng/L	0.074 U	0.165 J	0.074 U	0.40	0.074	8513671
Endosulfan sulfate	ng/L	0.070 U	0.070 U	0.070 U	0.20	0.070	8513671
Endrin	ng/L	0.118 J	0.101 J	0.133 J	0.20	0.045	8513671
Endrin aldehyde	ng/L	0.071 U	0.071 U	0.071 U	0.20	0.071	8513671
Endrin ketone	ng/L	0.034 U	0.034 U	0.034 U	0.20	0.034	8513671
Heptachlor	ng/L	0.039 J	0.036 J	0.041 J	0.20	0.029	8513671
Heptachlor epoxide	ng/L	0.015 U	0.015 U	0.015 U	0.20	0.015	8513671
Hexachlorobenzene	ng/L	0.10 U	0.10 U	0.10 U	0.20	0.10	8513671
Methoxychlor	ng/L	0.040 U	0.122 J	0.075 J	0.20	0.040	8513671
Mirex	ng/L	0.030 J	0.021 U	0.021 U	0.20	0.021	8513671
cis-Nonachlor	ng/L	0.037 U	0.037 U	0.037 U	0.20	0.037	8513671
trans-Nonachlor	ng/L	0.044 U	0.044 U	0.044 U	0.20	0.044	8513671
Surrogate Recovery (%)							
13C10-cis Nonachlor	%	64	72	65	N/A	N/A	8513671
13C10-Heptachlor	%	111	125 (1)	117	N/A	N/A	8513671
13C10-Heptachlor Epoxide	%	88	99	91	N/A	N/A	8513671
13C10-Oxychlordane	%	82	90	84	N/A	N/A	8513671

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) The extracted internal standard analyte exhibited high recovery and as such, may not have allowed for accurate recovery correction of the associated native compound. For results that were not detected (ND), this potential high bias has no impact.

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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VBZ251	VBZ252	VBZ253			
Sampling Date		2023/02/14 12:51	2023/02/14 14:37	2023/02/14 16:17			
	UNITS	MW5-20230214-GW-40 Lab-Dup	MW4-20230214-GW-40	MW6-20230214-GW-40.25	RDL	MDL	QC Batch
13C10-trans Nonachlor	%	74	83	77	N/A	N/A	8513671
13C12-Endrin	%	85	97	95	N/A	N/A	8513671
13C12-Endrin Ketone	%	61	71	68	N/A	N/A	8513671
13C6-beta BHC	%	45	52	78	N/A	N/A	8513671
13C6-d6-gamma BHC (Lindane	%	50	57	84	N/A	N/A	8513671
13C-Methoxychlor	%	113	120	119	N/A	N/A	8513671
13C-pp-DDD	%	73	85	75	N/A	N/A	8513671
13C-pp-DDE	%	72	82	75	N/A	N/A	8513671
13C-pp-DDT	%	51	59	53	N/A	N/A	8513671
C13-Hexachlorobenzene	%	56	70	61	N/A	N/A	8513671

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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PERFLUOROALKYL SUBSTANCES (WATER)

Bureau Veritas ID		VBZ249	VBZ250	VBZ251			
Sampling Date		2023/02/14 10:05	2023/02/14 10:05	2023/02/14 12:51			
	UNITS	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW5-20230214-GW-40	RDL	MDL	QC Batch
Perfluorobutanoic acid (PFBA)	ug/L	0.023	0.022	0.015 J	0.020	0.0015	8519276
Perfluoropentanoic acid (PFPeA)	ug/L	0.033	0.031	0.026	0.020	0.0025	8519276
Perfluorohexanoic acid (PFHxA)	ug/L	0.046	0.044	0.13	0.020	0.0038	8519276
Perfluoroheptanoic acid (PFHpA)	ug/L	0.068	0.067	0.042	0.020	0.0018	8519276
Perfluorooctanoic acid (PFOA)	ug/L	0.10	0.096	0.060	0.020	0.0030	8519276
Perfluorononanoic acid (PFNA)	ug/L	0.056	0.053	0.017 J	0.020	0.0021	8519276
Perfluorodecanoic acid (PFDA)	ug/L	0.021	0.018 J	0.0057 J	0.020	0.0016	8519276
Perfluoroundecanoic acid (PFUnA)	ug/L	0.0024 U	0.0024 U	0.0024 U	0.020	0.0024	8519276
Perfluorododecanoic acid (PFDoA)	ug/L	0.0029 U	0.0029 U	0.0029 U	0.020	0.0029	8519276
Perfluorotridecanoic acid (PFTRDA)	ug/L	0.0026 U	0.0026 U	0.0026 U	0.020	0.0026	8519276
Perfluorotetradecanoic acid(PFTEDA)	ug/L	0.0016 U	0.0016 U	0.0016 U	0.020	0.0016	8519276
Perfluorobutanesulfonic acid (PFBS)	ug/L	0.0021 U	0.0021 U	0.0021 U	0.020	0.0021	8519276
Perfluoropentanesulfonic acid PFPes	ug/L	0.0023 U	0.0023 U	0.0023 U	0.020	0.0023	8519276
Perfluorohexanesulfonic acid(PFHxS)	ug/L	0.0022 U	0.0022 U	0.0022 U	0.020	0.0022	8519276
Perfluoroheptanesulfonic acid PFHpS	ug/L	0.0039 U	0.0039 U	0.0039 U	0.020	0.0039	8519276
Perfluorooctanesulfonic acid (PFOS)	ug/L	0.0076 J	0.0070 J	0.0035 U	0.020	0.0035	8519276
Perfluorononanesulfonic acid (PFNS)	ug/L	0.0037 U	0.0037 U	0.0037 U	0.020	0.0037	8519276
Perfluorodecanesulfonic acid (PFDS)	ug/L	0.0048 U	0.0048 U	0.0048 U	0.020	0.0048	8519276
Perfluorooctane Sulfonamide (PFOSA	ug/L	0.0034 U	0.0034 U	0.0034 U	0.020	0.0034	8519276
EtFOSA	ug/L	0.0095 U	0.0095 U	0.0095 U	0.020	0.0095	8519276
MeFOSA	ug/L	0.0084 U	0.0084 U	0.0084 U	0.020	0.0084	8519276
EtFOSE	ug/L	0.0070 U	0.0070 U	0.0070 U	0.020	0.0070	8519276
MeFOSE	ug/L	0.0073 U	0.0073 U	0.0073 U	0.020	0.0073	8519276
EtFOSAA	ug/L	0.0046 U	0.0046 U	0.0046 U	0.020	0.0046	8519276
MeFOSAA	ug/L	0.0045 U	0.0045 U	0.0045 U	0.020	0.0045	8519276
4:2 Fluorotelomer sulfonic acid	ug/L	0.0033 U	0.0033 U	0.0033 U	0.020	0.0033	8519276
6:2 Fluorotelomer sulfonic acid	ug/L	0.0015 U	0.0015 U	0.0015 U	0.020	0.0015	8519276
8:2 Fluorotelomer sulfonic acid	ug/L	0.0031 U	0.0031 U	0.0031 U	0.020	0.0031	8519276
Hexafluoropropyleneoxide dimer acid	ug/L	0.0052 U	0.0052 U	0.0052 U	0.020	0.0052	8519276
4,8-Dioxa-3H-perfluorononanoic acid	ug/L	0.0027 U	0.0027 U	0.0027 U	0.020	0.0027	8519276
9Cl-PF3ONS (F-53B Major)	ug/L	0.0043 U	0.0043 U	0.0043 U	0.020	0.0043	8519276
11Cl-PF3OUdS (F-53B Minor)	ug/L	0.0035 U	0.0035 U	0.0035 U	0.020	0.0035	8519276
Surrogate Recovery (%)							
13C2-4:2-Fluorotelomersulfonic Acid	%	86	87	86	N/A	N/A	8519276
13C2-6:2-Fluorotelomersulfonic Acid	%	88	88	86	N/A	N/A	8519276
13C2-8:2-Fluorotelomersulfonic Acid	%	83	86	78	N/A	N/A	8519276

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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PERFLUOROALKYL SUBSTANCES (WATER)

Bureau Veritas ID		VBZ249	VBZ250	VBZ251			
Sampling Date		2023/02/14 10:05	2023/02/14 10:05	2023/02/14 12:51			
	UNITS	MW3-20230214-GW-35	MW3-20230214-GW-35-DUP	MW5-20230214-GW-40	RDL	MDL	QC Batch
13C2-Perfluorodecanoic acid	%	81	81	74	N/A	N/A	8519276
13C2-Perfluorododecanoic acid	%	73	74	63	N/A	N/A	8519276
13C2-Perfluorohexanoic acid	%	83	85	81	N/A	N/A	8519276
13C2-perfluorotetradecanoic acid	%	68	69	58	N/A	N/A	8519276
13C2-Perfluoroundecanoic acid	%	74	76	65	N/A	N/A	8519276
13C3-HFPO-DA	%	83	83	82	N/A	N/A	8519276
13C3-Perfluorobutanesulfonic acid	%	84	86	82	N/A	N/A	8519276
13C4-Perfluorobutanoic acid	%	87	88	87	N/A	N/A	8519276
13C4-Perfluoroheptanoic acid	%	84	86	84	N/A	N/A	8519276
13C4-Perfluorooctanesulfonic acid	%	83	83	76	N/A	N/A	8519276
13C4-Perfluorooctanoic acid	%	81	85	81	N/A	N/A	8519276
13C5-Perfluorononanoic acid	%	82	85	79	N/A	N/A	8519276
13C5-Perfluoropentanoic acid	%	85	87	84	N/A	N/A	8519276
13C8-Perfluorooctane Sulfonamide	%	73	73	61	N/A	N/A	8519276
18O2-Perfluorohexanesulfonic acid	%	84	87	81	N/A	N/A	8519276
D3-MeFOSA	%	54	52	44 (1)	N/A	N/A	8519276
D3-MeFOSAA	%	72	75	64	N/A	N/A	8519276
D5-EtFOSA	%	56	51	43 (2)	N/A	N/A	8519276
D5-EtFOSAA	%	73	71	60	N/A	N/A	8519276
D7-MeFOSE	%	66	62	57	N/A	N/A	8519276
D9-EtFOSE	%	65	66	56	N/A	N/A	8519276

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL) which may result in increased variability of the associated native analyte result (MeFOSA).
(2) Extracted internal standard analyte recovery was below the defined lower control limit (LCL) which may result in increased variability of the associated native analyte result (EtFOSA).

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PERFLUOROALKYL SUBSTANCES (WATER)

Bureau Veritas ID		VBZ252	VBZ253	VBZ254			
Sampling Date		2023/02/14 14:37	2023/02/14 16:17	2023/02/14 16:10			
	UNITS	MW4-20230214-GW-40	MW6-20230214-GW-40.25	FIELD BLANK-02	RDL	MDL	QC Batch
Perfluorobutanoic acid (PFBA)	ug/L	0.0015 U	0.0098 J	0.0015 U	0.020	0.0015	8519276
Perfluoropentanoic acid (PFPeA)	ug/L	0.012 J	0.022	0.0025 U	0.020	0.0025	8519276
Perfluorohexanoic acid (PFHxA)	ug/L	0.16	0.076	0.0038 U	0.020	0.0038	8519276
Perfluoroheptanoic acid (PFHpA)	ug/L	0.0087 J	0.049	0.0018 U	0.020	0.0018	8519276
Perfluorooctanoic acid (PFOA)	ug/L	0.025	0.083	0.0030 U	0.020	0.0030	8519276
Perfluorononanoic acid (PFNA)	ug/L	0.0030 J	0.038	0.0021 U	0.020	0.0021	8519276
Perfluorodecanoic acid (PFDA)	ug/L	0.0016 U	0.012 J	0.0016 U	0.020	0.0016	8519276
Perfluoroundecanoic acid (PFUnA)	ug/L	0.0024 U	0.0024 U	0.0024 U	0.020	0.0024	8519276
Perfluorododecanoic acid (PFDoA)	ug/L	0.0029 U	0.0029 U	0.0029 U	0.020	0.0029	8519276
Perfluorotridecanoic acid (PFTRDA)	ug/L	0.0026 U	0.0026 U	0.0026 U	0.020	0.0026	8519276
Perfluorotetradecanoic acid(PFTEDA)	ug/L	0.0016 U	0.0016 U	0.0016 U	0.020	0.0016	8519276
Perfluorobutanesulfonic acid (PFBS)	ug/L	0.0037 J	0.0028 J	0.0021 U	0.020	0.0021	8519276
Perfluoropentanesulfonic acid PFPes	ug/L	0.0023 U	0.0023 U	0.0023 U	0.020	0.0023	8519276
Perfluorohexanesulfonic acid(PFHxS)	ug/L	0.0022 U	0.0022 U	0.0022 U	0.020	0.0022	8519276
Perfluoroheptanesulfonic acid PFHpS	ug/L	0.0039 U	0.0039 U	0.0039 U	0.020	0.0039	8519276
Perfluorooctanesulfonic acid (PFOS)	ug/L	0.0035 U	0.012 J	0.0035 U	0.020	0.0035	8519276
Perfluorononanesulfonic acid (PFNS)	ug/L	0.0037 U	0.0037 U	0.0037 U	0.020	0.0037	8519276
Perfluorodecanesulfonic acid (PFDS)	ug/L	0.0048 U	0.0048 U	0.0048 U	0.020	0.0048	8519276
Perfluorooctane Sulfonamide (PFOSA	ug/L	0.0034 U	0.0034 U	0.0034 U	0.020	0.0034	8519276
EtFOSA	ug/L	0.0095 U	0.0095 U	0.0095 U	0.020	0.0095	8519276
MeFOSA	ug/L	0.0084 U	0.0084 U	0.0084 U	0.020	0.0084	8519276
EtFOSE	ug/L	0.0070 U	0.0070 U	0.0070 U	0.020	0.0070	8519276
MeFOSE	ug/L	0.0073 U	0.0073 U	0.0073 U	0.020	0.0073	8519276
EtFOSAA	ug/L	0.0046 U	0.0046 U	0.0046 U	0.020	0.0046	8519276
MeFOSAA	ug/L	0.0045 U	0.0045 U	0.0045 U	0.020	0.0045	8519276
4:2 Fluorotelomer sulfonic acid	ug/L	0.0033 U	0.0033 U	0.0033 U	0.020	0.0033	8519276
6:2 Fluorotelomer sulfonic acid	ug/L	0.0015 U	0.0021 J	0.0015 U	0.020	0.0015	8519276
8:2 Fluorotelomer sulfonic acid	ug/L	0.0031 U	0.0059 J	0.0031 U	0.020	0.0031	8519276
Hexafluoropropyleneoxide dimer acid	ug/L	0.0052 U	0.0052 U	0.0052 U	0.020	0.0052	8519276
4,8-Dioxa-3H-perfluorononanoic acid	ug/L	0.0027 U	0.0027 U	0.0027 U	0.020	0.0027	8519276
9Cl-PF3ONS (F-53B Major)	ug/L	0.0043 U	0.0043 U	0.0043 U	0.020	0.0043	8519276
11Cl-PF3OUdS (F-53B Minor)	ug/L	0.0035 U	0.0035 U	0.0035 U	0.020	0.0035	8519276
Surrogate Recovery (%)							
13C2-4:2-Fluorotelomersulfonic Acid	%	83	93	94	N/A	N/A	8519276
13C2-6:2-Fluorotelomersulfonic Acid	%	87	96	93	N/A	N/A	8519276
13C2-8:2-Fluorotelomersulfonic Acid	%	82	88	84	N/A	N/A	8519276

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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PERFLUOROALKYL SUBSTANCES (WATER)

Bureau Veritas ID		VBZ252	VBZ253	VBZ254			
Sampling Date		2023/02/14 14:37	2023/02/14 16:17	2023/02/14 16:10			
	UNITS	MW4-20230214-GW-40	MW6-20230214-GW-40.25	FIELD BLANK-02	RDL	MDL	QC Batch
13C2-Perfluorodecanoic acid	%	77	82	82	N/A	N/A	8519276
13C2-Perfluorododecanoic acid	%	69	71	74	N/A	N/A	8519276
13C2-Perfluorohexanoic acid	%	80	88	85	N/A	N/A	8519276
13C2-perfluorotetradecanoic acid	%	65	66	73	N/A	N/A	8519276
13C2-Perfluoroundecanoic acid	%	71	74	76	N/A	N/A	8519276
13C3-HFPO-DA	%	79	85	83	N/A	N/A	8519276
13C3-Perfluorobutanesulfonic acid	%	80	89	79	N/A	N/A	8519276
13C4-Perfluorobutanoic acid	%	86	93	87	N/A	N/A	8519276
13C4-Perfluoroheptanoic acid	%	83	90	87	N/A	N/A	8519276
13C4-Perfluorooctanesulfonic acid	%	78	87	81	N/A	N/A	8519276
13C4-Perfluorooctanoic acid	%	82	89	84	N/A	N/A	8519276
13C5-Perfluorononanoic acid	%	80	87	83	N/A	N/A	8519276
13C5-Perfluoropentanoic acid	%	83	84	87	N/A	N/A	8519276
13C8-Perfluorooctane Sulfonamide	%	63	70	75	N/A	N/A	8519276
18O2-Perfluorohexanesulfonic acid	%	82	91	82	N/A	N/A	8519276
D3-MeFOSA	%	47 (1)	51	56	N/A	N/A	8519276
D3-MeFOSAA	%	74	72	72	N/A	N/A	8519276
D5-EtFOSA	%	47 (2)	53	58	N/A	N/A	8519276
D5-EtFOSAA	%	70	66	70	N/A	N/A	8519276
D7-MeFOSE	%	60	64	67	N/A	N/A	8519276
D9-EtFOSE	%	60	64	70	N/A	N/A	8519276

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL) which may result in increased variability of the associated native analyte result (MeFOSA).
(2) Extracted internal standard analyte recovery was below the defined lower control limit (LCL) which may result in increased variability of the associated native analyte result (EtFOSA).

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VBZ249							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	1.37 U	1.37	9.26	1.45	1.00	1.37	0	8524619
1,2,3,7,8-Penta CDD *	pg/L	0.983 U	0.983	46.3	1.86	1.00	0.983	0	8524619
1,2,3,4,7,8-Hexa CDD *	pg/L	0.979 U	0.979	46.3	2.25	0.100	0.0979	0	8524619
1,2,3,6,7,8-Hexa CDD *	pg/L	1.01 U	1.01	46.3	1.40	0.100	0.101	0	8524619
1,2,3,7,8,9-Hexa CDD *	pg/L	0.924 U	0.924	46.3	1.13	0.100	0.0924	0	8524619
1,2,3,4,6,7,8-Hepta CDD *	pg/L	1.00 U	1.00	46.3	1.90	0.0100	0.0100	0	8524619
Octa CDD *	pg/L	2.11 J	0.995	92.6	3.13	0.000300	0.000633	1	8524619
Total Tetra CDD *	pg/L	1.37 U	1.37	9.26	4.00	N/A	N/A	0	8524619
Total Penta CDD *	pg/L	0.983 U	0.983	46.3	4.00	N/A	N/A	0	8524619
Total Hexa CDD *	pg/L	0.969 U	0.969	46.3	4.00	N/A	N/A	0	8524619
Total Hepta CDD *	pg/L	1.00 U	1.00	46.3	4.00	N/A	N/A	0	8524619
2,3,7,8-Tetra CDF **	pg/L	0.994 U	0.994	9.26	1.68	0.100	0.0994	0	8524619
1,2,3,7,8-Penta CDF **	pg/L	1.19 U	1.19	46.3	1.33	0.0300	0.0357	0	8524619
2,3,4,7,8-Penta CDF **	pg/L	1.02 U	1.02	46.3	1.23	0.300	0.306	0	8524619
1,2,3,4,7,8-Hexa CDF **	pg/L	0.815 U	0.815	46.3	1.85	0.100	0.0815	0	8524619
1,2,3,6,7,8-Hexa CDF **	pg/L	0.817 U	0.817	46.3	1.52	0.100	0.0817	0	8524619
2,3,4,6,7,8-Hexa CDF **	pg/L	0.738 U	0.738	46.3	1.97	0.100	0.0738	0	8524619
1,2,3,7,8,9-Hexa CDF **	pg/L	0.894 U	0.894	46.3	1.66	0.100	0.0894	0	8524619
1,2,3,4,6,7,8-Hepta CDF **	pg/L	0.815 U	0.815	46.3	2.00	0.0100	0.00815	0	8524619
1,2,3,4,7,8,9-Hepta CDF **	pg/L	0.888 U	0.888	46.3	1.87	0.0100	0.00888	0	8524619
Octa CDF **	pg/L	0.840 U	0.840	92.6	3.99	0.000300	0.000252	0	8524619
Total Tetra CDF **	pg/L	0.994 U	0.994	9.26	4.00	N/A	N/A	0	8524619
Total Penta CDF **	pg/L	1.10 U	1.10	46.3	4.00	N/A	N/A	0	8524619
Total Hexa CDF **	pg/L	0.813 U	0.813	46.3	4.00	N/A	N/A	0	8524619
Total Hepta CDF **	pg/L	0.849 U	0.849	46.3	4.00	N/A	N/A	0	8524619
TOTAL TOXIC EQUIVALENC	pg/L	N/A	N/A	N/A	N/A	N/A	3.44	N/A	N/A
Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234678 HeptaCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234678 HeptaCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8524619

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VBZ249							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-123478 HexaCDD *	%	101	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123478 HexaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234789 HeptaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDF **	%	95	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDD *	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123789 HexaCDF **	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-234678 HexaCDF **	%	106	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-23478 PentaCDF **	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDD *	%	80	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-OCDD *	%	103	N/A	N/A	N/A	N/A	N/A	N/A	8524619

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

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

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VBZ250							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	1.42 U	1.42	9.35	1.45	1.00	1.42	0	8524619
1,2,3,7,8-Penta CDD *	pg/L	1.10 U	1.10	46.7	1.86	1.00	1.10	0	8524619
1,2,3,4,7,8-Hexa CDD *	pg/L	1.04 U	1.04	46.7	2.25	0.100	0.104	0	8524619
1,2,3,6,7,8-Hexa CDD *	pg/L	1.03 U	1.03	46.7	1.40	0.100	0.103	0	8524619
1,2,3,7,8,9-Hexa CDD *	pg/L	0.964 U	0.964	46.7	1.13	0.100	0.0964	0	8524619
1,2,3,4,6,7,8-Hepta CDD *	pg/L	1.03 U	1.03	46.7	1.90	0.0100	0.0103	0	8524619
Octa CDD *	pg/L	3.24 J	1.12	93.5	3.13	0.000300	0.000972	1	8524619
Total Tetra CDD *	pg/L	1.42 U	1.42	9.35	4.00	N/A	N/A	0	8524619
Total Penta CDD *	pg/L	1.10 U	1.10	46.7	4.00	N/A	N/A	0	8524619
Total Hexa CDD *	pg/L	1.06 U	1.06	46.7	4.00	N/A	N/A	0	8524619
Total Hepta CDD *	pg/L	1.43 U	1.43	46.7	4.00	N/A	N/A	0	8524619
2,3,7,8-Tetra CDF **	pg/L	1.02 U	1.02	9.35	1.68	0.100	0.102	0	8524619
1,2,3,7,8-Penta CDF **	pg/L	1.29 U	1.29	46.7	1.33	0.0300	0.0387	0	8524619
2,3,4,7,8-Penta CDF **	pg/L	1.08 U	1.08	46.7	1.23	0.300	0.324	0	8524619
1,2,3,4,7,8-Hexa CDF **	pg/L	0.879 U	0.879	46.7	1.85	0.100	0.0879	0	8524619
1,2,3,6,7,8-Hexa CDF **	pg/L	0.908 U	0.908	46.7	1.52	0.100	0.0908	0	8524619
2,3,4,6,7,8-Hexa CDF **	pg/L	0.805 U	0.805	46.7	1.97	0.100	0.0805	0	8524619
1,2,3,7,8,9-Hexa CDF **	pg/L	0.973 U	0.973	46.7	1.66	0.100	0.0973	0	8524619
1,2,3,4,6,7,8-Hepta CDF **	pg/L	0.893 U	0.893	46.7	2.00	0.0100	0.00893	0	8524619
1,2,3,4,7,8,9-Hepta CDF **	pg/L	0.955 U	0.955	46.7	1.87	0.0100	0.00955	0	8524619
Octa CDF **	pg/L	0.989 U	0.989	93.5	3.99	0.000300	0.000297	0	8524619
Total Tetra CDF **	pg/L	1.02 U	1.02	9.35	4.00	N/A	N/A	0	8524619
Total Penta CDF **	pg/L	1.18 U	1.18	46.7	4.00	N/A	N/A	0	8524619
Total Hexa CDF **	pg/L	0.888 U	0.888	46.7	4.00	N/A	N/A	0	8524619
Total Hepta CDF **	pg/L	0.923 U	0.923	46.7	4.00	N/A	N/A	0	8524619
TOTAL TOXIC EQUIVALENC	pg/L	N/A	N/A	N/A	N/A	N/A	3.67	N/A	N/A
Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	86	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234678 HeptaCDD *	%	101	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234678 HeptaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8524619

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VBZ250							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-123478 HexaCDD *	%	102	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123478 HexaCDF **	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234789 HeptaCDF **	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDD *	%	102	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDF **	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123789 HexaCDF **	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-234678 HexaCDF **	%	107	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-23478 PentaCDF **	%	99	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDD *	%	82	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDF **	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-OCDD *	%	104	N/A	N/A	N/A	N/A	N/A	N/A	8524619

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VBZ251							
Sampling Date		2023/02/14 12:51				TOXIC EQUIVALENCY		# of	
	UNITS	MW5-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	1.47 U	1.47	9.26	1.45	1.00	1.47	0	8524619
1,2,3,7,8-Penta CDD *	pg/L	1.08 U	1.08	46.3	1.86	1.00	1.08	0	8524619
1,2,3,4,7,8-Hexa CDD *	pg/L	1.05 U	1.05	46.3	2.25	0.100	0.105	0	8524619
1,2,3,6,7,8-Hexa CDD *	pg/L	1.04 U	1.04	46.3	1.40	0.100	0.104	0	8524619
1,2,3,7,8,9-Hexa CDD *	pg/L	0.972 U	0.972	46.3	1.13	0.100	0.0972	0	8524619
1,2,3,4,6,7,8-Hepta CDD *	pg/L	1.01 U	1.01	46.3	1.90	0.0100	0.0101	0	8524619
Octa CDD *	pg/L	1.44 U	1.44	92.6	3.13	0.000300	0.000432	0	8524619
Total Tetra CDD *	pg/L	1.47 U	1.47	9.26	4.00	N/A	N/A	0	8524619
Total Penta CDD *	pg/L	1.08 U	1.08	46.3	4.00	N/A	N/A	0	8524619
Total Hexa CDD *	pg/L	1.02 U	1.02	46.3	4.00	N/A	N/A	0	8524619
Total Hepta CDD *	pg/L	1.01 U	1.01	46.3	4.00	N/A	N/A	0	8524619
2,3,7,8-Tetra CDF **	pg/L	1.02 U	1.02	9.26	1.68	0.100	0.102	0	8524619
1,2,3,7,8-Penta CDF **	pg/L	1.30 U	1.30	46.3	1.33	0.0300	0.0390	0	8524619
2,3,4,7,8-Penta CDF **	pg/L	1.11 U	1.11	46.3	1.23	0.300	0.333	0	8524619
1,2,3,4,7,8-Hexa CDF **	pg/L	0.944 U	0.944	46.3	1.85	0.100	0.0944	0	8524619
1,2,3,6,7,8-Hexa CDF **	pg/L	0.944 U	0.944	46.3	1.52	0.100	0.0944	0	8524619
2,3,4,6,7,8-Hexa CDF **	pg/L	0.830 U	0.830	46.3	1.97	0.100	0.0830	0	8524619
1,2,3,7,8,9-Hexa CDF **	pg/L	1.03 U	1.03	46.3	1.66	0.100	0.103	0	8524619
1,2,3,4,6,7,8-Hepta CDF **	pg/L	0.893 U	0.893	46.3	2.00	0.0100	0.00893	0	8524619
1,2,3,4,7,8,9-Hepta CDF **	pg/L	0.975 U	0.975	46.3	1.87	0.0100	0.00975	0	8524619
Octa CDF **	pg/L	0.959 U	0.959	92.6	3.99	0.000300	0.000288	0	8524619
Total Tetra CDF **	pg/L	1.02 U	1.02	9.26	4.00	N/A	N/A	0	8524619
Total Penta CDF **	pg/L	1.20 U	1.20	46.3	4.00	N/A	N/A	0	8524619
Total Hexa CDF **	pg/L	0.933 U	0.933	46.3	4.00	N/A	N/A	0	8524619
Total Hepta CDF **	pg/L	0.932 U	0.932	46.3	4.00	N/A	N/A	0	8524619
TOTAL TOXIC EQUIVALENC	pg/L	N/A	N/A	N/A	N/A	N/A	3.73	N/A	N/A
Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	81	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234678 HeptaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234678 HeptaCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	8524619

EDL = Estimated Detection Limit
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TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
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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
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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VBZ251							
Sampling Date		2023/02/14 12:51				TOXIC EQUIVALENCY		# of	
	UNITS	MW5-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-123478 HexaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123478 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234789 HeptaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDD *	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDF **	%	82	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123789 HexaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-234678 HexaCDF **	%	101	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-23478 PentaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDD *	%	73	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDF **	%	87	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-OCDD *	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8524619

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TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

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* CDD = Chloro Dibenzo-p-Dioxin

N/A = Not Applicable

** CDF = Chloro Dibenzo-p-Furan

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VBZ252							
Sampling Date		2023/02/14 14:37				TOXIC EQUIVALENCY		# of	
	UNITS	MW4-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	1.50 U	1.50	9.80	1.45	1.00	1.50	0	8524619
1,2,3,7,8-Penta CDD *	pg/L	1.15 U	1.15	49.0	1.86	1.00	1.15	0	8524619
1,2,3,4,7,8-Hexa CDD *	pg/L	1.05 U	1.05	49.0	2.25	0.100	0.105	0	8524619
1,2,3,6,7,8-Hexa CDD *	pg/L	1.01 U	1.01	49.0	1.40	0.100	0.101	0	8524619
1,2,3,7,8,9-Hexa CDD *	pg/L	0.959 U	0.959	49.0	1.13	0.100	0.0959	0	8524619
1,2,3,4,6,7,8-Hepta CDD *	pg/L	1.06 U	1.06	49.0	1.90	0.0100	0.0106	0	8524619
Octa CDD *	pg/L	4.17 U (1)	4.17	98.0	3.13	0.000300	0.00125	0	8524619
Total Tetra CDD *	pg/L	1.50 U	1.50	9.80	4.00	N/A	N/A	0	8524619
Total Penta CDD *	pg/L	1.15 U	1.15	49.0	4.00	N/A	N/A	0	8524619
Total Hexa CDD *	pg/L	1.01 U	1.01	49.0	4.00	N/A	N/A	0	8524619
Total Hepta CDD *	pg/L	1.06 U	1.06	49.0	4.00	N/A	N/A	0	8524619
2,3,7,8-Tetra CDF **	pg/L	1.07 U	1.07	9.80	1.68	0.100	0.107	0	8524619
1,2,3,7,8-Penta CDF **	pg/L	1.33 U	1.33	49.0	1.33	0.0300	0.0399	0	8524619
2,3,4,7,8-Penta CDF **	pg/L	1.10 U	1.10	49.0	1.23	0.300	0.330	0	8524619
1,2,3,4,7,8-Hexa CDF **	pg/L	0.937 U	0.937	49.0	1.85	0.100	0.0937	0	8524619
1,2,3,6,7,8-Hexa CDF **	pg/L	0.922 U	0.922	49.0	1.52	0.100	0.0922	0	8524619
2,3,4,6,7,8-Hexa CDF **	pg/L	0.827 U	0.827	49.0	1.97	0.100	0.0827	0	8524619
1,2,3,7,8,9-Hexa CDF **	pg/L	0.995 U	0.995	49.0	1.66	0.100	0.0995	0	8524619
1,2,3,4,6,7,8-Hepta CDF **	pg/L	0.880 U	0.880	49.0	2.00	0.0100	0.00880	0	8524619
1,2,3,4,7,8,9-Hepta CDF **	pg/L	0.954 U	0.954	49.0	1.87	0.0100	0.00954	0	8524619
Octa CDF **	pg/L	1.03 U	1.03	98.0	3.99	0.000300	0.000309	0	8524619
Total Tetra CDF **	pg/L	1.07 U	1.07	9.80	4.00	N/A	N/A	0	8524619
Total Penta CDF **	pg/L	1.21 U	1.21	49.0	4.00	N/A	N/A	0	8524619
Total Hexa CDF **	pg/L	0.917 U	0.917	49.0	4.00	N/A	N/A	0	8524619
Total Hepta CDF **	pg/L	0.915 U	0.915	49.0	4.00	N/A	N/A	0	8524619
TOTAL TOXIC EQUIVALENC	pg/L	N/A	N/A	N/A	N/A	N/A	3.83	N/A	N/A
Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	78	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234678 HeptaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8524619

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
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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.

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VBZ252							
Sampling Date		2023/02/14 14:37				TOXIC EQUIVALENCY		# of	
	UNITS	MW4-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123478 HexaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123478 HexaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234789 HeptaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123789 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-234678 HexaCDF **	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-23478 PentaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDD *	%	69	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-OCDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	8524619

EDL = Estimated Detection Limit

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TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,

The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

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

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VBZ253							
Sampling Date		2023/02/14 16:17				TOXIC EQUIVALENCY		# of	
	UNITS	MW6-20230214-GW-40.25	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	1.54 U	1.54	10.5	1.45	1.00	1.54	0	8524619
1,2,3,7,8-Penta CDD *	pg/L	1.34 U	1.34	52.6	1.86	1.00	1.34	0	8524619
1,2,3,4,7,8-Hexa CDD *	pg/L	1.25 U	1.25	52.6	2.25	0.100	0.125	0	8524619
1,2,3,6,7,8-Hexa CDD *	pg/L	1.21 U	1.21	52.6	1.40	0.100	0.121	0	8524619
1,2,3,7,8,9-Hexa CDD *	pg/L	1.14 U	1.14	52.6	1.13	0.100	0.114	0	8524619
1,2,3,4,6,7,8-Hepta CDD *	pg/L	1.39 U	1.39	52.6	1.90	0.0100	0.0139	0	8524619
Octa CDD *	pg/L	7.62 J	1.38	105	3.13	0.000300	0.00229	1	8524619
Total Tetra CDD *	pg/L	1.54 U	1.54	10.5	4.00	N/A	N/A	0	8524619
Total Penta CDD *	pg/L	1.34 U	1.34	52.6	4.00	N/A	N/A	0	8524619
Total Hexa CDD *	pg/L	1.20 U	1.20	52.6	4.00	N/A	N/A	0	8524619
Total Hepta CDD *	pg/L	1.45 U	1.45	52.6	4.00	N/A	N/A	0	8524619
2,3,7,8-Tetra CDF **	pg/L	1.03 U	1.03	10.5	1.68	0.100	0.103	0	8524619
1,2,3,7,8-Penta CDF **	pg/L	1.43 U	1.43	52.6	1.33	0.0300	0.0429	0	8524619
2,3,4,7,8-Penta CDF **	pg/L	1.23 U	1.23	52.6	1.23	0.300	0.369	0	8524619
1,2,3,4,7,8-Hexa CDF **	pg/L	0.994 U	0.994	52.6	1.85	0.100	0.0994	0	8524619
1,2,3,6,7,8-Hexa CDF **	pg/L	0.986 U	0.986	52.6	1.52	0.100	0.0986	0	8524619
2,3,4,6,7,8-Hexa CDF **	pg/L	0.898 U	0.898	52.6	1.97	0.100	0.0898	0	8524619
1,2,3,7,8,9-Hexa CDF **	pg/L	1.12 U	1.12	52.6	1.66	0.100	0.112	0	8524619
1,2,3,4,6,7,8-Hepta CDF **	pg/L	0.975 U	0.975	52.6	2.00	0.0100	0.00975	0	8524619
1,2,3,4,7,8,9-Hepta CDF **	pg/L	1.05 U	1.05	52.6	1.87	0.0100	0.0105	0	8524619
Octa CDF **	pg/L	1.21 U	1.21	105	3.99	0.000300	0.000363	0	8524619
Total Tetra CDF **	pg/L	1.03 U	1.03	10.5	4.00	N/A	N/A	0	8524619
Total Penta CDF **	pg/L	1.32 U	1.32	52.6	4.00	N/A	N/A	0	8524619
Total Hexa CDF **	pg/L	0.995 U	0.995	52.6	4.00	N/A	N/A	0	8524619
Total Hepta CDF **	pg/L	1.01 U	1.01	52.6	4.00	N/A	N/A	0	8524619
TOTAL TOXIC EQUIVALENC	pg/L	N/A	N/A	N/A	N/A	N/A	4.19	N/A	N/A
Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234678 HeptaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234678 HeptaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	8524619

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TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
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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

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VBZ253							
Sampling Date		2023/02/14 16:17				TOXIC EQUIVALENCY		# of	
	UNITS	MW6-20230214-GW-40.25	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-123478 HexaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123478 HexaCDF **	%	95	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234789 HeptaCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDD *	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDF **	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123789 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-234678 HexaCDF **	%	103	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-23478 PentaCDF **	%	95	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDD *	%	83	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDF **	%	105	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-OCDD *	%	95	N/A	N/A	N/A	N/A	N/A	N/A	8524619

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N/A = Not Applicable

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ249							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2-MonoCB-(1)	ng/L	0.013 J	0.011	0.020	0.0098	N/A	N/A	1	8533813
3-MonoCB-(2)	ng/L	0.011 U	0.011	0.020	0.0079	N/A	N/A	1	8533813
4-MonoCB-(3)	ng/L	0.0095 U	0.0095	0.050	0.0071	N/A	N/A	1	8533813
22'-DiCB-(4)	ng/L	0.0100 J	0.0074	0.050	0.017	N/A	N/A	1	8533813
2,3-DiCB-(5)	ng/L	0.0032 U	0.0032	0.050	0.012	N/A	N/A	1	8533813
2,3'-DiCB-(6)	ng/L	0.0031 U	0.0031	0.020	0.0053	N/A	N/A	1	8533813
2,4-DiCB-(7)	ng/L	0.0031 U	0.0031	0.020	0.0056	N/A	N/A	1	8533813
2,4'-DiCB-(8)	ng/L	0.0030 U	0.0030	0.050	0.017	N/A	N/A	1	8533813
2,5-DiCB-(9)	ng/L	0.0031 U	0.0031	0.020	0.0044	N/A	N/A	1	8533813
2,6-DiCB-(10)	ng/L	0.0039 U	0.0039	0.050	0.0052	N/A	N/A	1	8533813
3,3'-DiCB-(11)	ng/L	0.0032 U	0.0032	0.20	0.0090	N/A	N/A	1	8533813
DiCB-(12)+(13)	ng/L	0.0029 U	0.0029	0.050	0.015	N/A	N/A	1	8533813
3,5-DiCB-(14)	ng/L	0.0032 U	0.0032	0.020	0.0082	N/A	N/A	1	8533813
4,4'-DiCB-(15)	ng/L	0.0027 U	0.0027	0.050	0.011	N/A	N/A	1	8533813
22'3-TriCB-(16)	ng/L	0.0071 U	0.0071	0.050	0.0060	N/A	N/A	1	8533813
22'4-TriCB-(17)	ng/L	0.0057 U	0.0057	0.020	0.0091	N/A	N/A	1	8533813
TriCB-(18)+(30)	ng/L	0.0049 U	0.0049	0.050	0.017	N/A	N/A	1	8533813
22'6-TriCB-(19)	ng/L	0.0090 U	0.0090	0.020	0.0061	N/A	N/A	1	8533813
TriCB-(20) + (28)	ng/L	0.0033 U	0.0033	0.050	0.010	N/A	N/A	1	8533813
TriCB-(21)+(33)	ng/L	0.0036 U	0.0036	0.050	0.011	N/A	N/A	1	8533813
234'-TriCB-(22)	ng/L	0.0037 U	0.0037	0.020	0.0065	N/A	N/A	1	8533813
235-TriCB-(23)	ng/L	0.0037 U	0.0037	0.020	0.0072	N/A	N/A	1	8533813
236-TriCB-(24)	ng/L	0.0045 U	0.0045	0.020	0.0043	N/A	N/A	1	8533813
23'4-TriCB-(25)	ng/L	0.0037 U	0.0037	0.020	0.0054	N/A	N/A	1	8533813
TriCB-(26)+(29)	ng/L	0.0034 U	0.0034	0.050	0.013	N/A	N/A	1	8533813
23'6-TriCB-(27)	ng/L	0.0042 U	0.0042	0.020	0.0082	N/A	N/A	1	8533813
24'5-TriCB-(31)	ng/L	0.0032 U	0.0032	0.050	0.0078	N/A	N/A	1	8533813
24'6-TriCB-(32)	ng/L	0.0040 U	0.0040	0.020	0.0087	N/A	N/A	1	8533813
23'5'-TriCB-(34)	ng/L	0.0036 U	0.0036	0.020	0.0061	N/A	N/A	1	8533813
33'4-TriCB-(35)	ng/L	0.0035 U	0.0035	0.020	0.0042	N/A	N/A	1	8533813
33'5-TriCB-(36)	ng/L	0.0032 U	0.0032	0.020	0.0052	N/A	N/A	1	8533813
344'-TriCB-(37)	ng/L	0.0032 U	0.0032	0.020	0.0041	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ249							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
345-TriCB-(38)	ng/L	0.0034 U	0.0034	0.020	0.0047	N/A	N/A	1	8533813
34'5-TriCB-(39)	ng/L	0.0036 U	0.0036	0.020	0.0059	N/A	N/A	1	8533813
TetraCB-(40)+(41)+(71)	ng/L	0.011 U	0.011	0.10	0.035	N/A	N/A	1	8533813
22'34'-TetraCB-(42)	ng/L	0.015 U	0.015	0.050	0.011	N/A	N/A	1	8533813
22'35-TetraCB-(43)	ng/L	0.014 U	0.014	0.050	0.015	N/A	N/A	1	8533813
TetraCB-(44)+(47)+(65)	ng/L	0.019 J	0.010	0.10	0.029	N/A	N/A	1	8533813
TetraCB-(45)+(51)	ng/L	0.011 U	0.011	0.050	0.011	N/A	N/A	1	8533813
22'36'-TetraCB-(46)	ng/L	0.012 U	0.012	0.020	0.014	N/A	N/A	1	8533813
22'45-TetraCB-(48)	ng/L	0.011 U	0.011	0.050	0.017	N/A	N/A	1	8533813
TetraCB-(49)+TetraCB-(69)	ng/L	0.0097 U	0.0097	0.10	0.023	N/A	N/A	1	8533813
TetraCB-(50)+(53)	ng/L	0.011 U	0.011	0.10	0.027	N/A	N/A	1	8533813
22'55'-TetraCB-(52)	ng/L	0.011 U	0.011	0.050	0.019	N/A	N/A	1	8533813
22'66'-TetraCB-(54)	ng/L	0.018 U	0.018	0.050	0.020	N/A	N/A	1	8533813
233'4-TetraCB-(55)	ng/L	0.0077 U	0.0077	0.050	0.015	N/A	N/A	1	8533813
233'4'-Tetra CB(56)	ng/L	0.0075 U	0.0075	0.050	0.018	N/A	N/A	1	8533813
233'5-TetraCB-(57)	ng/L	0.0074 U	0.0074	0.050	0.0097	N/A	N/A	1	8533813
233'5'-TetraCB-(58)	ng/L	0.0073 U	0.0073	0.050	0.020	N/A	N/A	1	8533813
TetraCB-(59)+(62)+(75)	ng/L	0.0077 U	0.0077	0.10	0.038	N/A	N/A	1	8533813
2344'-TetraCB -(60)	ng/L	0.0072 U	0.0072	0.050	0.011	N/A	N/A	1	8533813
TetraCB-(61)+(70)+(74)+(76)	ng/L	0.0074 U	0.0074	0.20	0.035	N/A	N/A	1	8533813
234'5-TetraCB-(63)	ng/L	0.0071 U	0.0071	0.050	0.0080	N/A	N/A	1	8533813
234'6-TetraCB-(64)	ng/L	0.0090 U	0.0090	0.050	0.0089	N/A	N/A	1	8533813
23'44'-TetraCB-(66)	ng/L	0.0070 U	0.0070	0.050	0.0084	N/A	N/A	1	8533813
23'45-TetraCB-(67)	ng/L	0.0061 U	0.0061	0.050	0.0040	N/A	N/A	1	8533813
23'45'-TetraCB-(68)	ng/L	0.0066 U	0.0066	0.050	0.014	N/A	N/A	1	8533813
23'55'-TetraCB-(72)	ng/L	0.0071 U	0.0071	0.050	0.0082	N/A	N/A	1	8533813
23'5'6-TetraCB-(73)	ng/L	0.0075 U	0.0075	0.050	0.023	N/A	N/A	1	8533813
33'44'-TetraCB-(77)	ng/L	0.0055 U	0.0055	0.050	0.011	0.000100	0.000000550	1	8533813
33'45-TetraCB-(78)	ng/L	0.0077 U	0.0077	0.050	0.013	N/A	N/A	1	8533813
33'45'-TetraCB(79)	ng/L	0.0061 U	0.0061	0.050	0.0088	N/A	N/A	1	8533813
33'55'-TetraCB-(80)	ng/L	0.0060 U	0.0060	0.050	0.0087	N/A	N/A	1	8533813
344'5-TetraCB-(81)	ng/L	0.0060 U	0.0060	0.050	0.0079	0.000300	0.00000180	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ249							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'4-PentaCB-(82)	ng/L	0.011 U	0.011	0.050	0.014	N/A	N/A	1	8533813
PentaCB-(83)+(99)	ng/L	0.0087 U	0.0087	0.10	0.033	N/A	N/A	1	8533813
22'33'6-PentaCB-(84)	ng/L	0.0096 U	0.0096	0.020	0.0088	N/A	N/A	1	8533813
PentaCB-(85)+(116)+(117)	ng/L	0.0068 U	0.0068	0.10	0.040	N/A	N/A	1	8533813
PentaCB-(86)(87)(97)(109)(119)(125	ng/L	0.0073 U	0.0073	0.20	0.080	N/A	N/A	1	8533813
PentaCB-(88)+(91)	ng/L	0.0093 U	0.0093	0.050	0.025	N/A	N/A	1	8533813
22'346'-PentaCB-(89)	ng/L	0.011 U	0.011	0.050	0.0040	N/A	N/A	1	8533813
PentaCB-(90)+(101)+(113)	ng/L	0.0074 U	0.0074	0.20	0.0080	N/A	N/A	1	8533813
22'355'-PentaCB-(92)	ng/L	0.010 U	0.010	0.050	0.010	N/A	N/A	1	8533813
PentaCB-(93)+(98)+(100)+(102)	ng/L	0.0091 U	0.0091	0.20	0.051	N/A	N/A	1	8533813
22'356'-PentaCB-(94)	ng/L	0.0095 U	0.0095	0.050	0.017	N/A	N/A	1	8533813
22'35'6-PentaCB-(95)	ng/L	0.0099 U	0.0099	0.050	0.011	N/A	N/A	1	8533813
22'366'-PentaCB-(96)	ng/L	0.0080 U	0.0080	0.050	0.014	N/A	N/A	1	8533813
22'45'6-PentaCB-(103)	ng/L	0.0089 U	0.0089	0.050	0.012	N/A	N/A	1	8533813
22'466'-PentaCB-(104)	ng/L	0.0087 U	0.0087	0.050	0.022	N/A	N/A	1	8533813
233'44'-PentaCB-(105)	ng/L	0.0045 U	0.0045	0.050	0.0052	0.0000300	0.000000135	1	8533813
233'45-PentaCB-(106)	ng/L	0.0059 U	0.0059	0.050	0.018	N/A	N/A	1	8533813
233'4'5-PentaCB-(107)	ng/L	0.0045 U	0.0045	0.050	0.014	N/A	N/A	1	8533813
PentaCB-(108)+(124)	ng/L	0.0056 U	0.0056	0.10	0.023	N/A	N/A	1	8533813
PentaCB-(110)+(115)	ng/L	0.0067 U	0.0067	0.10	0.022	N/A	N/A	1	8533813
233'55'-PentaCB-(111)	ng/L	0.0060 U	0.0060	0.050	0.012	N/A	N/A	1	8533813
233'56-PentaCB-(112)	ng/L	0.0057 U	0.0057	0.050	0.018	N/A	N/A	1	8533813
2344'5-PentaCB-(114)	ng/L	0.0052 U	0.0052	0.050	0.0084	0.0000300	0.000000156	1	8533813
23'44'5-PentaCB-(118)	ng/L	0.0048 U	0.0048	0.10	0.0071	0.0000300	0.000000144	1	8533813
23'455'-PentaCB-(120)	ng/L	0.0061 U	0.0061	0.050	0.014	N/A	N/A	1	8533813
23'45'6-PentaCB-(121)	ng/L	0.0063 U	0.0063	0.050	0.0040	N/A	N/A	1	8533813
233'4'5'-PentaCB-(122)	ng/L	0.0073 U	0.0073	0.050	0.011	N/A	N/A	1	8533813
23'44'5'-PentaCB-(123)	ng/L	0.0054 U	0.0054	0.050	0.014	0.0000300	0.000000162	1	8533813
33'44'5-PentaCB-(126)	ng/L	0.0047 U	0.0047	0.050	0.0061	0.100	0.000470	1	8533813
33'455'-PentaCB-(127)	ng/L	0.0055 U	0.0055	0.050	0.017	N/A	N/A	1	8533813
HexaCB-(128)+(166)	ng/L	0.0066 U	0.0066	0.10	0.026	N/A	N/A	1	8533813
HexaCB-(129)+(138)+(163)	ng/L	0.0075 U	0.0075	0.20	0.014	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ249							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'45'-HexaCB-(130)	ng/L	0.0082 U	0.0082	0.050	0.020	N/A	N/A	1	8533813
22'33'46-HexaCB-(131)	ng/L	0.010 U	0.010	0.050	0.019	N/A	N/A	1	8533813
22'33'46'-HexaCB-(132)	ng/L	0.0089 U	0.0089	0.050	0.019	N/A	N/A	1	8533813
22'33'55'-HexaCB-(133)	ng/L	0.0088 U	0.0088	0.050	0.017	N/A	N/A	1	8533813
HexaCB-(134)+(143)	ng/L	0.0094 U	0.0094	0.10	0.028	N/A	N/A	1	8533813
HexaCB-(135)+(151)	ng/L	0.010 U	0.010	0.10	0.038	N/A	N/A	1	8533813
22'33'66'-HexaCB-(136)	ng/L	0.0074 U	0.0074	0.050	0.014	N/A	N/A	1	8533813
22'344'5-HexaCB-(137)	ng/L	0.0078 U	0.0078	0.10	0.014	N/A	N/A	1	8533813
HexaCB-(139)+(140)	ng/L	0.0072 U	0.0072	0.10	0.032	N/A	N/A	1	8533813
22'3455'-HexaCB-(141)	ng/L	0.0074 U	0.0074	0.050	0.018	N/A	N/A	1	8533813
22'3456-HexaCB-(142)	ng/L	0.0092 U	0.0092	0.050	0.018	N/A	N/A	1	8533813
22'345'6-HexaCB-(144)	ng/L	0.0099 U	0.0099	0.050	0.011	N/A	N/A	1	8533813
22'3466'-HexaCB-(145)	ng/L	0.0072 U	0.0072	0.050	0.022	N/A	N/A	1	8533813
22'34'55'-HexaCB-(146)	ng/L	0.0068 U	0.0068	0.050	0.014	N/A	N/A	1	8533813
HexaCB-(147)+(149)	ng/L	0.0071 U	0.0071	0.10	0.027	N/A	N/A	1	8533813
22'34'56'-HexaCB-(148)	ng/L	0.010 U	0.010	0.050	0.013	N/A	N/A	1	8533813
22'34'66'-HexaCB-(150)	ng/L	0.0071 U	0.0071	0.050	0.022	N/A	N/A	1	8533813
22'3566'-HexaCB-(152)	ng/L	0.0074 U	0.0074	0.050	0.020	N/A	N/A	1	8533813
HexaCB-(153)+(168)	ng/L	0.0060 U	0.0060	0.10	0.028	N/A	N/A	1	8533813
22'44'56'-HexaCB-(154)	ng/L	0.0078 U	0.0078	0.050	0.014	N/A	N/A	1	8533813
22'44'66'-HexaCB-(155)	ng/L	0.0077 U	0.0077	0.050	0.013	N/A	N/A	1	8533813
HexaCB-(156)+(157)	ng/L	0.0049 U	0.0049	0.10	0.015	0.0000300	0.000000147	1	8533813
233'44'6-HexaCB-(158)	ng/L	0.0049 U	0.0049	0.050	0.017	N/A	N/A	1	8533813
233'455'-HexaCB-(159)	ng/L	0.0047 U	0.0047	0.050	0.015	N/A	N/A	1	8533813
233'456-HexaCB-(160)	ng/L	0.0062 U	0.0062	0.050	0.013	N/A	N/A	1	8533813
233'45'6-HexaCB-(161)	ng/L	0.0057 U	0.0057	0.050	0.022	N/A	N/A	1	8533813
233'4'55'-HexaCB-(162)	ng/L	0.0046 U	0.0046	0.050	0.016	N/A	N/A	1	8533813
233'4'5'6-HexaCB-(164)	ng/L	0.0053 U	0.0053	0.050	0.020	N/A	N/A	1	8533813
233'55'6-HexaCB-(165)	ng/L	0.0063 U	0.0063	0.050	0.022	N/A	N/A	1	8533813
23'44'55'-HexaCB-(167)	ng/L	0.0049 U	0.0049	0.050	0.0096	0.0000300	0.000000147	1	8533813
33'44'55'-HexaCB-(169)	ng/L	0.0051 U	0.0051	0.050	0.0092	0.0300	0.000153	1	8533813
22'33'44'5-HeptaCB-(170)	ng/L	0.0051 U	0.0051	0.050	0.011	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ249							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
HeptaCB-(171)+(173)	ng/L	0.0063 U	0.0063	0.10	0.027	N/A	N/A	1	8533813
22'33'455'-HeptaCB-(172)	ng/L	0.0062 U	0.0062	0.050	0.012	N/A	N/A	1	8533813
22'33'456'-HeptaCB-(174)	ng/L	0.0059 U	0.0059	0.050	0.017	N/A	N/A	1	8533813
22'33'45'6-HeptaCB-(175)	ng/L	0.0072 U	0.0072	0.050	0.0064	N/A	N/A	1	8533813
22'33'466'-HeptaCB-(176)	ng/L	0.0052 U	0.0052	0.050	0.0079	N/A	N/A	1	8533813
22'33'45'6'-HeptaCB-(177)	ng/L	0.0064 U	0.0064	0.050	0.013	N/A	N/A	1	8533813
22'33'55'6-HeptaCB-(178)	ng/L	0.0073 U	0.0073	0.050	0.0071	N/A	N/A	1	8533813
22'33'566'-HeptaCB-(179)	ng/L	0.0052 U	0.0052	0.050	0.010	N/A	N/A	1	8533813
HeptaCB-(180)+(193)	ng/L	0.0048 U	0.0048	0.10	0.018	N/A	N/A	1	8533813
22'344'56-HeptaCB-(181)	ng/L	0.0061 U	0.0061	0.050	0.015	N/A	N/A	1	8533813
22'344'56'-HeptaCB-(182)	ng/L	0.0065 U	0.0065	0.050	0.0066	N/A	N/A	1	8533813
22'344'5'6-HeptaCB-(183)	ng/L	0.0055 U	0.0055	0.050	0.017	N/A	N/A	1	8533813
22'344'66'-HeptaCB-(184)	ng/L	0.0050 U	0.0050	0.050	0.0065	N/A	N/A	1	8533813
22'3455'6-HeptaCB-(185)	ng/L	0.0066 U	0.0066	0.050	0.017	N/A	N/A	1	8533813
22'34566'-HeptaCB-(186)	ng/L	0.0054 U	0.0054	0.050	0.0095	N/A	N/A	1	8533813
22'34'55'6-HeptaCB-(187)	ng/L	0.0065 U	0.0065	0.050	0.0047	N/A	N/A	1	8533813
22'34'566'-HeptaCB-(188)	ng/L	0.0056 U	0.0056	0.050	0.015	N/A	N/A	1	8533813
233'44'55'-HeptaCB-(189)	ng/L	0.0042 U	0.0042	0.050	0.014	0.0000300	0.000000126	1	8533813
233'44'56-HeptaCB-(190)	ng/L	0.0044 U	0.0044	0.050	0.016	N/A	N/A	1	8533813
233'44'5'6-HeptaCB-(191)	ng/L	0.0044 U	0.0044	0.050	0.014	N/A	N/A	1	8533813
233'455'6-HeptaCB-(192)	ng/L	0.0048 U	0.0048	0.050	0.0088	N/A	N/A	1	8533813
22'33'44'55'-OctaCB-(194)	ng/L	0.011 U	0.011	0.050	0.024	N/A	N/A	1	8533813
22'33'44'56-OctaCB-(195)	ng/L	0.012 U	0.012	0.050	0.019	N/A	N/A	1	8533813
22'33'44'56'-OctaCB-(196)	ng/L	0.012 U	0.012	0.050	0.017	N/A	N/A	1	8533813
22'33'44'66'OctaCB-(197)	ng/L	0.0086 U	0.0086	0.050	0.033	N/A	N/A	1	8533813
OctaCB-(198)+(199)	ng/L	0.013 U	0.013	0.10	0.028	N/A	N/A	1	8533813
22'33'4566'-OctaCB-(200)	ng/L	0.010 U	0.010	0.050	0.031	N/A	N/A	1	8533813
22'33'45'66'-OctaCB-(201)	ng/L	0.0088 U	0.0088	0.050	0.014	N/A	N/A	1	8533813
22'33'55'66'-OctaCB-(202)	ng/L	0.0097 U	0.0097	0.050	0.013	N/A	N/A	1	8533813
22'344'55'6-OctaCB-(203)	ng/L	0.012 U	0.012	0.050	0.021	N/A	N/A	1	8533813
22'344'566'-OctaCB-(204)	ng/L	0.0076 U	0.0076	0.050	0.018	N/A	N/A	1	8533813
233'44'55'6-OctaCB-(205)	ng/L	0.0077 U	0.0077	0.050	0.014	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ249							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'44'55'6-NonaCB-(206)	ng/L	0.014 U	0.014	0.050	0.020	N/A	N/A	1	8533813
22'33'44'566'-NonaCB-(207)	ng/L	0.013 U	0.013	0.050	0.018	N/A	N/A	1	8533813
22'33'455'66'-NonaCB-(208)	ng/L	0.012 U	0.012	0.050	0.021	N/A	N/A	1	8533813
DecaCB-(209)	ng/L	0.018 U	0.018	0.050	0.015	N/A	N/A	1	8533813
TOTAL TOXIC EQUIVALENCY	ng/L	N/A	N/A	N/A	N/A	N/A	0.000626	N/A	N/A
Surrogate Recovery (%)									
C13-2,44'-TriCB-(28)	%	37	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'55'6-NonaCB-(206)	%	123	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'5-HeptaCB-(170)	%	97	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'455'66'-NonaCB-(208)	%	107	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'66'-OctaCB-(202)	%	102	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'6-HeptaCB-(178)	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'344'55'-HeptaCB-(180)	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'34'566'-HeptaCB-(188)	%	80	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'44'66'-HexaCB-(155)	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'466'-PentaCB-(104)	%	55	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'66'-TetraCB-(54)	%	46	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'6-TriCB-(19)	%	46	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'-DiCB-(4)	%	38	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'6-OctaCB-(205)	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'-HeptaCB-(189)	%	82	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'-PentaCB-(105)	%	70	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'55'-PentaCB-(111)	%	84	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'55'-HexaCB-(167)	%	65	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2344'5-PentaCB-(114)	%	59	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'5-PentaCB-(118)	%	60	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2'344'5-PentaCB-(123)	%	61	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2-MonoCB-(1)	%	22	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'55'-HexaCB-(169)	%	71	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'5-PentaCB-(126)	%	72	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'-TetraCB-(77)	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-344'5-TetraCB-(81)	%	83	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ249							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-344'-TriCB-(37)	%	46	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-44'-DiCB-(15)	%	43	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-4-MonoCB-(3)	%	26	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-DecaCB-(209)	%	141	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-HexaCB-(156)+(157)	%	65	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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Bureau Veritas ID		VBZ250							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2-MonoCB-(1)	ng/L	0.017 U	0.017	0.020	0.0098	N/A	N/A	1	8533813
3-MonoCB-(2)	ng/L	0.017 U	0.017	0.020	0.0079	N/A	N/A	1	8533813
4-MonoCB-(3)	ng/L	0.014 U	0.014	0.051	0.0071	N/A	N/A	1	8533813
22'-DiCB-(4)	ng/L	0.020 U	0.020	0.051	0.017	N/A	N/A	1	8533813
2,3-DiCB-(5)	ng/L	0.0084 U	0.0084	0.051	0.012	N/A	N/A	1	8533813
2,3'-DiCB-(6)	ng/L	0.0082 U	0.0082	0.020	0.0053	N/A	N/A	1	8533813
2,4-DiCB-(7)	ng/L	0.0083 U	0.0083	0.020	0.0056	N/A	N/A	1	8533813
2,4'-DiCB-(8)	ng/L	0.0080 U	0.0080	0.051	0.017	N/A	N/A	1	8533813
2,5-DiCB-(9)	ng/L	0.0081 U	0.0081	0.020	0.0044	N/A	N/A	1	8533813
2,6-DiCB-(10)	ng/L	0.010 U	0.010	0.051	0.0052	N/A	N/A	1	8533813
3,3'-DiCB-(11)	ng/L	0.118 J	0.0084	0.20	0.0090	N/A	N/A	1	8533813
DiCB-(12)+(13)	ng/L	0.0076 U	0.0076	0.051	0.015	N/A	N/A	1	8533813
3,5-DiCB-(14)	ng/L	0.0083 U	0.0083	0.020	0.0082	N/A	N/A	1	8533813
4,4'-DiCB-(15)	ng/L	0.0070 U	0.0070	0.051	0.011	N/A	N/A	1	8533813
22'3-TriCB-(16)	ng/L	0.012 U	0.012	0.051	0.0060	N/A	N/A	1	8533813
22'4-TriCB-(17)	ng/L	0.0094 U	0.0094	0.020	0.0091	N/A	N/A	1	8533813
TriCB-(18)+(30)	ng/L	0.0081 U	0.0081	0.051	0.017	N/A	N/A	1	8533813
22'6-TriCB-(19)	ng/L	0.017 U	0.017	0.020	0.0061	N/A	N/A	1	8533813
TriCB-(20) + (28)	ng/L	0.0125 J	0.0054	0.050	0.010	N/A	N/A	1	8533813
TriCB-(21)+(33)	ng/L	0.0078 J	0.0060	0.051	0.011	N/A	N/A	1	8533813
234'-TriCB-(22)	ng/L	0.0060 U	0.0060	0.020	0.0065	N/A	N/A	1	8533813
235-TriCB-(23)	ng/L	0.0061 U	0.0061	0.020	0.0072	N/A	N/A	1	8533813
236-TriCB-(24)	ng/L	0.0074 U	0.0074	0.020	0.0043	N/A	N/A	1	8533813
23'4-TriCB-(25)	ng/L	0.0061 U	0.0061	0.020	0.0054	N/A	N/A	1	8533813
TriCB-(26)+(29)	ng/L	0.0056 U	0.0056	0.051	0.013	N/A	N/A	1	8533813
23'6-TriCB-(27)	ng/L	0.0069 U	0.0069	0.020	0.0082	N/A	N/A	1	8533813
24'5-TriCB-(31)	ng/L	0.0120 J	0.0053	0.051	0.0078	N/A	N/A	1	8533813
24'6-TriCB-(32)	ng/L	0.0066 U	0.0066	0.020	0.0087	N/A	N/A	1	8533813
23'5'-TriCB-(34)	ng/L	0.0060 U	0.0060	0.020	0.0061	N/A	N/A	1	8533813
33'4-TriCB-(35)	ng/L	0.0058 U	0.0058	0.020	0.0042	N/A	N/A	1	8533813
33'5-TriCB-(36)	ng/L	0.0053 U	0.0053	0.020	0.0052	N/A	N/A	1	8533813
344'-TriCB-(37)	ng/L	0.0051 U	0.0051	0.020	0.0041	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

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Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
345-TriCB-(38)	ng/L	0.0056 U	0.0056	0.020	0.0047	N/A	N/A	1	8533813
34'5-TriCB-(39)	ng/L	0.0059 U	0.0059	0.020	0.0059	N/A	N/A	1	8533813
TetraCB-(40)+(41)+(71)	ng/L	0.014 U	0.014	0.10	0.035	N/A	N/A	1	8533813
22'34'-TetraCB-(42)	ng/L	0.019 U	0.019	0.051	0.011	N/A	N/A	1	8533813
22'35-TetraCB-(43)	ng/L	0.018 U	0.018	0.051	0.015	N/A	N/A	1	8533813
TetraCB-(44)+(47)+(65)	ng/L	0.029 J	0.013	0.10	0.029	N/A	N/A	1	8533813
TetraCB-(45)+(51)	ng/L	0.015 U	0.015	0.051	0.011	N/A	N/A	1	8533813
22'36'-TetraCB-(46)	ng/L	0.016 U	0.016	0.020	0.014	N/A	N/A	1	8533813
22'45-TetraCB-(48)	ng/L	0.014 U	0.014	0.051	0.017	N/A	N/A	1	8533813
TetraCB-(49)+TetraCB-(69)	ng/L	0.012 U	0.012	0.10	0.023	N/A	N/A	1	8533813
TetraCB-(50)+(53)	ng/L	0.014 U	0.014	0.10	0.027	N/A	N/A	1	8533813
22'55'-TetraCB-(52)	ng/L	0.020 J	0.014	0.051	0.019	N/A	N/A	1	8533813
22'66'-TetraCB-(54)	ng/L	0.026 U	0.026	0.051	0.020	N/A	N/A	1	8533813
233'4-TetraCB-(55)	ng/L	0.0099 U	0.0099	0.051	0.015	N/A	N/A	1	8533813
233'4'-Tetra CB(56)	ng/L	0.0095 U	0.0095	0.051	0.018	N/A	N/A	1	8533813
233'5-TetraCB-(57)	ng/L	0.0094 U	0.0094	0.051	0.0097	N/A	N/A	1	8533813
233'5'-TetraCB-(58)	ng/L	0.0093 U	0.0093	0.051	0.020	N/A	N/A	1	8533813
TetraCB-(59)+(62)+(75)	ng/L	0.0098 U	0.0098	0.10	0.038	N/A	N/A	1	8533813
2344'-TetraCB -(60)	ng/L	0.0093 U	0.0093	0.051	0.011	N/A	N/A	1	8533813
TetraCB-(61)+(70)+(74)+(76)	ng/L	0.0260 J	0.0095	0.20	0.035	N/A	N/A	1	8533813
234'5-TetraCB-(63)	ng/L	0.0091 U	0.0091	0.051	0.0080	N/A	N/A	1	8533813
234'6-TetraCB-(64)	ng/L	0.011 U	0.011	0.051	0.0089	N/A	N/A	1	8533813
23'44'-TetraCB-(66)	ng/L	0.0093 J	0.0089	0.051	0.0084	N/A	N/A	1	8533813
23'45-TetraCB-(67)	ng/L	0.0078 U	0.0078	0.051	0.0040	N/A	N/A	1	8533813
23'45'-TetraCB-(68)	ng/L	0.0085 U	0.0085	0.051	0.014	N/A	N/A	1	8533813
23'55'-TetraCB-(72)	ng/L	0.0091 U	0.0091	0.051	0.0082	N/A	N/A	1	8533813
23'5'6-TetraCB-(73)	ng/L	0.0096 U	0.0096	0.051	0.023	N/A	N/A	1	8533813
33'44'-TetraCB-(77)	ng/L	0.0068 U	0.0068	0.051	0.011	0.000100	0.000000680	1	8533813
33'45-TetraCB-(78)	ng/L	0.0098 U	0.0098	0.051	0.013	N/A	N/A	1	8533813
33'45'-TetraCB(79)	ng/L	0.0078 U	0.0078	0.051	0.0088	N/A	N/A	1	8533813
33'55'-TetraCB-(80)	ng/L	0.0077 U	0.0077	0.051	0.0087	N/A	N/A	1	8533813
344'5-TetraCB-(81)	ng/L	0.0076 U	0.0076	0.051	0.0079	0.000300	0.00000228	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ250							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'4-PentaCB-(82)	ng/L	0.013 U	0.013	0.051	0.014	N/A	N/A	1	8533813
PentaCB-(83)+(99)	ng/L	0.011 U	0.011	0.10	0.033	N/A	N/A	1	8533813
22'33'6-PentaCB-(84)	ng/L	0.012 U	0.012	0.020	0.0088	N/A	N/A	1	8533813
PentaCB-(85)+(116)+(117)	ng/L	0.0084 U	0.0084	0.10	0.040	N/A	N/A	1	8533813
PentaCB-(86)(87)(97)(109)(119)(125	ng/L	0.0152 J	0.0091	0.20	0.080	N/A	N/A	1	8533813
PentaCB-(88)+(91)	ng/L	0.012 U	0.012	0.051	0.025	N/A	N/A	1	8533813
22'346'-PentaCB-(89)	ng/L	0.014 U	0.014	0.051	0.0040	N/A	N/A	1	8533813
PentaCB-(90)+(101)+(113)	ng/L	0.0361 J	0.0092	0.20	0.0080	N/A	N/A	1	8533813
22'355'-PentaCB-(92)	ng/L	0.012 U	0.012	0.051	0.010	N/A	N/A	1	8533813
PentaCB-(93)+(98)+(100)+(102)	ng/L	0.011 U	0.011	0.20	0.051	N/A	N/A	1	8533813
22'356'-PentaCB-(94)	ng/L	0.012 U	0.012	0.051	0.017	N/A	N/A	1	8533813
22'35'6-PentaCB-(95)	ng/L	0.033 J	0.012	0.051	0.011	N/A	N/A	1	8533813
22'366'-PentaCB-(96)	ng/L	0.010 U	0.010	0.051	0.014	N/A	N/A	1	8533813
22'45'6-PentaCB-(103)	ng/L	0.011 U	0.011	0.051	0.012	N/A	N/A	1	8533813
22'466'-PentaCB-(104)	ng/L	0.011 U	0.011	0.051	0.022	N/A	N/A	1	8533813
233'44'-PentaCB-(105)	ng/L	0.0056 U	0.0056	0.051	0.0052	0.0000300	0.000000168	1	8533813
233'45-PentaCB-(106)	ng/L	0.0073 U	0.0073	0.051	0.018	N/A	N/A	1	8533813
233'4'5-PentaCB-(107)	ng/L	0.0056 U	0.0056	0.051	0.014	N/A	N/A	1	8533813
PentaCB-(108)+(124)	ng/L	0.0069 U	0.0069	0.10	0.023	N/A	N/A	1	8533813
PentaCB-(110)+(115)	ng/L	0.0241 J	0.0084	0.10	0.022	N/A	N/A	1	8533813
233'55'-PentaCB-(111)	ng/L	0.0074 U	0.0074	0.051	0.012	N/A	N/A	1	8533813
233'56-PentaCB-(112)	ng/L	0.0071 U	0.0071	0.051	0.018	N/A	N/A	1	8533813
2344'5-PentaCB-(114)	ng/L	0.0063 U	0.0063	0.051	0.0084	0.0000300	0.000000189	1	8533813
23'44'5-PentaCB-(118)	ng/L	0.0144 J	0.0060	0.10	0.0071	0.0000300	0.000000432	1	8533813
23'455'-PentaCB-(120)	ng/L	0.0076 U	0.0076	0.051	0.014	N/A	N/A	1	8533813
23'45'6-PentaCB-(121)	ng/L	0.0078 U	0.0078	0.051	0.0040	N/A	N/A	1	8533813
233'4'5'-PentaCB-(122)	ng/L	0.0091 U	0.0091	0.051	0.011	N/A	N/A	1	8533813
23'44'5'-PentaCB-(123)	ng/L	0.0067 U	0.0067	0.051	0.014	0.0000300	0.000000201	1	8533813
33'44'5-PentaCB-(126)	ng/L	0.0060 U	0.0060	0.051	0.0061	0.100	0.000600	1	8533813
33'455'-PentaCB-(127)	ng/L	0.0068 U	0.0068	0.051	0.017	N/A	N/A	1	8533813
HexaCB-(128)+(166)	ng/L	0.0090 U	0.0090	0.10	0.026	N/A	N/A	1	8533813
HexaCB-(129)+(138)+(163)	ng/L	0.025 J	0.010	0.20	0.014	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ250							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'45'-HexaCB-(130)	ng/L	0.011 U	0.011	0.051	0.020	N/A	N/A	1	8533813
22'33'46-HexaCB-(131)	ng/L	0.014 U	0.014	0.051	0.019	N/A	N/A	1	8533813
22'33'46'-HexaCB-(132)	ng/L	0.012 U	0.012	0.051	0.019	N/A	N/A	1	8533813
22'33'55'-HexaCB-(133)	ng/L	0.012 U	0.012	0.051	0.017	N/A	N/A	1	8533813
HexaCB-(134)+(143)	ng/L	0.013 U	0.013	0.10	0.028	N/A	N/A	1	8533813
HexaCB-(135)+(151)	ng/L	0.014 U	0.014	0.10	0.038	N/A	N/A	1	8533813
22'33'66'-HexaCB-(136)	ng/L	0.010 U	0.010	0.051	0.014	N/A	N/A	1	8533813
22'344'5-HexaCB-(137)	ng/L	0.010 U	0.010	0.10	0.014	N/A	N/A	1	8533813
HexaCB-(139)+(140)	ng/L	0.0096 U	0.0096	0.10	0.032	N/A	N/A	1	8533813
22'3455'-HexaCB-(141)	ng/L	0.010 U	0.010	0.051	0.018	N/A	N/A	1	8533813
22'3456-HexaCB-(142)	ng/L	0.012 U	0.012	0.051	0.018	N/A	N/A	1	8533813
22'345'6-HexaCB-(144)	ng/L	0.013 U	0.013	0.051	0.011	N/A	N/A	1	8533813
22'3466'-HexaCB-(145)	ng/L	0.0097 U	0.0097	0.051	0.022	N/A	N/A	1	8533813
22'34'55'-HexaCB-(146)	ng/L	0.0092 U	0.0092	0.051	0.014	N/A	N/A	1	8533813
HexaCB-(147)+(149)	ng/L	0.0323 J	0.0095	0.10	0.027	N/A	N/A	1	8533813
22'34'56'-HexaCB-(148)	ng/L	0.014 U	0.014	0.051	0.013	N/A	N/A	1	8533813
22'34'66'-HexaCB-(150)	ng/L	0.0096 U	0.0096	0.051	0.022	N/A	N/A	1	8533813
22'3566'-HexaCB-(152)	ng/L	0.0099 U	0.0099	0.051	0.020	N/A	N/A	1	8533813
HexaCB-(153)+(168)	ng/L	0.0253 J	0.0081	0.10	0.028	N/A	N/A	1	8533813
22'44'56'-HexaCB-(154)	ng/L	0.011 U	0.011	0.051	0.014	N/A	N/A	1	8533813
22'44'66'-HexaCB-(155)	ng/L	0.0098 U	0.0098	0.051	0.013	N/A	N/A	1	8533813
HexaCB-(156)+(157)	ng/L	0.0062 U	0.0062	0.10	0.015	0.0000300	0.000000186	1	8533813
233'44'6-HexaCB-(158)	ng/L	0.0066 U	0.0066	0.051	0.017	N/A	N/A	1	8533813
233'455'-HexaCB-(159)	ng/L	0.0063 U	0.0063	0.051	0.015	N/A	N/A	1	8533813
233'456-HexaCB-(160)	ng/L	0.0083 U	0.0083	0.051	0.013	N/A	N/A	1	8533813
233'45'6-HexaCB-(161)	ng/L	0.0077 U	0.0077	0.051	0.022	N/A	N/A	1	8533813
233'4'55'-HexaCB-(162)	ng/L	0.0062 U	0.0062	0.051	0.016	N/A	N/A	1	8533813
233'4'5'6-HexaCB-(164)	ng/L	0.0072 U	0.0072	0.051	0.020	N/A	N/A	1	8533813
233'55'6-HexaCB-(165)	ng/L	0.0084 U	0.0084	0.051	0.022	N/A	N/A	1	8533813
23'44'55'-HexaCB-(167)	ng/L	0.0064 U	0.0064	0.051	0.0096	0.0000300	0.000000192	1	8533813
33'44'55'-HexaCB-(169)	ng/L	0.0082 U	0.0082	0.051	0.0092	0.0300	0.000246	1	8533813
22'33'44'5-HeptaCB-(170)	ng/L	0.0068 U	0.0068	0.051	0.011	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ250							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
HeptaCB-(171)+(173)	ng/L	0.0083 U	0.0083	0.10	0.027	N/A	N/A	1	8533813
22'33'455'-HeptaCB-(172)	ng/L	0.0082 U	0.0082	0.051	0.012	N/A	N/A	1	8533813
22'33'456'-HeptaCB-(174)	ng/L	0.0077 U	0.0077	0.051	0.017	N/A	N/A	1	8533813
22'33'45'6-HeptaCB-(175)	ng/L	0.0094 U	0.0094	0.051	0.0064	N/A	N/A	1	8533813
22'33'466'-HeptaCB-(176)	ng/L	0.0068 U	0.0068	0.051	0.0079	N/A	N/A	1	8533813
22'33'45'6'-HeptaCB-(177)	ng/L	0.0085 U	0.0085	0.051	0.013	N/A	N/A	1	8533813
22'33'55'6-HeptaCB-(178)	ng/L	0.0096 U	0.0096	0.051	0.0071	N/A	N/A	1	8533813
22'33'566'-HeptaCB-(179)	ng/L	0.0068 U	0.0068	0.051	0.010	N/A	N/A	1	8533813
HeptaCB-(180)+(193)	ng/L	0.0089 J	0.0062	0.10	0.018	N/A	N/A	1	8533813
22'344'56-HeptaCB-(181)	ng/L	0.0080 U	0.0080	0.051	0.015	N/A	N/A	1	8533813
22'344'56'-HeptaCB-(182)	ng/L	0.0085 U	0.0085	0.051	0.0066	N/A	N/A	1	8533813
22'344'5'6-HeptaCB-(183)	ng/L	0.0073 U	0.0073	0.051	0.017	N/A	N/A	1	8533813
22'344'66'-HeptaCB-(184)	ng/L	0.0065 U	0.0065	0.051	0.0065	N/A	N/A	1	8533813
22'3455'6-HeptaCB-(185)	ng/L	0.0087 U	0.0087	0.051	0.017	N/A	N/A	1	8533813
22'34566'-HeptaCB-(186)	ng/L	0.0071 U	0.0071	0.051	0.0095	N/A	N/A	1	8533813
22'34'55'6-HeptaCB-(187)	ng/L	0.0085 U	0.0085	0.051	0.0047	N/A	N/A	1	8533813
22'34'566'-HeptaCB-(188)	ng/L	0.0069 U	0.0069	0.051	0.015	N/A	N/A	1	8533813
233'44'55'-HeptaCB-(189)	ng/L	0.0058 U	0.0058	0.051	0.014	0.0000300	0.000000174	1	8533813
233'44'56-HeptaCB-(190)	ng/L	0.0057 U	0.0057	0.051	0.016	N/A	N/A	1	8533813
233'44'5'6-HeptaCB-(191)	ng/L	0.0057 U	0.0057	0.051	0.014	N/A	N/A	1	8533813
233'455'6-HeptaCB-(192)	ng/L	0.0063 U	0.0063	0.051	0.0088	N/A	N/A	1	8533813
22'33'44'55'-OctaCB-(194)	ng/L	0.015 U	0.015	0.051	0.024	N/A	N/A	1	8533813
22'33'44'56-OctaCB-(195)	ng/L	0.017 U	0.017	0.051	0.019	N/A	N/A	1	8533813
22'33'44'56'-OctaCB-(196)	ng/L	0.017 U	0.017	0.051	0.017	N/A	N/A	1	8533813
22'33'44'66'OctaCB-(197)	ng/L	0.012 U	0.012	0.051	0.033	N/A	N/A	1	8533813
OctaCB-(198)+(199)	ng/L	0.018 U	0.018	0.10	0.028	N/A	N/A	1	8533813
22'33'4566'-OctaCB-(200)	ng/L	0.014 U	0.014	0.051	0.031	N/A	N/A	1	8533813
22'33'45'66'-OctaCB-(201)	ng/L	0.012 U	0.012	0.051	0.014	N/A	N/A	1	8533813
22'33'55'66'-OctaCB-(202)	ng/L	0.013 U	0.013	0.051	0.013	N/A	N/A	1	8533813
22'344'55'6-OctaCB-(203)	ng/L	0.017 U	0.017	0.051	0.021	N/A	N/A	1	8533813
22'344'566'-OctaCB-(204)	ng/L	0.010 U	0.010	0.051	0.018	N/A	N/A	1	8533813
233'44'55'6-OctaCB-(205)	ng/L	0.011 U	0.011	0.051	0.014	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ250							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'44'55'6-NonaCB-(206)	ng/L	0.020 U	0.020	0.051	0.020	N/A	N/A	1	8533813
22'33'44'566'-NonaCB-(207)	ng/L	0.018 U	0.018	0.051	0.018	N/A	N/A	1	8533813
22'33'455'66'-NonaCB-(208)	ng/L	0.016 U	0.016	0.051	0.021	N/A	N/A	1	8533813
DecaCB-(209)	ng/L	0.024 U	0.024	0.051	0.015	N/A	N/A	1	8533813
TOTAL TOXIC EQUIVALENCY	ng/L	N/A	N/A	N/A	N/A	N/A	0.000851	N/A	N/A
Surrogate Recovery (%)									
C13-2,44'-TriCB-(28)	%	36	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'55'6-NonaCB-(206)	%	115	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'5-HeptaCB-(170)	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'455'66'-NonaCB-(208)	%	101	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'66'-OctaCB-(202)	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'6-HeptaCB-(178)	%	101	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'344'55'-HeptaCB-(180)	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'34'566'-HeptaCB-(188)	%	79	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'44'66'-HexaCB-(155)	%	72	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'466'-PentaCB-(104)	%	47	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'66'-TetraCB-(54)	%	35	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'6-TriCB-(19)	%	35 (1)	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'-DiCB-(4)	%	29	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'6-OctaCB-(205)	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'-HeptaCB-(189)	%	76	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'-PentaCB-(105)	%	62	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'55'-PentaCB-(111)	%	85	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'55'-HexaCB-(167)	%	61	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2344'5-PentaCB-(114)	%	54	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'5-PentaCB-(118)	%	54	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2'344'5-PentaCB-(123)	%	54	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2-MonoCB-(1)	%	15	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'55'-HexaCB-(169)	%	55	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'5-PentaCB-(126)	%	62	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'-TetraCB-(77)	%	79	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ250							
Sampling Date		2023/02/14 10:05				TOXIC EQUIVALENCY		# of	
	UNITS	MW3-20230214-GW-35-DUP	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-344'5-TetraCB-(81)	%	72	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-344'-TriCB-(37)	%	41	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-44'-DiCB-(15)	%	34	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-4-MonoCB-(3)	%	19	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-DecaCB-(209)	%	125	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-HexaCB-(156)+(157)	%	63	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ251							
Sampling Date		2023/02/14 12:51				TOXIC EQUIVALENCY		# of	
	UNITS	MW5-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2-MonoCB-(1)	ng/L	0.018 J	0.015	0.021	0.0098	N/A	N/A	1	8533813
3-MonoCB-(2)	ng/L	0.016 U	0.016	0.021	0.0079	N/A	N/A	1	8533813
4-MonoCB-(3)	ng/L	0.014 U	0.014	0.053	0.0071	N/A	N/A	1	8533813
22'-DiCB-(4)	ng/L	0.022 U	0.022	0.053	0.017	N/A	N/A	1	8533813
2,3-DiCB-(5)	ng/L	0.0090 U	0.0090	0.053	0.012	N/A	N/A	1	8533813
2,3'-DiCB-(6)	ng/L	0.0089 U	0.0089	0.021	0.0053	N/A	N/A	1	8533813
2,4-DiCB-(7)	ng/L	0.0089 U	0.0089	0.021	0.0056	N/A	N/A	1	8533813
2,4'-DiCB-(8)	ng/L	0.0086 J	0.0086	0.053	0.017	N/A	N/A	1	8533813
2,5-DiCB-(9)	ng/L	0.0087 U	0.0087	0.021	0.0044	N/A	N/A	1	8533813
2,6-DiCB-(10)	ng/L	0.011 U	0.011	0.053	0.0052	N/A	N/A	1	8533813
3,3'-DiCB-(11)	ng/L	0.117 J	0.0090	0.21	0.0090	N/A	N/A	1	8533813
DiCB-(12)+(13)	ng/L	0.0082 U	0.0082	0.053	0.015	N/A	N/A	1	8533813
3,5-DiCB-(14)	ng/L	0.0090 U	0.0090	0.021	0.0082	N/A	N/A	1	8533813
4,4'-DiCB-(15)	ng/L	0.0075 U	0.0075	0.053	0.011	N/A	N/A	1	8533813
22'3-TriCB-(16)	ng/L	0.013 U	0.013	0.053	0.0060	N/A	N/A	1	8533813
22'4-TriCB-(17)	ng/L	0.011 U	0.011	0.021	0.0091	N/A	N/A	1	8533813
TriCB-(18)+(30)	ng/L	0.0091 U	0.0091	0.053	0.017	N/A	N/A	1	8533813
22'6-TriCB-(19)	ng/L	0.017 U	0.017	0.021	0.0061	N/A	N/A	1	8533813
TriCB-(20) + (28)	ng/L	0.0084 J	0.0060	0.050	0.010	N/A	N/A	1	8533813
TriCB-(21)+(33)	ng/L	0.0067 U	0.0067	0.053	0.011	N/A	N/A	1	8533813
234'-TriCB-(22)	ng/L	0.0068 U	0.0068	0.021	0.0065	N/A	N/A	1	8533813
235-TriCB-(23)	ng/L	0.0068 U	0.0068	0.021	0.0072	N/A	N/A	1	8533813
236-TriCB-(24)	ng/L	0.0083 U	0.0083	0.021	0.0043	N/A	N/A	1	8533813
23'4-TriCB-(25)	ng/L	0.0069 U	0.0069	0.021	0.0054	N/A	N/A	1	8533813
TriCB-(26)+(29)	ng/L	0.0063 U	0.0063	0.053	0.013	N/A	N/A	1	8533813
23'6-TriCB-(27)	ng/L	0.0078 U	0.0078	0.021	0.0082	N/A	N/A	1	8533813
24'5-TriCB-(31)	ng/L	0.0060 U	0.0060	0.053	0.0078	N/A	N/A	1	8533813
24'6-TriCB-(32)	ng/L	0.0074 U	0.0074	0.021	0.0087	N/A	N/A	1	8533813
23'5'-TriCB-(34)	ng/L	0.0067 U	0.0067	0.021	0.0061	N/A	N/A	1	8533813
33'4-TriCB-(35)	ng/L	0.0065 U	0.0065	0.021	0.0042	N/A	N/A	1	8533813
33'5-TriCB-(36)	ng/L	0.0060 U	0.0060	0.021	0.0052	N/A	N/A	1	8533813
344'-TriCB-(37)	ng/L	0.0058 U	0.0058	0.021	0.0041	N/A	N/A	1	8533813

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	UNITS	MW5-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
345-TriCB-(38)	ng/L	0.0063 U	0.0063	0.021	0.0047	N/A	N/A	1	8533813
34'5-TriCB-(39)	ng/L	0.0067 U	0.0067	0.021	0.0059	N/A	N/A	1	8533813
TetraCB-(40)+(41)+(71)	ng/L	0.019 U	0.019	0.11	0.035	N/A	N/A	1	8533813
22'34'-TetraCB-(42)	ng/L	0.026 U	0.026	0.053	0.011	N/A	N/A	1	8533813
22'35-TetraCB-(43)	ng/L	0.025 U	0.025	0.053	0.015	N/A	N/A	1	8533813
TetraCB-(44)+(47)+(65)	ng/L	0.020 J	0.018	0.11	0.029	N/A	N/A	1	8533813
TetraCB-(45)+(51)	ng/L	0.020 U	0.020	0.053	0.011	N/A	N/A	1	8533813
22'36'-TetraCB-(46)	ng/L	0.022 U	0.022	0.021	0.014	N/A	N/A	1	8533813
22'45-TetraCB-(48)	ng/L	0.019 U	0.019	0.053	0.017	N/A	N/A	1	8533813
TetraCB-(49)+TetraCB-(69)	ng/L	0.017 U	0.017	0.11	0.023	N/A	N/A	1	8533813
TetraCB-(50)+(53)	ng/L	0.020 U	0.020	0.11	0.027	N/A	N/A	1	8533813
22'55'-TetraCB-(52)	ng/L	0.019 U	0.019	0.053	0.019	N/A	N/A	1	8533813
22'66'-TetraCB-(54)	ng/L	0.029 U	0.029	0.053	0.020	N/A	N/A	1	8533813
233'4-TetraCB-(55)	ng/L	0.014 U	0.014	0.053	0.015	N/A	N/A	1	8533813
233'4'-Tetra CB(56)	ng/L	0.013 U	0.013	0.053	0.018	N/A	N/A	1	8533813
233'5-TetraCB-(57)	ng/L	0.013 U	0.013	0.053	0.0097	N/A	N/A	1	8533813
233'5'-TetraCB-(58)	ng/L	0.013 U	0.013	0.053	0.020	N/A	N/A	1	8533813
TetraCB-(59)+(62)+(75)	ng/L	0.014 U	0.014	0.11	0.038	N/A	N/A	1	8533813
2344'-TetraCB -(60)	ng/L	0.013 U	0.013	0.053	0.011	N/A	N/A	1	8533813
TetraCB-(61)+(70)+(74)+(76)	ng/L	0.013 U	0.013	0.21	0.035	N/A	N/A	1	8533813
234'5-TetraCB-(63)	ng/L	0.013 U	0.013	0.053	0.0080	N/A	N/A	1	8533813
234'6-TetraCB-(64)	ng/L	0.016 U	0.016	0.053	0.0089	N/A	N/A	1	8533813
23'44'-TetraCB-(66)	ng/L	0.012 U	0.012	0.053	0.0084	N/A	N/A	1	8533813
23'45-TetraCB-(67)	ng/L	0.011 U	0.011	0.053	0.0040	N/A	N/A	1	8533813
23'45'-TetraCB-(68)	ng/L	0.012 U	0.012	0.053	0.014	N/A	N/A	1	8533813
23'55'-TetraCB-(72)	ng/L	0.013 U	0.013	0.053	0.0082	N/A	N/A	1	8533813
23'5'6-TetraCB-(73)	ng/L	0.013 U	0.013	0.053	0.023	N/A	N/A	1	8533813
33'44'-TetraCB-(77)	ng/L	0.0098 U	0.0098	0.053	0.011	0.000100	0.000000980	1	8533813
33'45-TetraCB-(78)	ng/L	0.014 U	0.014	0.053	0.013	N/A	N/A	1	8533813
33'45'-TetraCB(79)	ng/L	0.011 U	0.011	0.053	0.0088	N/A	N/A	1	8533813
33'55'-TetraCB-(80)	ng/L	0.011 U	0.011	0.053	0.0087	N/A	N/A	1	8533813
344'5-TetraCB-(81)	ng/L	0.011 U	0.011	0.053	0.0079	0.000300	0.00000330	1	8533813

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	UNITS	MW5-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'4-PentaCB-(82)	ng/L	0.018 U	0.018	0.053	0.014	N/A	N/A	1	8533813
PentaCB-(83)+(99)	ng/L	0.015 U	0.015	0.11	0.033	N/A	N/A	1	8533813
22'33'6-PentaCB-(84)	ng/L	0.017 U	0.017	0.021	0.0088	N/A	N/A	1	8533813
PentaCB-(85)+(116)+(117)	ng/L	0.012 U	0.012	0.11	0.040	N/A	N/A	1	8533813
PentaCB-(86)(87)(97)(109)(119)(125	ng/L	0.013 U	0.013	0.21	0.080	N/A	N/A	1	8533813
PentaCB-(88)+(91)	ng/L	0.016 U	0.016	0.053	0.025	N/A	N/A	1	8533813
22'346'-PentaCB-(89)	ng/L	0.019 U	0.019	0.053	0.0040	N/A	N/A	1	8533813
PentaCB-(90)+(101)+(113)	ng/L	0.013 J	0.013	0.21	0.0080	N/A	N/A	1	8533813
22'355'-PentaCB-(92)	ng/L	0.017 U	0.017	0.053	0.010	N/A	N/A	1	8533813
PentaCB-(93)+(98)+(100)+(102)	ng/L	0.016 U	0.016	0.21	0.051	N/A	N/A	1	8533813
22'356'-PentaCB-(94)	ng/L	0.016 U	0.016	0.053	0.017	N/A	N/A	1	8533813
22'35'6-PentaCB-(95)	ng/L	0.017 U	0.017	0.053	0.011	N/A	N/A	1	8533813
22'366'-PentaCB-(96)	ng/L	0.014 U	0.014	0.053	0.014	N/A	N/A	1	8533813
22'45'6-PentaCB-(103)	ng/L	0.015 U	0.015	0.053	0.012	N/A	N/A	1	8533813
22'466'-PentaCB-(104)	ng/L	0.015 U	0.015	0.053	0.022	N/A	N/A	1	8533813
233'44'-PentaCB-(105)	ng/L	0.0076 U	0.0076	0.053	0.0052	0.0000300	0.000000228	1	8533813
233'45-PentaCB-(106)	ng/L	0.010 U	0.010	0.053	0.018	N/A	N/A	1	8533813
233'4'5-PentaCB-(107)	ng/L	0.0077 U	0.0077	0.053	0.014	N/A	N/A	1	8533813
PentaCB-(108)+(124)	ng/L	0.0096 U	0.0096	0.11	0.023	N/A	N/A	1	8533813
PentaCB-(110)+(115)	ng/L	0.012 U	0.012	0.11	0.022	N/A	N/A	1	8533813
233'55'-PentaCB-(111)	ng/L	0.010 U	0.010	0.053	0.012	N/A	N/A	1	8533813
233'56-PentaCB-(112)	ng/L	0.0098 U	0.0098	0.053	0.018	N/A	N/A	1	8533813
2344'5-PentaCB-(114)	ng/L	0.0089 U	0.0089	0.053	0.0084	0.0000300	0.000000267	1	8533813
23'44'5-PentaCB-(118)	ng/L	0.0084 U	0.0084	0.11	0.0071	0.0000300	0.000000252	1	8533813
23'455'-PentaCB-(120)	ng/L	0.010 U	0.010	0.053	0.014	N/A	N/A	1	8533813
23'45'6-PentaCB-(121)	ng/L	0.011 U	0.011	0.053	0.0040	N/A	N/A	1	8533813
233'4'5'-PentaCB-(122)	ng/L	0.013 U	0.013	0.053	0.011	N/A	N/A	1	8533813
23'44'5'-PentaCB-(123)	ng/L	0.0093 U	0.0093	0.053	0.014	0.0000300	0.000000279	1	8533813
33'44'5-PentaCB-(126)	ng/L	0.0084 U	0.0084	0.053	0.0061	0.100	0.000840	1	8533813
33'455'-PentaCB-(127)	ng/L	0.0094 U	0.0094	0.053	0.017	N/A	N/A	1	8533813
HexaCB-(128)+(166)	ng/L	0.011 U	0.011	0.11	0.026	N/A	N/A	1	8533813
HexaCB-(129)+(138)+(163)	ng/L	0.012 U	0.012	0.21	0.014	N/A	N/A	1	8533813

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	UNITS	MW5-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'45'-HexaCB-(130)	ng/L	0.014 U	0.014	0.053	0.020	N/A	N/A	1	8533813
22'33'46-HexaCB-(131)	ng/L	0.017 U	0.017	0.053	0.019	N/A	N/A	1	8533813
22'33'46'-HexaCB-(132)	ng/L	0.015 U	0.015	0.053	0.019	N/A	N/A	1	8533813
22'33'55'-HexaCB-(133)	ng/L	0.015 U	0.015	0.053	0.017	N/A	N/A	1	8533813
HexaCB-(134)+(143)	ng/L	0.016 U	0.016	0.11	0.028	N/A	N/A	1	8533813
HexaCB-(135)+(151)	ng/L	0.017 U	0.017	0.11	0.038	N/A	N/A	1	8533813
22'33'66'-HexaCB-(136)	ng/L	0.012 U	0.012	0.053	0.014	N/A	N/A	1	8533813
22'344'5-HexaCB-(137)	ng/L	0.013 U	0.013	0.11	0.014	N/A	N/A	1	8533813
HexaCB-(139)+(140)	ng/L	0.012 U	0.012	0.11	0.032	N/A	N/A	1	8533813
22'3455'-HexaCB-(141)	ng/L	0.012 U	0.012	0.053	0.018	N/A	N/A	1	8533813
22'3456-HexaCB-(142)	ng/L	0.015 U	0.015	0.053	0.018	N/A	N/A	1	8533813
22'345'6-HexaCB-(144)	ng/L	0.016 U	0.016	0.053	0.011	N/A	N/A	1	8533813
22'3466'-HexaCB-(145)	ng/L	0.012 U	0.012	0.053	0.022	N/A	N/A	1	8533813
22'34'55'-HexaCB-(146)	ng/L	0.011 U	0.011	0.053	0.014	N/A	N/A	1	8533813
HexaCB-(147)+(149)	ng/L	0.012 U	0.012	0.11	0.027	N/A	N/A	1	8533813
22'34'56'-HexaCB-(148)	ng/L	0.017 U	0.017	0.053	0.013	N/A	N/A	1	8533813
22'34'66'-HexaCB-(150)	ng/L	0.012 U	0.012	0.053	0.022	N/A	N/A	1	8533813
22'3566'-HexaCB-(152)	ng/L	0.012 U	0.012	0.053	0.020	N/A	N/A	1	8533813
HexaCB-(153)+(168)	ng/L	0.0099 U	0.0099	0.11	0.028	N/A	N/A	1	8533813
22'44'56'-HexaCB-(154)	ng/L	0.013 U	0.013	0.053	0.014	N/A	N/A	1	8533813
22'44'66'-HexaCB-(155)	ng/L	0.014 U	0.014	0.053	0.013	N/A	N/A	1	8533813
HexaCB-(156)+(157)	ng/L	0.0078 U	0.0078	0.11	0.015	0.0000300	0.000000234	1	8533813
233'44'6-HexaCB-(158)	ng/L	0.0081 U	0.0081	0.053	0.017	N/A	N/A	1	8533813
233'455'-HexaCB-(159)	ng/L	0.0077 U	0.0077	0.053	0.015	N/A	N/A	1	8533813
233'456-HexaCB-(160)	ng/L	0.010 U	0.010	0.053	0.013	N/A	N/A	1	8533813
233'45'6-HexaCB-(161)	ng/L	0.0095 U	0.0095	0.053	0.022	N/A	N/A	1	8533813
233'4'55'-HexaCB-(162)	ng/L	0.0075 U	0.0075	0.053	0.016	N/A	N/A	1	8533813
233'4'5'6-HexaCB-(164)	ng/L	0.0088 U	0.0088	0.053	0.020	N/A	N/A	1	8533813
233'55'6-HexaCB-(165)	ng/L	0.010 U	0.010	0.053	0.022	N/A	N/A	1	8533813
23'44'55'-HexaCB-(167)	ng/L	0.0080 U	0.0080	0.053	0.0096	0.0000300	0.000000240	1	8533813
33'44'55'-HexaCB-(169)	ng/L	0.0083 U	0.0083	0.053	0.0092	0.0300	0.000249	1	8533813
22'33'44'5-HeptaCB-(170)	ng/L	0.0089 U	0.0089	0.053	0.011	N/A	N/A	1	8533813

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HeptaCB-(171)+(173)	ng/L	0.011 U	0.011	0.11	0.027	N/A	N/A	1	8533813
22'33'455'-HeptaCB-(172)	ng/L	0.011 U	0.011	0.053	0.012	N/A	N/A	1	8533813
22'33'456'-HeptaCB-(174)	ng/L	0.010 U	0.010	0.053	0.017	N/A	N/A	1	8533813
22'33'45'6-HeptaCB-(175)	ng/L	0.012 U	0.012	0.053	0.0064	N/A	N/A	1	8533813
22'33'466'-HeptaCB-(176)	ng/L	0.0090 U	0.0090	0.053	0.0079	N/A	N/A	1	8533813
22'33'45'6'-HeptaCB-(177)	ng/L	0.011 U	0.011	0.053	0.013	N/A	N/A	1	8533813
22'33'55'6-HeptaCB-(178)	ng/L	0.013 U	0.013	0.053	0.0071	N/A	N/A	1	8533813
22'33'566'-HeptaCB-(179)	ng/L	0.0090 U	0.0090	0.053	0.010	N/A	N/A	1	8533813
HeptaCB-(180)+(193)	ng/L	0.0083 U	0.0083	0.11	0.018	N/A	N/A	1	8533813
22'344'56-HeptaCB-(181)	ng/L	0.011 U	0.011	0.053	0.015	N/A	N/A	1	8533813
22'344'56'-HeptaCB-(182)	ng/L	0.011 U	0.011	0.053	0.0066	N/A	N/A	1	8533813
22'344'5'6-HeptaCB-(183)	ng/L	0.0096 U	0.0096	0.053	0.017	N/A	N/A	1	8533813
22'344'66'-HeptaCB-(184)	ng/L	0.0086 U	0.0086	0.053	0.0065	N/A	N/A	1	8533813
22'3455'6-HeptaCB-(185)	ng/L	0.011 U	0.011	0.053	0.017	N/A	N/A	1	8533813
22'34566'-HeptaCB-(186)	ng/L	0.0094 U	0.0094	0.053	0.0095	N/A	N/A	1	8533813
22'34'55'6-HeptaCB-(187)	ng/L	0.011 U	0.011	0.053	0.0047	N/A	N/A	1	8533813
22'34'566'-HeptaCB-(188)	ng/L	0.011 U	0.011	0.053	0.015	N/A	N/A	1	8533813
233'44'55'-HeptaCB-(189)	ng/L	0.0067 U	0.0067	0.053	0.014	0.0000300	0.000000201	1	8533813
233'44'56-HeptaCB-(190)	ng/L	0.0076 U	0.0076	0.053	0.016	N/A	N/A	1	8533813
233'44'5'6-HeptaCB-(191)	ng/L	0.0076 U	0.0076	0.053	0.014	N/A	N/A	1	8533813
233'455'6-HeptaCB-(192)	ng/L	0.0084 U	0.0084	0.053	0.0088	N/A	N/A	1	8533813
22'33'44'55'-OctaCB-(194)	ng/L	0.0063 U	0.0063	0.053	0.024	N/A	N/A	1	8533813
22'33'44'56-OctaCB-(195)	ng/L	0.0071 U	0.0071	0.053	0.019	N/A	N/A	1	8533813
22'33'44'56'-OctaCB-(196)	ng/L	0.0072 U	0.0072	0.053	0.017	N/A	N/A	1	8533813
22'33'44'66'OctaCB-(197)	ng/L	0.0050 U	0.0050	0.053	0.033	N/A	N/A	1	8533813
OctaCB-(198)+(199)	ng/L	0.0077 U	0.0077	0.11	0.028	N/A	N/A	1	8533813
22'33'4566'-OctaCB-(200)	ng/L	0.0060 U	0.0060	0.053	0.031	N/A	N/A	1	8533813
22'33'45'66'-OctaCB-(201)	ng/L	0.0051 U	0.0051	0.053	0.014	N/A	N/A	1	8533813
22'33'55'66'-OctaCB-(202)	ng/L	0.0059 U	0.0059	0.053	0.013	N/A	N/A	1	8533813
22'344'55'6-OctaCB-(203)	ng/L	0.0072 U	0.0072	0.053	0.021	N/A	N/A	1	8533813
22'344'566'-OctaCB-(204)	ng/L	0.0044 U	0.0044	0.053	0.018	N/A	N/A	1	8533813
233'44'55'6-OctaCB-(205)	ng/L	0.0043 U	0.0043	0.053	0.014	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ251							
Sampling Date		2023/02/14 12:51				TOXIC EQUIVALENCY		# of	
	UNITS	MW5-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'44'55'6-NonaCB-(206)	ng/L	0.0078 U	0.0078	0.053	0.020	N/A	N/A	1	8533813
22'33'44'566'-NonaCB-(207)	ng/L	0.0071 U	0.0071	0.053	0.018	N/A	N/A	1	8533813
22'33'455'66'-NonaCB-(208)	ng/L	0.0068 U	0.0068	0.053	0.021	N/A	N/A	1	8533813
DecaCB-(209)	ng/L	0.0063 U	0.0063	0.053	0.015	N/A	N/A	1	8533813
TOTAL TOXIC EQUIVALENCY	ng/L	N/A	N/A	N/A	N/A	N/A	0.00109	N/A	N/A
Surrogate Recovery (%)									
C13-2,44'-TriCB-(28)	%	48	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'55'6-NonaCB-(206)	%	115	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'5-HeptaCB-(170)	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'455'66'-NonaCB-(208)	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'66'-OctaCB-(202)	%	88	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'6-HeptaCB-(178)	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'344'55'-HeptaCB-(180)	%	88	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'34'566'-HeptaCB-(188)	%	76	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'44'66'-HexaCB-(155)	%	71	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'466'-PentaCB-(104)	%	60	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'66'-TetraCB-(54)	%	51	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'6-TriCB-(19)	%	48	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'-DiCB-(4)	%	44	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'6-OctaCB-(205)	%	95	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'-HeptaCB-(189)	%	85	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'-PentaCB-(105)	%	77	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'55'-PentaCB-(111)	%	87	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'55'-HexaCB-(167)	%	71	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2344'5-PentaCB-(114)	%	64	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'5-PentaCB-(118)	%	65	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2'344'5-PentaCB-(123)	%	65	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2-MonoCB-(1)	%	30	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'55'-HexaCB-(169)	%	79	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'5-PentaCB-(126)	%	76	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'-TetraCB-(77)	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-344'5-TetraCB-(81)	%	83	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ251							
Sampling Date		2023/02/14 12:51				TOXIC EQUIVALENCY		# of	
	UNITS	MW5-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-344'-TriCB-(37)	%	55	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-44'-DiCB-(15)	%	51	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-4-MonoCB-(3)	%	33	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-DecaCB-(209)	%	131	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-HexaCB-(156)+(157)	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ252							
Sampling Date		2023/02/14 14:37				TOXIC EQUIVALENCY		# of	
	UNITS	MW4-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2-MonoCB-(1)	ng/L	0.024	0.019	0.022	0.0098	N/A	N/A	1	8533813
3-MonoCB-(2)	ng/L	0.019 U	0.019	0.022	0.0079	N/A	N/A	1	8533813
4-MonoCB-(3)	ng/L	0.017 U	0.017	0.056	0.0071	N/A	N/A	1	8533813
22'-DiCB-(4)	ng/L	0.022 U	0.022	0.056	0.017	N/A	N/A	1	8533813
2,3-DiCB-(5)	ng/L	0.0098 U	0.0098	0.056	0.012	N/A	N/A	1	8533813
2,3'-DiCB-(6)	ng/L	0.0096 U	0.0096	0.022	0.0053	N/A	N/A	1	8533813
2,4-DiCB-(7)	ng/L	0.0097 U	0.0097	0.022	0.0056	N/A	N/A	1	8533813
2,4'-DiCB-(8)	ng/L	0.0093 U	0.0093	0.056	0.017	N/A	N/A	1	8533813
2,5-DiCB-(9)	ng/L	0.0095 U	0.0095	0.022	0.0044	N/A	N/A	1	8533813
2,6-DiCB-(10)	ng/L	0.012 U	0.012	0.056	0.0052	N/A	N/A	1	8533813
3,3'-DiCB-(11)	ng/L	0.0738 J	0.0098	0.22	0.0090	N/A	N/A	1	8533813
DiCB-(12)+(13)	ng/L	0.0090 U	0.0090	0.056	0.015	N/A	N/A	1	8533813
3,5-DiCB-(14)	ng/L	0.0098 U	0.0098	0.022	0.0082	N/A	N/A	1	8533813
4,4'-DiCB-(15)	ng/L	0.0084 U	0.0084	0.056	0.011	N/A	N/A	1	8533813
22'3-TriCB-(16)	ng/L	0.015 U	0.015	0.056	0.0060	N/A	N/A	1	8533813
22'4-TriCB-(17)	ng/L	0.012 U	0.012	0.022	0.0091	N/A	N/A	1	8533813
TriCB-(18)+(30)	ng/L	0.010 U	0.010	0.056	0.017	N/A	N/A	1	8533813
22'6-TriCB-(19)	ng/L	0.019 U	0.019	0.022	0.0061	N/A	N/A	1	8533813
TriCB-(20) + (28)	ng/L	0.0095 J	0.0068	0.050	0.010	N/A	N/A	1	8533813
TriCB-(21)+(33)	ng/L	0.0076 U	0.0076	0.056	0.011	N/A	N/A	1	8533813
234'-TriCB-(22)	ng/L	0.0076 U	0.0076	0.022	0.0065	N/A	N/A	1	8533813
235-TriCB-(23)	ng/L	0.0077 U	0.0077	0.022	0.0072	N/A	N/A	1	8533813
236-TriCB-(24)	ng/L	0.0094 U	0.0094	0.022	0.0043	N/A	N/A	1	8533813
23'4-TriCB-(25)	ng/L	0.0078 U	0.0078	0.022	0.0054	N/A	N/A	1	8533813
TriCB-(26)+(29)	ng/L	0.0071 U	0.0071	0.056	0.013	N/A	N/A	1	8533813
23'6-TriCB-(27)	ng/L	0.0088 U	0.0088	0.022	0.0082	N/A	N/A	1	8533813
24'5-TriCB-(31)	ng/L	0.0076 J	0.0067	0.056	0.0078	N/A	N/A	1	8533813
24'6-TriCB-(32)	ng/L	0.0084 U	0.0084	0.022	0.0087	N/A	N/A	1	8533813
23'5'-TriCB-(34)	ng/L	0.0076 U	0.0076	0.022	0.0061	N/A	N/A	1	8533813
33'4-TriCB-(35)	ng/L	0.0074 U	0.0074	0.022	0.0042	N/A	N/A	1	8533813
33'5-TriCB-(36)	ng/L	0.0068 U	0.0068	0.022	0.0052	N/A	N/A	1	8533813
344'-TriCB-(37)	ng/L	0.0067 U	0.0067	0.022	0.0041	N/A	N/A	1	8533813

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Bureau Veritas ID		VBZ252							
Sampling Date		2023/02/14 14:37				TOXIC EQUIVALENCY		# of	
	UNITS	MW4-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
345-TriCB-(38)	ng/L	0.0071 U	0.0071	0.022	0.0047	N/A	N/A	1	8533813
34'5-TriCB-(39)	ng/L	0.0075 U	0.0075	0.022	0.0059	N/A	N/A	1	8533813
TetraCB-(40)+(41)+(71)	ng/L	0.019 U	0.019	0.11	0.035	N/A	N/A	1	8533813
22'34'-TetraCB-(42)	ng/L	0.026 U	0.026	0.056	0.011	N/A	N/A	1	8533813
22'35-TetraCB-(43)	ng/L	0.025 U	0.025	0.056	0.015	N/A	N/A	1	8533813
TetraCB-(44)+(47)+(65)	ng/L	0.018 U	0.018	0.11	0.029	N/A	N/A	1	8533813
TetraCB-(45)+(51)	ng/L	0.020 U	0.020	0.056	0.011	N/A	N/A	1	8533813
22'36'-TetraCB-(46)	ng/L	0.022 U	0.022	0.022	0.014	N/A	N/A	1	8533813
22'45-TetraCB-(48)	ng/L	0.019 U	0.019	0.056	0.017	N/A	N/A	1	8533813
TetraCB-(49)+TetraCB-(69)	ng/L	0.017 U	0.017	0.11	0.023	N/A	N/A	1	8533813
TetraCB-(50)+(53)	ng/L	0.020 U	0.020	0.11	0.027	N/A	N/A	1	8533813
22'55'-TetraCB-(52)	ng/L	0.019 U	0.019	0.056	0.019	N/A	N/A	1	8533813
22'66'-TetraCB-(54)	ng/L	0.034 U	0.034	0.056	0.020	N/A	N/A	1	8533813
233'4-TetraCB-(55)	ng/L	0.014 U	0.014	0.056	0.015	N/A	N/A	1	8533813
233'4'-Tetra CB(56)	ng/L	0.013 U	0.013	0.056	0.018	N/A	N/A	1	8533813
233'5-TetraCB-(57)	ng/L	0.013 U	0.013	0.056	0.0097	N/A	N/A	1	8533813
233'5'-TetraCB-(58)	ng/L	0.013 U	0.013	0.056	0.020	N/A	N/A	1	8533813
TetraCB-(59)+(62)+(75)	ng/L	0.014 U	0.014	0.11	0.038	N/A	N/A	1	8533813
2344'-TetraCB -(60)	ng/L	0.013 U	0.013	0.056	0.011	N/A	N/A	1	8533813
TetraCB-(61)+(70)+(74)+(76)	ng/L	0.013 U	0.013	0.22	0.035	N/A	N/A	1	8533813
234'5-TetraCB-(63)	ng/L	0.013 U	0.013	0.056	0.0080	N/A	N/A	1	8533813
234'6-TetraCB-(64)	ng/L	0.016 U	0.016	0.056	0.0089	N/A	N/A	1	8533813
23'44'-TetraCB-(66)	ng/L	0.012 U	0.012	0.056	0.0084	N/A	N/A	1	8533813
23'45-TetraCB-(67)	ng/L	0.011 U	0.011	0.056	0.0040	N/A	N/A	1	8533813
23'45'-TetraCB-(68)	ng/L	0.012 U	0.012	0.056	0.014	N/A	N/A	1	8533813
23'55'-TetraCB-(72)	ng/L	0.013 U	0.013	0.056	0.0082	N/A	N/A	1	8533813
23'5'6-TetraCB-(73)	ng/L	0.013 U	0.013	0.056	0.023	N/A	N/A	1	8533813
33'44'-TetraCB-(77)	ng/L	0.0097 U	0.0097	0.056	0.011	0.000100	0.000000970	1	8533813
33'45-TetraCB-(78)	ng/L	0.014 U	0.014	0.056	0.013	N/A	N/A	1	8533813
33'45'-TetraCB(79)	ng/L	0.011 U	0.011	0.056	0.0088	N/A	N/A	1	8533813
33'55'-TetraCB-(80)	ng/L	0.011 U	0.011	0.056	0.0087	N/A	N/A	1	8533813
344'5-TetraCB-(81)	ng/L	0.011 U	0.011	0.056	0.0079	0.000300	0.00000330	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ252							
Sampling Date		2023/02/14 14:37				TOXIC EQUIVALENCY		# of	
	UNITS	MW4-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'4-PentaCB-(82)	ng/L	0.018 U	0.018	0.056	0.014	N/A	N/A	1	8533813
PentaCB-(83)+(99)	ng/L	0.015 U	0.015	0.11	0.033	N/A	N/A	1	8533813
22'33'6-PentaCB-(84)	ng/L	0.016 U	0.016	0.022	0.0088	N/A	N/A	1	8533813
PentaCB-(85)+(116)+(117)	ng/L	0.012 U	0.012	0.11	0.040	N/A	N/A	1	8533813
PentaCB-(86)(87)(97)(109)(119)(125	ng/L	0.012 U	0.012	0.22	0.080	N/A	N/A	1	8533813
PentaCB-(88)+(91)	ng/L	0.016 U	0.016	0.056	0.025	N/A	N/A	1	8533813
22'346'-PentaCB-(89)	ng/L	0.019 U	0.019	0.056	0.0040	N/A	N/A	1	8533813
PentaCB-(90)+(101)+(113)	ng/L	0.018 J	0.013	0.22	0.0080	N/A	N/A	1	8533813
22'355'-PentaCB-(92)	ng/L	0.017 U	0.017	0.056	0.010	N/A	N/A	1	8533813
PentaCB-(93)+(98)+(100)+(102)	ng/L	0.016 U	0.016	0.22	0.051	N/A	N/A	1	8533813
22'356'-PentaCB-(94)	ng/L	0.016 U	0.016	0.056	0.017	N/A	N/A	1	8533813
22'35'6-PentaCB-(95)	ng/L	0.017 U	0.017	0.056	0.011	N/A	N/A	1	8533813
22'366'-PentaCB-(96)	ng/L	0.014 U	0.014	0.056	0.014	N/A	N/A	1	8533813
22'45'6-PentaCB-(103)	ng/L	0.015 U	0.015	0.056	0.012	N/A	N/A	1	8533813
22'466'-PentaCB-(104)	ng/L	0.016 U	0.016	0.056	0.022	N/A	N/A	1	8533813
233'44'-PentaCB-(105)	ng/L	0.0077 U	0.0077	0.056	0.0052	0.0000300	0.000000231	1	8533813
233'45-PentaCB-(106)	ng/L	0.010 U	0.010	0.056	0.018	N/A	N/A	1	8533813
233'4'5-PentaCB-(107)	ng/L	0.0077 U	0.0077	0.056	0.014	N/A	N/A	1	8533813
PentaCB-(108)+(124)	ng/L	0.0095 U	0.0095	0.11	0.023	N/A	N/A	1	8533813
PentaCB-(110)+(115)	ng/L	0.015 J	0.012	0.11	0.022	N/A	N/A	1	8533813
233'55'-PentaCB-(111)	ng/L	0.010 U	0.010	0.056	0.012	N/A	N/A	1	8533813
233'56-PentaCB-(112)	ng/L	0.0098 U	0.0098	0.056	0.018	N/A	N/A	1	8533813
2344'5-PentaCB-(114)	ng/L	0.0085 U	0.0085	0.056	0.0084	0.0000300	0.000000255	1	8533813
23'44'5-PentaCB-(118)	ng/L	0.0082 U	0.0082	0.11	0.0071	0.0000300	0.000000246	1	8533813
23'455'-PentaCB-(120)	ng/L	0.010 U	0.010	0.056	0.014	N/A	N/A	1	8533813
23'45'6-PentaCB-(121)	ng/L	0.011 U	0.011	0.056	0.0040	N/A	N/A	1	8533813
233'4'5'-PentaCB-(122)	ng/L	0.012 U	0.012	0.056	0.011	N/A	N/A	1	8533813
23'44'5'-PentaCB-(123)	ng/L	0.0091 U	0.0091	0.056	0.014	0.0000300	0.000000273	1	8533813
33'44'5-PentaCB-(126)	ng/L	0.0083 U	0.0083	0.056	0.0061	0.100	0.000830	1	8533813
33'455'-PentaCB-(127)	ng/L	0.0094 U	0.0094	0.056	0.017	N/A	N/A	1	8533813
HexaCB-(128)+(166)	ng/L	0.0099 U	0.0099	0.11	0.026	N/A	N/A	1	8533813
HexaCB-(129)+(138)+(163)	ng/L	0.011 U	0.011	0.22	0.014	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ252							
Sampling Date		2023/02/14 14:37				TOXIC EQUIVALENCY		# of	
	UNITS	MW4-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'45'-HexaCB-(130)	ng/L	0.012 U	0.012	0.056	0.020	N/A	N/A	1	8533813
22'33'46-HexaCB-(131)	ng/L	0.015 U	0.015	0.056	0.019	N/A	N/A	1	8533813
22'33'46'-HexaCB-(132)	ng/L	0.013 U	0.013	0.056	0.019	N/A	N/A	1	8533813
22'33'55'-HexaCB-(133)	ng/L	0.013 U	0.013	0.056	0.017	N/A	N/A	1	8533813
HexaCB-(134)+(143)	ng/L	0.014 U	0.014	0.11	0.028	N/A	N/A	1	8533813
HexaCB-(135)+(151)	ng/L	0.015 U	0.015	0.11	0.038	N/A	N/A	1	8533813
22'33'66'-HexaCB-(136)	ng/L	0.011 U	0.011	0.056	0.014	N/A	N/A	1	8533813
22'344'5-HexaCB-(137)	ng/L	0.012 U	0.012	0.11	0.014	N/A	N/A	1	8533813
HexaCB-(139)+(140)	ng/L	0.011 U	0.011	0.11	0.032	N/A	N/A	1	8533813
22'3455'-HexaCB-(141)	ng/L	0.011 U	0.011	0.056	0.018	N/A	N/A	1	8533813
22'3456-HexaCB-(142)	ng/L	0.014 U	0.014	0.056	0.018	N/A	N/A	1	8533813
22'345'6-HexaCB-(144)	ng/L	0.015 U	0.015	0.056	0.011	N/A	N/A	1	8533813
22'3466'-HexaCB-(145)	ng/L	0.011 U	0.011	0.056	0.022	N/A	N/A	1	8533813
22'34'55'-HexaCB-(146)	ng/L	0.010 U	0.010	0.056	0.014	N/A	N/A	1	8533813
HexaCB-(147)+(149)	ng/L	0.013 J	0.011	0.11	0.027	N/A	N/A	1	8533813
22'34'56'-HexaCB-(148)	ng/L	0.015 U	0.015	0.056	0.013	N/A	N/A	1	8533813
22'34'66'-HexaCB-(150)	ng/L	0.011 U	0.011	0.056	0.022	N/A	N/A	1	8533813
22'3566'-HexaCB-(152)	ng/L	0.011 U	0.011	0.056	0.020	N/A	N/A	1	8533813
HexaCB-(153)+(168)	ng/L	0.0128 J	0.0090	0.11	0.028	N/A	N/A	1	8533813
22'44'56'-HexaCB-(154)	ng/L	0.012 U	0.012	0.056	0.014	N/A	N/A	1	8533813
22'44'66'-HexaCB-(155)	ng/L	0.014 U	0.014	0.056	0.013	N/A	N/A	1	8533813
HexaCB-(156)+(157)	ng/L	0.0063 U	0.0063	0.11	0.015	0.0000300	0.000000189	1	8533813
233'44'6-HexaCB-(158)	ng/L	0.0073 U	0.0073	0.056	0.017	N/A	N/A	1	8533813
233'455'-HexaCB-(159)	ng/L	0.0070 U	0.0070	0.056	0.015	N/A	N/A	1	8533813
233'456-HexaCB-(160)	ng/L	0.0092 U	0.0092	0.056	0.013	N/A	N/A	1	8533813
233'45'6-HexaCB-(161)	ng/L	0.0086 U	0.0086	0.056	0.022	N/A	N/A	1	8533813
233'4'55'-HexaCB-(162)	ng/L	0.0068 U	0.0068	0.056	0.016	N/A	N/A	1	8533813
233'4'5'6-HexaCB-(164)	ng/L	0.0080 U	0.0080	0.056	0.020	N/A	N/A	1	8533813
233'55'6-HexaCB-(165)	ng/L	0.0094 U	0.0094	0.056	0.022	N/A	N/A	1	8533813
23'44'55'-HexaCB-(167)	ng/L	0.0071 U	0.0071	0.056	0.0096	0.0000300	0.000000213	1	8533813
33'44'55'-HexaCB-(169)	ng/L	0.0098 U	0.0098	0.056	0.0092	0.0300	0.000294	1	8533813
22'33'44'5-HeptaCB-(170)	ng/L	0.0092 U	0.0092	0.056	0.011	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ252							
Sampling Date		2023/02/14 14:37				TOXIC EQUIVALENCY		# of	
	UNITS	MW4-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
HeptaCB-(171)+(173)	ng/L	0.011 U	0.011	0.11	0.027	N/A	N/A	1	8533813
22'33'455'-HeptaCB-(172)	ng/L	0.011 U	0.011	0.056	0.012	N/A	N/A	1	8533813
22'33'456'-HeptaCB-(174)	ng/L	0.010 U	0.010	0.056	0.017	N/A	N/A	1	8533813
22'33'45'6-HeptaCB-(175)	ng/L	0.013 U	0.013	0.056	0.0064	N/A	N/A	1	8533813
22'33'466'-HeptaCB-(176)	ng/L	0.0093 U	0.0093	0.056	0.0079	N/A	N/A	1	8533813
22'33'45'6'-HeptaCB-(177)	ng/L	0.012 U	0.012	0.056	0.013	N/A	N/A	1	8533813
22'33'55'6-HeptaCB-(178)	ng/L	0.013 U	0.013	0.056	0.0071	N/A	N/A	1	8533813
22'33'566'-HeptaCB-(179)	ng/L	0.0092 U	0.0092	0.056	0.010	N/A	N/A	1	8533813
HeptaCB-(180)+(193)	ng/L	0.0085 U	0.0085	0.11	0.018	N/A	N/A	1	8533813
22'344'56-HeptaCB-(181)	ng/L	0.011 U	0.011	0.056	0.015	N/A	N/A	1	8533813
22'344'56'-HeptaCB-(182)	ng/L	0.012 U	0.012	0.056	0.0066	N/A	N/A	1	8533813
22'344'5'6-HeptaCB-(183)	ng/L	0.0099 U	0.0099	0.056	0.017	N/A	N/A	1	8533813
22'344'66'-HeptaCB-(184)	ng/L	0.0088 U	0.0088	0.056	0.0065	N/A	N/A	1	8533813
22'3455'6-HeptaCB-(185)	ng/L	0.012 U	0.012	0.056	0.017	N/A	N/A	1	8533813
22'34566'-HeptaCB-(186)	ng/L	0.0096 U	0.0096	0.056	0.0095	N/A	N/A	1	8533813
22'34'55'6-HeptaCB-(187)	ng/L	0.012 U	0.012	0.056	0.0047	N/A	N/A	1	8533813
22'34'566'-HeptaCB-(188)	ng/L	0.0098 U	0.0098	0.056	0.015	N/A	N/A	1	8533813
233'44'55'-HeptaCB-(189)	ng/L	0.0076 U	0.0076	0.056	0.014	0.0000300	0.000000228	1	8533813
233'44'56-HeptaCB-(190)	ng/L	0.0078 U	0.0078	0.056	0.016	N/A	N/A	1	8533813
233'44'5'6-HeptaCB-(191)	ng/L	0.0078 U	0.0078	0.056	0.014	N/A	N/A	1	8533813
233'455'6-HeptaCB-(192)	ng/L	0.0086 U	0.0086	0.056	0.0088	N/A	N/A	1	8533813
22'33'44'55'-OctaCB-(194)	ng/L	0.019 U	0.019	0.056	0.024	N/A	N/A	1	8533813
22'33'44'56-OctaCB-(195)	ng/L	0.022 U	0.022	0.056	0.019	N/A	N/A	1	8533813
22'33'44'56'-OctaCB-(196)	ng/L	0.022 U	0.022	0.056	0.017	N/A	N/A	1	8533813
22'33'44'66'OctaCB-(197)	ng/L	0.015 U	0.015	0.056	0.033	N/A	N/A	1	8533813
OctaCB-(198)+(199)	ng/L	0.023 U	0.023	0.11	0.028	N/A	N/A	1	8533813
22'33'4566'-OctaCB-(200)	ng/L	0.018 U	0.018	0.056	0.031	N/A	N/A	1	8533813
22'33'45'66'-OctaCB-(201)	ng/L	0.015 U	0.015	0.056	0.014	N/A	N/A	1	8533813
22'33'55'66'-OctaCB-(202)	ng/L	0.015 U	0.015	0.056	0.013	N/A	N/A	1	8533813
22'344'55'6-OctaCB-(203)	ng/L	0.022 U	0.022	0.056	0.021	N/A	N/A	1	8533813
22'344'566'-OctaCB-(204)	ng/L	0.013 U	0.013	0.056	0.018	N/A	N/A	1	8533813
233'44'55'6-OctaCB-(205)	ng/L	0.015 U	0.015	0.056	0.014	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ252							
Sampling Date		2023/02/14 14:37				TOXIC EQUIVALENCY		# of	
	UNITS	MW4-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'44'55'6-NonaCB-(206)	ng/L	0.029 U	0.029	0.056	0.020	N/A	N/A	1	8533813
22'33'44'566'-NonaCB-(207)	ng/L	0.025 U	0.025	0.056	0.018	N/A	N/A	1	8533813
22'33'455'66'-NonaCB-(208)	ng/L	0.023 U	0.023	0.056	0.021	N/A	N/A	1	8533813
DecaCB-(209)	ng/L	0.027 U	0.027	0.056	0.015	N/A	N/A	1	8533813
TOTAL TOXIC EQUIVALENCY	ng/L	N/A	N/A	N/A	N/A	N/A	0.00113	N/A	N/A
Surrogate Recovery (%)									
C13-2,44'-TriCB-(28)	%	34	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'55'6-NonaCB-(206)	%	115	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'5-HeptaCB-(170)	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'455'66'-NonaCB-(208)	%	104	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'66'-OctaCB-(202)	%	124	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'6-HeptaCB-(178)	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'344'55'-HeptaCB-(180)	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'34'566'-HeptaCB-(188)	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'44'66'-HexaCB-(155)	%	67	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'466'-PentaCB-(104)	%	47	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'66'-TetraCB-(54)	%	37	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'6-TriCB-(19)	%	39 (1)	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'-DiCB-(4)	%	34	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'6-OctaCB-(205)	%	97	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'-HeptaCB-(189)	%	84	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'-PentaCB-(105)	%	65	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'55'-PentaCB-(111)	%	84	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'55'-HexaCB-(167)	%	73	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2344'5-PentaCB-(114)	%	57	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'5-PentaCB-(118)	%	56	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2'344'5-PentaCB-(123)	%	57	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2-MonoCB-(1)	%	20	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'55'-HexaCB-(169)	%	61	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'5-PentaCB-(126)	%	65	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'-TetraCB-(77)	%	78	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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(1) Within criteria.

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ252							
Sampling Date		2023/02/14 14:37				TOXIC EQUIVALENCY		# of	
	UNITS	MW4-20230214-GW-40	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-344'5-TetraCB-(81)	%	73	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-344'-TriCB-(37)	%	41	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-44'-DiCB-(15)	%	35	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-4-MonoCB-(3)	%	23	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-DecaCB-(209)	%	126	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-HexaCB-(156)+(157)	%	83	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ253							
Sampling Date		2023/02/14 16:17				TOXIC EQUIVALENCY		# of	
	UNITS	MW6-20230214-GW-40.25	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2-MonoCB-(1)	ng/L	0.042	0.013	0.020	0.0098	N/A	N/A	1	8533813
3-MonoCB-(2)	ng/L	0.013 U	0.013	0.020	0.0079	N/A	N/A	1	8533813
4-MonoCB-(3)	ng/L	0.011 U	0.011	0.050	0.0071	N/A	N/A	1	8533813
22'-DiCB-(4)	ng/L	0.017 J	0.014	0.050	0.017	N/A	N/A	1	8533813
2,3-DiCB-(5)	ng/L	0.0063 U	0.0063	0.050	0.012	N/A	N/A	1	8533813
2,3'-DiCB-(6)	ng/L	0.0062 U	0.0062	0.020	0.0053	N/A	N/A	1	8533813
2,4-DiCB-(7)	ng/L	0.0062 U	0.0062	0.020	0.0056	N/A	N/A	1	8533813
2,4'-DiCB-(8)	ng/L	0.0203 J	0.0060	0.050	0.017	N/A	N/A	1	8533813
2,5-DiCB-(9)	ng/L	0.0061 U	0.0061	0.020	0.0044	N/A	N/A	1	8533813
2,6-DiCB-(10)	ng/L	0.0078 U	0.0078	0.050	0.0052	N/A	N/A	1	8533813
3,3'-DiCB-(11)	ng/L	0.139 J	0.0063	0.20	0.0090	N/A	N/A	1	8533813
DiCB-(12)+(13)	ng/L	0.0058 U	0.0058	0.050	0.015	N/A	N/A	1	8533813
3,5-DiCB-(14)	ng/L	0.0063 U	0.0063	0.020	0.0082	N/A	N/A	1	8533813
4,4'-DiCB-(15)	ng/L	0.0092 J	0.0053	0.050	0.011	N/A	N/A	1	8533813
22'3-TriCB-(16)	ng/L	0.010 U	0.010	0.050	0.0060	N/A	N/A	1	8533813
22'4-TriCB-(17)	ng/L	0.0084 U	0.0084	0.020	0.0091	N/A	N/A	1	8533813
TriCB-(18)+(30)	ng/L	0.0131 J	0.0073	0.050	0.017	N/A	N/A	1	8533813
22'6-TriCB-(19)	ng/L	0.014 U	0.014	0.020	0.0061	N/A	N/A	1	8533813
TriCB-(20) + (28)	ng/L	0.0048 U	0.0048	0.050	0.010	N/A	N/A	1	8533813
TriCB-(21)+(33)	ng/L	0.0168 J	0.0053	0.050	0.011	N/A	N/A	1	8533813
234'-TriCB-(22)	ng/L	0.0054 U	0.0054	0.020	0.0065	N/A	N/A	1	8533813
235-TriCB-(23)	ng/L	0.0054 U	0.0054	0.020	0.0072	N/A	N/A	1	8533813
236-TriCB-(24)	ng/L	0.0066 U	0.0066	0.020	0.0043	N/A	N/A	1	8533813
23'4-TriCB-(25)	ng/L	0.0055 U	0.0055	0.020	0.0054	N/A	N/A	1	8533813
TriCB-(26)+(29)	ng/L	0.0050 U	0.0050	0.050	0.013	N/A	N/A	1	8533813
23'6-TriCB-(27)	ng/L	0.0062 U	0.0062	0.020	0.0082	N/A	N/A	1	8533813
24'5-TriCB-(31)	ng/L	0.0048 U	0.0048	0.050	0.0078	N/A	N/A	1	8533813
24'6-TriCB-(32)	ng/L	0.0059 U	0.0059	0.020	0.0087	N/A	N/A	1	8533813
23'5'-TriCB-(34)	ng/L	0.0053 U	0.0053	0.020	0.0061	N/A	N/A	1	8533813
33'4-TriCB-(35)	ng/L	0.0052 U	0.0052	0.020	0.0042	N/A	N/A	1	8533813
33'5-TriCB-(36)	ng/L	0.0048 U	0.0048	0.020	0.0052	N/A	N/A	1	8533813
344'-TriCB-(37)	ng/L	0.0101 J	0.0046	0.020	0.0041	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ253							
Sampling Date		2023/02/14 16:17				TOXIC EQUIVALENCY		# of	
	UNITS	MW6-20230214-GW-40.25	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
345-TriCB-(38)	ng/L	0.0050 U	0.0050	0.020	0.0047	N/A	N/A	1	8533813
34'5-TriCB-(39)	ng/L	0.0053 U	0.0053	0.020	0.0059	N/A	N/A	1	8533813
TetraCB-(40)+(41)+(71)	ng/L	0.014 U	0.014	0.10	0.035	N/A	N/A	1	8533813
22'34'-TetraCB-(42)	ng/L	0.020 U	0.020	0.050	0.011	N/A	N/A	1	8533813
22'35-TetraCB-(43)	ng/L	0.019 U	0.019	0.050	0.015	N/A	N/A	1	8533813
TetraCB-(44)+(47)+(65)	ng/L	0.037 J	0.014	0.10	0.029	N/A	N/A	1	8533813
TetraCB-(45)+(51)	ng/L	0.015 U	0.015	0.050	0.011	N/A	N/A	1	8533813
22'36'-TetraCB-(46)	ng/L	0.017 U	0.017	0.020	0.014	N/A	N/A	1	8533813
22'45-TetraCB-(48)	ng/L	0.015 U	0.015	0.050	0.017	N/A	N/A	1	8533813
TetraCB-(49)+TetraCB-(69)	ng/L	0.017 J	0.013	0.10	0.023	N/A	N/A	1	8533813
TetraCB-(50)+(53)	ng/L	0.015 U	0.015	0.10	0.027	N/A	N/A	1	8533813
22'55'-TetraCB-(52)	ng/L	0.038 J	0.015	0.050	0.019	N/A	N/A	1	8533813
22'66'-TetraCB-(54)	ng/L	0.023 U	0.023	0.050	0.020	N/A	N/A	1	8533813
233'4-TetraCB-(55)	ng/L	0.010 U	0.010	0.050	0.015	N/A	N/A	1	8533813
233'4'-Tetra CB(56)	ng/L	0.010 U	0.010	0.050	0.018	N/A	N/A	1	8533813
233'5-TetraCB-(57)	ng/L	0.010 U	0.010	0.050	0.0097	N/A	N/A	1	8533813
233'5'-TetraCB-(58)	ng/L	0.0099 U	0.0099	0.050	0.020	N/A	N/A	1	8533813
TetraCB-(59)+(62)+(75)	ng/L	0.010 U	0.010	0.10	0.038	N/A	N/A	1	8533813
2344'-TetraCB -(60)	ng/L	0.0098 U	0.0098	0.050	0.011	N/A	N/A	1	8533813
TetraCB-(61)+(70)+(74)+(76)	ng/L	0.047 J	0.010	0.20	0.035	N/A	N/A	1	8533813
234'5-TetraCB-(63)	ng/L	0.0096 U	0.0096	0.050	0.0080	N/A	N/A	1	8533813
234'6-TetraCB-(64)	ng/L	0.012 U	0.012	0.050	0.0089	N/A	N/A	1	8533813
23'44'-TetraCB-(66)	ng/L	0.0204 J	0.0095	0.050	0.0084	N/A	N/A	1	8533813
23'45-TetraCB-(67)	ng/L	0.0083 U	0.0083	0.050	0.0040	N/A	N/A	1	8533813
23'45'-TetraCB-(68)	ng/L	0.0090 U	0.0090	0.050	0.014	N/A	N/A	1	8533813
23'55'-TetraCB-(72)	ng/L	0.0097 U	0.0097	0.050	0.0082	N/A	N/A	1	8533813
23'5'6-TetraCB-(73)	ng/L	0.010 U	0.010	0.050	0.023	N/A	N/A	1	8533813
33'44'-TetraCB-(77)	ng/L	0.0090 J	0.0074	0.050	0.011	0.000100	0.000000900	1	8533813
33'45-TetraCB-(78)	ng/L	0.010 U	0.010	0.050	0.013	N/A	N/A	1	8533813
33'45'-TetraCB(79)	ng/L	0.0083 U	0.0083	0.050	0.0088	N/A	N/A	1	8533813
33'55'-TetraCB-(80)	ng/L	0.0081 U	0.0081	0.050	0.0087	N/A	N/A	1	8533813
344'5-TetraCB-(81)	ng/L	0.0083 U	0.0083	0.050	0.0079	0.000300	0.00000249	1	8533813

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	UNITS	MW6-20230214-GW-40.25	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'4-PentaCB-(82)	ng/L	0.014 U	0.014	0.050	0.014	N/A	N/A	1	8533813
PentaCB-(83)+(99)	ng/L	0.012 U	0.012	0.10	0.033	N/A	N/A	1	8533813
22'33'6-PentaCB-(84)	ng/L	0.013 U	0.013	0.020	0.0088	N/A	N/A	1	8533813
PentaCB-(85)+(116)+(117)	ng/L	0.0091 U	0.0091	0.10	0.040	N/A	N/A	1	8533813
PentaCB-(86)(87)(97)(109)(119)(125	ng/L	0.0098 U	0.0098	0.20	0.080	N/A	N/A	1	8533813
PentaCB-(88)+(91)	ng/L	0.012 U	0.012	0.050	0.025	N/A	N/A	1	8533813
22'346'-PentaCB-(89)	ng/L	0.015 U	0.015	0.050	0.0040	N/A	N/A	1	8533813
PentaCB-(90)+(101)+(113)	ng/L	0.0692 J	0.0099	0.20	0.0080	N/A	N/A	1	8533813
22'355'-PentaCB-(92)	ng/L	0.013 U	0.013	0.050	0.010	N/A	N/A	1	8533813
PentaCB-(93)+(98)+(100)+(102)	ng/L	0.012 U	0.012	0.20	0.051	N/A	N/A	1	8533813
22'356'-PentaCB-(94)	ng/L	0.013 U	0.013	0.050	0.017	N/A	N/A	1	8533813
22'35'6-PentaCB-(95)	ng/L	0.058	0.013	0.050	0.011	N/A	N/A	1	8533813
22'366'-PentaCB-(96)	ng/L	0.011 U	0.011	0.050	0.014	N/A	N/A	1	8533813
22'45'6-PentaCB-(103)	ng/L	0.012 U	0.012	0.050	0.012	N/A	N/A	1	8533813
22'466'-PentaCB-(104)	ng/L	0.011 U	0.011	0.050	0.022	N/A	N/A	1	8533813
233'44'-PentaCB-(105)	ng/L	0.0178 J	0.0060	0.050	0.0052	0.0000300	0.000000534	1	8533813
233'45-PentaCB-(106)	ng/L	0.0079 U	0.0079	0.050	0.018	N/A	N/A	1	8533813
233'4'5-PentaCB-(107)	ng/L	0.0060 U	0.0060	0.050	0.014	N/A	N/A	1	8533813
PentaCB-(108)+(124)	ng/L	0.0075 U	0.0075	0.10	0.023	N/A	N/A	1	8533813
PentaCB-(110)+(115)	ng/L	0.0521 J	0.0090	0.10	0.022	N/A	N/A	1	8533813
233'55'-PentaCB-(111)	ng/L	0.0080 U	0.0080	0.050	0.012	N/A	N/A	1	8533813
233'56-PentaCB-(112)	ng/L	0.0076 U	0.0076	0.050	0.018	N/A	N/A	1	8533813
2344'5-PentaCB-(114)	ng/L	0.0070 U	0.0070	0.050	0.0084	0.0000300	0.000000210	1	8533813
23'44'5-PentaCB-(118)	ng/L	0.0314 J	0.0066	0.10	0.0071	0.0000300	0.000000942	1	8533813
23'455'-PentaCB-(120)	ng/L	0.0082 U	0.0082	0.050	0.014	N/A	N/A	1	8533813
23'45'6-PentaCB-(121)	ng/L	0.0084 U	0.0084	0.050	0.0040	N/A	N/A	1	8533813
233'4'5'-PentaCB-(122)	ng/L	0.0098 U	0.0098	0.050	0.011	N/A	N/A	1	8533813
23'44'5'-PentaCB-(123)	ng/L	0.0073 U	0.0073	0.050	0.014	0.0000300	0.000000219	1	8533813
33'44'5-PentaCB-(126)	ng/L	0.0067 U	0.0067	0.050	0.0061	0.100	0.000670	1	8533813
33'455'-PentaCB-(127)	ng/L	0.0073 U	0.0073	0.050	0.017	N/A	N/A	1	8533813
HexaCB-(128)+(166)	ng/L	0.0099 U	0.0099	0.10	0.026	N/A	N/A	1	8533813
HexaCB-(129)+(138)+(163)	ng/L	0.056 J	0.011	0.20	0.014	N/A	N/A	1	8533813

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	UNITS	MW6-20230214-GW-40.25	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'45'-HexaCB-(130)	ng/L	0.012 U	0.012	0.050	0.020	N/A	N/A	1	8533813
22'33'46-HexaCB-(131)	ng/L	0.015 U	0.015	0.050	0.019	N/A	N/A	1	8533813
22'33'46'-HexaCB-(132)	ng/L	0.019 J	0.013	0.050	0.019	N/A	N/A	1	8533813
22'33'55'-HexaCB-(133)	ng/L	0.013 U	0.013	0.050	0.017	N/A	N/A	1	8533813
HexaCB-(134)+(143)	ng/L	0.014 U	0.014	0.10	0.028	N/A	N/A	1	8533813
HexaCB-(135)+(151)	ng/L	0.038 J	0.015	0.10	0.038	N/A	N/A	1	8533813
22'33'66'-HexaCB-(136)	ng/L	0.011 U	0.011	0.050	0.014	N/A	N/A	1	8533813
22'344'5-HexaCB-(137)	ng/L	0.012 U	0.012	0.10	0.014	N/A	N/A	1	8533813
HexaCB-(139)+(140)	ng/L	0.011 U	0.011	0.10	0.032	N/A	N/A	1	8533813
22'3455'-HexaCB-(141)	ng/L	0.014 J	0.011	0.050	0.018	N/A	N/A	1	8533813
22'3456-HexaCB-(142)	ng/L	0.014 U	0.014	0.050	0.018	N/A	N/A	1	8533813
22'345'6-HexaCB-(144)	ng/L	0.015 U	0.015	0.050	0.011	N/A	N/A	1	8533813
22'3466'-HexaCB-(145)	ng/L	0.011 U	0.011	0.050	0.022	N/A	N/A	1	8533813
22'34'55'-HexaCB-(146)	ng/L	0.010 U	0.010	0.050	0.014	N/A	N/A	1	8533813
HexaCB-(147)+(149)	ng/L	0.063 J	0.010	0.10	0.027	N/A	N/A	1	8533813
22'34'56'-HexaCB-(148)	ng/L	0.015 U	0.015	0.050	0.013	N/A	N/A	1	8533813
22'34'66'-HexaCB-(150)	ng/L	0.011 U	0.011	0.050	0.022	N/A	N/A	1	8533813
22'3566'-HexaCB-(152)	ng/L	0.011 U	0.011	0.050	0.020	N/A	N/A	1	8533813
HexaCB-(153)+(168)	ng/L	0.0594 J	0.0089	0.10	0.028	N/A	N/A	1	8533813
22'44'56'-HexaCB-(154)	ng/L	0.012 U	0.012	0.050	0.014	N/A	N/A	1	8533813
22'44'66'-HexaCB-(155)	ng/L	0.011 U	0.011	0.050	0.013	N/A	N/A	1	8533813
HexaCB-(156)+(157)	ng/L	0.0071 U	0.0071	0.10	0.015	0.0000300	0.000000213	1	8533813
233'44'6-HexaCB-(158)	ng/L	0.0073 U	0.0073	0.050	0.017	N/A	N/A	1	8533813
233'455'-HexaCB-(159)	ng/L	0.0069 U	0.0069	0.050	0.015	N/A	N/A	1	8533813
233'456-HexaCB-(160)	ng/L	0.0092 U	0.0092	0.050	0.013	N/A	N/A	1	8533813
233'45'6-HexaCB-(161)	ng/L	0.0085 U	0.0085	0.050	0.022	N/A	N/A	1	8533813
233'4'55'-HexaCB-(162)	ng/L	0.0068 U	0.0068	0.050	0.016	N/A	N/A	1	8533813
233'4'5'6-HexaCB-(164)	ng/L	0.0079 U	0.0079	0.050	0.020	N/A	N/A	1	8533813
233'55'6-HexaCB-(165)	ng/L	0.0093 U	0.0093	0.050	0.022	N/A	N/A	1	8533813
23'44'55'-HexaCB-(167)	ng/L	0.0072 U	0.0072	0.050	0.0096	0.0000300	0.000000216	1	8533813
33'44'55'-HexaCB-(169)	ng/L	0.0083 U	0.0083	0.050	0.0092	0.0300	0.000249	1	8533813
22'33'44'5-HeptaCB-(170)	ng/L	0.0078 U	0.0078	0.050	0.011	N/A	N/A	1	8533813

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	UNITS	MW6-20230214-GW-40.25	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
HeptaCB-(171)+(173)	ng/L	0.0095 U	0.0095	0.10	0.027	N/A	N/A	1	8533813
22'33'455'-HeptaCB-(172)	ng/L	0.0093 U	0.0093	0.050	0.012	N/A	N/A	1	8533813
22'33'456'-HeptaCB-(174)	ng/L	0.0101 J	0.0088	0.050	0.017	N/A	N/A	1	8533813
22'33'45'6-HeptaCB-(175)	ng/L	0.011 U	0.011	0.050	0.0064	N/A	N/A	1	8533813
22'33'466'-HeptaCB-(176)	ng/L	0.0078 U	0.0078	0.050	0.0079	N/A	N/A	1	8533813
22'33'45'6'-HeptaCB-(177)	ng/L	0.0097 U	0.0097	0.050	0.013	N/A	N/A	1	8533813
22'33'55'6-HeptaCB-(178)	ng/L	0.011 U	0.011	0.050	0.0071	N/A	N/A	1	8533813
22'33'566'-HeptaCB-(179)	ng/L	0.0090 J	0.0078	0.050	0.010	N/A	N/A	1	8533813
HeptaCB-(180)+(193)	ng/L	0.0180 J	0.0071	0.10	0.018	N/A	N/A	1	8533813
22'344'56-HeptaCB-(181)	ng/L	0.0091 U	0.0091	0.050	0.015	N/A	N/A	1	8533813
22'344'56'-HeptaCB-(182)	ng/L	0.0097 U	0.0097	0.050	0.0066	N/A	N/A	1	8533813
22'344'5'6-HeptaCB-(183)	ng/L	0.0090 J	0.0083	0.050	0.017	N/A	N/A	1	8533813
22'344'66'-HeptaCB-(184)	ng/L	0.0074 U	0.0074	0.050	0.0065	N/A	N/A	1	8533813
22'3455'6-HeptaCB-(185)	ng/L	0.0099 U	0.0099	0.050	0.017	N/A	N/A	1	8533813
22'34566'-HeptaCB-(186)	ng/L	0.0081 U	0.0081	0.050	0.0095	N/A	N/A	1	8533813
22'34'55'6-HeptaCB-(187)	ng/L	0.0191 J	0.0097	0.050	0.0047	N/A	N/A	1	8533813
22'34'566'-HeptaCB-(188)	ng/L	0.0080 U	0.0080	0.050	0.015	N/A	N/A	1	8533813
233'44'55'-HeptaCB-(189)	ng/L	0.0063 U	0.0063	0.050	0.014	0.0000300	0.000000189	1	8533813
233'44'56-HeptaCB-(190)	ng/L	0.0065 U	0.0065	0.050	0.016	N/A	N/A	1	8533813
233'44'5'6-HeptaCB-(191)	ng/L	0.0065 U	0.0065	0.050	0.014	N/A	N/A	1	8533813
233'455'6-HeptaCB-(192)	ng/L	0.0072 U	0.0072	0.050	0.0088	N/A	N/A	1	8533813
22'33'44'55'-OctaCB-(194)	ng/L	0.011 U	0.011	0.050	0.024	N/A	N/A	1	8533813
22'33'44'56-OctaCB-(195)	ng/L	0.012 U	0.012	0.050	0.019	N/A	N/A	1	8533813
22'33'44'56'-OctaCB-(196)	ng/L	0.012 U	0.012	0.050	0.017	N/A	N/A	1	8533813
22'33'44'66'OctaCB-(197)	ng/L	0.0085 U	0.0085	0.050	0.033	N/A	N/A	1	8533813
OctaCB-(198)+(199)	ng/L	0.013 U	0.013	0.10	0.028	N/A	N/A	1	8533813
22'33'4566'-OctaCB-(200)	ng/L	0.010 U	0.010	0.050	0.031	N/A	N/A	1	8533813
22'33'45'66'-OctaCB-(201)	ng/L	0.0088 U	0.0088	0.050	0.014	N/A	N/A	1	8533813
22'33'55'66'-OctaCB-(202)	ng/L	0.0094 U	0.0094	0.050	0.013	N/A	N/A	1	8533813
22'344'55'6-OctaCB-(203)	ng/L	0.012 U	0.012	0.050	0.021	N/A	N/A	1	8533813
22'344'566'-OctaCB-(204)	ng/L	0.0076 U	0.0076	0.050	0.018	N/A	N/A	1	8533813
233'44'55'6-OctaCB-(205)	ng/L	0.0078 U	0.0078	0.050	0.014	N/A	N/A	1	8533813

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ253							
Sampling Date		2023/02/14 16:17				TOXIC EQUIVALENCY		# of	
	UNITS	MW6-20230214-GW-40.25	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'44'55'6-NonaCB-(206)	ng/L	0.026 U	0.026	0.050	0.020	N/A	N/A	1	8533813
22'33'44'566'-NonaCB-(207)	ng/L	0.023 U	0.023	0.050	0.018	N/A	N/A	1	8533813
22'33'455'66'-NonaCB-(208)	ng/L	0.021 U	0.021	0.050	0.021	N/A	N/A	1	8533813
DecaCB-(209)	ng/L	0.025 U	0.025	0.050	0.015	N/A	N/A	1	8533813
TOTAL TOXIC EQUIVALENCY	ng/L	N/A	N/A	N/A	N/A	N/A	0.000925	N/A	N/A
Surrogate Recovery (%)									
C13-2,44'-TriCB-(28)	%	38	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'55'6-NonaCB-(206)	%	109	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'5-HeptaCB-(170)	%	102	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'455'66'-NonaCB-(208)	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'66'-OctaCB-(202)	%	102	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'6-HeptaCB-(178)	%	87	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'344'55'-HeptaCB-(180)	%	97	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'34'566'-HeptaCB-(188)	%	77	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'44'66'-HexaCB-(155)	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'466'-PentaCB-(104)	%	57	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'66'-TetraCB-(54)	%	43	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'6-TriCB-(19)	%	42	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'-DiCB-(4)	%	37	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'6-OctaCB-(205)	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'-HeptaCB-(189)	%	88	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'-PentaCB-(105)	%	68	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'55'-PentaCB-(111)	%	82	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'55'-HexaCB-(167)	%	62	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2344'5-PentaCB-(114)	%	56	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'5-PentaCB-(118)	%	57	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2'344'5-PentaCB-(123)	%	57	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2-MonoCB-(1)	%	21	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'55'-HexaCB-(169)	%	62	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'5-PentaCB-(126)	%	65	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'-TetraCB-(77)	%	83	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-344'5-TetraCB-(81)	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8533813

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VBZ253							
Sampling Date		2023/02/14 16:17				TOXIC EQUIVALENCY		# of	
	UNITS	MW6-20230214-GW-40.25	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-344'-TriCB-(37)	%	48	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-44'-DiCB-(15)	%	41	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-4-MonoCB-(3)	%	25	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-DecaCB-(209)	%	122	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-HexaCB-(156)+(157)	%	64	N/A	N/A	N/A	N/A	N/A	N/A	8533813

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
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

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TEST SUMMARY

Bureau Veritas ID: VBZ249
Sample ID: MW3-20230214-GW-35
Matrix: Water

Collected: 2023/02/14
Shipped:
Received: 2023/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	8524619	2023/02/24	2023/02/28	Yan Qin
OC Pesticides in Water by GCTQ	GCTQ/MS	8513671	2023/02/21	2023/02/24	Chau Ting (Ruth) Chan
PCB Congeners in Water (1668C)	HRMS/MS	8533813	2023/02/23	2023/03/05	Cathy Xu
PFAS in water by SPE/LCMS	LCMS	8519276	2023/02/23	2023/02/25	Erik Slempers

Bureau Veritas ID: VBZ250
Sample ID: MW3-20230214-GW-35-DUP
Matrix: Water

Collected: 2023/02/14
Shipped:
Received: 2023/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	8524619	2023/02/24	2023/02/28	Yan Qin
OC Pesticides in Water by GCTQ	GCTQ/MS	8513671	2023/02/21	2023/02/24	Chau Ting (Ruth) Chan
PCB Congeners in Water (1668C)	HRMS/MS	8533813	2023/02/23	2023/03/05	Cathy Xu
PFAS in water by SPE/LCMS	LCMS	8519276	2023/02/23	2023/02/25	Erik Slempers

Bureau Veritas ID: VBZ251
Sample ID: MW5-20230214-GW-40
Matrix: Water

Collected: 2023/02/14
Shipped:
Received: 2023/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	8524619	2023/02/24	2023/02/28	Yan Qin
OC Pesticides in Water by GCTQ	GCTQ/MS	8513671	2023/02/21	2023/02/24	Chau Ting (Ruth) Chan
PCB Congeners in Water (1668C)	HRMS/MS	8533813	2023/02/23	2023/03/06	Cathy Xu
PFAS in water by SPE/LCMS	LCMS	8519276	2023/02/23	2023/02/25	Erik Slempers

Bureau Veritas ID: VBZ251 Dup
Sample ID: MW5-20230214-GW-40
Matrix: Water

Collected: 2023/02/14
Shipped:
Received: 2023/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
OC Pesticides in Water by GCTQ	GCTQ/MS	8513671	2023/02/21	2023/02/24	Chau Ting (Ruth) Chan

Bureau Veritas ID: VBZ252
Sample ID: MW4-20230214-GW-40
Matrix: Water

Collected: 2023/02/14
Shipped:
Received: 2023/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	8524619	2023/02/24	2023/02/28	Yan Qin
OC Pesticides in Water by GCTQ	GCTQ/MS	8513671	2023/02/21	2023/02/24	Chau Ting (Ruth) Chan
PCB Congeners in Water (1668C)	HRMS/MS	8533813	2023/02/23	2023/03/05	Cathy Xu
PFAS in water by SPE/LCMS	LCMS	8519276	2023/02/23	2023/02/25	Erik Slempers

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TEST SUMMARY

Bureau Veritas ID: VBZ253
Sample ID: MW6-20230214-GW-40.25
Matrix: Water

Collected: 2023/02/14
Shipped:
Received: 2023/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	8524619	2023/02/24	2023/02/28	Yan Qin
OC Pesticides in Water by GCTQ	GCTQ/MS	8513671	2023/02/21	2023/02/24	Chau Ting (Ruth) Chan
PCB Congeners in Water (1668C)	HRMS/MS	8533813	2023/02/23	2023/03/05	Cathy Xu
PFAS in water by SPE/LCMS	LCMS	8519276	2023/02/23	2023/02/25	Erik Slempers

Bureau Veritas ID: VBZ254
Sample ID: FIELD BLANK-02
Matrix: Water

Collected: 2023/02/14
Shipped:
Received: 2023/02/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	8519276	2023/02/23	2023/02/25	Erik Slempers

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.0°C
Package 2	3.1°C
Package 3	4.5°C
Package 4	4.9°C

Revised Report (2023/5/17): Added additional parameters (full list) for PFAS.

SEMI-VOLATILE ORGANICS BY HRMS (WATER)

PCB Congeners in Water (1668C): Worksheet Blank contains some traces of PCB congeners natives that are above the RDL. However, all samples in worksheet (8533813) shows trace concentration levels below RDL. Results should be reviewed with caution.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
8513671	CTC	Matrix Spike(VBZ250)	13C10-cis Nonachlor	2023/02/23		77	%	36 - 139
			13C10-Heptachlor	2023/02/23		161 (1)	%	5 - 120
			13C10-Heptachlor Epoxide	2023/02/23		105	%	27 - 137
			13C10-Oxychlordane	2023/02/23		101	%	23 - 135
			13C10-trans Nonachlor	2023/02/23		88	%	14 - 136
			13C12-Endrin	2023/02/23		117	%	35 - 155
			13C12-Endrin Ketone	2023/02/23		57	%	35 - 155
			13C6-beta BHC	2023/02/23		71	%	32 - 130
			13C6-d6-gamma BHC (Lindane)	2023/02/23		78	%	11 - 120
			13C-Methoxychlor	2023/02/23		132 (1)	%	5 - 120
			13C-pp-DDD	2023/02/23		94	%	5 - 120
			13C-pp-DDE	2023/02/23		78	%	47 - 160
			13C-pp-DDT	2023/02/23		73	%	5 - 120
			C13-Hexachlorobenzene	2023/02/23		75	%	5 - 120
			Aldrin	2023/02/23		51	%	50 - 200
			alpha-BHC	2023/02/23		119	%	50 - 200
			delta-BHC	2023/02/23		118	%	50 - 200
			beta-BHC	2023/02/23		125	%	50 - 200
			Lindane	2023/02/23		118	%	50 - 200
			a-Chlordane	2023/02/23		138	%	50 - 200
			g-Chlordane	2023/02/23		134	%	50 - 200
			Oxychlordane	2023/02/23		104	%	50 - 200
			o,p-DDD	2023/02/23		122	%	50 - 200
			p,p-DDD	2023/02/23		124	%	50 - 200
			o,p-DDE	2023/02/23		112	%	50 - 200
			p,p-DDE	2023/02/23		112	%	50 - 200
			o,p-DDT	2023/02/23		136	%	50 - 200
			p,p-DDT	2023/02/23		150	%	50 - 200
			Dieldrin	2023/02/23		144	%	50 - 200
			Endosulfan I	2023/02/23		124	%	50 - 200
			Endosulfan II	2023/02/23		127	%	50 - 200
			Endosulfan sulfate	2023/02/23		145	%	50 - 200
			Endrin	2023/02/23		112	%	50 - 200
			Endrin aldehyde	2023/02/23		140	%	50 - 200
			Endrin ketone	2023/02/23		112	%	50 - 200
			Heptachlor	2023/02/23		119	%	50 - 200
			Heptachlor epoxide	2023/02/23		113	%	50 - 200
			Hexachlorobenzene	2023/02/23		109	%	50 - 200
			Methoxychlor	2023/02/23		116	%	50 - 200
			Mirex	2023/02/23		66	%	50 - 200
			cis-Nonachlor	2023/02/23		121	%	50 - 200
			trans-Nonachlor	2023/02/23		117	%	50 - 200
8513671	CTC	Spiked Blank	13C10-cis Nonachlor	2023/02/23		60	%	36 - 139
			13C10-Heptachlor	2023/02/23		82	%	5 - 120
			13C10-Heptachlor Epoxide	2023/02/23		83	%	27 - 137
			13C10-Oxychlordane	2023/02/23		74	%	23 - 135
			13C10-trans Nonachlor	2023/02/23		71	%	14 - 136
			13C12-Endrin	2023/02/23		63	%	35 - 155
			13C12-Endrin Ketone	2023/02/23		43	%	35 - 155
			13C6-beta BHC	2023/02/23		68	%	32 - 130
			13C6-d6-gamma BHC (Lindane)	2023/02/23		79	%	11 - 120
			13C-Methoxychlor	2023/02/23		77	%	5 - 120
			13C-pp-DDD	2023/02/23		57	%	5 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C-pp-DDE	2023/02/23		74	%	47 - 160
			13C-pp-DDT	2023/02/23		55	%	5 - 120
			C13-Hexachlorobenzene	2023/02/23		61	%	5 - 120
			Aldrin	2023/02/23		91	%	50 - 200
			alpha-BHC	2023/02/23		132	%	50 - 200
			delta-BHC	2023/02/23		127	%	50 - 200
			beta-BHC	2023/02/23		117	%	50 - 200
			Lindane	2023/02/23		124	%	50 - 200
			a-Chlordane	2023/02/23		128	%	50 - 200
			g-Chlordane	2023/02/23		117	%	50 - 200
			Oxychlordane	2023/02/23		110	%	50 - 200
			o,p-DDD	2023/02/23		149	%	50 - 200
			p,p-DDD	2023/02/23		128	%	50 - 200
			o,p-DDE	2023/02/23		110	%	50 - 200
			p,p-DDE	2023/02/23		110	%	50 - 200
			o,p-DDT	2023/02/23		123	%	50 - 200
			p,p-DDT	2023/02/23		124	%	50 - 200
			Dieldrin	2023/02/23		136	%	50 - 200
			Endosulfan I	2023/02/23		140	%	50 - 200
			Endosulfan II	2023/02/23		112	%	50 - 200
			Endosulfan sulfate	2023/02/23		150	%	50 - 200
			Endrin	2023/02/23		113	%	50 - 200
			Endrin aldehyde	2023/02/23		145	%	50 - 200
			Endrin ketone	2023/02/23		123	%	50 - 200
			Heptachlor	2023/02/23		109	%	50 - 200
			Heptachlor epoxide	2023/02/23		115	%	50 - 200
			Hexachlorobenzene	2023/02/23		109	%	50 - 200
			Methoxychlor	2023/02/23		118	%	50 - 200
			Mirex	2023/02/23		75	%	50 - 200
			cis-Nonachlor	2023/02/23		127	%	50 - 200
			trans-Nonachlor	2023/02/23		119	%	50 - 200
8513671	CTC	Method Blank	13C10-cis Nonachlor	2023/02/23		62	%	36 - 139
			13C10-Heptachlor	2023/02/23		97	%	5 - 120
			13C10-Heptachlor Epoxide	2023/02/23		88	%	27 - 137
			13C10-Oxychlordane	2023/02/23		78	%	23 - 135
			13C10-trans Nonachlor	2023/02/23		70	%	14 - 136
			13C12-Endrin	2023/02/23		74	%	35 - 155
			13C12-Endrin Ketone	2023/02/23		53	%	35 - 155
			13C6-beta BHC	2023/02/23		74	%	32 - 130
			13C6-d6-gamma BHC (Lindane)	2023/02/23		92	%	11 - 120
			13C-Methoxychlor	2023/02/23		82	%	5 - 120
			13C-pp-DDD	2023/02/23		57	%	5 - 120
			13C-pp-DDE	2023/02/23		77	%	47 - 160
			13C-pp-DDT	2023/02/23		57	%	5 - 120
			C13-Hexachlorobenzene	2023/02/23		65	%	5 - 120
			Aldrin	2023/02/23	0.021 U, MDL=0.021		ng/L	
			alpha-BHC	2023/02/23	0.024 U, MDL=0.024		ng/L	
			delta-BHC	2023/02/23	0.029 U, MDL=0.029		ng/L	
			beta-BHC	2023/02/23	0.014 U, MDL=0.014		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Lindane	2023/02/23	0.033 U, MDL=0.033		ng/L	
			a-Chlordane	2023/02/23	0.029 U, MDL=0.029		ng/L	
			g-Chlordane	2023/02/23	0.029 U, MDL=0.029		ng/L	
			Oxychlordane	2023/02/23	0.028 U, MDL=0.028		ng/L	
			o,p-DDD	2023/02/23	0.020 U, MDL=0.020		ng/L	
			p,p-DDD	2023/02/23	0.014 U, MDL=0.014		ng/L	
			o,p-DDE	2023/02/23	0.016 U, MDL=0.016		ng/L	
			p,p-DDE	2023/02/23	0.012 J, MDL=0.012		ng/L	
			o,p-DDT	2023/02/23	0.040 U, MDL=0.040		ng/L	
			p,p-DDT	2023/02/23	0.050 U, MDL=0.050		ng/L	
			Dieldrin	2023/02/23	0.050 U, MDL=0.050		ng/L	
			Endosulfan I	2023/02/23	0.067 U, MDL=0.067		ng/L	
			Endosulfan II	2023/02/23	0.074 U, MDL=0.074		ng/L	
			Endosulfan sulfate	2023/02/23	0.070 U, MDL=0.070		ng/L	
			Endrin	2023/02/23	0.083 J, MDL=0.045		ng/L	
			Endrin aldehyde	2023/02/23	0.071 U, MDL=0.071		ng/L	
			Endrin ketone	2023/02/23	0.034 U, MDL=0.034		ng/L	
			Heptachlor	2023/02/23	0.029 U, MDL=0.029		ng/L	
			Heptachlor epoxide	2023/02/23	0.015 U, MDL=0.015		ng/L	
			Hexachlorobenzene	2023/02/23	0.10 U, MDL=0.10		ng/L	
			Methoxychlor	2023/02/23	0.040 U, MDL=0.040		ng/L	
			Mirex	2023/02/23	0.021 U, MDL=0.021		ng/L	
			cis-Nonachlor	2023/02/23	0.037 U, MDL=0.037		ng/L	
			trans-Nonachlor	2023/02/23	0.044 U, MDL=0.044		ng/L	
8513671	CTC	RPD - Sample/Sample Dup	Aldrin	2023/02/24	NC		%	25
			alpha-BHC	2023/02/24	NC		%	25
			delta-BHC	2023/02/24	NC		%	25
			beta-BHC	2023/02/24	NC		%	25
			Lindane	2023/02/24	NC		%	25
			a-Chlordane	2023/02/24	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			g-Chlordane	2023/02/24	NC		%	25
			Oxychlordane	2023/02/24	NC		%	25
			o,p-DDD	2023/02/24	NC		%	25
			p,p-DDD	2023/02/24	NC		%	25
			o,p-DDE	2023/02/24	NC		%	25
			p,p-DDE	2023/02/24	NC		%	25
			o,p-DDT	2023/02/24	NC		%	25
			p,p-DDT	2023/02/24	NC		%	25
			Dieldrin	2023/02/24	NC		%	25
			Endosulfan I	2023/02/24	NC		%	25
			Endosulfan II	2023/02/24	NC		%	25
			Endosulfan sulfate	2023/02/24	NC		%	25
			Endrin	2023/02/24	NC		%	25
			Endrin aldehyde	2023/02/24	NC		%	25
			Endrin ketone	2023/02/24	NC		%	25
			Heptachlor	2023/02/24	NC		%	25
			Heptachlor epoxide	2023/02/24	NC		%	25
			Hexachlorobenzene	2023/02/24	NC		%	25
			Methoxychlor	2023/02/24	NC		%	25
			Mirex	2023/02/24	NC		%	25
			cis-Nonachlor	2023/02/24	NC		%	25
			trans-Nonachlor	2023/02/24	NC		%	25
8519276	ESL	Spiked Blank	13C2-4:2-Fluorotelomersulfonic Acid	2023/02/25		91	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/02/25		90	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/02/25		87	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/02/25		88	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/02/25		80	%	50 - 150
			13C2-Perfluorohexanoic acid	2023/02/25		89	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/02/25		77	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/02/25		82	%	50 - 150
			13C3-HFPO-DA	2023/02/25		87	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/02/25		89	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/02/25		92	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/02/25		90	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/02/25		88	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/02/25		90	%	50 - 150
			13C5-Perfluorononanoic acid	2023/02/25		88	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/02/25		90	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/02/25		79	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/02/25		91	%	50 - 150
			D3-MeFOSA	2023/02/25		59	%	50 - 150
			D3-MeFOSAA	2023/02/25		75	%	50 - 150
			D5-EtFOSA	2023/02/25		61	%	50 - 150
			D5-EtFOSAA	2023/02/25		74	%	50 - 150
			D7-MeFOSE	2023/02/25		73	%	50 - 150
			D9-EtFOSE	2023/02/25		70	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2023/02/25		109	%	70 - 130
			Perfluoropentanoic acid (PFPeA)	2023/02/25		106	%	70 - 130
			Perfluorohexanoic acid (PFHxA)	2023/02/25		107	%	70 - 130
			Perfluoroheptanoic acid (PFHpA)	2023/02/25		107	%	70 - 130
			Perfluorooctanoic acid (PFOA)	2023/02/25		108	%	70 - 130
			Perfluorononanoic acid (PFNA)	2023/02/25		110	%	70 - 130
			Perfluorodecanoic acid (PFDA)	2023/02/25		109	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluoroundecanoic acid (PFUnA)	2023/02/25		104	%	70 - 130
			Perfluorododecanoic acid (PFDoA)	2023/02/25		108	%	70 - 130
			Perfluorotridecanoic acid (PFTRDA)	2023/02/25		108	%	70 - 130
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/25		108	%	70 - 130
			Perfluorobutanesulfonic acid (PFBS)	2023/02/25		109	%	70 - 130
			Perfluoropentanesulfonic acid PFPes	2023/02/25		105	%	70 - 130
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/25		107	%	70 - 130
			Perfluoroheptanesulfonic acid PFHpS	2023/02/25		106	%	70 - 130
			Perfluorooctanesulfonic acid (PFOS)	2023/02/25		109	%	70 - 130
			Perfluorononanesulfonic acid (PFNS)	2023/02/25		104	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2023/02/25		100	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/25		111	%	70 - 130
			EtFOSA	2023/02/25		114	%	70 - 130
			MeFOSA	2023/02/25		115	%	70 - 130
			EtFOSE	2023/02/25		111	%	70 - 130
			MeFOSE	2023/02/25		109	%	70 - 130
			EtFOSAA	2023/02/25		108	%	70 - 130
			MeFOSAA	2023/02/25		112	%	70 - 130
			4:2 Fluorotelomer sulfonic acid	2023/02/25		109	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2023/02/25		108	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2023/02/25		108	%	70 - 130
			Hexafluoropropyleneoxide dimer acid	2023/02/25		112	%	70 - 130
			4,8-Dioxa-3H-perfluorononanoic acid	2023/02/25		107	%	70 - 130
			9Cl-PF3ONS (F-53B Major)	2023/02/25		106	%	70 - 130
			11Cl-PF3OUdS (F-53B Minor)	2023/02/25		102	%	70 - 130
8519276	ESL	Spiked Blank DUP	13C2-4:2-Fluorotelomersulfonic Acid	2023/02/25		89	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/02/25		86	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/02/25		84	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/02/25		86	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/02/25		78	%	50 - 150
			13C2-Perfluorohexanoic acid	2023/02/25		86	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/02/25		76	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/02/25		82	%	50 - 150
			13C3-HFPO-DA	2023/02/25		87	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/02/25		86	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/02/25		89	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/02/25		86	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/02/25		86	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/02/25		86	%	50 - 150
			13C5-Perfluorononanoic acid	2023/02/25		84	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/02/25		88	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/02/25		76	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/02/25		88	%	50 - 150
			D3-MeFOSA	2023/02/25		62	%	50 - 150
			D3-MeFOSAA	2023/02/25		75	%	50 - 150
			D5-EtFOSA	2023/02/25		62	%	50 - 150
			D5-EtFOSAA	2023/02/25		70	%	50 - 150
			D7-MeFOSE	2023/02/25		70	%	50 - 150
			D9-EtFOSE	2023/02/25		73	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2023/02/25		108	%	70 - 130
			Perfluoropentanoic acid (PFPeA)	2023/02/25		107	%	70 - 130
			Perfluorohexanoic acid (PFHxA)	2023/02/25		108	%	70 - 130
			Perfluoroheptanoic acid (PFHpA)	2023/02/25		107	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorooctanoic acid (PFOA)	2023/02/25		107	%	70 - 130
			Perfluorononanoic acid (PFNA)	2023/02/25		111	%	70 - 130
			Perfluorodecanoic acid (PFDA)	2023/02/25		107	%	70 - 130
			Perfluoroundecanoic acid (PFUnA)	2023/02/25		104	%	70 - 130
			Perfluorododecanoic acid (PFDoA)	2023/02/25		109	%	70 - 130
			Perfluorotridecanoic acid (PFTRDA)	2023/02/25		107	%	70 - 130
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/25		108	%	70 - 130
			Perfluorobutanesulfonic acid (PFBS)	2023/02/25		108	%	70 - 130
			Perfluoropentanesulfonic acid PFPes	2023/02/25		106	%	70 - 130
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/25		106	%	70 - 130
			Perfluoroheptanesulfonic acid PFHpS	2023/02/25		106	%	70 - 130
			Perfluorooctanesulfonic acid (PFOS)	2023/02/25		108	%	70 - 130
			Perfluorononanesulfonic acid (PFNS)	2023/02/25		105	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2023/02/25		102	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/25		113	%	70 - 130
			EtFOSA	2023/02/25		114	%	70 - 130
			MeFOSA	2023/02/25		116	%	70 - 130
			EtFOSE	2023/02/25		106	%	70 - 130
			MeFOSE	2023/02/25		116	%	70 - 130
			EtFOSAA	2023/02/25		113	%	70 - 130
			MeFOSAA	2023/02/25		111	%	70 - 130
			4:2 Fluorotelomer sulfonic acid	2023/02/25		106	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2023/02/25		108	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2023/02/25		108	%	70 - 130
			Hexafluoropropyleneoxide dimer acid	2023/02/25		104	%	70 - 130
			4,8-Dioxa-3H-perfluorononanoic acid	2023/02/25		106	%	70 - 130
			9Cl-PF3ONS (F-53B Major)	2023/02/25		106	%	70 - 130
			11Cl-PF3OUdS (F-53B Minor)	2023/02/25		103	%	70 - 130
8519276	ESL	RPD	Perfluorobutanoic acid (PFBA)	2023/02/25	1.6		%	30
			Perfluoropentanoic acid (PFPeA)	2023/02/25	0.066		%	30
			Perfluorohexanoic acid (PFHxA)	2023/02/25	0.82		%	30
			Perfluoroheptanoic acid (PFHpA)	2023/02/25	0.15		%	30
			Perfluorooctanoic acid (PFOA)	2023/02/25	0.53		%	30
			Perfluorononanoic acid (PFNA)	2023/02/25	1.4		%	30
			Perfluorodecanoic acid (PFDA)	2023/02/25	2.3		%	30
			Perfluoroundecanoic acid (PFUnA)	2023/02/25	0.45		%	30
			Perfluorododecanoic acid (PFDoA)	2023/02/25	1.3		%	30
			Perfluorotridecanoic acid (PFTRDA)	2023/02/25	0.53		%	30
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/25	0.18		%	30
			Perfluorobutanesulfonic acid (PFBS)	2023/02/25	1.3		%	30
			Perfluoropentanesulfonic acid PFPes	2023/02/25	0.63		%	30
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/25	1.1		%	30
			Perfluoroheptanesulfonic acid PFHpS	2023/02/25	0.13		%	30
			Perfluorooctanesulfonic acid (PFOS)	2023/02/25	1.2		%	30
			Perfluorononanesulfonic acid (PFNS)	2023/02/25	1.3		%	30
			Perfluorodecanesulfonic acid (PFDS)	2023/02/25	1.4		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/25	1.4		%	30
			EtFOSA	2023/02/25	0.44		%	30
			MeFOSA	2023/02/25	0.31		%	30
			EtFOSE	2023/02/25	4.1		%	30
			MeFOSE	2023/02/25	5.6		%	30
			EtFOSAA	2023/02/25	4.8		%	30
			MeFOSAA	2023/02/25	0.41		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			4:2 Fluorotelomer sulfonic acid	2023/02/25	2.8		%	30
			6:2 Fluorotelomer sulfonic acid	2023/02/25	0.73		%	30
			8:2 Fluorotelomer sulfonic acid	2023/02/25	0.077		%	30
			Hexafluoropropyleneoxide dimer acid	2023/02/25	7.1		%	30
			4,8-Dioxa-3H-perfluorononanoic acid	2023/02/25	0.26		%	30
			9Cl-PF3ONS (F-53B Major)	2023/02/25	0.17		%	30
			11Cl-PF3OUdS (F-53B Minor)	2023/02/25	0.61		%	30
8519276	ESL	Method Blank	13C2-4:2-Fluorotelomersulfonic Acid	2023/02/25		99	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/02/25		96	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/02/25		89	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/02/25		86	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/02/25		79	%	50 - 150
			13C2-Perfluorohexanoic acid	2023/02/25		91	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/02/25		68	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/02/25		80	%	50 - 150
			13C3-HFPO-DA	2023/02/25		87	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/02/25		89	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/02/25		93	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/02/25		91	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/02/25		86	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/02/25		88	%	50 - 150
			13C5-Perfluorononanoic acid	2023/02/25		88	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/02/25		92	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/02/25		79	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/02/25		91	%	50 - 150
			D3-MeFOSA	2023/02/25		57	%	50 - 150
			D3-MeFOSAA	2023/02/25		75	%	50 - 150
			D5-EtFOSA	2023/02/25		57	%	50 - 150
			D5-EtFOSAA	2023/02/25		74	%	50 - 150
			D7-MeFOSE	2023/02/25		73	%	50 - 150
			D9-EtFOSE	2023/02/25		72	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2023/02/25	0.0015 U, MDL=0.0015		ug/L	
			Perfluoropentanoic acid (PFPeA)	2023/02/25	0.0025 U, MDL=0.0025		ug/L	
			Perfluorohexanoic acid (PFHxA)	2023/02/25	0.0038 U, MDL=0.0038		ug/L	
			Perfluoroheptanoic acid (PFHpA)	2023/02/25	0.0018 U, MDL=0.0018		ug/L	
			Perfluorooctanoic acid (PFOA)	2023/02/25	0.0030 U, MDL=0.0030		ug/L	
			Perfluorononanoic acid (PFNA)	2023/02/25	0.0021 U, MDL=0.0021		ug/L	
			Perfluorodecanoic acid (PFDA)	2023/02/25	0.0016 U, MDL=0.0016		ug/L	
			Perfluoroundecanoic acid (PFUnA)	2023/02/25	0.0024 U, MDL=0.0024		ug/L	
			Perfluorododecanoic acid (PFDoA)	2023/02/25	0.0029 U, MDL=0.0029		ug/L	
			Perfluorotridecanoic acid (PFTRDA)	2023/02/25	0.0026 U, MDL=0.0026		ug/L	
			Perfluorotetradecanoic acid(PFTEDA)	2023/02/25	0.0016 U, MDL=0.0016		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorobutanesulfonic acid (PFBS)	2023/02/25	0.0021 U, MDL=0.0021		ug/L	
			Perfluoropentanesulfonic acid PFPes	2023/02/25	0.0023 U, MDL=0.0023		ug/L	
			Perfluorohexanesulfonic acid(PFHxS)	2023/02/25	0.0022 U, MDL=0.0022		ug/L	
			Perfluoroheptanesulfonic acid PFHpS	2023/02/25	0.0039 U, MDL=0.0039		ug/L	
			Perfluorooctanesulfonic acid (PFOS)	2023/02/25	0.0035 U, MDL=0.0035		ug/L	
			Perfluorononanesulfonic acid (PFNS)	2023/02/25	0.0037 U, MDL=0.0037		ug/L	
			Perfluorodecanesulfonic acid (PFDS)	2023/02/25	0.0048 U, MDL=0.0048		ug/L	
			Perfluorooctane Sulfonamide (PFOSA)	2023/02/25	0.0034 U, MDL=0.0034		ug/L	
			EtFOSA	2023/02/25	0.0095 U, MDL=0.0095		ug/L	
			MeFOSA	2023/02/25	0.0084 U, MDL=0.0084		ug/L	
			EtFOSE	2023/02/25	0.0070 U, MDL=0.0070		ug/L	
			MeFOSE	2023/02/25	0.0073 U, MDL=0.0073		ug/L	
			EtFOSAA	2023/02/25	0.0046 U, MDL=0.0046		ug/L	
			MeFOSAA	2023/02/25	0.0045 U, MDL=0.0045		ug/L	
			4:2 Fluorotelomer sulfonic acid	2023/02/25	0.0033 U, MDL=0.0033		ug/L	
			6:2 Fluorotelomer sulfonic acid	2023/02/25	0.0015 U, MDL=0.0015		ug/L	
			8:2 Fluorotelomer sulfonic acid	2023/02/25	0.0031 U, MDL=0.0031		ug/L	
			Hexafluoropropyleneoxide dimer acid	2023/02/25	0.0052 U, MDL=0.0052		ug/L	
			4,8-Dioxa-3H-perfluorononanoic acid	2023/02/25	0.0027 U, MDL=0.0027		ug/L	
			9Cl-PF3ONS (F-53B Major)	2023/02/25	0.0043 U, MDL=0.0043		ug/L	
			11Cl-PF3OUdS (F-53B Minor)	2023/02/25	0.0035 U, MDL=0.0035		ug/L	
8524619	YQI	Spiked Blank	37CL4 2378 Tetra CDD	2023/02/28		76	%	35 - 197
			C13-1234678 HeptaCDD	2023/02/28		96	%	23 - 140
			C13-1234678 HeptaCDF	2023/02/28		91	%	28 - 143
			C13-123478 HexaCDD	2023/02/28		92	%	32 - 141
			C13-123478 HexaCDF	2023/02/28		88	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/28		93	%	28 - 138
			C13-123678 HexaCDD	2023/02/28		96	%	28 - 130
			C13-123678 HexaCDF	2023/02/28		90	%	26 - 123
			C13-12378 PentaCDD	2023/02/28		91	%	25 - 181
			C13-12378 PentaCDF	2023/02/28		82	%	24 - 185
			C13-123789 HexaCDF	2023/02/28		92	%	29 - 147
			C13-234678 HexaCDF	2023/02/28		99	%	28 - 136

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-23478 PentaCDF	2023/02/28		89	%	21 - 178
			C13-2378 TetraCDD	2023/02/28		72	%	25 - 164
			C13-2378 TetraCDF	2023/02/28		83	%	24 - 169
			C13-OCDD	2023/02/28		96	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/28		105	%	67 - 158
			1,2,3,7,8-Penta CDD	2023/02/28		96	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2023/02/28		97	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2023/02/28		97	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2023/02/28		97	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2023/02/28		100	%	70 - 140
			Octa CDD	2023/02/28		103	%	78 - 144
			2,3,7,8-Tetra CDF	2023/02/28		99	%	75 - 158
			1,2,3,7,8-Penta CDF	2023/02/28		102	%	80 - 134
			2,3,4,7,8-Penta CDF	2023/02/28		98	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2023/02/28		99	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2023/02/28		98	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2023/02/28		93	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2023/02/28		98	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2023/02/28		102	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2023/02/28		96	%	78 - 138
			Octa CDF	2023/02/28		97	%	63 - 170
8524619	YQI	Spiked Blank DUP	37CL4 2378 Tetra CDD	2023/02/28		74	%	35 - 197
			C13-1234678 HeptaCDD	2023/02/28		93	%	23 - 140
			C13-1234678 HeptaCDF	2023/02/28		90	%	28 - 143
			C13-123478 HexaCDD	2023/02/28		95	%	32 - 141
			C13-123478 HexaCDF	2023/02/28		89	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/28		92	%	28 - 138
			C13-123678 HexaCDD	2023/02/28		98	%	28 - 130
			C13-123678 HexaCDF	2023/02/28		91	%	26 - 123
			C13-12378 PentaCDD	2023/02/28		87	%	25 - 181
			C13-12378 PentaCDF	2023/02/28		81	%	24 - 185
			C13-123789 HexaCDF	2023/02/28		91	%	29 - 147
			C13-234678 HexaCDF	2023/02/28		103	%	28 - 136
			C13-23478 PentaCDF	2023/02/28		84	%	21 - 178
			C13-2378 TetraCDD	2023/02/28		72	%	25 - 164
			C13-2378 TetraCDF	2023/02/28		80	%	24 - 169
			C13-OCDD	2023/02/28		91	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/28		100	%	67 - 158
			1,2,3,7,8-Penta CDD	2023/02/28		98	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2023/02/28		95	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2023/02/28		99	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2023/02/28		98	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2023/02/28		101	%	70 - 140
			Octa CDD	2023/02/28		103	%	78 - 144
			2,3,7,8-Tetra CDF	2023/02/28		94	%	75 - 158
			1,2,3,7,8-Penta CDF	2023/02/28		99	%	80 - 134
			2,3,4,7,8-Penta CDF	2023/02/28		101	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2023/02/28		98	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2023/02/28		95	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2023/02/28		89	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2023/02/28		99	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2023/02/28		104	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2023/02/28		96	%	78 - 138

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Octa CDF	2023/02/28		98	%	63 - 170
8524619	YQI	RPD	2,3,7,8-Tetra CDD	2023/02/28	4.9		%	25
			1,2,3,7,8-Penta CDD	2023/02/28	2.1		%	25
			1,2,3,4,7,8-Hexa CDD	2023/02/28	2.1		%	25
			1,2,3,6,7,8-Hexa CDD	2023/02/28	2.0		%	25
			1,2,3,7,8,9-Hexa CDD	2023/02/28	1.0		%	25
			1,2,3,4,6,7,8-Hepta CDD	2023/02/28	1.0		%	25
			Octa CDD	2023/02/28	0		%	25
			2,3,7,8-Tetra CDF	2023/02/28	5.2		%	25
			1,2,3,7,8-Penta CDF	2023/02/28	3.0		%	25
			2,3,4,7,8-Penta CDF	2023/02/28	3.0		%	25
			1,2,3,4,7,8-Hexa CDF	2023/02/28	1.0		%	25
			1,2,3,6,7,8-Hexa CDF	2023/02/28	3.1		%	25
			2,3,4,6,7,8-Hexa CDF	2023/02/28	4.4		%	25
			1,2,3,7,8,9-Hexa CDF	2023/02/28	1.0		%	25
			1,2,3,4,6,7,8-Hepta CDF	2023/02/28	1.9		%	25
			1,2,3,4,7,8,9-Hepta CDF	2023/02/28	0		%	25
			Octa CDF	2023/02/28	1.0		%	25
8524619	YQI	Method Blank	37CL4 2378 Tetra CDD	2023/02/28		84	%	35 - 197
			C13-1234678 HeptaCDD	2023/02/28		86	%	23 - 140
			C13-1234678 HeptaCDF	2023/02/28		83	%	28 - 143
			C13-123478 HexaCDD	2023/02/28		92	%	32 - 141
			C13-123478 HexaCDF	2023/02/28		89	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/28		83	%	28 - 138
			C13-123678 HexaCDD	2023/02/28		95	%	28 - 130
			C13-123678 HexaCDF	2023/02/28		91	%	26 - 123
			C13-12378 PentaCDD	2023/02/28		91	%	25 - 181
			C13-12378 PentaCDF	2023/02/28		85	%	24 - 185
			C13-123789 HexaCDF	2023/02/28		86	%	29 - 147
			C13-234678 HexaCDF	2023/02/28		95	%	28 - 136
			C13-23478 PentaCDF	2023/02/28		93	%	21 - 178
			C13-2378 TetraCDD	2023/02/28		75	%	25 - 164
			C13-2378 TetraCDF	2023/02/28		87	%	24 - 169
			C13-OCDD	2023/02/28		86	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/28	1.43 U, EDL=1.43		pg/L	
			1,2,3,7,8-Penta CDD	2023/02/28	1.04 U, EDL=1.04		pg/L	
			1,2,3,4,7,8-Hexa CDD	2023/02/28	1.01 U, EDL=1.01		pg/L	
			1,2,3,6,7,8-Hexa CDD	2023/02/28	0.967 U, EDL=0.967		pg/L	
			1,2,3,7,8,9-Hexa CDD	2023/02/28	0.919 U, EDL=0.919		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2023/02/28	1.04 U, EDL=1.04		pg/L	
			Octa CDD	2023/02/28	2.48 J, EDL=1.19		pg/L	
			Total Tetra CDD	2023/02/28	1.43 U, EDL=1.43		pg/L	
			Total Penta CDD	2023/02/28	1.04 U, EDL=1.04		pg/L	
			Total Hexa CDD	2023/02/28	1.12 U, EDL=1.12		pg/L	

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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	2023/02/28	1.04 U, EDL=1.04		pg/L	
			2,3,7,8-Tetra CDF	2023/02/28	1.04 U, EDL=1.04		pg/L	
			1,2,3,7,8-Penta CDF	2023/02/28	1.28 U, EDL=1.28		pg/L	
			2,3,4,7,8-Penta CDF	2023/02/28	1.07 U, EDL=1.07		pg/L	
			1,2,3,4,7,8-Hexa CDF	2023/02/28	0.863 U, EDL=0.863		pg/L	
			1,2,3,6,7,8-Hexa CDF	2023/02/28	0.820 U, EDL=0.820		pg/L	
			2,3,4,6,7,8-Hexa CDF	2023/02/28	0.790 U, EDL=0.790		pg/L	
			1,2,3,7,8,9-Hexa CDF	2023/02/28	0.960 U, EDL=0.960		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2023/02/28	0.860 U, EDL=0.860		pg/L	
			1,2,3,4,7,8,9-Hepta CDF	2023/02/28	0.950 U, EDL=0.950		pg/L	
			Octa CDF	2023/02/28	1.06 U, EDL=1.06		pg/L	
			Total Tetra CDF	2023/02/28	1.04 U, EDL=1.04		pg/L	
			Total Penta CDF	2023/02/28	1.16 U, EDL=1.16		pg/L	
			Total Hexa CDF	2023/02/28	0.854 U, EDL=0.854		pg/L	
			Total Hepta CDF	2023/02/28	0.902 U, EDL=0.902		pg/L	
8533813	CXU	Spiked Blank	C13-2,44'-TriCB-(28)	2023/04/04		80 (1)	%	30 - 170
			C13-22'33'44'55'6-NonaCB-(206)	2023/04/04		108	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/04/04		116	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/04/04		107	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/04/04		98	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2023/04/04		85	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/04/04		111	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/04/04		77	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/04/04		60	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/04/04		66	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/04/04		40	%	15 - 145
			C13-22'6-TriCB-(19)	2023/04/04		50	%	40 - 145
			C13-22'-DiCB-(4)	2023/04/04		33	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/04/04		115	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/04/04		123	%	40 - 145
			C13-233'44'-PentaCB-(105)	2023/04/04		132 (1)	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/04/04		94	%	30 - 170
			C13-23'44'55'-HexaCB-(167)	2023/04/04		109	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/04/04		121	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/04/04		126 (1)	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/04/04		127 (1)	%	40 - 145
			C13-2-MonoCB-(1)	2023/04/04		35	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/04/04		121	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/04/04		144 (1)	%	40 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-33'44'-TetraCB-(77)	2023/04/04		120	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/04/04		115	%	40 - 145
			C13-344'-TriCB-(37)	2023/04/04		98 (1)	%	40 - 145
			C13-44'-DiCB-(15)	2023/04/04		73	%	15 - 145
			C13-4-MonoCB-(3)	2023/04/04		44	%	15 - 145
			C13-DecaCB-(209)	2023/04/04		96	%	40 - 145
			C13-HexaCB-(156)+(157)	2023/04/04		114	%	40 - 145
			2-MonoCB-(1)	2023/04/04		108	%	60 - 145
			3-MonoCB-(2)	2023/04/04		118	%	N/A
			4-MonoCB-(3)	2023/04/04		107	%	60 - 145
			22'-DiCB-(4)	2023/04/04		114	%	60 - 145
			2,3-DiCB-(5)	2023/04/04		92	%	N/A
			2,3'-DiCB-(6)	2023/04/04		95	%	N/A
			2,4-DiCB-(7)	2023/04/04		89	%	N/A
			2,4'-DiCB-(8)	2023/04/04		53	%	N/A
			2,5-DiCB-(9)	2023/04/04		92	%	N/A
			2,6-DiCB-(10)	2023/04/04		71	%	N/A
			3,3'-DiCB-(11)	2023/04/04		126	%	N/A
			DiCB-(12)+(13)	2023/04/04		102	%	N/A
			3,5-DiCB-(14)	2023/04/04		106	%	N/A
			4,4'-DiCB-(15)	2023/04/04		112	%	60 - 145
			22'3-TriCB-(16)	2023/04/04		70	%	N/A
			22'4-TriCB-(17)	2023/04/04		68	%	N/A
			TriCB-(18)+(30)	2023/04/04		59	%	N/A
			22'6-TriCB-(19)	2023/04/04		105	%	60 - 145
			TriCB-(20) + (28)	2023/04/04		92	%	N/A
			TriCB-(21)+(33)	2023/04/04		100	%	N/A
			234'-TriCB-(22)	2023/04/04		101	%	N/A
			235-TriCB-(23)	2023/04/04		90	%	N/A
			236-TriCB-(24)	2023/04/04		81	%	N/A
			23'4-TriCB-(25)	2023/04/04		102	%	N/A
			TriCB-(26)+(29)	2023/04/04		91	%	N/A
			23'6-TriCB-(27)	2023/04/04		60	%	N/A
			24'5-TriCB-(31)	2023/04/04		94	%	N/A
			24'6-TriCB-(32)	2023/04/04		72	%	N/A
			23'5'-TriCB-(34)	2023/04/04		89	%	N/A
			33'4-TriCB-(35)	2023/04/04		115	%	N/A
			33'5-TriCB-(36)	2023/04/04		106	%	N/A
			344'-TriCB-(37)	2023/04/04		107	%	60 - 145
			345-TriCB-(38)	2023/04/04		109	%	N/A
			34'5-TriCB-(39)	2023/04/04		119	%	N/A
			TetraCB-(40)+(41)+(71)	2023/04/04		83	%	N/A
			22'34'-TetraCB-(42)	2023/04/04		94	%	N/A
			22'35-TetraCB-(43)	2023/04/04		84	%	N/A
			TetraCB-(44)+(47)+(65)	2023/04/04		83	%	N/A
			TetraCB-(45)+(51)	2023/04/04		69	%	N/A
			22'36'-TetraCB-(46)	2023/04/04		71	%	N/A
			22'45-TetraCB-(48)	2023/04/04		78	%	N/A
			TetraCB-(49)+TetraCB-(69)	2023/04/04		77	%	N/A
			TetraCB-(50)+(53)	2023/04/04		68	%	N/A
			22'55'-TetraCB-(52)	2023/04/04		80	%	N/A
			22'66'-TetraCB-(54)	2023/04/04		115	%	60 - 145
			233'4-TetraCB-(55)	2023/04/04		94	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			233'4'-Tetra CB(56)	2023/04/04		97	%	N/A
			233'5-TetraCB-(57)	2023/04/04		86	%	N/A
			233'5'-TetraCB-(58)	2023/04/04		88	%	N/A
			TetraCB-(59)+(62)+(75)	2023/04/04		78	%	N/A
			2344'-TetraCB -(60)	2023/04/04		95	%	N/A
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04		95	%	N/A
			234'5-TetraCB-(63)	2023/04/04		92	%	N/A
			234'6-TetraCB-(64)	2023/04/04		92	%	N/A
			23'44'-TetraCB-(66)	2023/04/04		96	%	N/A
			23'45-TetraCB-(67)	2023/04/04		89	%	N/A
			23'45'-TetraCB-(68)	2023/04/04		89	%	N/A
			23'55'-TetraCB-(72)	2023/04/04		84	%	N/A
			23'5'6-TetraCB-(73)	2023/04/04		69	%	N/A
			33'44'-TetraCB-(77)	2023/04/04		94	%	60 - 145
			33'45-TetraCB-(78)	2023/04/04		114	%	N/A
			33'45'-TetraCB(79)	2023/04/04		103	%	N/A
			33'55'-TetraCB-(80)	2023/04/04		92	%	N/A
			344'5-TetraCB-(81)	2023/04/04		99	%	60 - 145
			22'33'4-PentaCB-(82)	2023/04/04		104	%	N/A
			PentaCB-(83)+(99)	2023/04/04		91	%	N/A
			22'33'6-PentaCB-(84)	2023/04/04		83	%	N/A
			PentaCB-(85)+(116)+(117)	2023/04/04		88	%	N/A
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04		87	%	N/A
			PentaCB-(88)+(91)	2023/04/04		84	%	N/A
			22'346'-PentaCB-(89)	2023/04/04		98	%	N/A
			PentaCB-(90)+(101)+(113)	2023/04/04		88	%	N/A
			22'355'-PentaCB-(92)	2023/04/04		97	%	N/A
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04		78	%	N/A
			22'356'-PentaCB-(94)	2023/04/04		77	%	N/A
			22'35'6-PentaCB-(95)	2023/04/04		94	%	N/A
			22'366'-PentaCB-(96)	2023/04/04		83	%	N/A
			22'45'6-PentaCB-(103)	2023/04/04		84	%	N/A
			22'466'-PentaCB-(104)	2023/04/04		100	%	60 - 145
			233'44'-PentaCB-(105)	2023/04/04		106	%	60 - 145
			233'45-PentaCB-(106)	2023/04/04		111	%	N/A
			233'4'5-PentaCB-(107)	2023/04/04		91	%	N/A
			PentaCB-(108)+(124)	2023/04/04		98	%	N/A
			PentaCB-(110)+(115)	2023/04/04		99	%	N/A
			233'55'-PentaCB-(111)	2023/04/04		92	%	N/A
			233'56-PentaCB-(112)	2023/04/04		94	%	N/A
			2344'5-PentaCB-(114)	2023/04/04		104	%	60 - 145
			23'44'5-PentaCB-(118)	2023/04/04		97	%	60 - 145
			23'455'-PentaCB-(120)	2023/04/04		100	%	N/A
			23'45'6-PentaCB-(121)	2023/04/04		83	%	N/A
			233'4'5'-PentaCB-(122)	2023/04/04		125	%	N/A
			23'44'5'-PentaCB-(123)	2023/04/04		101	%	60 - 145
			33'44'5-PentaCB-(126)	2023/04/04		98	%	60 - 145
			33'455'-PentaCB-(127)	2023/04/04		107	%	N/A
			HexaCB-(128)+(166)	2023/04/04		92	%	N/A
			HexaCB-(129)+(138)+(163)	2023/04/04		98	%	N/A
			22'33'45'-HexaCB-(130)	2023/04/04		91	%	N/A
			22'33'46-HexaCB-(131)	2023/04/04		105	%	N/A
			22'33'46'-HexaCB-(132)	2023/04/04		89	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'33'55'-HexaCB-(133)	2023/04/04		93	%	N/A
			HexaCB-(134)+(143)	2023/04/04		94	%	N/A
			HexaCB-(135)+(151)	2023/04/04		89	%	N/A
			22'33'66'-HexaCB-(136)	2023/04/04		84	%	N/A
			22'344'5-HexaCB-(137)	2023/04/04		86	%	N/A
			HexaCB-(139)+(140)	2023/04/04		86	%	N/A
			22'3455'-HexaCB-(141)	2023/04/04		94	%	N/A
			22'3456-HexaCB-(142)	2023/04/04		94	%	N/A
			22'345'6-HexaCB-(144)	2023/04/04		96	%	N/A
			22'3466'-HexaCB-(145)	2023/04/04		82	%	N/A
			22'34'55'-HexaCB-(146)	2023/04/04		90	%	N/A
			HexaCB-(147)+(149)	2023/04/04		87	%	N/A
			22'34'56'-HexaCB-(148)	2023/04/04		86	%	N/A
			22'34'66'-HexaCB-(150)	2023/04/04		80	%	N/A
			22'3566'-HexaCB-(152)	2023/04/04		82	%	N/A
			HexaCB-(153)+(168)	2023/04/04		87	%	N/A
			22'44'56'-HexaCB-(154)	2023/04/04		85	%	N/A
			22'44'66'-HexaCB-(155)	2023/04/04		98	%	60 - 145
			HexaCB-(156)+(157)	2023/04/04		101	%	N/A
			233'44'6-HexaCB-(158)	2023/04/04		93	%	N/A
			233'455'-HexaCB-(159)	2023/04/04		91	%	N/A
			233'456-HexaCB-(160)	2023/04/04		97	%	N/A
			233'45'6-HexaCB-(161)	2023/04/04		88	%	N/A
			233'4'55'-HexaCB-(162)	2023/04/04		93	%	N/A
			233'4'5'6-HexaCB-(164)	2023/04/04		95	%	N/A
			233'55'6-HexaCB-(165)	2023/04/04		89	%	N/A
			23'44'55'-HexaCB-(167)	2023/04/04		105	%	60 - 145
			33'44'55'-HexaCB-(169)	2023/04/04		103	%	60 - 145
			22'33'44'5-HeptaCB-(170)	2023/04/04		87	%	60 - 145
			HeptaCB-(171)+(173)	2023/04/04		93	%	N/A
			22'33'455'-HeptaCB-(172)	2023/04/04		94	%	N/A
			22'33'456'-HeptaCB-(174)	2023/04/04		94	%	N/A
			22'33'45'6-HeptaCB-(175)	2023/04/04		86	%	N/A
			22'33'466'-HeptaCB-(176)	2023/04/04		84	%	N/A
			22'33'45'6'-HeptaCB-(177)	2023/04/04		90	%	N/A
			22'33'55'6-HeptaCB-(178)	2023/04/04		88	%	N/A
			22'33'566'-HeptaCB-(179)	2023/04/04		88	%	N/A
			HeptaCB-(180)+(193)	2023/04/04		99	%	N/A
			22'344'56-HeptaCB-(181)	2023/04/04		93	%	N/A
			22'344'56'-HeptaCB-(182)	2023/04/04		89	%	N/A
			22'344'5'6-HeptaCB-(183)	2023/04/04		92	%	N/A
			22'344'66'-HeptaCB-(184)	2023/04/04		82	%	N/A
			22'3455'6-HeptaCB-(185)	2023/04/04		87	%	N/A
			22'34566'-HeptaCB-(186)	2023/04/04		87	%	N/A
			22'34'55'6-HeptaCB-(187)	2023/04/04		90	%	N/A
			22'34'566'-HeptaCB-(188)	2023/04/04		100	%	60 - 145
			233'44'55'-HeptaCB-(189)	2023/04/04		100	%	60 - 145
			233'44'56-HeptaCB-(190)	2023/04/04		91	%	N/A
			233'44'5'6-HeptaCB-(191)	2023/04/04		92	%	N/A
			233'455'6-HeptaCB-(192)	2023/04/04		94	%	N/A
			22'33'44'55'-OctaCB-(194)	2023/04/04		100	%	N/A
			22'33'44'56-OctaCB-(195)	2023/04/04		103	%	N/A
			22'33'44'56'-OctaCB-(196)	2023/04/04		97	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'33'44'66'OctaCB-(197)	2023/04/04		91	%	N/A
			OctaCB-(198)+(199)	2023/04/04		98	%	N/A
			22'33'4566'-OctaCB-(200)	2023/04/04		100	%	N/A
			22'33'45'66'-OctaCB-(201)	2023/04/04		89	%	N/A
			22'33'55'66'-OctaCB-(202)	2023/04/04		92	%	60 - 145
			22'344'55'6-OctaCB-(203)	2023/04/04		101	%	N/A
			22'344'566'-OctaCB-(204)	2023/04/04		87	%	N/A
			233'44'55'6-OctaCB-(205)	2023/04/04		92	%	60 - 145
			22'33'44'55'6-NonaCB-(206)	2023/04/04		91	%	60 - 145
			22'33'44'566'-NonaCB-(207)	2023/04/04		86	%	N/A
			22'33'455'66'-NonaCB-(208)	2023/04/04		93	%	60 - 145
			DecaCB-(209)	2023/04/04		108	%	60 - 145
8533813	CXU	Spiked Blank DUP	C13-2,44'-TriCB-(28)	2023/04/04		82	%	30 - 170
			C13-22'33'44'55'6-NonaCB-(206)	2023/04/04		100	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/04/04		106	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/04/04		95	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/04/04		91	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2023/04/04		83	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/04/04		102	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/04/04		71	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/04/04		56	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/04/04		66	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/04/04		41	%	15 - 145
			C13-22'6-TriCB-(19)	2023/04/04		52	%	40 - 145
			C13-22'-DiCB-(4)	2023/04/04		37	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/04/04		107	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/04/04		111	%	40 - 145
			C13-233'44'-PentaCB-(105)	2023/04/04		125 (1)	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/04/04		92	%	30 - 170
			C13-23'44'55'-HexaCB-(167)	2023/04/04		101	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/04/04		115	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/04/04		116	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/04/04		118	%	40 - 145
			C13-2-MonoCB-(1)	2023/04/04		39	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/04/04		112	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/04/04		134 (1)	%	40 - 145
			C13-33'44'-TetraCB-(77)	2023/04/04		113	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/04/04		110	%	40 - 145
			C13-344'-TriCB-(37)	2023/04/04		96	%	40 - 145
			C13-44'-DiCB-(15)	2023/04/04		75	%	15 - 145
			C13-4-MonoCB-(3)	2023/04/04		49 (1)	%	15 - 145
			C13-DecaCB-(209)	2023/04/04		85	%	40 - 145
			C13-HexaCB-(156)+(157)	2023/04/04		103	%	40 - 145
			2-MonoCB-(1)	2023/04/04		107	%	60 - 145
			3-MonoCB-(2)	2023/04/04		116	%	N/A
			4-MonoCB-(3)	2023/04/04		106	%	60 - 145
			22'-DiCB-(4)	2023/04/04		109	%	60 - 145
			2,3-DiCB-(5)	2023/04/04		96	%	N/A
			2,3'-DiCB-(6)	2023/04/04		95	%	N/A
			2,4-DiCB-(7)	2023/04/04		90	%	N/A
			2,4'-DiCB-(8)	2023/04/04		55	%	N/A
			2,5-DiCB-(9)	2023/04/04		94	%	N/A
			2,6-DiCB-(10)	2023/04/04		72	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			3,3'-DiCB-(11)	2023/04/04		127	%	N/A
			DiCB-(12)+(13)	2023/04/04		102	%	N/A
			3,5-DiCB-(14)	2023/04/04		106	%	N/A
			4,4'-DiCB-(15)	2023/04/04		111	%	60 - 145
			22'3-TriCB-(16)	2023/04/04		77	%	N/A
			22'4-TriCB-(17)	2023/04/04		71	%	N/A
			TriCB-(18)+(30)	2023/04/04		61	%	N/A
			22'6-TriCB-(19)	2023/04/04		102	%	60 - 145
			TriCB-(20) + (28)	2023/04/04		97	%	N/A
			TriCB-(21)+(33)	2023/04/04		102	%	N/A
			234'-TriCB-(22)	2023/04/04		101	%	N/A
			235-TriCB-(23)	2023/04/04		93	%	N/A
			236-TriCB-(24)	2023/04/04		75	%	N/A
			23'4-TriCB-(25)	2023/04/04		106	%	N/A
			TriCB-(26)+(29)	2023/04/04		92	%	N/A
			23'6-TriCB-(27)	2023/04/04		66	%	N/A
			24'5-TriCB-(31)	2023/04/04		97	%	N/A
			24'6-TriCB-(32)	2023/04/04		74	%	N/A
			23'5'-TriCB-(34)	2023/04/04		90	%	N/A
			33'4-TriCB-(35)	2023/04/04		117	%	N/A
			33'5-TriCB-(36)	2023/04/04		106	%	N/A
			344'-TriCB-(37)	2023/04/04		109	%	60 - 145
			345-TriCB-(38)	2023/04/04		112	%	N/A
			34'5-TriCB-(39)	2023/04/04		120	%	N/A
			TetraCB-(40)+(41)+(71)	2023/04/04		86	%	N/A
			22'34'-TetraCB-(42)	2023/04/04		97	%	N/A
			22'35-TetraCB-(43)	2023/04/04		90	%	N/A
			TetraCB-(44)+(47)+(65)	2023/04/04		87	%	N/A
			TetraCB-(45)+(51)	2023/04/04		73	%	N/A
			22'36'-TetraCB-(46)	2023/04/04		73	%	N/A
			22'45-TetraCB-(48)	2023/04/04		82	%	N/A
			TetraCB-(49)+TetraCB-(69)	2023/04/04		80	%	N/A
			TetraCB-(50)+(53)	2023/04/04		72	%	N/A
			22'55'-TetraCB-(52)	2023/04/04		87	%	N/A
			22'66'-TetraCB-(54)	2023/04/04		116	%	60 - 145
			233'4-TetraCB-(55)	2023/04/04		97	%	N/A
			233'4'-Tetra CB(56)	2023/04/04		99	%	N/A
			233'5-TetraCB-(57)	2023/04/04		90	%	N/A
			233'5'-TetraCB-(58)	2023/04/04		91	%	N/A
			TetraCB-(59)+(62)+(75)	2023/04/04		83	%	N/A
			2344'-TetraCB -(60)	2023/04/04		98	%	N/A
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04		99	%	N/A
			234'5-TetraCB-(63)	2023/04/04		96	%	N/A
			234'6-TetraCB-(64)	2023/04/04		96	%	N/A
			23'44'-TetraCB-(66)	2023/04/04		98	%	N/A
			23'45-TetraCB-(67)	2023/04/04		91	%	N/A
			23'45'-TetraCB-(68)	2023/04/04		91	%	N/A
			23'55'-TetraCB-(72)	2023/04/04		89	%	N/A
			23'5'6-TetraCB-(73)	2023/04/04		71	%	N/A
			33'44'-TetraCB-(77)	2023/04/04		98	%	60 - 145
			33'45-TetraCB-(78)	2023/04/04		116	%	N/A
			33'45'-TetraCB(79)	2023/04/04		105	%	N/A
			33'55'-TetraCB-(80)	2023/04/04		95	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			344'5-TetraCB-(81)	2023/04/04		100	%	60 - 145
			22'33'4-PentaCB-(82)	2023/04/04		108	%	N/A
			PentaCB-(83)+(99)	2023/04/04		96	%	N/A
			22'33'6-PentaCB-(84)	2023/04/04		87	%	N/A
			PentaCB-(85)+(116)+(117)	2023/04/04		93	%	N/A
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04		92	%	N/A
			PentaCB-(88)+(91)	2023/04/04		89	%	N/A
			22'346'-PentaCB-(89)	2023/04/04		103	%	N/A
			PentaCB-(90)+(101)+(113)	2023/04/04		93	%	N/A
			22'355'-PentaCB-(92)	2023/04/04		101	%	N/A
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04		82	%	N/A
			22'356'-PentaCB-(94)	2023/04/04		80	%	N/A
			22'35'6-PentaCB-(95)	2023/04/04		103	%	N/A
			22'366'-PentaCB-(96)	2023/04/04		88	%	N/A
			22'45'6-PentaCB-(103)	2023/04/04		88	%	N/A
			22'466'-PentaCB-(104)	2023/04/04		102	%	60 - 145
			233'44'-PentaCB-(105)	2023/04/04		105	%	60 - 145
			233'45-PentaCB-(106)	2023/04/04		112	%	N/A
			233'4'5-PentaCB-(107)	2023/04/04		96	%	N/A
			PentaCB-(108)+(124)	2023/04/04		101	%	N/A
			PentaCB-(110)+(115)	2023/04/04		104	%	N/A
			233'55'-PentaCB-(111)	2023/04/04		96	%	N/A
			233'56-PentaCB-(112)	2023/04/04		97	%	N/A
			2344'5-PentaCB-(114)	2023/04/04		106	%	60 - 145
			23'44'5-PentaCB-(118)	2023/04/04		103	%	60 - 145
			23'455'-PentaCB-(120)	2023/04/04		105	%	N/A
			23'45'6-PentaCB-(121)	2023/04/04		88	%	N/A
			233'4'5'-PentaCB-(122)	2023/04/04		128	%	N/A
			23'44'5'-PentaCB-(123)	2023/04/04		104	%	60 - 145
			33'44'5-PentaCB-(126)	2023/04/04		100	%	60 - 145
			33'455'-PentaCB-(127)	2023/04/04		109	%	N/A
			HexaCB-(128)+(166)	2023/04/04		97	%	N/A
			HexaCB-(129)+(138)+(163)	2023/04/04		103	%	N/A
			22'33'45'-HexaCB-(130)	2023/04/04		93	%	N/A
			22'33'46-HexaCB-(131)	2023/04/04		108	%	N/A
			22'33'46'-HexaCB-(132)	2023/04/04		92	%	N/A
			22'33'55'-HexaCB-(133)	2023/04/04		96	%	N/A
			HexaCB-(134)+(143)	2023/04/04		99	%	N/A
			HexaCB-(135)+(151)	2023/04/04		94	%	N/A
			22'33'66'-HexaCB-(136)	2023/04/04		92	%	N/A
			22'344'5-HexaCB-(137)	2023/04/04		85	%	N/A
			HexaCB-(139)+(140)	2023/04/04		90	%	N/A
			22'3455'-HexaCB-(141)	2023/04/04		98	%	N/A
			22'3456-HexaCB-(142)	2023/04/04		96	%	N/A
			22'345'6-HexaCB-(144)	2023/04/04		97	%	N/A
			22'3466'-HexaCB-(145)	2023/04/04		86	%	N/A
			22'34'55'-HexaCB-(146)	2023/04/04		93	%	N/A
			HexaCB-(147)+(149)	2023/04/04		91	%	N/A
			22'34'56'-HexaCB-(148)	2023/04/04		93	%	N/A
			22'34'66'-HexaCB-(150)	2023/04/04		84	%	N/A
			22'3566'-HexaCB-(152)	2023/04/04		87	%	N/A
			HexaCB-(153)+(168)	2023/04/04		91	%	N/A
			22'44'56'-HexaCB-(154)	2023/04/04		89	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'44'66'-HexaCB-(155)	2023/04/04		103	%	60 - 145
			HexaCB-(156)+(157)	2023/04/04		105	%	N/A
			233'44'6-HexaCB-(158)	2023/04/04		96	%	N/A
			233'455'-HexaCB-(159)	2023/04/04		95	%	N/A
			233'456-HexaCB-(160)	2023/04/04		99	%	N/A
			233'45'6-HexaCB-(161)	2023/04/04		92	%	N/A
			233'4'55'-HexaCB-(162)	2023/04/04		97	%	N/A
			233'4'5'6-HexaCB-(164)	2023/04/04		104	%	N/A
			233'55'6-HexaCB-(165)	2023/04/04		91	%	N/A
			23'44'55'-HexaCB-(167)	2023/04/04		107	%	60 - 145
			33'44'55'-HexaCB-(169)	2023/04/04		106	%	60 - 145
			22'33'44'5-HeptaCB-(170)	2023/04/04		88	%	60 - 145
			HeptaCB-(171)+(173)	2023/04/04		96	%	N/A
			22'33'455'-HeptaCB-(172)	2023/04/04		98	%	N/A
			22'33'456'-HeptaCB-(174)	2023/04/04		96	%	N/A
			22'33'45'6-HeptaCB-(175)	2023/04/04		93	%	N/A
			22'33'466'-HeptaCB-(176)	2023/04/04		90	%	N/A
			22'33'45'6'-HeptaCB-(177)	2023/04/04		93	%	N/A
			22'33'55'6-HeptaCB-(178)	2023/04/04		93	%	N/A
			22'33'566'-HeptaCB-(179)	2023/04/04		94	%	N/A
			HeptaCB-(180)+(193)	2023/04/04		103	%	N/A
			22'344'56-HeptaCB-(181)	2023/04/04		96	%	N/A
			22'344'56'-HeptaCB-(182)	2023/04/04		97	%	N/A
			22'344'5'6-HeptaCB-(183)	2023/04/04		88	%	N/A
			22'344'66'-HeptaCB-(184)	2023/04/04		86	%	N/A
			22'3455'6-HeptaCB-(185)	2023/04/04		103	%	N/A
			22'34566'-HeptaCB-(186)	2023/04/04		91	%	N/A
			22'34'55'6-HeptaCB-(187)	2023/04/04		96	%	N/A
			22'34'566'-HeptaCB-(188)	2023/04/04		103	%	60 - 145
			233'44'55'-HeptaCB-(189)	2023/04/04		104	%	60 - 145
			233'44'56-HeptaCB-(190)	2023/04/04		95	%	N/A
			233'44'5'6-HeptaCB-(191)	2023/04/04		95	%	N/A
			233'455'6-HeptaCB-(192)	2023/04/04		99	%	N/A
			22'33'44'55'-OctaCB-(194)	2023/04/04		101	%	N/A
			22'33'44'56-OctaCB-(195)	2023/04/04		102	%	N/A
			22'33'44'56'-OctaCB-(196)	2023/04/04		99	%	N/A
			22'33'44'66'OctaCB-(197)	2023/04/04		94	%	N/A
			OctaCB-(198)+(199)	2023/04/04		100	%	N/A
			22'33'4566'-OctaCB-(200)	2023/04/04		104	%	N/A
			22'33'45'66'-OctaCB-(201)	2023/04/04		92	%	N/A
			22'33'55'66'-OctaCB-(202)	2023/04/04		95	%	60 - 145
			22'344'55'6-OctaCB-(203)	2023/04/04		103	%	N/A
			22'344'566'-OctaCB-(204)	2023/04/04		91	%	N/A
			233'44'55'6-OctaCB-(205)	2023/04/04		93	%	60 - 145
			22'33'44'55'6-NonaCB-(206)	2023/04/04		93	%	60 - 145
			22'33'44'566'-NonaCB-(207)	2023/04/04		90	%	N/A
			22'33'455'66'-NonaCB-(208)	2023/04/04		97	%	60 - 145
			DecaCB-(209)	2023/04/04		115	%	60 - 145
8533813	CXU	RPD	2-MonoCB-(1)	2023/04/04	1.0		%	30
			3-MonoCB-(2)	2023/04/04	1.9		%	30
			4-MonoCB-(3)	2023/04/04	0.85		%	30
			22'-DiCB-(4)	2023/04/04	4.4		%	30
			2,3-DiCB-(5)	2023/04/04	3.6		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			2,3'-DiCB-(6)	2023/04/04	0		%	30
			2,4-DiCB-(7)	2023/04/04	1.0		%	30
			2,4'-DiCB-(8)	2023/04/04	3.7		%	30
			2,5-DiCB-(9)	2023/04/04	2.3		%	30
			2,6-DiCB-(10)	2023/04/04	2.0		%	30
			3,3'-DiCB-(11)	2023/04/04	1.0		%	30
			DiCB-(12)+(13)	2023/04/04	0.29		%	30
			3,5-DiCB-(14)	2023/04/04	0.38		%	30
			4,4'-DiCB-(15)	2023/04/04	1.2		%	30
			22'3-TriCB-(16)	2023/04/04	9.8		%	30
			22'4-TriCB-(17)	2023/04/04	4.0		%	30
			TriCB-(18)+(30)	2023/04/04	2.5		%	30
			22'6-TriCB-(19)	2023/04/04	2.5		%	30
			TriCB-(20) + (28)	2023/04/04	4.3		%	30
			TriCB-(21)+(33)	2023/04/04	1.7		%	30
			234'-TriCB-(22)	2023/04/04	0.099		%	30
			235-TriCB-(23)	2023/04/04	3.2		%	30
			236-TriCB-(24)	2023/04/04	7.4		%	30
			23'4-TriCB-(25)	2023/04/04	3.3		%	30
			TriCB-(26)+(29)	2023/04/04	1.4		%	30
			23'6-TriCB-(27)	2023/04/04	9.2		%	30
			24'5-TriCB-(31)	2023/04/04	3.2		%	30
			24'6-TriCB-(32)	2023/04/04	2.3		%	30
			23'5'-TriCB-(34)	2023/04/04	1.7		%	30
			33'4-TriCB-(35)	2023/04/04	1.5		%	30
			33'5-TriCB-(36)	2023/04/04	0		%	30
			344'-TriCB-(37)	2023/04/04	2.1		%	30
			345-TriCB-(38)	2023/04/04	2.4		%	30
			34'5-TriCB-(39)	2023/04/04	1.1		%	30
			TetraCB-(40)+(41)+(71)	2023/04/04	4.3		%	30
			22'34'-TetraCB-(42)	2023/04/04	2.5		%	30
			22'35-TetraCB-(43)	2023/04/04	6.9		%	30
			TetraCB-(44)+(47)+(65)	2023/04/04	4.6		%	30
			TetraCB-(45)+(51)	2023/04/04	5.5		%	30
			22'36'-TetraCB-(46)	2023/04/04	3.7		%	30
			22'45-TetraCB-(48)	2023/04/04	5.1		%	30
			TetraCB-(49)+TetraCB-(69)	2023/04/04	4.3		%	30
			TetraCB-(50)+(53)	2023/04/04	6.2		%	30
			22'55'-TetraCB-(52)	2023/04/04	7.4		%	30
			22'66'-TetraCB-(54)	2023/04/04	1.3		%	30
			233'4-TetraCB-(55)	2023/04/04	3.1		%	30
			233'4'-Tetra CB(56)	2023/04/04	2.0		%	30
			233'5-TetraCB-(57)	2023/04/04	4.1		%	30
			233'5'-TetraCB-(58)	2023/04/04	3.5		%	30
			TetraCB-(59)+(62)+(75)	2023/04/04	6.1		%	30
			2344'-TetraCB -(60)	2023/04/04	2.9		%	30
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04	4.1		%	30
			234'5-TetraCB-(63)	2023/04/04	4.2		%	30
			234'6-TetraCB-(64)	2023/04/04	4.5		%	30
			23'44'-TetraCB-(66)	2023/04/04	1.8		%	30
			23'45-TetraCB-(67)	2023/04/04	1.6		%	30
			23'45'-TetraCB-(68)	2023/04/04	2.8		%	30
			23'55'-TetraCB-(72)	2023/04/04	5.7		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			23'5'6-TetraCB-(73)	2023/04/04	3.7		%	30
			33'44'-TetraCB-(77)	2023/04/04	3.3		%	30
			33'45-TetraCB-(78)	2023/04/04	1.7		%	30
			33'45'-TetraCB(79)	2023/04/04	2.8		%	30
			33'55'-TetraCB-(80)	2023/04/04	3.5		%	30
			344'5-TetraCB-(81)	2023/04/04	1.8		%	30
			22'33'4-PentaCB-(82)	2023/04/04	3.5		%	30
			PentaCB-(83)+(99)	2023/04/04	5.9		%	30
			22'33'6-PentaCB-(84)	2023/04/04	4.5		%	30
			PentaCB-(85)+(116)+(117)	2023/04/04	5.1		%	30
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04	5.0		%	30
			PentaCB-(88)+(91)	2023/04/04	6.0		%	30
			22'346'-PentaCB-(89)	2023/04/04	5.1		%	30
			PentaCB-(90)+(101)+(113)	2023/04/04	5.0		%	30
			22'355'-PentaCB-(92)	2023/04/04	3.6		%	30
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04	5.5		%	30
			22'356'-PentaCB-(94)	2023/04/04	3.7		%	30
			22'35'6-PentaCB-(95)	2023/04/04	8.8		%	30
			22'366'-PentaCB-(96)	2023/04/04	6.0		%	30
			22'45'6-PentaCB-(103)	2023/04/04	4.9		%	30
			22'466'-PentaCB-(104)	2023/04/04	1.6		%	30
			233'44'-PentaCB-(105)	2023/04/04	0.66		%	30
			233'45-PentaCB-(106)	2023/04/04	1.5		%	30
			233'4'5-PentaCB-(107)	2023/04/04	4.9		%	30
			PentaCB-(108)+(124)	2023/04/04	3.1		%	30
			PentaCB-(110)+(115)	2023/04/04	5.0		%	30
			233'55'-PentaCB-(111)	2023/04/04	4.0		%	30
			233'56-PentaCB-(112)	2023/04/04	4.0		%	30
			2344'5-PentaCB-(114)	2023/04/04	2.1		%	30
			23'44'5-PentaCB-(118)	2023/04/04	6.1		%	30
			23'455'-PentaCB-(120)	2023/04/04	5.4		%	30
			23'45'6-PentaCB-(121)	2023/04/04	6.6		%	30
			233'4'5'-PentaCB-(122)	2023/04/04	2.0		%	30
			23'44'5'-PentaCB-(123)	2023/04/04	3.4		%	30
			33'44'5-PentaCB-(126)	2023/04/04	2.3		%	30
			33'455'-PentaCB-(127)	2023/04/04	1.5		%	30
			HexaCB-(128)+(166)	2023/04/04	6.0		%	30
			HexaCB-(129)+(138)+(163)	2023/04/04	5.1		%	30
			22'33'45'-HexaCB-(130)	2023/04/04	2.4		%	30
			22'33'46-HexaCB-(131)	2023/04/04	2.8		%	30
			22'33'46'-HexaCB-(132)	2023/04/04	3.3		%	30
			22'33'55'-HexaCB-(133)	2023/04/04	2.7		%	30
			HexaCB-(134)+(143)	2023/04/04	4.9		%	30
			HexaCB-(135)+(151)	2023/04/04	5.0		%	30
			22'33'66'-HexaCB-(136)	2023/04/04	8.6		%	30
			22'344'5-HexaCB-(137)	2023/04/04	0.47		%	30
			HexaCB-(139)+(140)	2023/04/04	4.0		%	30
			22'3455'-HexaCB-(141)	2023/04/04	4.7		%	30
			22'3456-HexaCB-(142)	2023/04/04	2.2		%	30
			22'345'6-HexaCB-(144)	2023/04/04	1.8		%	30
			22'3466'-HexaCB-(145)	2023/04/04	4.7		%	30
			22'34'55'-HexaCB-(146)	2023/04/04	3.7		%	30
			HexaCB-(147)+(149)	2023/04/04	5.2		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'34'56'-HexaCB-(148)	2023/04/04	7.8		%	30
			22'34'66'-HexaCB-(150)	2023/04/04	4.1		%	30
			22'3566'-HexaCB-(152)	2023/04/04	6.5		%	30
			HexaCB-(153)+(168)	2023/04/04	4.8		%	30
			22'44'56'-HexaCB-(154)	2023/04/04	5.4		%	30
			22'44'66'-HexaCB-(155)	2023/04/04	5.3		%	30
			HexaCB-(156)+(157)	2023/04/04	3.4		%	30
			233'44'6-HexaCB-(158)	2023/04/04	3.6		%	30
			233'455'-HexaCB-(159)	2023/04/04	4.4		%	30
			233'456-HexaCB-(160)	2023/04/04	2.2		%	30
			233'45'6-HexaCB-(161)	2023/04/04	4.2		%	30
			233'4'55'-HexaCB-(162)	2023/04/04	4.3		%	30
			233'4'5'6-HexaCB-(164)	2023/04/04	9.2		%	30
			233'55'6-HexaCB-(165)	2023/04/04	2.3		%	30
			23'44'55'-HexaCB-(167)	2023/04/04	1.2		%	30
			33'44'55'-HexaCB-(169)	2023/04/04	2.3		%	30
			22'33'44'5-HeptaCB-(170)	2023/04/04	1.4		%	30
			HeptaCB-(171)+(173)	2023/04/04	3.9		%	30
			22'33'455'-HeptaCB-(172)	2023/04/04	4.6		%	30
			22'33'456'-HeptaCB-(174)	2023/04/04	1.9		%	30
			22'33'45'6-HeptaCB-(175)	2023/04/04	7.6		%	30
			22'33'466'-HeptaCB-(176)	2023/04/04	7.6		%	30
			22'33'45'6'-HeptaCB-(177)	2023/04/04	3.2		%	30
			22'33'55'6-HeptaCB-(178)	2023/04/04	5.2		%	30
			22'33'566'-HeptaCB-(179)	2023/04/04	6.6		%	30
			HeptaCB-(180)+(193)	2023/04/04	3.9		%	30
			22'344'56-HeptaCB-(181)	2023/04/04	3.9		%	30
			22'344'56'-HeptaCB-(182)	2023/04/04	8.6		%	30
			22'344'5'6-HeptaCB-(183)	2023/04/04	4.2		%	30
			22'344'66'-HeptaCB-(184)	2023/04/04	5.0		%	30
			22'3455'6-HeptaCB-(185)	2023/04/04	17		%	30
			22'34566'-HeptaCB-(186)	2023/04/04	4.4		%	30
			22'34'55'6-HeptaCB-(187)	2023/04/04	6.8		%	30
			22'34'566'-HeptaCB-(188)	2023/04/04	3.3		%	30
			233'44'55'-HeptaCB-(189)	2023/04/04	3.4		%	30
			233'44'56-HeptaCB-(190)	2023/04/04	4.3		%	30
			233'44'5'6-HeptaCB-(191)	2023/04/04	3.0		%	30
			233'455'6-HeptaCB-(192)	2023/04/04	5.1		%	30
			22'33'44'55'-OctaCB-(194)	2023/04/04	1.5		%	30
			22'33'44'56-OctaCB-(195)	2023/04/04	0.098		%	30
			22'33'44'56'-OctaCB-(196)	2023/04/04	2.2		%	30
			22'33'44'66'OctaCB-(197)	2023/04/04	2.5		%	30
			OctaCB-(198)+(199)	2023/04/04	1.7		%	30
			22'33'4566'-OctaCB-(200)	2023/04/04	3.6		%	30
			22'33'45'66'-OctaCB-(201)	2023/04/04	2.5		%	30
			22'33'55'66'-OctaCB-(202)	2023/04/04	3.6		%	30
			22'344'55'6-OctaCB-(203)	2023/04/04	2.2		%	30
			22'344'566'-OctaCB-(204)	2023/04/04	3.8		%	30
			233'44'55'6-OctaCB-(205)	2023/04/04	0.86		%	30
			22'33'44'55'6-NonaCB-(206)	2023/04/04	2.2		%	30
			22'33'44'566'-NonaCB-(207)	2023/04/04	4.3		%	30
			22'33'455'66'-NonaCB-(208)	2023/04/04	4.9		%	30
			DecaCB-(209)	2023/04/04	6.0		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
8533813	CXU	Method Blank	C13-2,44'-TriCB-(28)	2023/03/03		109	%	30 - 170
			C13-22'33'44'55'6-NonaCB-(206)	2023/03/03		89	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/03/03		118	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/03/03		94	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/03/03		94	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2023/03/03		76	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/03/03		110	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/03/03		69	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/03/03		48	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/03/03		67	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/03/03		56	%	15 - 145
			C13-22'6-TriCB-(19)	2023/03/03		52	%	40 - 145
			C13-22'-DiCB-(4)	2023/03/03		37	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/03/03		109	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/03/03		113	%	40 - 145
			C13-233'44'-PentaCB-(105)	2023/03/03		146 (1)	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/03/03		98	%	30 - 170
			C13-23'44'55'-HexaCB-(167)	2023/03/03		96	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/03/03		139	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/03/03		143	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/03/03		143	%	40 - 145
			C13-2-MonoCB-(1)	2023/03/03		39	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/03/03		101	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/03/03		151 (1)	%	40 - 145
			C13-33'44'-TetraCB-(77)	2023/03/03		86	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/03/03		82	%	40 - 145
			C13-344'-TriCB-(37)	2023/03/03		80	%	40 - 145
			C13-44'-DiCB-(15)	2023/03/03		82	%	15 - 145
			C13-4-MonoCB-(3)	2023/03/03		49	%	15 - 145
			C13-DecaCB-(209)	2023/03/03		69	%	40 - 145
			C13-HexaCB-(156)+(157)	2023/03/03		96	%	40 - 145
			2-MonoCB-(1)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			3-MonoCB-(2)	2023/03/03	0.0087 U, EDL=0.0087		ng/L	
			4-MonoCB-(3)	2023/03/03	0.0083 U, EDL=0.0083		ng/L	
			22'-DiCB-(4)	2023/03/03	0.029 U, EDL=0.029		ng/L	
			2,3-DiCB-(5)	2023/03/03	0.0053 U, EDL=0.0053		ng/L	
			2,3'-DiCB-(6)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			2,4-DiCB-(7)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			2,4'-DiCB-(8)	2023/03/03	0.0062 J, EDL=0.0051		ng/L	
			2,5-DiCB-(9)	2023/03/03	0.0055 U, EDL=0.0055		ng/L	
			2,6-DiCB-(10)	2023/03/03	0.0097 U, EDL=0.0097		ng/L	
			3,3'-DiCB-(11)	2023/03/03	0.0834 J, EDL=0.0052		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			DiCB-(12)+(13)	2023/03/03	0.0051 U, EDL=0.0051		ng/L	
			3,5-DiCB-(14)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			4,4'-DiCB-(15)	2023/03/03	0.0110 J, EDL=0.0053		ng/L	
			22'3-TriCB-(16)	2023/03/03	0.0279 J, EDL=0.0081		ng/L	
			22'4-TriCB-(17)	2023/03/03	0.0179 J, EDL=0.0061		ng/L	
			TriCB-(18)+(30)	2023/03/03	0.0176 J, EDL=0.0053		ng/L	
			22'6-TriCB-(19)	2023/03/03	0.0081 U, EDL=0.0081		ng/L	
			TriCB-(20) + (28)	2023/03/03	0.0548, EDL=0.0027		ng/L	
			TriCB-(21)+(33)	2023/03/03	0.0405 J, EDL=0.0029		ng/L	
			234'-TriCB-(22)	2023/03/03	0.0213, EDL=0.0029		ng/L	
			235-TriCB-(23)	2023/03/03	0.0028 U, EDL=0.0028		ng/L	
			236-TriCB-(24)	2023/03/03	0.0048 U, EDL=0.0048		ng/L	
			23'4-TriCB-(25)	2023/03/03	0.0050 U, EDL=0.0050		ng/L	
			TriCB-(26)+(29)	2023/03/03	0.0111 J, EDL=0.0022		ng/L	
			23'6-TriCB-(27)	2023/03/03	0.0046 U, EDL=0.0046		ng/L	
			24'5-TriCB-(31)	2023/03/03	0.0613, EDL=0.0026		ng/L	
			24'6-TriCB-(32)	2023/03/03	0.0157 J, EDL=0.0043		ng/L	
			23'5'-TriCB-(34)	2023/03/03	0.0029 U, EDL=0.0029		ng/L	
			33'4-TriCB-(35)	2023/03/03	0.0030 U, EDL=0.0030		ng/L	
			33'5-TriCB-(36)	2023/03/03	0.0025 U, EDL=0.0025		ng/L	
			344'-TriCB-(37)	2023/03/03	0.0127 J, EDL=0.0031		ng/L	
			345-TriCB-(38)	2023/03/03	0.0029 U, EDL=0.0029		ng/L	
			34'5-TriCB-(39)	2023/03/03	0.0030 U, EDL=0.0030		ng/L	
			TetraCB-(40)+(41)+(71)	2023/03/03	0.029 J, EDL=0.015		ng/L	
			22'34'-TetraCB-(42)	2023/03/03	0.020 U, EDL=0.020		ng/L	
			22'35-TetraCB-(43)	2023/03/03	0.018 U, EDL=0.018		ng/L	
			TetraCB-(44)+(47)+(65)	2023/03/03	0.057 U, EDL=0.057 (2)		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			TetraCB-(45)+(51)	2023/03/03	0.015 U, EDL=0.015		ng/L	
			22'36'-TetraCB-(46)	2023/03/03	0.017 U, EDL=0.017		ng/L	
			22'45-TetraCB-(48)	2023/03/03	0.015 U, EDL=0.015		ng/L	
			TetraCB-(49)+TetraCB-(69)	2023/03/03	0.051 J, EDL=0.013		ng/L	
			TetraCB-(50)+(53)	2023/03/03	0.014 U, EDL=0.014		ng/L	
			22'55'-TetraCB-(52)	2023/03/03	0.150, EDL=0.015		ng/L	
			22'66'-TetraCB-(54)	2023/03/03	0.025 U, EDL=0.025		ng/L	
			233'4-TetraCB-(55)	2023/03/03	0.0095 U, EDL=0.0095		ng/L	
			233'4'-Tetra CB(56)	2023/03/03	0.0176 J, EDL=0.0097		ng/L	
			233'5-TetraCB-(57)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			233'5'-TetraCB-(58)	2023/03/03	0.0094 U, EDL=0.0094		ng/L	
			TetraCB-(59)+(62)+(75)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			2344'-TetraCB -(60)	2023/03/03	0.0121 J, EDL=0.0092		ng/L	
			TetraCB-(61)+(70)+(74)+(76)	2023/03/03	0.115 J, EDL=0.0086		ng/L	
			234'5-TetraCB-(63)	2023/03/03	0.0091 U, EDL=0.0091		ng/L	
			234'6-TetraCB-(64)	2023/03/03	0.028 J, EDL=0.013		ng/L	
			23'44'-TetraCB-(66)	2023/03/03	0.0394 J, EDL=0.0086		ng/L	
			23'45-TetraCB-(67)	2023/03/03	0.0080 U, EDL=0.0080		ng/L	
			23'45'-TetraCB-(68)	2023/03/03	0.0085 U, EDL=0.0085		ng/L	
			23'55'-TetraCB-(72)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			23'5'6-TetraCB-(73)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			33'44'-TetraCB-(77)	2023/03/03	0.0098 U, EDL=0.0098		ng/L	
			33'45-TetraCB-(78)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			33'45'-TetraCB(79)	2023/03/03	0.0084 U, EDL=0.0084		ng/L	
			33'55'-TetraCB-(80)	2023/03/03	0.0077 U, EDL=0.0077		ng/L	
			344'5-TetraCB-(81)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			22'33'4-PentaCB-(82)	2023/03/03	0.017 U, EDL=0.017		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			PentaCB-(83)+(99)	2023/03/03	0.059 J, EDL=0.014		ng/L	
			22'33'6-PentaCB-(84)	2023/03/03	0.024, EDL=0.014		ng/L	
			PentaCB-(85)+(116)+(117)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/03/03	0.068 J, EDL=0.011		ng/L	
			PentaCB-(88)+(91)	2023/03/03	0.012 U, EDL=0.012		ng/L	
			22'346'-PentaCB-(89)	2023/03/03	0.016 U, EDL=0.016		ng/L	
			PentaCB-(90)+(101)+(113)	2023/03/03	0.206, EDL=0.011		ng/L	
			22'355'-PentaCB-(92)	2023/03/03	0.035 J, EDL=0.015		ng/L	
			PentaCB-(93)+(98)+(100)+(102)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			22'356'-PentaCB-(94)	2023/03/03	0.014 U, EDL=0.014		ng/L	
			22'35'6-PentaCB-(95)	2023/03/03	0.210, EDL=0.015		ng/L	
			22'366'-PentaCB-(96)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			22'45'6-PentaCB-(103)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			22'466'-PentaCB-(104)	2023/03/03	0.017 U, EDL=0.017		ng/L	
			233'44'-PentaCB-(105)	2023/03/03	0.0276 J, EDL=0.0052		ng/L	
			233'45-PentaCB-(106)	2023/03/03	0.0057 U, EDL=0.0057		ng/L	
			233'4'5-PentaCB-(107)	2023/03/03	0.0081 J, EDL=0.0043		ng/L	
			PentaCB-(108)+(124)	2023/03/03	0.0053 U, EDL=0.0053		ng/L	
			PentaCB-(110)+(115)	2023/03/03	0.122, EDL=0.011		ng/L	
			233'55'-PentaCB-(111)	2023/03/03	0.0092 U, EDL=0.0092		ng/L	
			233'56-PentaCB-(112)	2023/03/03	0.0091 U, EDL=0.0091		ng/L	
			2344'5-PentaCB-(114)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			23'44'5-PentaCB-(118)	2023/03/03	0.0962 J, EDL=0.0048		ng/L	
			23'455'-PentaCB-(120)	2023/03/03	0.0097 U, EDL=0.0097		ng/L	
			23'45'6-PentaCB-(121)	2023/03/03	0.0092 U, EDL=0.0092		ng/L	
			233'4'5'-PentaCB-(122)	2023/03/03	0.0070 U, EDL=0.0070		ng/L	
			23'44'5'-PentaCB-(123)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			33'44'5-PentaCB-(126)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			33'455'-PentaCB-(127)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			HexaCB-(128)+(166)	2023/03/03	0.0124 J, EDL=0.0057		ng/L	
			HexaCB-(129)+(138)+(163)	2023/03/03	0.201, EDL=0.0064		ng/L	
			22'33'45'-HexaCB-(130)	2023/03/03	0.0072 J, EDL=0.0069		ng/L	
			22'33'46-HexaCB-(131)	2023/03/03	0.0083 U, EDL=0.0083		ng/L	
			22'33'46'-HexaCB-(132)	2023/03/03	0.0682, EDL=0.0069		ng/L	
			22'33'55'-HexaCB-(133)	2023/03/03	0.0071 U, EDL=0.0071		ng/L	
			HexaCB-(134)+(143)	2023/03/03	0.0135 J, EDL=0.0076		ng/L	
			HexaCB-(135)+(151)	2023/03/03	0.143, EDL=0.013		ng/L	
			22'33'66'-HexaCB-(136)	2023/03/03	0.0455 J, EDL=0.0099		ng/L	
			22'344'5-HexaCB-(137)	2023/03/03	0.0065 U, EDL=0.0065		ng/L	
			HexaCB-(139)+(140)	2023/03/03	0.0060 U, EDL=0.0060		ng/L	
			22'3455'-HexaCB-(141)	2023/03/03	0.0545, EDL=0.0062		ng/L	
			22'3456-HexaCB-(142)	2023/03/03	0.0074 U, EDL=0.0074		ng/L	
			22'345'6-HexaCB-(144)	2023/03/03	0.022 J, EDL=0.013		ng/L	
			22'3466'-HexaCB-(145)	2023/03/03	0.0093 U, EDL=0.0093		ng/L	
			22'34'55'-HexaCB-(146)	2023/03/03	0.0310 J, EDL=0.0058		ng/L	
			HexaCB-(147)+(149)	2023/03/03	0.274, EDL=0.0055		ng/L	
			22'34'56'-HexaCB-(148)	2023/03/03	0.014 U, EDL=0.014		ng/L	
			22'34'66'-HexaCB-(150)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			22'3566'-HexaCB-(152)	2023/03/03	0.0094 U, EDL=0.0094		ng/L	
			HexaCB-(153)+(168)	2023/03/03	0.237, EDL=0.0050		ng/L	
			22'44'56'-HexaCB-(154)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			22'44'66'-HexaCB-(155)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			HexaCB-(156)+(157)	2023/03/03	0.0088 J, EDL=0.0035		ng/L	
			233'44'6-HexaCB-(158)	2023/03/03	0.0167 J, EDL=0.0042		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			233'455'-HexaCB-(159)	2023/03/03	0.0033 U, EDL=0.0033		ng/L	
			233'456-HexaCB-(160)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			233'45'6-HexaCB-(161)	2023/03/03	0.0048 U, EDL=0.0048		ng/L	
			233'4'55'-HexaCB-(162)	2023/03/03	0.0032 U, EDL=0.0032		ng/L	
			233'4'5'6-HexaCB-(164)	2023/03/03	0.0103 J, EDL=0.0046		ng/L	
			233'55'6-HexaCB-(165)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			23'44'55'-HexaCB-(167)	2023/03/03	0.0041 J, EDL=0.0035		ng/L	
			33'44'55'-HexaCB-(169)	2023/03/03	0.0038 U, EDL=0.0038		ng/L	
			22'33'44'5-HeptaCB-(170)	2023/03/03	0.0208 J, EDL=0.0054		ng/L	
			HeptaCB-(171)+(173)	2023/03/03	0.013 U, EDL=0.013 (2)		ng/L	
			22'33'455'-HeptaCB-(172)	2023/03/03	0.0060 U, EDL=0.0060		ng/L	
			22'33'456'-HeptaCB-(174)	2023/03/03	0.0523, EDL=0.0054		ng/L	
			22'33'45'6-HeptaCB-(175)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			22'33'466'-HeptaCB-(176)	2023/03/03	0.0140 J, EDL=0.0076		ng/L	
			22'33'45'6'-HeptaCB-(177)	2023/03/03	0.0308 J, EDL=0.0059		ng/L	
			22'33'55'6-HeptaCB-(178)	2023/03/03	0.014 J, EDL=0.011		ng/L	
			22'33'566'-HeptaCB-(179)	2023/03/03	0.0419 J, EDL=0.0074		ng/L	
			HeptaCB-(180)+(193)	2023/03/03	0.0737 J, EDL=0.0047		ng/L	
			22'344'56-HeptaCB-(181)	2023/03/03	0.0056 U, EDL=0.0056		ng/L	
			22'344'56'-HeptaCB-(182)	2023/03/03	0.0098 U, EDL=0.0098		ng/L	
			22'344'5'6-HeptaCB-(183)	2023/03/03	0.0419 J, EDL=0.0048		ng/L	
			22'344'66'-HeptaCB-(184)	2023/03/03	0.0073 U, EDL=0.0073		ng/L	
			22'3455'6-HeptaCB-(185)	2023/03/03	0.0058 U, EDL=0.0058		ng/L	
			22'34566'-HeptaCB-(186)	2023/03/03	0.0079 U, EDL=0.0079		ng/L	
			22'34'55'6-HeptaCB-(187)	2023/03/03	0.085, EDL=0.010		ng/L	
			22'34'566'-HeptaCB-(188)	2023/03/03	0.0080 U, EDL=0.0080		ng/L	
			233'44'55'-HeptaCB-(189)	2023/03/03	0.0039 U, EDL=0.0039		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			233'44'56-HeptaCB-(190)	2023/03/03	0.0049 J, EDL=0.0043		ng/L	
			233'44'5'6-HeptaCB-(191)	2023/03/03	0.0042 U, EDL=0.0042		ng/L	
			233'455'6-HeptaCB-(192)	2023/03/03	0.0047 U, EDL=0.0047		ng/L	
			22'33'44'55'-OctaCB-(194)	2023/03/03	0.0078 U, EDL=0.0078		ng/L	
			22'33'44'56-OctaCB-(195)	2023/03/03	0.0084 U, EDL=0.0084		ng/L	
			22'33'44'56'-OctaCB-(196)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			22'33'44'66'OctaCB-(197)	2023/03/03	0.0081 U, EDL=0.0081		ng/L	
			OctaCB-(198)+(199)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			22'33'4566'-OctaCB-(200)	2023/03/03	0.0082 U, EDL=0.0082		ng/L	
			22'33'45'66'-OctaCB-(201)	2023/03/03	0.0076 U, EDL=0.0076		ng/L	
			22'33'55'66'-OctaCB-(202)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			22'344'55'6-OctaCB-(203)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			22'344'566'-OctaCB-(204)	2023/03/03	0.0075 U, EDL=0.0075		ng/L	
			233'44'55'6-OctaCB-(205)	2023/03/03	0.0060 U, EDL=0.0060		ng/L	
			22'33'44'55'6-NonaCB-(206)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			22'33'44'566'-NonaCB-(207)	2023/03/03	0.0076 U, EDL=0.0076		ng/L	
			22'33'455'66'-NonaCB-(208)	2023/03/03	0.0079 U, EDL=0.0079		ng/L	
			DecaCB-(209)	2023/03/03	0.012 U, EDL=0.012		ng/L	

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 (absolute difference <= 2x RDL).

(1) The extracted internal standard analyte exhibited high recovery and as such, may not have allowed for accurate recovery correction of the associated native compound. For results that were not detected (ND), this potential high bias has no impact.

(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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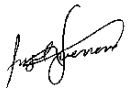
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Angel Guerrero, Supervisor, Ultra Trace Analysis, HRMS and SVOC

Colm McNamara, Senior Analyst, Liquid Chromatography

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SUBCONTRACT ORDER

Apex Laboratories

A3B0522

17-Feb-23 12:20

Lori Dufour

C347713

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. AJH ENV-1656

BV Labs / Maxxam
C/O FEDEX DEPOT 299 Cayuga Rd
Cheektowaga, NY 14225
Phone :(800) 668-0639
Fax: (905) 332-9169

Sample Name: MW3-20230214-GW-35 **Water** **Sampled: 02/14/23 10:05** (A3B0522-01)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	02/28/23 17:00	02/14/24 10:05	
1668C PCB Congeners (SUB)	02/28/23 17:00	02/14/24 10:05	
1699 Insecticides/Pesticides (SUB)	02/28/23 17:00	02/21/23 10:05	waters
537M - PFOAs (SUB)	02/28/23 17:00	02/21/23 10:05	
Containers Supplied:			
(H)Other-Non Preserved			
(I)Other-Non Preserved			
(Q)1 L Amber Glass - Non Preserved			
(R)1 L Amber Glass - Non Preserved			
(S)1 L Amber Glass - Non Preserved			
(U)1 L Amber Glass - Non Preserved			

Sample Name: MW3-20230214-GW-35-DUP **Water** **Sampled: 02/14/23 10:05** (A3B0522-02)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	02/28/23 17:00	02/14/24 10:05	
1668C PCB Congeners (SUB)	02/28/23 17:00	02/14/24 10:05	
1699 Insecticides/Pesticides (SUB)	02/28/23 17:00	02/21/23 10:05	waters
537M - PFOAs (SUB)	02/28/23 17:00	02/21/23 10:05	
Containers Supplied:			
(H)Other-Non Preserved			
(I)Other-Non Preserved			
(Q)1 L Amber Glass - Non Preserved			
(R)1 L Amber Glass - Non Preserved			
(S)1 L Amber Glass - Non Preserved			
(U)1 L Amber Glass - Non Preserved			

Standard TAT

PCS 2.5
2-15-23

Released By	Date	Received By	Date
		Fed Ex (Shipper)	
Fed Ex (Shipper)		ARSHDEEP	2023/02/17 12:2c
Released By	Date	Received By	Date
N/A		On ice	Refer to ACTR

Page 1 of 3

SUBCONTRACT ORDER

Apex Laboratories

2/15/23 **A3B0522**

Sample Name: MW5-20230214-GW-40 **Water** **Sampled: 02/14/23 12:51** (A3B0522-03)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	02/28/23 17:00	02/14/24 12:51	
1668C PCB Congeners (SUB)	02/28/23 17:00	02/14/24 12:51	
1699 Insecticides/Pesticides (SUB)	02/28/23 17:00	02/21/23 12:51	waters
537M - PFOAs (SUB)	02/28/23 17:00	02/21/23 12:51	
Containers Supplied:			
(H)Other-Non Preserved			
(I)Other-Non Preserved			
(Q)1 L Amber Glass - Non Preserved			
(R)1 L Amber Glass - Non Preserved			
(S)1 L Amber Glass - Non Preserved			
(U)1 L Amber Glass - Non Preserved			

Sample Name: MW4-20230214-GW-40 **Water** **Sampled: 02/14/23 14:37** (A3B0522-04)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	02/28/23 17:00	02/14/24 14:37	
1668C PCB Congeners (SUB)	02/28/23 17:00	02/14/24 14:37	
1699 Insecticides/Pesticides (SUB)	02/28/23 17:00	02/21/23 14:37	waters
537M - PFOAs (SUB)	02/28/23 17:00	02/21/23 14:37	
Containers Supplied:			
(H)Other-Non Preserved			
(I)Other-Non Preserved			
(Q)1 L Amber Glass - Non Preserved			
(R)1 L Amber Glass - Non Preserved			
(S)1 L Amber Glass - Non Preserved			
(U)1 L Amber Glass - Non Preserved			

Standard TAT

Released By	2-15-23 Date	Fed Ex (Shipper) Received By	Date
Fed Ex (Shipper) Released By	Date	Received By	Date

Page 2 of 3

SUBCONTRACT ORDER

Apex Laboratories

2/15/23 **A3B0522**

Sample Name: MW6-20230214-GW-40.25 **Water** **Sampled: 02/14/23 16:17** (A3B0522-05)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	02/28/23 17:00	02/14/24 16:17	
1668C PCB Congeners (SUB)	02/28/23 17:00	02/14/24 16:17	
1699 Insecticides/Pesticides (SUB)	02/28/23 17:00	02/21/23 16:17	waters
537M - PFOAs (SUB)	02/28/23 17:00	02/21/23 16:17	
Containers Supplied:			
(H)Other-Non Preserved			
(I)Other-Non Preserved			
(Q)1 L Amber Glass - Non Preserved			
(R)1 L Amber Glass - Non Preserved			
(S)1 L Amber Glass - Non Preserved			
(U)1 L Amber Glass - Non Preserved			

Sample Name: Field Blank-02 **Water** **Sampled: 02/14/23 16:10** (A3B0522-06)

Analysis	Due	Expires	Comments
537M - PFOAs (SUB)	02/28/23 17:00	02/21/23 16:10	
Containers Supplied:			
(A)Other-Non Preserved			
(B)Other-Non Preserved			

Standard TAT

Released By	Date	Received By	Date
	2-15-23	Fed Ex (Shipper)	
Fed Ex (Shipper)			
Released By	Date	Received By	Date

Your Project #: A3B0674
Your C.O.C. #: n/a

Attention: Philip Nerenberg

Apex Laboratories
6700 SW Sandburg St.
Tigard, OR
USA 97223

Report Date: 2023/04/21
Report #: R7597655
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C351279
Received: 2023/02/22, 12:20

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dioxins/Furans in Water (1613B) (1)	2	2023/02/24	2023/02/28	BRL SOP-00410	EPA 1613B m
OC Pesticides in Water by GCTQ	2	2023/02/27	2023/03/03	BRL SOP-00014	EPA Method 1699m
PCB Congeners in Water (1668C)	2	2023/02/23	2023/04/06	BRL SOP-00408	EPA 1668C m
PFAS in water by SPE/LCMS (2)	2	2023/03/04	2023/03/05	CAM SOP-00894	EPA 537.1 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.

(2) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

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:
Lori Dufour, Project Manager
Email: Lori.Dufour@bureauveritas.com
Phone# (905) 817-5700

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VCT482			VCT483			
Sampling Date		2023/02/20 10:26			2023/02/20 14:41			
COC Number		n/a			n/a			
	UNITS	MW1-20230220-GW-70	RDL	MDL	MW2-20230220-GW-60	RDL	MDL	QC Batch
Aldrin	ng/L	0.021 U	0.20	0.021	0.052 J	0.20	0.021	8523575
alpha-BHC	ng/L	0.024 U	0.20	0.024	0.024 U	0.20	0.024	8523575
delta-BHC	ng/L	0.029 U	0.20	0.029	0.029 U	0.20	0.029	8523575
beta-BHC	ng/L	0.024 J	0.20	0.014	0.020 U (1)	0.29	0.020	8523575
Lindane	ng/L	0.067 J	0.20	0.033	0.058 J	0.20	0.033	8523575
a-Chlordane	ng/L	0.029 U	0.20	0.029	0.029 U	0.20	0.029	8523575
g-Chlordane	ng/L	0.029 U	0.20	0.029	0.029 U	0.20	0.029	8523575
Oxychlordane	ng/L	0.028 U	0.20	0.028	0.028 U	0.20	0.028	8523575
o,p-DDD	ng/L	0.020 U	0.20	0.020	0.020 U	0.20	0.020	8523575
p,p-DDD	ng/L	0.014 U	0.20	0.014	0.015 J	0.20	0.014	8523575
o,p-DDE	ng/L	0.016 U	0.20	0.016	0.016 U	0.20	0.016	8523575
p,p-DDE	ng/L	0.012 U	0.20	0.012	0.026 J	0.20	0.012	8523575
o,p-DDT	ng/L	0.040 U	0.20	0.040	0.041 J	0.20	0.040	8523575
p,p-DDT	ng/L	0.050 U	0.20	0.050	0.050 U	0.20	0.050	8523575
Dieldrin	ng/L	0.050 U	0.20	0.050	0.050 U	0.20	0.050	8523575
Endosulfan I	ng/L	0.067 U	0.40	0.067	0.067 U	0.40	0.067	8523575
Endosulfan II	ng/L	0.074 U	0.40	0.074	0.089 J	0.40	0.074	8523575
Endosulfan sulfate	ng/L	0.070 U	0.20	0.070	0.070 U	0.20	0.070	8523575
Endrin	ng/L	0.093 J	0.20	0.045	0.045 U	0.20	0.045	8523575
Endrin aldehyde	ng/L	0.071 U	0.20	0.071	0.071 U	0.20	0.071	8523575
Endrin ketone	ng/L	0.034 U	0.20	0.034	0.034 U	0.20	0.034	8523575
Heptachlor	ng/L	0.029 U	0.20	0.029	0.029 U	0.20	0.029	8523575
Heptachlor epoxide	ng/L	0.015 U	0.20	0.015	0.092 J	0.20	0.015	8523575
Hexachlorobenzene	ng/L	0.10 U	0.20	0.10	0.10 U	0.20	0.10	8523575
Methoxychlor	ng/L	0.040 U	0.20	0.040	0.040 U	0.20	0.040	8523575
Mirex	ng/L	0.021 U	0.20	0.021	0.021 U	0.20	0.021	8523575
cis-Nonachlor	ng/L	0.037 U	0.20	0.037	0.037 U	0.20	0.037	8523575
trans-Nonachlor	ng/L	0.044 U	0.20	0.044	0.044 U	0.20	0.044	8523575
Surrogate Recovery (%)								
13C10-cis Nonachlor	%	79	N/A	N/A	84	N/A	N/A	8523575
13C10-Heptachlor	%	79	N/A	N/A	83	N/A	N/A	8523575
13C10-Heptachlor Epoxide	%	76	N/A	N/A	88	N/A	N/A	8523575
13C10-Oxychlordane	%	79	N/A	N/A	89	N/A	N/A	8523575
13C10-trans Nonachlor	%	76	N/A	N/A	88	N/A	N/A	8523575
13C12-Endrin	%	96	N/A	N/A	106	N/A	N/A	8523575

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VCT482			VCT483			
Sampling Date		2023/02/20 10:26			2023/02/20 14:41			
COC Number		n/a			n/a			
	UNITS	MW1-20230220-GW-70	RDL	MDL	MW2-20230220-GW-60	RDL	MDL	QC Batch
13C12-Endrin Ketone	%	78	N/A	N/A	78	N/A	N/A	8523575
13C6-beta BHC	%	74	N/A	N/A	57	N/A	N/A	8523575
13C6-d6-gamma BHC (Lindane)	%	74	N/A	N/A	63	N/A	N/A	8523575
13C-Methoxychlor	%	96	N/A	N/A	110	N/A	N/A	8523575
13C-pp-DDD	%	83	N/A	N/A	93	N/A	N/A	8523575
13C-pp-DDE	%	79	N/A	N/A	85	N/A	N/A	8523575
13C-pp-DDT	%	73	N/A	N/A	77	N/A	N/A	8523575
C13-Hexachlorobenzene	%	64	N/A	N/A	70	N/A	N/A	8523575

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VCT483			
Sampling Date		2023/02/20 14:41			
COC Number		n/a			
	UNITS	MW2-20230220-GW-60 Lab-Dup	RDL	MDL	QC Batch
Aldrin	ng/L	0.031 J	0.20	0.021	8523575
alpha-BHC	ng/L	0.024 U	0.20	0.024	8523575
delta-BHC	ng/L	0.029 U	0.20	0.029	8523575
beta-BHC	ng/L	0.016 U (1)	0.23	0.016	8523575
Lindane	ng/L	0.072 J	0.20	0.033	8523575
a-Chlordane	ng/L	0.029 U	0.20	0.029	8523575
g-Chlordane	ng/L	0.029 U	0.20	0.029	8523575
Oxychlordane	ng/L	0.028 U	0.20	0.028	8523575
o,p-DDD	ng/L	0.020 U	0.20	0.020	8523575
p,p-DDD	ng/L	0.014 U	0.20	0.014	8523575
o,p-DDE	ng/L	0.016 U	0.20	0.016	8523575
p,p-DDE	ng/L	0.026 J	0.20	0.012	8523575
o,p-DDT	ng/L	0.040 U	0.20	0.040	8523575
p,p-DDT	ng/L	0.050 U	0.20	0.050	8523575
Dieldrin	ng/L	0.050 U	0.20	0.050	8523575
Endosulfan I	ng/L	0.092 J	0.40	0.067	8523575
Endosulfan II	ng/L	0.074 U	0.40	0.074	8523575
Endosulfan sulfate	ng/L	0.070 U	0.20	0.070	8523575
Endrin	ng/L	0.075 J	0.20	0.045	8523575
Endrin aldehyde	ng/L	0.071 U	0.20	0.071	8523575
Endrin ketone	ng/L	0.034 U	0.20	0.034	8523575
Heptachlor	ng/L	0.029 U	0.20	0.029	8523575
Heptachlor epoxide	ng/L	0.112 J	0.20	0.015	8523575
Hexachlorobenzene	ng/L	0.10 U	0.20	0.10	8523575
Methoxychlor	ng/L	0.040 U	0.20	0.040	8523575
Mirex	ng/L	0.021 U	0.20	0.021	8523575
cis-Nonachlor	ng/L	0.037 U	0.20	0.037	8523575
trans-Nonachlor	ng/L	0.044 U	0.20	0.044	8523575
Surrogate Recovery (%)					
13C10-cis Nonachlor	%	91	N/A	N/A	8523575
13C10-Heptachlor	%	85	N/A	N/A	8523575
13C10-Heptachlor Epoxide	%	95	N/A	N/A	8523575
13C10-Oxychlordane	%	87	N/A	N/A	8523575

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		VCT483			
Sampling Date		2023/02/20 14:41			
COC Number		n/a			
	UNITS	MW2-20230220-GW-60 Lab-Dup	RDL	MDL	QC Batch
13C10-trans Nonachlor	%	86	N/A	N/A	8523575
13C12-Endrin	%	103	N/A	N/A	8523575
13C12-Endrin Ketone	%	78	N/A	N/A	8523575
13C6-beta BHC	%	82	N/A	N/A	8523575
13C6-d6-gamma BHC (Lindane)	%	77	N/A	N/A	8523575
13C-Methoxychlor	%	114	N/A	N/A	8523575
13C-pp-DDD	%	94	N/A	N/A	8523575
13C-pp-DDE	%	96	N/A	N/A	8523575
13C-pp-DDT	%	79	N/A	N/A	8523575
C13-Hexachlorobenzene	%	63	N/A	N/A	8523575

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

PERFLUOROALKYL SUBSTANCES (WATER)

Bureau Veritas ID		VCT482	VCT483			
Sampling Date		2023/02/20 10:26	2023/02/20 14:41			
COC Number		n/a	n/a			
	UNITS	MW1-20230220-GW-70	MW2-20230220-GW-60	RDL	MDL	QC Batch
Perfluorobutanoic acid (PFBA)	ug/L	0.0015 U	0.0015 U	0.020	0.0015	8534937
Perfluoropentanoic acid (PFPeA)	ug/L	0.0025 U	0.0025 U	0.020	0.0025	8534937
Perfluorohexanoic acid (PFHxA)	ug/L	0.0038 U	0.0038 U	0.020	0.0038	8534937
Perfluoroheptanoic acid (PFHpA)	ug/L	0.0018 U	0.0018 U	0.020	0.0018	8534937
Perfluorooctanoic acid (PFOA)	ug/L	0.011 J	0.0030 U	0.020	0.0030	8534937
Perfluorononanoic acid (PFNA)	ug/L	0.0070 J	0.0021 U	0.020	0.0021	8534937
Perfluorodecanoic acid (PFDA)	ug/L	0.0016 U	0.0016 U	0.020	0.0016	8534937
Perfluoroundecanoic acid (PFUnA)	ug/L	0.0024 U	0.0024 U	0.020	0.0024	8534937
Perfluorododecanoic acid (PFDoA)	ug/L	0.0029 U	0.0029 U	0.020	0.0029	8534937
Perfluorotridecanoic acid (PFTRDA)	ug/L	0.0026 U	0.0026 U	0.020	0.0026	8534937
Perfluorotetradecanoic acid(PFTEDA)	ug/L	0.0016 U	0.0016 U	0.020	0.0016	8534937
Perfluorobutanesulfonic acid (PFBS)	ug/L	0.0021 U	0.0021 U	0.020	0.0021	8534937
Perfluoropentanesulfonic acid PFPes	ug/L	0.0023 U	0.0023 U	0.020	0.0023	8534937
Perfluorohexanesulfonic acid(PFHxS)	ug/L	0.0022 U	0.0022 U	0.020	0.0022	8534937
Perfluoroheptanesulfonic acid PFHpS	ug/L	0.0039 U	0.0039 U	0.020	0.0039	8534937
Perfluorooctanesulfonic acid (PFOS)	ug/L	0.0035 U	0.0035 U	0.020	0.0035	8534937
Perfluorononanesulfonic acid (PFNS)	ug/L	0.0037 U	0.0037 U	0.020	0.0037	8534937
Perfluorodecanesulfonic acid (PFDS)	ug/L	0.0048 U	0.0048 U	0.020	0.0048	8534937
Perfluorooctane Sulfonamide (PFOSA)	ug/L	0.0034 U	0.0034 U	0.020	0.0034	8534937
EtFOSA	ug/L	0.0095 U	0.0095 U	0.020	0.0095	8534937
MeFOSA	ug/L	0.0084 U	0.0084 U	0.020	0.0084	8534937
EtFOSE	ug/L	0.0070 U	0.0070 U	0.020	0.0070	8534937
MeFOSE	ug/L	0.0073 U	0.0073 U	0.020	0.0073	8534937
EtFOSAA	ug/L	0.0046 U	0.0046 U	0.020	0.0046	8534937
MeFOSAA	ug/L	0.0045 U	0.0045 U	0.020	0.0045	8534937
4:2 Fluorotelomer sulfonic acid	ug/L	0.0033 U	0.0033 U	0.020	0.0033	8534937
6:2 Fluorotelomer sulfonic acid	ug/L	0.0015 U	0.0015 U	0.020	0.0015	8534937
8:2 Fluorotelomer sulfonic acid	ug/L	0.0031 U	0.0031 U	0.020	0.0031	8534937
Hexafluoropropyleneoxide dimer acid	ug/L	0.0052 U	0.0052 U	0.020	0.0052	8534937
4,8-Dioxa-3H-perfluorononanoic acid	ug/L	0.0027 U	0.0027 U	0.020	0.0027	8534937
9Cl-PF3ONS (F-53B Major)	ug/L	0.0043 U	0.0043 U	0.020	0.0043	8534937
11Cl-PF3OUdS (F-53B Minor)	ug/L	0.0035 U	0.0035 U	0.020	0.0035	8534937
Surrogate Recovery (%)						
13C2-4:2-Fluorotelomersulfonic Acid	%	102	90	N/A	N/A	8534937
13C2-6:2-Fluorotelomersulfonic Acid	%	101	92	N/A	N/A	8534937

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

PERFLUOROALKYL SUBSTANCES (WATER)

Bureau Veritas ID		VCT482	VCT483			
Sampling Date		2023/02/20 10:26	2023/02/20 14:41			
COC Number		n/a	n/a			
	UNITS	MW1-20230220-GW-70	MW2-20230220-GW-60	RDL	MDL	QC Batch
13C2-8:2-Fluorotelomersulfonic Acid	%	100	93	N/A	N/A	8534937
13C2-Perfluorodecanoic acid	%	102	90	N/A	N/A	8534937
13C2-Perfluorododecanoic acid	%	92	82	N/A	N/A	8534937
13C2-Perfluorohexanoic acid	%	104	93	N/A	N/A	8534937
13C2-perfluorotetradecanoic acid	%	82	56	N/A	N/A	8534937
13C2-Perfluoroundecanoic acid	%	96	87	N/A	N/A	8534937
13C3-HFPO-DA	%	99	91	N/A	N/A	8534937
13C3-Perfluorobutanesulfonic acid	%	108	96	N/A	N/A	8534937
13C4-Perfluorobutanoic acid	%	105	93	N/A	N/A	8534937
13C4-Perfluoroheptanoic acid	%	104	93	N/A	N/A	8534937
13C4-Perfluorooctanesulfonic acid	%	101	94	N/A	N/A	8534937
13C4-Perfluorooctanoic acid	%	102	92	N/A	N/A	8534937
13C5-Perfluorononanoic acid	%	103	91	N/A	N/A	8534937
13C5-Perfluoropentanoic acid	%	106	94	N/A	N/A	8534937
13C8-Perfluorooctane Sulfonamide	%	100	93	N/A	N/A	8534937
18O2-Perfluorohexanesulfonic acid	%	105	94	N/A	N/A	8534937
D3-MeFOSA	%	82	74	N/A	N/A	8534937
D3-MeFOSAA	%	95	89	N/A	N/A	8534937
D5-EtFOSA	%	82	75	N/A	N/A	8534937
D5-EtFOSAA	%	91	83	N/A	N/A	8534937
D7-MeFOSE	%	90	78	N/A	N/A	8534937
D9-EtFOSE	%	90	78	N/A	N/A	8534937

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VCT482							
Sampling Date		2023/02/20 10:26							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW1-20230220-GW-70	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	1.45 U	1.45	10.5	1.45	1.00	1.45	0	8524619
1,2,3,7,8-Penta CDD *	pg/L	1.07 U	1.07	52.6	1.86	1.00	1.07	0	8524619
1,2,3,4,7,8-Hexa CDD *	pg/L	1.10 U	1.10	52.6	2.25	0.100	0.110	0	8524619
1,2,3,6,7,8-Hexa CDD *	pg/L	1.08 U	1.08	52.6	1.40	0.100	0.108	0	8524619
1,2,3,7,8,9-Hexa CDD *	pg/L	1.02 U	1.02	52.6	1.13	0.100	0.102	0	8524619
1,2,3,4,6,7,8-Hepta CDD *	pg/L	1.06 U	1.06	52.6	1.90	0.0100	0.0106	0	8524619
Octa CDD *	pg/L	1.07 U	1.07	105	3.13	0.000300	0.000321	0	8524619
Total Tetra CDD *	pg/L	1.45 U	1.45	10.5	4.00	N/A	N/A	0	8524619
Total Penta CDD *	pg/L	1.07 U	1.07	52.6	4.00	N/A	N/A	0	8524619
Total Hexa CDD *	pg/L	1.15 U	1.15	52.6	4.00	N/A	N/A	0	8524619
Total Hepta CDD *	pg/L	1.06 U	1.06	52.6	4.00	N/A	N/A	0	8524619
2,3,7,8-Tetra CDF **	pg/L	1.07 U	1.07	10.5	1.68	0.100	0.107	0	8524619
1,2,3,7,8-Penta CDF **	pg/L	1.31 U	1.31	52.6	1.33	0.0300	0.0393	0	8524619
2,3,4,7,8-Penta CDF **	pg/L	1.11 U	1.11	52.6	1.23	0.300	0.333	0	8524619
1,2,3,4,7,8-Hexa CDF **	pg/L	0.904 U	0.904	52.6	1.85	0.100	0.0904	0	8524619
1,2,3,6,7,8-Hexa CDF **	pg/L	0.911 U	0.911	52.6	1.52	0.100	0.0911	0	8524619
2,3,4,6,7,8-Hexa CDF **	pg/L	0.811 U	0.811	52.6	1.97	0.100	0.0811	0	8524619
1,2,3,7,8,9-Hexa CDF **	pg/L	0.979 U	0.979	52.6	1.66	0.100	0.0979	0	8524619
1,2,3,4,6,7,8-Hepta CDF **	pg/L	0.870 U	0.870	52.6	2.00	0.0100	0.00870	0	8524619
1,2,3,4,7,8,9-Hepta CDF **	pg/L	0.962 U	0.962	52.6	1.87	0.0100	0.00962	0	8524619
Octa CDF **	pg/L	0.954 U	0.954	105	3.99	0.000300	0.000286	0	8524619
Total Tetra CDF **	pg/L	1.07 U	1.07	10.5	4.00	N/A	N/A	0	8524619
Total Penta CDF **	pg/L	1.20 U	1.20	52.6	4.00	N/A	N/A	0	8524619
Total Hexa CDF **	pg/L	0.898 U	0.898	52.6	4.00	N/A	N/A	0	8524619
Total Hepta CDF **	pg/L	0.913 U	0.913	52.6	4.00	N/A	N/A	0	8524619
TOTAL TOXIC EQUIVALENCY	pg/L	N/A	N/A	N/A	N/A	N/A	3.71	N/A	N/A
Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	79	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234678 HeptaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8524619

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
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QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
N/A = Not Applicable
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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VCT482							
Sampling Date		2023/02/20 10:26							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW1-20230220-GW-70	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123478 HexaCDD *	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123478 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234789 HeptaCDF **	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDD *	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDF **	%	88	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDD *	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123789 HexaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-234678 HexaCDF **	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-23478 PentaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDD *	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDF **	%	85	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-OCDD *	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8524619

EDL = Estimated Detection Limit

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TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VCT483							
Sampling Date		2023/02/20 14:41							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW2-20230220-GW-60	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	1.53 U	1.53	10.2	1.45	1.00	1.53	0	8524619
1,2,3,7,8-Penta CDD *	pg/L	1.06 U	1.06	51.0	1.86	1.00	1.06	0	8524619
1,2,3,4,7,8-Hexa CDD *	pg/L	1.02 U	1.02	51.0	2.25	0.100	0.102	0	8524619
1,2,3,6,7,8-Hexa CDD *	pg/L	1.07 U	1.07	51.0	1.40	0.100	0.107	0	8524619
1,2,3,7,8,9-Hexa CDD *	pg/L	0.971 U	0.971	51.0	1.13	0.100	0.0971	0	8524619
1,2,3,4,6,7,8-Hepta CDD *	pg/L	1.01 U	1.01	51.0	1.90	0.0100	0.0101	0	8524619
Octa CDD *	pg/L	3.63 J	1.08	102	3.13	0.000300	0.00109	1	8524619
Total Tetra CDD *	pg/L	1.53 U	1.53	10.2	4.00	N/A	N/A	0	8524619
Total Penta CDD *	pg/L	1.06 U	1.06	51.0	4.00	N/A	N/A	0	8524619
Total Hexa CDD *	pg/L	1.39 U	1.39	51.0	4.00	N/A	N/A	0	8524619
Total Hepta CDD *	pg/L	1.01 U	1.01	51.0	4.00	N/A	N/A	0	8524619
2,3,7,8-Tetra CDF **	pg/L	1.12 U	1.12	10.2	1.68	0.100	0.112	0	8524619
1,2,3,7,8-Penta CDF **	pg/L	1.33 U	1.33	51.0	1.33	0.0300	0.0399	0	8524619
2,3,4,7,8-Penta CDF **	pg/L	1.14 U	1.14	51.0	1.23	0.300	0.342	0	8524619
1,2,3,4,7,8-Hexa CDF **	pg/L	0.891 U	0.891	51.0	1.85	0.100	0.0891	0	8524619
1,2,3,6,7,8-Hexa CDF **	pg/L	0.884 U	0.884	51.0	1.52	0.100	0.0884	0	8524619
2,3,4,6,7,8-Hexa CDF **	pg/L	0.800 U	0.800	51.0	1.97	0.100	0.0800	0	8524619
1,2,3,7,8,9-Hexa CDF **	pg/L	0.955 U	0.955	51.0	1.66	0.100	0.0955	0	8524619
1,2,3,4,6,7,8-Hepta CDF **	pg/L	0.844 U	0.844	51.0	2.00	0.0100	0.00844	0	8524619
1,2,3,4,7,8,9-Hepta CDF **	pg/L	0.897 U	0.897	51.0	1.87	0.0100	0.00897	0	8524619
Octa CDF **	pg/L	0.958 U	0.958	102	3.99	0.000300	0.000287	0	8524619
Total Tetra CDF **	pg/L	1.12 U	1.12	10.2	4.00	N/A	N/A	0	8524619
Total Penta CDF **	pg/L	1.23 U	1.23	51.0	4.00	N/A	N/A	0	8524619
Total Hexa CDF **	pg/L	0.880 U	0.880	51.0	4.00	N/A	N/A	0	8524619
Total Hepta CDF **	pg/L	0.869 U	0.869	51.0	4.00	N/A	N/A	0	8524619
TOTAL TOXIC EQUIVALENCY	pg/L	N/A	N/A	N/A	N/A	N/A	3.77	N/A	N/A
Surrogate Recovery (%)									
37CL4 2378 Tetra CDD *	%	84	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234678 HeptaCDD *	%	96	N/A	N/A	N/A	N/A	N/A	N/A	8524619

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
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QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
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DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		VCT483							
Sampling Date		2023/02/20 14:41							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW2-20230220-GW-60	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-1234678 HeptaCDF **	%	91	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123478 HexaCDD *	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123478 HexaCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-1234789 HeptaCDF **	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDD *	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123678 HexaCDF **	%	90	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDD *	%	88	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-12378 PentaCDF **	%	81	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-123789 HexaCDF **	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-234678 HexaCDF **	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-23478 PentaCDF **	%	86	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDD *	%	71	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-2378 TetraCDF **	%	83	N/A	N/A	N/A	N/A	N/A	N/A	8524619
C13-OCDD *	%	99	N/A	N/A	N/A	N/A	N/A	N/A	8524619

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N/A = Not Applicable

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VCT482							
Sampling Date		2023/02/20 10:26							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW1-20230220-GW-70	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2-MonoCB-(1)	ng/L	0.028	0.024	0.021	0.0098	N/A	N/A	1	8533813
3-MonoCB-(2)	ng/L	0.055	0.021	0.021	0.0079	N/A	N/A	1	8533813
4-MonoCB-(3)	ng/L	0.100	0.017	0.052	0.0071	N/A	N/A	1	8533813
22'-DiCB-(4)	ng/L	0.020 U	0.020	0.052	0.017	N/A	N/A	1	8533813
2,3-DiCB-(5)	ng/L	0.0053 U	0.0053	0.052	0.012	N/A	N/A	1	8533813
2,3'-DiCB-(6)	ng/L	0.0055 U	0.0055	0.021	0.0053	N/A	N/A	1	8533813
2,4-DiCB-(7)	ng/L	0.0053 U	0.0053	0.021	0.0056	N/A	N/A	1	8533813
2,4'-DiCB-(8)	ng/L	0.0091 J	0.0052	0.052	0.017	N/A	N/A	1	8533813
2,5-DiCB-(9)	ng/L	0.0052 U	0.0052	0.021	0.0044	N/A	N/A	1	8533813
2,6-DiCB-(10)	ng/L	0.0073 U	0.0073	0.052	0.0052	N/A	N/A	1	8533813
3,3'-DiCB-(11)	ng/L	0.365	0.0054	0.21	0.0090	N/A	N/A	1	8533813
DiCB-(12)+(13)	ng/L	0.0057 J	0.0050	0.052	0.015	N/A	N/A	1	8533813
3,5-DiCB-(14)	ng/L	0.0054 U	0.0054	0.021	0.0082	N/A	N/A	1	8533813
4,4'-DiCB-(15)	ng/L	0.0138 J	0.0046	0.052	0.011	N/A	N/A	1	8533813
22'3-TriCB-(16)	ng/L	0.013 U	0.013	0.052	0.0060	N/A	N/A	1	8533813
22'4-TriCB-(17)	ng/L	0.011 U	0.011	0.021	0.0091	N/A	N/A	1	8533813
TriCB-(18)+(30)	ng/L	0.0123 J	0.0091	0.052	0.017	N/A	N/A	1	8533813
22'6-TriCB-(19)	ng/L	0.012 U	0.012	0.021	0.0061	N/A	N/A	1	8533813
TriCB-(20) + (28)	ng/L	0.0059 J	0.0028	0.050	0.010	N/A	N/A	1	8533813
TriCB-(21)+(33)	ng/L	0.0038 J	0.0031	0.052	0.011	N/A	N/A	1	8533813
234'-TriCB-(22)	ng/L	0.0064 U	0.0064	0.021	0.0065	N/A	N/A	1	8533813
235-TriCB-(23)	ng/L	0.0063 U	0.0063	0.021	0.0072	N/A	N/A	1	8533813
236-TriCB-(24)	ng/L	0.0080 U	0.0080	0.021	0.0043	N/A	N/A	1	8533813
23'4-TriCB-(25)	ng/L	0.0064 U	0.0064	0.021	0.0054	N/A	N/A	1	8533813
TriCB-(26)+(29)	ng/L	0.0058 U	0.0058	0.052	0.013	N/A	N/A	1	8533813
23'6-TriCB-(27)	ng/L	0.0076 U	0.0076	0.021	0.0082	N/A	N/A	1	8533813
24'5-TriCB-(31)	ng/L	0.0114 J	0.0054	0.052	0.0078	N/A	N/A	1	8533813
24'6-TriCB-(32)	ng/L	0.0074 U	0.0074	0.021	0.0087	N/A	N/A	1	8533813
23'5'-TriCB-(34)	ng/L	0.0062 U	0.0062	0.021	0.0061	N/A	N/A	1	8533813
33'4-TriCB-(35)	ng/L	0.0064 U	0.0064	0.021	0.0042	N/A	N/A	1	8533813
33'5-TriCB-(36)	ng/L	0.0057 U	0.0057	0.021	0.0052	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VCT482							
Sampling Date		2023/02/20 10:26							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW1-20230220-GW-70	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
344'-TriCB-(37)	ng/L	0.0066 U	0.0066	0.021	0.0041	N/A	N/A	1	8533813
345-TriCB-(38)	ng/L	0.0059 U	0.0059	0.021	0.0047	N/A	N/A	1	8533813
34'5-TriCB-(39)	ng/L	0.0063 U	0.0063	0.021	0.0059	N/A	N/A	1	8533813
TetraCB-(40)+(41)+(71)	ng/L	0.019 U	0.019	0.10	0.035	N/A	N/A	1	8533813
22'34'-TetraCB-(42)	ng/L	0.026 U	0.026	0.052	0.011	N/A	N/A	1	8533813
22'35-TetraCB-(43)	ng/L	0.025 U	0.025	0.052	0.015	N/A	N/A	1	8533813
TetraCB-(44)+(47)+(65)	ng/L	0.018 U	0.018	0.10	0.029	N/A	N/A	1	8533813
TetraCB-(45)+(51)	ng/L	0.020 U (1)	0.020	0.052	0.011	N/A	N/A	1	8533813
22'36'-TetraCB-(46)	ng/L	0.022 U	0.022	0.021	0.014	N/A	N/A	1	8533813
22'45-TetraCB-(48)	ng/L	0.019 U	0.019	0.052	0.017	N/A	N/A	1	8533813
TetraCB-(49)+TetraCB-(69)	ng/L	0.017 U	0.017	0.10	0.023	N/A	N/A	1	8533813
TetraCB-(50)+(53)	ng/L	0.019 U	0.019	0.10	0.027	N/A	N/A	1	8533813
22'55'-TetraCB-(52)	ng/L	0.031 J	0.019	0.052	0.019	N/A	N/A	1	8533813
22'66'-TetraCB-(54)	ng/L	0.021 U	0.021	0.052	0.020	N/A	N/A	1	8533813
233'4-TetraCB-(55)	ng/L	0.015 U	0.015	0.052	0.015	N/A	N/A	1	8533813
233'4'-Tetra CB(56)	ng/L	0.014 U	0.014	0.052	0.018	N/A	N/A	1	8533813
233'5-TetraCB-(57)	ng/L	0.014 U	0.014	0.052	0.0097	N/A	N/A	1	8533813
233'5'-TetraCB-(58)	ng/L	0.013 U	0.013	0.052	0.020	N/A	N/A	1	8533813
TetraCB-(59)+(62)+(75)	ng/L	0.014 U	0.014	0.10	0.038	N/A	N/A	1	8533813
2344'-TetraCB -(60)	ng/L	0.014 U	0.014	0.052	0.011	N/A	N/A	1	8533813
TetraCB-(61)+(70)+(74)+(76)	ng/L	0.032 J	0.014	0.21	0.035	N/A	N/A	1	8533813
234'5-TetraCB-(63)	ng/L	0.013 U	0.013	0.052	0.0080	N/A	N/A	1	8533813
234'6-TetraCB-(64)	ng/L	0.016 U	0.016	0.052	0.0089	N/A	N/A	1	8533813
23'44'-TetraCB-(66)	ng/L	0.013 U	0.013	0.052	0.0084	N/A	N/A	1	8533813
23'45-TetraCB-(67)	ng/L	0.011 U	0.011	0.052	0.0040	N/A	N/A	1	8533813
23'45'-TetraCB-(68)	ng/L	0.012 U	0.012	0.052	0.014	N/A	N/A	1	8533813
23'55'-TetraCB-(72)	ng/L	0.013 U	0.013	0.052	0.0082	N/A	N/A	1	8533813
23'5'6-TetraCB-(73)	ng/L	0.013 U	0.013	0.052	0.023	N/A	N/A	1	8533813
33'44'-TetraCB-(77)	ng/L	0.011 U	0.011	0.052	0.011	0.000100	0.00000110	1	8533813
33'45-TetraCB-(78)	ng/L	0.015 U	0.015	0.052	0.013	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VCT482							
Sampling Date		2023/02/20 10:26							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW1-20230220-GW-70	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
33'45'-TetraCB(79)	ng/L	0.011 U	0.011	0.052	0.0088	N/A	N/A	1	8533813
33'55'-TetraCB-(80)	ng/L	0.011 U	0.011	0.052	0.0087	N/A	N/A	1	8533813
344'5-TetraCB-(81)	ng/L	0.012 U	0.012	0.052	0.0079	0.000300	0.00000360	1	8533813
22'33'4-PentaCB-(82)	ng/L	0.025 U	0.025	0.052	0.014	N/A	N/A	1	8533813
PentaCB-(83)+(99)	ng/L	0.020 U	0.020	0.10	0.033	N/A	N/A	1	8533813
22'33'6-PentaCB-(84)	ng/L	0.021 U	0.021	0.021	0.0088	N/A	N/A	1	8533813
PentaCB-(85)+(116)+(117)	ng/L	0.026 U	0.026	0.10	0.040	N/A	N/A	1	8533813
PentaCB-(86)(87)(97)(109)(119)(125)	ng/L	0.026 J	0.016	0.21	0.080	N/A	N/A	1	8533813
PentaCB-(88)+(91)	ng/L	0.020 U	0.020	0.052	0.025	N/A	N/A	1	8533813
22'346'-PentaCB-(89)	ng/L	0.024 U	0.024	0.052	0.0040	N/A	N/A	1	8533813
PentaCB-(90)+(101)+(113)	ng/L	0.016 U (1)	0.016	0.21	0.0080	N/A	N/A	1	8533813
22'355'-PentaCB-(92)	ng/L	0.022 U	0.022	0.052	0.010	N/A	N/A	1	8533813
PentaCB-(93)+(98)+(100)+(102)	ng/L	0.019 U	0.019	0.21	0.051	N/A	N/A	1	8533813
22'356'-PentaCB-(94)	ng/L	0.020 U	0.020	0.052	0.017	N/A	N/A	1	8533813
22'35'6-PentaCB-(95)	ng/L	0.052	0.022	0.052	0.011	N/A	N/A	1	8533813
22'366'-PentaCB-(96)	ng/L	0.016 U	0.016	0.052	0.014	N/A	N/A	1	8533813
22'45'6-PentaCB-(103)	ng/L	0.020 U	0.020	0.052	0.012	N/A	N/A	1	8533813
22'466'-PentaCB-(104)	ng/L	0.016 U (1)	0.016	0.052	0.022	N/A	N/A	1	8533813
233'44'-PentaCB-(105)	ng/L	0.0100 J	0.0096	0.052	0.0052	0.0000300	0.000000300	1	8533813
233'45-PentaCB-(106)	ng/L	0.012 U	0.012	0.052	0.018	N/A	N/A	1	8533813
233'4'5-PentaCB-(107)	ng/L	0.0091 U	0.0091	0.052	0.014	N/A	N/A	1	8533813
PentaCB-(108)+(124)	ng/L	0.011 U	0.011	0.10	0.023	N/A	N/A	1	8533813
PentaCB-(110)+(115)	ng/L	0.046 J	0.015	0.10	0.022	N/A	N/A	1	8533813
233'55'-PentaCB-(111)	ng/L	0.013 U	0.013	0.052	0.012	N/A	N/A	1	8533813
233'56-PentaCB-(112)	ng/L	0.013 U	0.013	0.052	0.018	N/A	N/A	1	8533813
2344'5-PentaCB-(114)	ng/L	0.011 U	0.011	0.052	0.0084	0.0000300	0.000000330	1	8533813
23'44'5-PentaCB-(118)	ng/L	0.031 J	0.010	0.10	0.0071	0.0000300	0.000000930	1	8533813
23'455'-PentaCB-(120)	ng/L	0.014 U	0.014	0.052	0.014	N/A	N/A	1	8533813
23'45'6-PentaCB-(121)	ng/L	0.014 U	0.014	0.052	0.0040	N/A	N/A	1	8533813
233'4'5'-PentaCB-(122)	ng/L	0.015 U	0.015	0.052	0.011	N/A	N/A	1	8533813

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COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW1-20230220-GW-70	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
23'44'5'-PentaCB-(123)	ng/L	0.011 U	0.011	0.052	0.014	0.0000300	0.000000330	1	8533813
33'44'5-PentaCB-(126)	ng/L	0.010 U	0.010	0.052	0.0061	0.100	0.00100	1	8533813
33'455'-PentaCB-(127)	ng/L	0.011 U	0.011	0.052	0.017	N/A	N/A	1	8533813
HexaCB-(128)+(166)	ng/L	0.016 U	0.016	0.10	0.026	N/A	N/A	1	8533813
HexaCB-(129)+(138)+(163)	ng/L	0.061 J	0.018	0.21	0.014	N/A	N/A	1	8533813
22'33'45'-HexaCB-(130)	ng/L	0.018 U	0.018	0.052	0.020	N/A	N/A	1	8533813
22'33'46-HexaCB-(131)	ng/L	0.023 U	0.023	0.052	0.019	N/A	N/A	1	8533813
22'33'46'-HexaCB-(132)	ng/L	0.020 U	0.020	0.052	0.019	N/A	N/A	1	8533813
22'33'55'-HexaCB-(133)	ng/L	0.020 U	0.020	0.052	0.017	N/A	N/A	1	8533813
HexaCB-(134)+(143)	ng/L	0.022 U	0.022	0.10	0.028	N/A	N/A	1	8533813
HexaCB-(135)+(151)	ng/L	0.037 J	0.023	0.10	0.038	N/A	N/A	1	8533813
22'33'66'-HexaCB-(136)	ng/L	0.016 U	0.016	0.052	0.014	N/A	N/A	1	8533813
22'344'5-HexaCB-(137)	ng/L	0.019 U	0.019	0.10	0.014	N/A	N/A	1	8533813
HexaCB-(139)+(140)	ng/L	0.017 U	0.017	0.10	0.032	N/A	N/A	1	8533813
22'3455'-HexaCB-(141)	ng/L	0.016 U	0.016	0.052	0.018	N/A	N/A	1	8533813
22'3456-HexaCB-(142)	ng/L	0.021 U	0.021	0.052	0.018	N/A	N/A	1	8533813
22'345'6-HexaCB-(144)	ng/L	0.022 U	0.022	0.052	0.011	N/A	N/A	1	8533813
22'3466'-HexaCB-(145)	ng/L	0.015 U	0.015	0.052	0.022	N/A	N/A	1	8533813
22'34'55'-HexaCB-(146)	ng/L	0.016 U	0.016	0.052	0.014	N/A	N/A	1	8533813
HexaCB-(147)+(149)	ng/L	0.072 J	0.016	0.10	0.027	N/A	N/A	1	8533813
22'34'56'-HexaCB-(148)	ng/L	0.023 U	0.023	0.052	0.013	N/A	N/A	1	8533813
22'34'66'-HexaCB-(150)	ng/L	0.016 U	0.016	0.052	0.022	N/A	N/A	1	8533813
22'3566'-HexaCB-(152)	ng/L	0.017 U	0.017	0.052	0.020	N/A	N/A	1	8533813
HexaCB-(153)+(168)	ng/L	0.062 J	0.014	0.10	0.028	N/A	N/A	1	8533813
22'44'56'-HexaCB-(154)	ng/L	0.018 U	0.018	0.052	0.014	N/A	N/A	1	8533813
22'44'66'-HexaCB-(155)	ng/L	0.018 U	0.018	0.052	0.013	N/A	N/A	1	8533813
HexaCB-(156)+(157)	ng/L	0.010 U	0.010	0.10	0.015	0.0000300	0.000000300	1	8533813
233'44'6-HexaCB-(158)	ng/L	0.011 U	0.011	0.052	0.017	N/A	N/A	1	8533813
233'455'-HexaCB-(159)	ng/L	0.0096 U	0.0096	0.052	0.015	N/A	N/A	1	8533813
233'456-HexaCB-(160)	ng/L	0.014 U	0.014	0.052	0.013	N/A	N/A	1	8533813
233'45'6-HexaCB-(161)	ng/L	0.014 U	0.014	0.052	0.022	N/A	N/A	1	8533813

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COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW1-20230220-GW-70	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
233'4'55'-HexaCB-(162)	ng/L	0.0095 U	0.0095	0.052	0.016	N/A	N/A	1	8533813
233'4'5'6-HexaCB-(164)	ng/L	0.012 U	0.012	0.052	0.020	N/A	N/A	1	8533813
233'55'6-HexaCB-(165)	ng/L	0.015 U	0.015	0.052	0.022	N/A	N/A	1	8533813
23'44'55'-HexaCB-(167)	ng/L	0.010 U	0.010	0.052	0.0096	0.0000300	0.000000300	1	8533813
33'44'55'-HexaCB-(169)	ng/L	0.011 U	0.011	0.052	0.0092	0.0300	0.000330	1	8533813
22'33'44'5-HeptaCB-(170)	ng/L	0.012 U	0.012	0.052	0.011	N/A	N/A	1	8533813
HeptaCB-(171)+(173)	ng/L	0.015 U	0.015	0.10	0.027	N/A	N/A	1	8533813
22'33'455'-HeptaCB-(172)	ng/L	0.015 U	0.015	0.052	0.012	N/A	N/A	1	8533813
22'33'456'-HeptaCB-(174)	ng/L	0.014 U	0.014	0.052	0.017	N/A	N/A	1	8533813
22'33'45'6-HeptaCB-(175)	ng/L	0.018 U	0.018	0.052	0.0064	N/A	N/A	1	8533813
22'33'466'-HeptaCB-(176)	ng/L	0.013 U	0.013	0.052	0.0079	N/A	N/A	1	8533813
22'33'45'6'-HeptaCB-(177)	ng/L	0.015 U	0.015	0.052	0.013	N/A	N/A	1	8533813
22'33'55'6-HeptaCB-(178)	ng/L	0.018 U	0.018	0.052	0.0071	N/A	N/A	1	8533813
22'33'566'-HeptaCB-(179)	ng/L	0.013 U (1)	0.013	0.052	0.010	N/A	N/A	1	8533813
HeptaCB-(180)+(193)	ng/L	0.023 J	0.011	0.10	0.018	N/A	N/A	1	8533813
22'344'56-HeptaCB-(181)	ng/L	0.014 U	0.014	0.052	0.015	N/A	N/A	1	8533813
22'344'56'-HeptaCB-(182)	ng/L	0.016 U	0.016	0.052	0.0066	N/A	N/A	1	8533813
22'344'5'6-HeptaCB-(183)	ng/L	0.013 U	0.013	0.052	0.017	N/A	N/A	1	8533813
22'344'66'-HeptaCB-(184)	ng/L	0.012 U	0.012	0.052	0.0065	N/A	N/A	1	8533813
22'3455'6-HeptaCB-(185)	ng/L	0.013 U	0.013	0.052	0.017	N/A	N/A	1	8533813
22'34566'-HeptaCB-(186)	ng/L	0.013 U	0.013	0.052	0.0095	N/A	N/A	1	8533813
22'34'55'6-HeptaCB-(187)	ng/L	0.022 J	0.016	0.052	0.0047	N/A	N/A	1	8533813
22'34'566'-HeptaCB-(188)	ng/L	0.013 U	0.013	0.052	0.015	N/A	N/A	1	8533813
233'44'55'-HeptaCB-(189)	ng/L	0.0093 U	0.0093	0.052	0.014	0.0000300	0.000000279	1	8533813
233'44'56-HeptaCB-(190)	ng/L	0.010 U	0.010	0.052	0.016	N/A	N/A	1	8533813
233'44'5'6-HeptaCB-(191)	ng/L	0.010 U	0.010	0.052	0.014	N/A	N/A	1	8533813
233'455'6-HeptaCB-(192)	ng/L	0.012 U	0.012	0.052	0.0088	N/A	N/A	1	8533813
22'33'44'55'-OctaCB-(194)	ng/L	0.0095 U	0.0095	0.052	0.024	N/A	N/A	1	8533813
22'33'44'56-OctaCB-(195)	ng/L	0.011 U	0.011	0.052	0.019	N/A	N/A	1	8533813
22'33'44'56'-OctaCB-(196)	ng/L	0.011 U	0.011	0.052	0.017	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

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Sampling Date		2023/02/20 10:26							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW1-20230220-GW-70	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
22'33'44'66'OctaCB-(197)	ng/L	0.0080 U	0.0080	0.052	0.033	N/A	N/A	1	8533813
OctaCB-(198)+(199)	ng/L	0.012 U	0.012	0.10	0.028	N/A	N/A	1	8533813
22'33'4566'-OctaCB-(200)	ng/L	0.0091 U	0.0091	0.052	0.031	N/A	N/A	1	8533813
22'33'45'66'-OctaCB-(201)	ng/L	0.0081 U	0.0081	0.052	0.014	N/A	N/A	1	8533813
22'33'55'66'-OctaCB-(202)	ng/L	0.0090 U	0.0090	0.052	0.013	N/A	N/A	1	8533813
22'344'55'6-OctaCB-(203)	ng/L	0.011 U	0.011	0.052	0.021	N/A	N/A	1	8533813
22'344'566'-OctaCB-(204)	ng/L	0.0056 U	0.0056	0.052	0.018	N/A	N/A	1	8533813
233'44'55'6-OctaCB-(205)	ng/L	0.0069 U	0.0069	0.052	0.014	N/A	N/A	1	8533813
22'33'44'55'6-NonaCB-(206)	ng/L	0.014 U	0.014	0.052	0.020	N/A	N/A	1	8533813
22'33'44'566'-NonaCB-(207)	ng/L	0.012 U	0.012	0.052	0.018	N/A	N/A	1	8533813
22'33'455'66'-NonaCB-(208)	ng/L	0.011 U	0.011	0.052	0.021	N/A	N/A	1	8533813
DecaCB-(209)	ng/L	0.011 U	0.011	0.052	0.015	N/A	N/A	1	8533813
Total PCB	ng/L	1.11	0.026	N/A	N/A	N/A	N/A	N/A	8533813
TOTAL TOXIC EQUIVALENCY	ng/L	N/A	N/A	N/A	N/A	N/A	0.00134	N/A	N/A
Surrogate Recovery (%)									
C13-2,44'-TriCB-(28)	%	61	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2,4'5-TriCB-(31) (FS)	%	116	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'55'6-NonaCB-(206)	%	111	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'5-HeptaCB-(170)	%	94	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'455'66'-NonaCB-(208)	%	99	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'66'-OctaCB-(202)	%	95	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'6-HeptaCB-(178)	%	98	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'344'55'-HeptaCB-(180)	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'34'566'-HeptaCB-(188)	%	77	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'44'66'-HexaCB-(155)	%	75	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'466'-PentaCB-(104)	%	64	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'66'-TetraCB-(54)	%	76	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'6-TriCB-(19)	%	48	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'-DiCB-(4)	%	33	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'6-OctaCB-(205)	%	97	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'-HeptaCB-(189)	%	85	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VCT482							
Sampling Date		2023/02/20 10:26							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW1-20230220-GW-70	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-233'44'-PentaCB-(105)	%	70	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'55'-PentaCB-(111)	%	87	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'55'-HexaCB-(167)	%	71	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2344'5-PentaCB-(114)	%	61	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'5-PentaCB-(118)	%	61	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2'344'5-PentaCB-(123)	%	61	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2-MonoCB-(1)	%	15	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'55'-HexaCB-(169)	%	76	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'5-PentaCB-(126)	%	69	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'-TetraCB-(77)	%	83	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-344'5-TetraCB-(81)	%	75	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-344'-TriCB-(37)	%	54	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-44'-DiCB-(15)	%	58	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-4-MonoCB-(3)	%	21	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-DecaCB-(209)	%	127	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-HexaCB-(156)+(157)	%	73	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VCT483							
Sampling Date		2023/02/20 14:41							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW2-20230220-GW-60	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2-MonoCB-(1)	ng/L	0.023 U	0.023	0.020	0.0098	N/A	N/A	1	8533813
3-MonoCB-(2)	ng/L	0.021 U	0.021	0.020	0.0079	N/A	N/A	1	8533813
4-MonoCB-(3)	ng/L	0.018 U	0.018	0.050	0.0071	N/A	N/A	1	8533813
22'-DiCB-(4)	ng/L	0.025 U	0.025	0.050	0.017	N/A	N/A	1	8533813
2,3-DiCB-(5)	ng/L	0.0083 U	0.0083	0.050	0.012	N/A	N/A	1	8533813
2,3'-DiCB-(6)	ng/L	0.0086 U	0.0086	0.020	0.0053	N/A	N/A	1	8533813
2,4-DiCB-(7)	ng/L	0.0084 U	0.0084	0.020	0.0056	N/A	N/A	1	8533813
2,4'-DiCB-(8)	ng/L	0.0082 U	0.0082	0.050	0.017	N/A	N/A	1	8533813
2,5-DiCB-(9)	ng/L	0.0082 U	0.0082	0.020	0.0044	N/A	N/A	1	8533813
2,6-DiCB-(10)	ng/L	0.011 U	0.011	0.050	0.0052	N/A	N/A	1	8533813
3,3'-DiCB-(11)	ng/L	0.102 J	0.0085	0.20	0.0090	N/A	N/A	1	8533813
DiCB-(12)+(13)	ng/L	0.0079 U	0.0079	0.050	0.015	N/A	N/A	1	8533813
3,5-DiCB-(14)	ng/L	0.0085 U	0.0085	0.020	0.0082	N/A	N/A	1	8533813
4,4'-DiCB-(15)	ng/L	0.0075 U	0.0075	0.050	0.011	N/A	N/A	1	8533813
22'3-TriCB-(16)	ng/L	0.013 U	0.013	0.050	0.0060	N/A	N/A	1	8533813
22'4-TriCB-(17)	ng/L	0.010 U	0.010	0.020	0.0091	N/A	N/A	1	8533813
TriCB-(18)+(30)	ng/L	0.0085 U	0.0085	0.050	0.017	N/A	N/A	1	8533813
22'6-TriCB-(19)	ng/L	0.018 U	0.018	0.020	0.0061	N/A	N/A	1	8533813
TriCB-(20) + (28)	ng/L	0.0077 J	0.0026	0.050	0.010	N/A	N/A	1	8533813
TriCB-(21)+(33)	ng/L	0.0047 J	0.0029	0.050	0.011	N/A	N/A	1	8533813
234'-TriCB-(22)	ng/L	0.0070 J	0.0060	0.020	0.0065	N/A	N/A	1	8533813
235-TriCB-(23)	ng/L	0.0059 U	0.0059	0.020	0.0072	N/A	N/A	1	8533813
236-TriCB-(24)	ng/L	0.0075 U	0.0075	0.020	0.0043	N/A	N/A	1	8533813
23'4-TriCB-(25)	ng/L	0.0060 U	0.0060	0.020	0.0054	N/A	N/A	1	8533813
TriCB-(26)+(29)	ng/L	0.0054 U	0.0054	0.050	0.013	N/A	N/A	1	8533813
23'6-TriCB-(27)	ng/L	0.0071 U	0.0071	0.020	0.0082	N/A	N/A	1	8533813
24'5-TriCB-(31)	ng/L	0.0148 J	0.0051	0.050	0.0078	N/A	N/A	1	8533813
24'6-TriCB-(32)	ng/L	0.0070 U	0.0070	0.020	0.0087	N/A	N/A	1	8533813
23'5'-TriCB-(34)	ng/L	0.0058 U	0.0058	0.020	0.0061	N/A	N/A	1	8533813
33'4-TriCB-(35)	ng/L	0.0060 U	0.0060	0.020	0.0042	N/A	N/A	1	8533813
33'5-TriCB-(36)	ng/L	0.0053 U	0.0053	0.020	0.0052	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VCT483							
Sampling Date		2023/02/20 14:41							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW2-20230220-GW-60	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
344'-TriCB-(37)	ng/L	0.0077 J	0.0052	0.020	0.0041	N/A	N/A	1	8533813
345-TriCB-(38)	ng/L	0.0055 U	0.0055	0.020	0.0047	N/A	N/A	1	8533813
34'5-TriCB-(39)	ng/L	0.0059 U	0.0059	0.020	0.0059	N/A	N/A	1	8533813
TetraCB-(40)+(41)+(71)	ng/L	0.016 U	0.016	0.10	0.035	N/A	N/A	1	8533813
22'34'-TetraCB-(42)	ng/L	0.022 U	0.022	0.050	0.011	N/A	N/A	1	8533813
22'35-TetraCB-(43)	ng/L	0.021 U	0.021	0.050	0.015	N/A	N/A	1	8533813
TetraCB-(44)+(47)+(65)	ng/L	0.028 J	0.015	0.10	0.029	N/A	N/A	1	8533813
TetraCB-(45)+(51)	ng/L	0.017 U	0.017	0.050	0.011	N/A	N/A	1	8533813
22'36'-TetraCB-(46)	ng/L	0.019 U	0.019	0.020	0.014	N/A	N/A	1	8533813
22'45-TetraCB-(48)	ng/L	0.016 U	0.016	0.050	0.017	N/A	N/A	1	8533813
TetraCB-(49)+TetraCB-(69)	ng/L	0.015 U	0.015	0.10	0.023	N/A	N/A	1	8533813
TetraCB-(50)+(53)	ng/L	0.017 U	0.017	0.10	0.027	N/A	N/A	1	8533813
22'55'-TetraCB-(52)	ng/L	0.049 J	0.017	0.050	0.019	N/A	N/A	1	8533813
22'66'-TetraCB-(54)	ng/L	0.028 U	0.028	0.050	0.020	N/A	N/A	1	8533813
233'4-TetraCB-(55)	ng/L	0.012 U	0.012	0.050	0.015	N/A	N/A	1	8533813
233'4'-Tetra CB(56)	ng/L	0.012 U	0.012	0.050	0.018	N/A	N/A	1	8533813
233'5-TetraCB-(57)	ng/L	0.012 U	0.012	0.050	0.0097	N/A	N/A	1	8533813
233'5'-TetraCB-(58)	ng/L	0.011 U	0.011	0.050	0.020	N/A	N/A	1	8533813
TetraCB-(59)+(62)+(75)	ng/L	0.012 U	0.012	0.10	0.038	N/A	N/A	1	8533813
2344'-TetraCB -(60)	ng/L	0.012 U	0.012	0.050	0.011	N/A	N/A	1	8533813
TetraCB-(61)+(70)+(74)+(76)	ng/L	0.058 J	0.012	0.20	0.035	N/A	N/A	1	8533813
234'5-TetraCB-(63)	ng/L	0.011 U	0.011	0.050	0.0080	N/A	N/A	1	8533813
234'6-TetraCB-(64)	ng/L	0.014 U	0.014	0.050	0.0089	N/A	N/A	1	8533813
23'44'-TetraCB-(66)	ng/L	0.011 U (1)	0.011	0.050	0.0084	N/A	N/A	1	8533813
23'45-TetraCB-(67)	ng/L	0.0095 U	0.0095	0.050	0.0040	N/A	N/A	1	8533813
23'45'-TetraCB-(68)	ng/L	0.011 U	0.011	0.050	0.014	N/A	N/A	1	8533813
23'55'-TetraCB-(72)	ng/L	0.011 U	0.011	0.050	0.0082	N/A	N/A	1	8533813
23'5'6-TetraCB-(73)	ng/L	0.011 U	0.011	0.050	0.023	N/A	N/A	1	8533813
33'44'-TetraCB-(77)	ng/L	0.0086 U	0.0086	0.050	0.011	0.000100	0.000000860	1	8533813
33'45-TetraCB-(78)	ng/L	0.012 U	0.012	0.050	0.013	N/A	N/A	1	8533813

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(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VCT483							
Sampling Date		2023/02/20 14:41							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW2-20230220-GW-60	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
33'45'-TetraCB(79)	ng/L	0.0095 U	0.0095	0.050	0.0088	N/A	N/A	1	8533813
33'55'-TetraCB-(80)	ng/L	0.0097 U	0.0097	0.050	0.0087	N/A	N/A	1	8533813
344'5-TetraCB-(81)	ng/L	0.0093 U	0.0093	0.050	0.0079	0.000300	0.00000279	1	8533813
22'33'4-PentaCB-(82)	ng/L	0.018 U	0.018	0.050	0.014	N/A	N/A	1	8533813
PentaCB-(83)+(99)	ng/L	0.015 U	0.015	0.10	0.033	N/A	N/A	1	8533813
22'33'6-PentaCB-(84)	ng/L	0.019 J	0.015	0.020	0.0088	N/A	N/A	1	8533813
PentaCB-(85)+(116)+(117)	ng/L	0.026 J	0.019	0.10	0.040	N/A	N/A	1	8533813
PentaCB-(86)(87)(97)(109)(119)(125)	ng/L	0.050 J	0.012	0.20	0.080	N/A	N/A	1	8533813
PentaCB-(88)+(91)	ng/L	0.015 U	0.015	0.050	0.025	N/A	N/A	1	8533813
22'346'-PentaCB-(89)	ng/L	0.018 U	0.018	0.050	0.0040	N/A	N/A	1	8533813
PentaCB-(90)+(101)+(113)	ng/L	0.120 J	0.012	0.20	0.0080	N/A	N/A	1	8533813
22'355'-PentaCB-(92)	ng/L	0.016 U	0.016	0.050	0.010	N/A	N/A	1	8533813
PentaCB-(93)+(98)+(100)+(102)	ng/L	0.014 U	0.014	0.20	0.051	N/A	N/A	1	8533813
22'356'-PentaCB-(94)	ng/L	0.015 U	0.015	0.050	0.017	N/A	N/A	1	8533813
22'35'6-PentaCB-(95)	ng/L	0.104	0.016	0.050	0.011	N/A	N/A	1	8533813
22'366'-PentaCB-(96)	ng/L	0.012 U	0.012	0.050	0.014	N/A	N/A	1	8533813
22'45'6-PentaCB-(103)	ng/L	0.014 U	0.014	0.050	0.012	N/A	N/A	1	8533813
22'466'-PentaCB-(104)	ng/L	0.013 U	0.013	0.050	0.022	N/A	N/A	1	8533813
233'44'-PentaCB-(105)	ng/L	0.0196 J	0.0070	0.050	0.0052	0.0000300	0.000000588	1	8533813
233'45-PentaCB-(106)	ng/L	0.0084 U	0.0084	0.050	0.018	N/A	N/A	1	8533813
233'4'5-PentaCB-(107)	ng/L	0.0066 U	0.0066	0.050	0.014	N/A	N/A	1	8533813
PentaCB-(108)+(124)	ng/L	0.0083 U	0.0083	0.10	0.023	N/A	N/A	1	8533813
PentaCB-(110)+(115)	ng/L	0.102	0.011	0.10	0.022	N/A	N/A	1	8533813
233'55'-PentaCB-(111)	ng/L	0.0095 U	0.0095	0.050	0.012	N/A	N/A	1	8533813
233'56-PentaCB-(112)	ng/L	0.0243 J	0.0092	0.050	0.018	N/A	N/A	1	8533813
2344'5-PentaCB-(114)	ng/L	0.0075 U	0.0075	0.050	0.0084	0.0000300	0.000000225	1	8533813
23'44'5-PentaCB-(118)	ng/L	0.0617 J	0.0071	0.10	0.0071	0.0000300	0.00000185	1	8533813
23'455'-PentaCB-(120)	ng/L	0.010 U	0.010	0.050	0.014	N/A	N/A	1	8533813
23'45'6-PentaCB-(121)	ng/L	0.010 U	0.010	0.050	0.0040	N/A	N/A	1	8533813
233'4'5'-PentaCB-(122)	ng/L	0.011 U	0.011	0.050	0.011	N/A	N/A	1	8533813
23'44'5'-PentaCB-(123)	ng/L	0.0082 U	0.0082	0.050	0.014	0.0000300	0.000000246	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VCT483							
Sampling Date		2023/02/20 14:41							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW2-20230220-GW-60	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
33'44'5-PentaCB-(126)	ng/L	0.0075 U	0.0075	0.050	0.0061	0.100	0.000750	1	8533813
33'455'-PentaCB-(127)	ng/L	0.0081 U	0.0081	0.050	0.017	N/A	N/A	1	8533813
HexaCB-(128)+(166)	ng/L	0.011 U (1)	0.011	0.10	0.026	N/A	N/A	1	8533813
HexaCB-(129)+(138)+(163)	ng/L	0.139 J	0.013	0.20	0.014	N/A	N/A	1	8533813
22'33'45'-HexaCB-(130)	ng/L	0.013 U	0.013	0.050	0.020	N/A	N/A	1	8533813
22'33'46-HexaCB-(131)	ng/L	0.017 U	0.017	0.050	0.019	N/A	N/A	1	8533813
22'33'46'-HexaCB-(132)	ng/L	0.044 J	0.014	0.050	0.019	N/A	N/A	1	8533813
22'33'55'-HexaCB-(133)	ng/L	0.014 U	0.014	0.050	0.017	N/A	N/A	1	8533813
HexaCB-(134)+(143)	ng/L	0.016 U	0.016	0.10	0.028	N/A	N/A	1	8533813
HexaCB-(135)+(151)	ng/L	0.076 J	0.016	0.10	0.038	N/A	N/A	1	8533813
22'33'66'-HexaCB-(136)	ng/L	0.023 J	0.011	0.050	0.014	N/A	N/A	1	8533813
22'344'5-HexaCB-(137)	ng/L	0.013 U	0.013	0.10	0.014	N/A	N/A	1	8533813
HexaCB-(139)+(140)	ng/L	0.012 U	0.012	0.10	0.032	N/A	N/A	1	8533813
22'3455'-HexaCB-(141)	ng/L	0.029 J	0.012	0.050	0.018	N/A	N/A	1	8533813
22'3456-HexaCB-(142)	ng/L	0.015 U	0.015	0.050	0.018	N/A	N/A	1	8533813
22'345'6-HexaCB-(144)	ng/L	0.016 U	0.016	0.050	0.011	N/A	N/A	1	8533813
22'3466'-HexaCB-(145)	ng/L	0.011 U	0.011	0.050	0.022	N/A	N/A	1	8533813
22'34'55'-HexaCB-(146)	ng/L	0.018 J	0.011	0.050	0.014	N/A	N/A	1	8533813
HexaCB-(147)+(149)	ng/L	0.134	0.012	0.10	0.027	N/A	N/A	1	8533813
22'34'56'-HexaCB-(148)	ng/L	0.016 U	0.016	0.050	0.013	N/A	N/A	1	8533813
22'34'66'-HexaCB-(150)	ng/L	0.011 U	0.011	0.050	0.022	N/A	N/A	1	8533813
22'3566'-HexaCB-(152)	ng/L	0.012 U	0.012	0.050	0.020	N/A	N/A	1	8533813
HexaCB-(153)+(168)	ng/L	0.125	0.0097	0.10	0.028	N/A	N/A	1	8533813
22'44'56'-HexaCB-(154)	ng/L	0.013 U	0.013	0.050	0.014	N/A	N/A	1	8533813
22'44'66'-HexaCB-(155)	ng/L	0.011 U	0.011	0.050	0.013	N/A	N/A	1	8533813
HexaCB-(156)+(157)	ng/L	0.0098 J	0.0073	0.10	0.015	0.0000300	0.000000294	1	8533813
233'44'6-HexaCB-(158)	ng/L	0.0113 J	0.0079	0.050	0.017	N/A	N/A	1	8533813
233'455'-HexaCB-(159)	ng/L	0.0068 U	0.0068	0.050	0.015	N/A	N/A	1	8533813
233'456-HexaCB-(160)	ng/L	0.010 U	0.010	0.050	0.013	N/A	N/A	1	8533813
233'45'6-HexaCB-(161)	ng/L	0.0096 U	0.0096	0.050	0.022	N/A	N/A	1	8533813

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TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

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

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VCT483							
Sampling Date		2023/02/20 14:41							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW2-20230220-GW-60	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
233'4'55'-HexaCB-(162)	ng/L	0.0068 U	0.0068	0.050	0.016	N/A	N/A	1	8533813
233'4'5'6-HexaCB-(164)	ng/L	0.0084 U	0.0084	0.050	0.020	N/A	N/A	1	8533813
233'55'6-HexaCB-(165)	ng/L	0.010 U	0.010	0.050	0.022	N/A	N/A	1	8533813
23'44'55'-HexaCB-(167)	ng/L	0.0074 U	0.0074	0.050	0.0096	0.0000300	0.000000222	1	8533813
33'44'55'-HexaCB-(169)	ng/L	0.0081 U	0.0081	0.050	0.0092	0.0300	0.000243	1	8533813
22'33'44'5-HeptaCB-(170)	ng/L	0.0163 J	0.0087	0.050	0.011	N/A	N/A	1	8533813
HeptaCB-(171)+(173)	ng/L	0.010 U	0.010	0.10	0.027	N/A	N/A	1	8533813
22'33'455'-HeptaCB-(172)	ng/L	0.011 U	0.011	0.050	0.012	N/A	N/A	1	8533813
22'33'456'-HeptaCB-(174)	ng/L	0.0298 J	0.0098	0.050	0.017	N/A	N/A	1	8533813
22'33'45'6-HeptaCB-(175)	ng/L	0.012 U	0.012	0.050	0.0064	N/A	N/A	1	8533813
22'33'466'-HeptaCB-(176)	ng/L	0.0087 U	0.0087	0.050	0.0079	N/A	N/A	1	8533813
22'33'45'6'-HeptaCB-(177)	ng/L	0.019 J	0.011	0.050	0.013	N/A	N/A	1	8533813
22'33'55'6-HeptaCB-(178)	ng/L	0.012 U	0.012	0.050	0.0071	N/A	N/A	1	8533813
22'33'566'-HeptaCB-(179)	ng/L	0.0204 J	0.0087	0.050	0.010	N/A	N/A	1	8533813
HeptaCB-(180)+(193)	ng/L	0.0498 J	0.0074	0.10	0.018	N/A	N/A	1	8533813
22'344'56-HeptaCB-(181)	ng/L	0.0099 U	0.0099	0.050	0.015	N/A	N/A	1	8533813
22'344'56'-HeptaCB-(182)	ng/L	0.011 U	0.011	0.050	0.0066	N/A	N/A	1	8533813
22'344'5'6-HeptaCB-(183)	ng/L	0.0193 J	0.0089	0.050	0.017	N/A	N/A	1	8533813
22'344'66'-HeptaCB-(184)	ng/L	0.0084 U	0.0084	0.050	0.0065	N/A	N/A	1	8533813
22'3455'6-HeptaCB-(185)	ng/L	0.0093 U	0.0093	0.050	0.017	N/A	N/A	1	8533813
22'34566'-HeptaCB-(186)	ng/L	0.0089 U	0.0089	0.050	0.0095	N/A	N/A	1	8533813
22'34'55'6-HeptaCB-(187)	ng/L	0.038 J	0.011	0.050	0.0047	N/A	N/A	1	8533813
22'34'566'-HeptaCB-(188)	ng/L	0.0083 U	0.0083	0.050	0.015	N/A	N/A	1	8533813
233'44'55'-HeptaCB-(189)	ng/L	0.0066 U	0.0066	0.050	0.014	0.0000300	0.000000198	1	8533813
233'44'56-HeptaCB-(190)	ng/L	0.0071 U	0.0071	0.050	0.016	N/A	N/A	1	8533813
233'44'5'6-HeptaCB-(191)	ng/L	0.0070 U	0.0070	0.050	0.014	N/A	N/A	1	8533813
233'455'6-HeptaCB-(192)	ng/L	0.0082 U	0.0082	0.050	0.0088	N/A	N/A	1	8533813
22'33'44'55'-OctaCB-(194)	ng/L	0.0092 U	0.0092	0.050	0.024	N/A	N/A	1	8533813
22'33'44'56-OctaCB-(195)	ng/L	0.011 U	0.011	0.050	0.019	N/A	N/A	1	8533813
22'33'44'56'-OctaCB-(196)	ng/L	0.011 U	0.011	0.050	0.017	N/A	N/A	1	8533813
22'33'44'66'OctaCB-(197)	ng/L	0.0079 U	0.0079	0.050	0.033	N/A	N/A	1	8533813

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VCT483							
Sampling Date		2023/02/20 14:41							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW2-20230220-GW-60	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
OctaCB-(198)+(199)	ng/L	0.012 U	0.012	0.10	0.028	N/A	N/A	1	8533813
22'33'4566'-OctaCB-(200)	ng/L	0.0089 U	0.0089	0.050	0.031	N/A	N/A	1	8533813
22'33'45'66'-OctaCB-(201)	ng/L	0.0079 U	0.0079	0.050	0.014	N/A	N/A	1	8533813
22'33'55'66'-OctaCB-(202)	ng/L	0.0084 U	0.0084	0.050	0.013	N/A	N/A	1	8533813
22'344'55'6-OctaCB-(203)	ng/L	0.011 U	0.011	0.050	0.021	N/A	N/A	1	8533813
22'344'566'-OctaCB-(204)	ng/L	0.0055 U	0.0055	0.050	0.018	N/A	N/A	1	8533813
233'44'55'6-OctaCB-(205)	ng/L	0.0070 U	0.0070	0.050	0.014	N/A	N/A	1	8533813
22'33'44'55'6-NonaCB-(206)	ng/L	0.014 U	0.014	0.050	0.020	N/A	N/A	1	8533813
22'33'44'566'-NonaCB-(207)	ng/L	0.012 U	0.012	0.050	0.018	N/A	N/A	1	8533813
22'33'455'66'-NonaCB-(208)	ng/L	0.011 U	0.011	0.050	0.021	N/A	N/A	1	8533813
DecaCB-(209)	ng/L	0.010 U	0.010	0.050	0.015	N/A	N/A	1	8533813
Total PCB	ng/L	1.60	0.028	N/A	N/A	N/A	N/A	N/A	8533813
TOTAL TOXIC EQUIVALENCY	ng/L	N/A	N/A	N/A	N/A	N/A	0.00100	N/A	N/A
Surrogate Recovery (%)									
C13-2,44'-TriCB-(28)	%	45	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2,4'5-TriCB-(31) (FS)	%	87	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'55'6-NonaCB-(206)	%	114	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'44'5-HeptaCB-(170)	%	102	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'455'66'-NonaCB-(208)	%	105	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'66'-OctaCB-(202)	%	107	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'33'55'6-HeptaCB-(178)	%	107	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'344'55'-HeptaCB-(180)	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'34'566'-HeptaCB-(188)	%	92	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'44'66'-HexaCB-(155)	%	89	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'466'-PentaCB-(104)	%	58	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'66'-TetraCB-(54)	%	44	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'6-TriCB-(19)	%	39 (1)	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-22'-DiCB-(4)	%	33	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'55'6-OctaCB-(205)	%	100	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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SEMI-VOLATILE ORGANICS BY HRMS (WATER)

Bureau Veritas ID		VCT483							
Sampling Date		2023/02/20 14:41							
COC Number		n/a				TOXIC EQUIVALENCY		# of	
	UNITS	MW2-20230220-GW-60	EDL	RDL	MDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
C13-233'44'55'-HeptaCB-(189)	%	93	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'44'-PentaCB-(105)	%	71	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-233'55'-PentaCB-(111)	%	90	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'55'-HexaCB-(167)	%	74	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2344'5-PentaCB-(114)	%	64	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-23'44'5-PentaCB-(118)	%	64	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2'344'5-PentaCB-(123)	%	62	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-2-MonoCB-(1)	%	18	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'55'-HexaCB-(169)	%	77	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'5-PentaCB-(126)	%	71	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-33'44'-TetraCB-(77)	%	87	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-344'5-TetraCB-(81)	%	81	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-344'-TriCB-(37)	%	52	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-44'-DiCB-(15)	%	44	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-4-MonoCB-(3)	%	23	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-DecaCB-(209)	%	131	N/A	N/A	N/A	N/A	N/A	N/A	8533813
C13-HexaCB-(156)+(157)	%	75	N/A	N/A	N/A	N/A	N/A	N/A	8533813

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TEST SUMMARY

Bureau Veritas ID: VCT482
Sample ID: MW1-20230220-GW-70
Matrix: Water

Collected: 2023/02/20
Shipped:
Received: 2023/02/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	8524619	2023/02/24	2023/02/28	Yan Qin
OC Pesticides in Water by GCTQ	GCTQ/MS	8523575	2023/02/27	2023/03/03	Chau Ting (Ruth) Chan
PCB Congeners in Water (1668C)	HRMS/MS	8533813	2023/02/23	2023/04/06	Cathy Xu
PFAS in water by SPE/LCMS	LCMS	8534937	2023/03/04	2023/03/05	Hitaishi Bhardwaj

Bureau Veritas ID: VCT483
Sample ID: MW2-20230220-GW-60
Matrix: Water

Collected: 2023/02/20
Shipped:
Received: 2023/02/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dioxins/Furans in Water (1613B)	HRMS/MS	8524619	2023/02/24	2023/02/28	Yan Qin
OC Pesticides in Water by GCTQ	GCTQ/MS	8523575	2023/02/27	2023/03/03	Chau Ting (Ruth) Chan
PCB Congeners in Water (1668C)	HRMS/MS	8533813	2023/02/23	2023/04/06	Cathy Xu
PFAS in water by SPE/LCMS	LCMS	8534937	2023/03/04	2023/03/05	Hitaishi Bhardwaj

Bureau Veritas ID: VCT483 Dup
Sample ID: MW2-20230220-GW-60
Matrix: Water

Collected: 2023/02/20
Shipped:
Received: 2023/02/22

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
OC Pesticides in Water by GCTQ	GCTQ/MS	8523575	2023/02/27	2023/03/03	Chau Ting (Ruth) Chan

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C
Package 2	3.7°C

SEMI-VOLATILE ORGANICS BY HRMS (WATER)

PCB Congeners in Water (1668C): Worksheet Blank contains some traces of PCB congeners natives that are above the RDL. However, all samples in worksheet (8533813) shows trace concentration levels below RDL. Results should be reviewed with caution.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
8523575	CTC	Matrix Spike(VCT482)	13C10-cis Nonachlor	2023/03/03		108	%	36 - 139
			13C10-Heptachlor	2023/03/03		97	%	5 - 120
			13C10-Heptachlor Epoxide	2023/03/03		94	%	27 - 137
			13C10-Oxychlordane	2023/03/03		97	%	23 - 135
			13C10-trans Nonachlor	2023/03/03		89	%	14 - 136
			13C12-Endrin	2023/03/03		131	%	35 - 155
			13C12-Endrin Ketone	2023/03/03		89	%	35 - 155
			13C6-beta BHC	2023/03/03		81	%	32 - 130
			13C6-d6-gamma BHC (Lindane)	2023/03/03		94	%	11 - 120
			13C-Methoxychlor	2023/03/03		125 (1)	%	5 - 120
			13C-pp-DDD	2023/03/03		110	%	5 - 120
			13C-pp-DDE	2023/03/03		96	%	47 - 160
			13C-pp-DDT	2023/03/03		90	%	5 - 120
			C13-Hexachlorobenzene	2023/03/03		79	%	5 - 120
			Aldrin	2023/03/03		155	%	50 - 200
			alpha-BHC	2023/03/03		122	%	50 - 200
			delta-BHC	2023/03/03		128	%	50 - 200
			beta-BHC	2023/03/03		130	%	50 - 200
			Lindane	2023/03/03		120	%	50 - 200
			a-Chlordane	2023/03/03		137	%	50 - 200
			g-Chlordane	2023/03/03		120	%	50 - 200
			Oxychlordane	2023/03/03		86	%	50 - 200
			o,p-DDD	2023/03/03		110	%	50 - 200
			p,p-DDD	2023/03/03		119	%	50 - 200
			o,p-DDE	2023/03/03		118	%	50 - 200
			p,p-DDE	2023/03/03		126	%	50 - 200
			o,p-DDT	2023/03/03		111	%	50 - 200
			p,p-DDT	2023/03/03		143	%	50 - 200
			Dieldrin	2023/03/03		126	%	50 - 200
			Endosulfan I	2023/03/03		125	%	50 - 200
			Endosulfan II	2023/03/03		127	%	50 - 200
			Endosulfan sulfate	2023/03/03		139	%	50 - 200
			Endrin	2023/03/03		96	%	50 - 200
			Endrin aldehyde	2023/03/03		123	%	50 - 200
			Endrin ketone	2023/03/03		139	%	50 - 200
			Heptachlor	2023/03/03		114	%	50 - 200
			Heptachlor epoxide	2023/03/03		136	%	50 - 200
			Hexachlorobenzene	2023/03/03		115	%	50 - 200
			Methoxychlor	2023/03/03		131	%	50 - 200
			Mirex	2023/03/03		118	%	50 - 200
			cis-Nonachlor	2023/03/03		123	%	50 - 200
			trans-Nonachlor	2023/03/03		126	%	50 - 200
8523575	CTC	Spiked Blank	13C10-cis Nonachlor	2023/03/03		88	%	36 - 139
			13C10-Heptachlor	2023/03/03		81	%	5 - 120
			13C10-Heptachlor Epoxide	2023/03/03		87	%	27 - 137
			13C10-Oxychlordane	2023/03/03		88	%	23 - 135
			13C10-trans Nonachlor	2023/03/03		82	%	14 - 136
			13C12-Endrin	2023/03/03		90	%	35 - 155
			13C12-Endrin Ketone	2023/03/03		76	%	35 - 155
			13C6-beta BHC	2023/03/03		80	%	32 - 130
			13C6-d6-gamma BHC (Lindane)	2023/03/03		86	%	11 - 120
			13C-Methoxychlor	2023/03/03		83	%	5 - 120
			13C-pp-DDD	2023/03/03		88	%	5 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C-pp-DDE	2023/03/03		81	%	47 - 160
			13C-pp-DDT	2023/03/03		79	%	5 - 120
			C13-Hexachlorobenzene	2023/03/03		67	%	5 - 120
			Aldrin	2023/03/03		124	%	50 - 200
			alpha-BHC	2023/03/03		110	%	50 - 200
			delta-BHC	2023/03/03		110	%	50 - 200
			beta-BHC	2023/03/03		105	%	50 - 200
			Lindane	2023/03/03		117	%	50 - 200
			a-Chlordane	2023/03/03		141	%	50 - 200
			g-Chlordane	2023/03/03		126	%	50 - 200
			Oxychlordane	2023/03/03		101	%	50 - 200
			o,p-DDD	2023/03/03		110	%	50 - 200
			p,p-DDD	2023/03/03		119	%	50 - 200
			o,p-DDE	2023/03/03		115	%	50 - 200
			p,p-DDE	2023/03/03		118	%	50 - 200
			o,p-DDT	2023/03/03		106	%	50 - 200
			p,p-DDT	2023/03/03		122	%	50 - 200
			Dieldrin	2023/03/03		114	%	50 - 200
			Endosulfan I	2023/03/03		132	%	50 - 200
			Endosulfan II	2023/03/03		135	%	50 - 200
			Endosulfan sulfate	2023/03/03		114	%	50 - 200
			Endrin	2023/03/03		107	%	50 - 200
			Endrin aldehyde	2023/03/03		126	%	50 - 200
			Endrin ketone	2023/03/03		119	%	50 - 200
			Heptachlor	2023/03/03		109	%	50 - 200
			Heptachlor epoxide	2023/03/03		124	%	50 - 200
			Hexachlorobenzene	2023/03/03		113	%	50 - 200
			Methoxychlor	2023/03/03		121	%	50 - 200
			Mirex	2023/03/03		99	%	50 - 200
			cis-Nonachlor	2023/03/03		121	%	50 - 200
			trans-Nonachlor	2023/03/03		119	%	50 - 200
8523575	CTC	Method Blank	13C10-cis Nonachlor	2023/03/03		80	%	36 - 139
			13C10-Heptachlor	2023/03/03		66	%	5 - 120
			13C10-Heptachlor Epoxide	2023/03/03		83	%	27 - 137
			13C10-Oxychlordane	2023/03/03		86	%	23 - 135
			13C10-trans Nonachlor	2023/03/03		83	%	14 - 136
			13C12-Endrin	2023/03/03		91	%	35 - 155
			13C12-Endrin Ketone	2023/03/03		77	%	35 - 155
			13C6-beta BHC	2023/03/03		70	%	32 - 130
			13C6-d6-gamma BHC (Lindane)	2023/03/03		98	%	11 - 120
			13C-Methoxychlor	2023/03/03		69	%	5 - 120
			13C-pp-DDD	2023/03/03		71	%	5 - 120
			13C-pp-DDE	2023/03/03		97	%	47 - 160
			13C-pp-DDT	2023/03/03		79	%	5 - 120
			C13-Hexachlorobenzene	2023/03/03		75	%	5 - 120
			Aldrin	2023/03/03	0.021 U, MDL=0.021		ng/L	
			alpha-BHC	2023/03/03	0.024 U, MDL=0.024		ng/L	
			delta-BHC	2023/03/03	0.029 U, MDL=0.029		ng/L	
			beta-BHC	2023/03/03	0.014 U, MDL=0.014		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Lindane	2023/03/03	0.033 U, MDL=0.033		ng/L	
			a-Chlordane	2023/03/03	0.029 U, MDL=0.029		ng/L	
			g-Chlordane	2023/03/03	0.029 U, MDL=0.029		ng/L	
			Oxychlordane	2023/03/03	0.028 U, MDL=0.028		ng/L	
			o,p-DDD	2023/03/03	0.020 U, MDL=0.020		ng/L	
			p,p-DDD	2023/03/03	0.014 U, MDL=0.014		ng/L	
			o,p-DDE	2023/03/03	0.016 U, MDL=0.016		ng/L	
			p,p-DDE	2023/03/03	0.012 U, MDL=0.012		ng/L	
			o,p-DDT	2023/03/03	0.040 U, MDL=0.040		ng/L	
			p,p-DDT	2023/03/03	0.050 U, MDL=0.050		ng/L	
			Dieldrin	2023/03/03	0.050 U, MDL=0.050		ng/L	
			Endosulfan I	2023/03/03	0.067 U, MDL=0.067		ng/L	
			Endosulfan II	2023/03/03	0.074 U, MDL=0.074		ng/L	
			Endosulfan sulfate	2023/03/03	0.070 U, MDL=0.070		ng/L	
			Endrin	2023/03/03	0.063 J, MDL=0.045		ng/L	
			Endrin aldehyde	2023/03/03	0.071 U, MDL=0.071		ng/L	
			Endrin ketone	2023/03/03	0.034 U, MDL=0.034		ng/L	
			Heptachlor	2023/03/03	0.029 U, MDL=0.029		ng/L	
			Heptachlor epoxide	2023/03/03	0.015 U, MDL=0.015		ng/L	
			Hexachlorobenzene	2023/03/03	0.10 U, MDL=0.10		ng/L	
			Methoxychlor	2023/03/03	0.040 U, MDL=0.040		ng/L	
			Mirex	2023/03/03	0.021 U, MDL=0.021		ng/L	
			cis-Nonachlor	2023/03/03	0.037 U, MDL=0.037		ng/L	
			trans-Nonachlor	2023/03/03	0.044 U, MDL=0.044		ng/L	
8523575	CTC	RPD - Sample/Sample Dup	Aldrin	2023/03/03	NC		%	25
			alpha-BHC	2023/03/03	NC		%	25
			delta-BHC	2023/03/03	NC		%	25
			beta-BHC	2023/03/03	NC (2)		%	25
			Lindane	2023/03/03	NC		%	25
			a-Chlordane	2023/03/03	NC		%	25

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			g-Chlordane	2023/03/03	NC		%	25
			Oxychlordane	2023/03/03	NC		%	25
			o,p-DDD	2023/03/03	NC		%	25
			p,p-DDD	2023/03/03	NC		%	25
			o,p-DDE	2023/03/03	NC		%	25
			p,p-DDE	2023/03/03	NC		%	25
			o,p-DDT	2023/03/03	NC		%	25
			p,p-DDT	2023/03/03	NC		%	25
			Dieldrin	2023/03/03	NC		%	25
			Endosulfan I	2023/03/03	NC		%	25
			Endosulfan II	2023/03/03	NC		%	25
			Endosulfan sulfate	2023/03/03	NC		%	25
			Endrin	2023/03/03	NC		%	25
			Endrin aldehyde	2023/03/03	NC		%	25
			Endrin ketone	2023/03/03	NC		%	25
			Heptachlor	2023/03/03	NC		%	25
			Heptachlor epoxide	2023/03/03	NC		%	25
			Hexachlorobenzene	2023/03/03	NC		%	25
			Methoxychlor	2023/03/03	NC		%	25
			Mirex	2023/03/03	NC		%	25
			cis-Nonachlor	2023/03/03	NC		%	25
			trans-Nonachlor	2023/03/03	NC		%	25
8524619	YQI	Spiked Blank	37CL4 2378 Tetra CDD	2023/02/28		76	%	35 - 197
			C13-1234678 HeptaCDD	2023/02/28		96	%	23 - 140
			C13-1234678 HeptaCDF	2023/02/28		91	%	28 - 143
			C13-123478 HexaCDD	2023/02/28		92	%	32 - 141
			C13-123478 HexaCDF	2023/02/28		88	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/28		93	%	28 - 138
			C13-123678 HexaCDD	2023/02/28		96	%	28 - 130
			C13-123678 HexaCDF	2023/02/28		90	%	26 - 123
			C13-12378 PentaCDD	2023/02/28		91	%	25 - 181
			C13-12378 PentaCDF	2023/02/28		82	%	24 - 185
			C13-123789 HexaCDF	2023/02/28		92	%	29 - 147
			C13-234678 HexaCDF	2023/02/28		99	%	28 - 136
			C13-23478 PentaCDF	2023/02/28		89	%	21 - 178
			C13-2378 TetraCDD	2023/02/28		72	%	25 - 164
			C13-2378 TetraCDF	2023/02/28		83	%	24 - 169
			C13-OCDD	2023/02/28		96	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/28		105	%	67 - 158
			1,2,3,7,8-Penta CDD	2023/02/28		96	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2023/02/28		97	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2023/02/28		97	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2023/02/28		97	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2023/02/28		100	%	70 - 140
			Octa CDD	2023/02/28		103	%	78 - 144
			2,3,7,8-Tetra CDF	2023/02/28		99	%	75 - 158
			1,2,3,7,8-Penta CDF	2023/02/28		102	%	80 - 134
			2,3,4,7,8-Penta CDF	2023/02/28		98	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2023/02/28		99	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2023/02/28		98	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2023/02/28		93	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2023/02/28		98	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2023/02/28		102	%	82 - 122

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2023/02/28		96	%	78 - 138
			Octa CDF	2023/02/28		97	%	63 - 170
8524619	YQI	Spiked Blank DUP	37CL4 2378 Tetra CDD	2023/02/28		74	%	35 - 197
			C13-1234678 HeptaCDD	2023/02/28		93	%	23 - 140
			C13-1234678 HeptaCDF	2023/02/28		90	%	28 - 143
			C13-123478 HexaCDD	2023/02/28		95	%	32 - 141
			C13-123478 HexaCDF	2023/02/28		89	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/28		92	%	28 - 138
			C13-123678 HexaCDD	2023/02/28		98	%	28 - 130
			C13-123678 HexaCDF	2023/02/28		91	%	26 - 123
			C13-12378 PentaCDD	2023/02/28		87	%	25 - 181
			C13-12378 PentaCDF	2023/02/28		81	%	24 - 185
			C13-123789 HexaCDF	2023/02/28		91	%	29 - 147
			C13-234678 HexaCDF	2023/02/28		103	%	28 - 136
			C13-23478 PentaCDF	2023/02/28		84	%	21 - 178
			C13-2378 TetraCDD	2023/02/28		72	%	25 - 164
			C13-2378 TetraCDF	2023/02/28		80	%	24 - 169
			C13-OCDD	2023/02/28		91	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/28		100	%	67 - 158
			1,2,3,7,8-Penta CDD	2023/02/28		98	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2023/02/28		95	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2023/02/28		99	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2023/02/28		98	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2023/02/28		101	%	70 - 140
			Octa CDD	2023/02/28		103	%	78 - 144
			2,3,7,8-Tetra CDF	2023/02/28		94	%	75 - 158
			1,2,3,7,8-Penta CDF	2023/02/28		99	%	80 - 134
			2,3,4,7,8-Penta CDF	2023/02/28		101	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2023/02/28		98	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2023/02/28		95	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2023/02/28		89	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2023/02/28		99	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2023/02/28		104	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2023/02/28		96	%	78 - 138
			Octa CDF	2023/02/28		98	%	63 - 170
8524619	YQI	RPD	2,3,7,8-Tetra CDD	2023/02/28	4.9		%	25
			1,2,3,7,8-Penta CDD	2023/02/28	2.1		%	25
			1,2,3,4,7,8-Hexa CDD	2023/02/28	2.1		%	25
			1,2,3,6,7,8-Hexa CDD	2023/02/28	2.0		%	25
			1,2,3,7,8,9-Hexa CDD	2023/02/28	1.0		%	25
			1,2,3,4,6,7,8-Hepta CDD	2023/02/28	1.0		%	25
			Octa CDD	2023/02/28	0		%	25
			2,3,7,8-Tetra CDF	2023/02/28	5.2		%	25
			1,2,3,7,8-Penta CDF	2023/02/28	3.0		%	25
			2,3,4,7,8-Penta CDF	2023/02/28	3.0		%	25
			1,2,3,4,7,8-Hexa CDF	2023/02/28	1.0		%	25
			1,2,3,6,7,8-Hexa CDF	2023/02/28	3.1		%	25
			2,3,4,6,7,8-Hexa CDF	2023/02/28	4.4		%	25
			1,2,3,7,8,9-Hexa CDF	2023/02/28	1.0		%	25
			1,2,3,4,6,7,8-Hepta CDF	2023/02/28	1.9		%	25
			1,2,3,4,7,8,9-Hepta CDF	2023/02/28	0		%	25
			Octa CDF	2023/02/28	1.0		%	25
8524619	YQI	Method Blank	37CL4 2378 Tetra CDD	2023/02/28		84	%	35 - 197

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-1234678 HeptaCDD	2023/02/28		86	%	23 - 140
			C13-1234678 HeptaCDF	2023/02/28		83	%	28 - 143
			C13-123478 HexaCDD	2023/02/28		92	%	32 - 141
			C13-123478 HexaCDF	2023/02/28		89	%	26 - 152
			C13-1234789 HeptaCDF	2023/02/28		83	%	28 - 138
			C13-123678 HexaCDD	2023/02/28		95	%	28 - 130
			C13-123678 HexaCDF	2023/02/28		91	%	26 - 123
			C13-12378 PentaCDD	2023/02/28		91	%	25 - 181
			C13-12378 PentaCDF	2023/02/28		85	%	24 - 185
			C13-123789 HexaCDF	2023/02/28		86	%	29 - 147
			C13-234678 HexaCDF	2023/02/28		95	%	28 - 136
			C13-23478 PentaCDF	2023/02/28		93	%	21 - 178
			C13-2378 TetraCDD	2023/02/28		75	%	25 - 164
			C13-2378 TetraCDF	2023/02/28		87	%	24 - 169
			C13-OCDD	2023/02/28		86	%	17 - 157
			2,3,7,8-Tetra CDD	2023/02/28	1.43 U, EDL=1.43		pg/L	
			1,2,3,7,8-Penta CDD	2023/02/28	1.04 U, EDL=1.04		pg/L	
			1,2,3,4,7,8-Hexa CDD	2023/02/28	1.01 U, EDL=1.01		pg/L	
			1,2,3,6,7,8-Hexa CDD	2023/02/28	0.967 U, EDL=0.967		pg/L	
			1,2,3,7,8,9-Hexa CDD	2023/02/28	0.919 U, EDL=0.919		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2023/02/28	1.04 U, EDL=1.04		pg/L	
			Octa CDD	2023/02/28	2.48 J, EDL=1.19		pg/L	
			Total Tetra CDD	2023/02/28	1.43 U, EDL=1.43		pg/L	
			Total Penta CDD	2023/02/28	1.04 U, EDL=1.04		pg/L	
			Total Hexa CDD	2023/02/28	1.12 U, EDL=1.12		pg/L	
			Total Hepta CDD	2023/02/28	1.04 U, EDL=1.04		pg/L	
			2,3,7,8-Tetra CDF	2023/02/28	1.04 U, EDL=1.04		pg/L	
			1,2,3,7,8-Penta CDF	2023/02/28	1.28 U, EDL=1.28		pg/L	
			2,3,4,7,8-Penta CDF	2023/02/28	1.07 U, EDL=1.07		pg/L	
			1,2,3,4,7,8-Hexa CDF	2023/02/28	0.863 U, EDL=0.863		pg/L	
			1,2,3,6,7,8-Hexa CDF	2023/02/28	0.820 U, EDL=0.820		pg/L	
			2,3,4,6,7,8-Hexa CDF	2023/02/28	0.790 U, EDL=0.790		pg/L	
			1,2,3,7,8,9-Hexa CDF	2023/02/28	0.960 U, EDL=0.960		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2023/02/28	0.860 U, EDL=0.860		pg/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2023/02/28	0.950 U, EDL=0.950		pg/L	
			Octa CDF	2023/02/28	1.06 U, EDL=1.06		pg/L	
			Total Tetra CDF	2023/02/28	1.04 U, EDL=1.04		pg/L	
			Total Penta CDF	2023/02/28	1.16 U, EDL=1.16		pg/L	
			Total Hexa CDF	2023/02/28	0.854 U, EDL=0.854		pg/L	
			Total Hepta CDF	2023/02/28	0.902 U, EDL=0.902		pg/L	
8533813	CXU	Spiked Blank	C13-2,44'-TriCB-(28)	2023/04/04		80 (1)	%	30 - 170
			C13-22'33'44'55'6-NonaCB-(206)	2023/04/04		108	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/04/04		116	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/04/04		107	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/04/04		98	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2023/04/04		85	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/04/04		111	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/04/04		77	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/04/04		60	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/04/04		66	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/04/04		40	%	15 - 145
			C13-22'6-TriCB-(19)	2023/04/04		50	%	40 - 145
			C13-22'-DiCB-(4)	2023/04/04		33	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/04/04		115	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/04/04		123	%	40 - 145
			C13-233'44'-PentaCB-(105)	2023/04/04		132 (1)	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/04/04		94	%	30 - 170
			C13-23'44'55'-HexaCB-(167)	2023/04/04		109	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/04/04		121	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/04/04		126 (1)	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/04/04		127 (1)	%	40 - 145
			C13-2-MonoCB-(1)	2023/04/04		35	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/04/04		121	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/04/04		144 (1)	%	40 - 145
			C13-33'44'-TetraCB-(77)	2023/04/04		120	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/04/04		115	%	40 - 145
			C13-344'-TriCB-(37)	2023/04/04		98 (1)	%	40 - 145
			C13-44'-DiCB-(15)	2023/04/04		73	%	15 - 145
			C13-4-MonoCB-(3)	2023/04/04		44	%	15 - 145
			C13-DecaCB-(209)	2023/04/04		96	%	40 - 145
			C13-HexaCB-(156)+(157)	2023/04/04		114	%	40 - 145
			2-MonoCB-(1)	2023/04/04		108	%	60 - 145
			3-MonoCB-(2)	2023/04/04		118	%	N/A
			4-MonoCB-(3)	2023/04/04		107	%	60 - 145
			22'-DiCB-(4)	2023/04/04		114	%	60 - 145
			2,3-DiCB-(5)	2023/04/04		92	%	N/A
			2,3'-DiCB-(6)	2023/04/04		95	%	N/A
			2,4-DiCB-(7)	2023/04/04		89	%	N/A
			2,4'-DiCB-(8)	2023/04/04		53	%	N/A
			2,5-DiCB-(9)	2023/04/04		92	%	N/A
			2,6-DiCB-(10)	2023/04/04		71	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			3,3'-DiCB-(11)	2023/04/04		126	%	N/A
			DiCB-(12)+(13)	2023/04/04		102	%	N/A
			3,5-DiCB-(14)	2023/04/04		106	%	N/A
			4,4'-DiCB-(15)	2023/04/04		112	%	60 - 145
			22'3-TriCB-(16)	2023/04/04		70	%	N/A
			22'4-TriCB-(17)	2023/04/04		68	%	N/A
			TriCB-(18)+(30)	2023/04/04		59	%	N/A
			22'6-TriCB-(19)	2023/04/04		105	%	60 - 145
			TriCB-(20) + (28)	2023/04/04		92	%	N/A
			TriCB-(21)+(33)	2023/04/04		100	%	N/A
			234'-TriCB-(22)	2023/04/04		101	%	N/A
			235-TriCB-(23)	2023/04/04		90	%	N/A
			236-TriCB-(24)	2023/04/04		81	%	N/A
			23'4-TriCB-(25)	2023/04/04		102	%	N/A
			TriCB-(26)+(29)	2023/04/04		91	%	N/A
			23'6-TriCB-(27)	2023/04/04		60	%	N/A
			24'5-TriCB-(31)	2023/04/04		94	%	N/A
			24'6-TriCB-(32)	2023/04/04		72	%	N/A
			23'5'-TriCB-(34)	2023/04/04		89	%	N/A
			33'4-TriCB-(35)	2023/04/04		115	%	N/A
			33'5-TriCB-(36)	2023/04/04		106	%	N/A
			344'-TriCB-(37)	2023/04/04		107	%	60 - 145
			345-TriCB-(38)	2023/04/04		109	%	N/A
			34'5-TriCB-(39)	2023/04/04		119	%	N/A
			TetraCB-(40)+(41)+(71)	2023/04/04		83	%	N/A
			22'34'-TetraCB-(42)	2023/04/04		94	%	N/A
			22'35-TetraCB-(43)	2023/04/04		84	%	N/A
			TetraCB-(44)+(47)+(65)	2023/04/04		83	%	N/A
			TetraCB-(45)+(51)	2023/04/04		69	%	N/A
			22'36'-TetraCB-(46)	2023/04/04		71	%	N/A
			22'45-TetraCB-(48)	2023/04/04		78	%	N/A
			TetraCB-(49)+TetraCB-(69)	2023/04/04		77	%	N/A
			TetraCB-(50)+(53)	2023/04/04		68	%	N/A
			22'55'-TetraCB-(52)	2023/04/04		80	%	N/A
			22'66'-TetraCB-(54)	2023/04/04		115	%	60 - 145
			233'4-TetraCB-(55)	2023/04/04		94	%	N/A
			233'4'-Tetra CB(56)	2023/04/04		97	%	N/A
			233'5-TetraCB-(57)	2023/04/04		86	%	N/A
			233'5'-TetraCB-(58)	2023/04/04		88	%	N/A
			TetraCB-(59)+(62)+(75)	2023/04/04		78	%	N/A
			2344'-TetraCB -(60)	2023/04/04		95	%	N/A
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04		95	%	N/A
			234'5-TetraCB-(63)	2023/04/04		92	%	N/A
			234'6-TetraCB-(64)	2023/04/04		92	%	N/A
			23'44'-TetraCB-(66)	2023/04/04		96	%	N/A
			23'45-TetraCB-(67)	2023/04/04		89	%	N/A
			23'45'-TetraCB-(68)	2023/04/04		89	%	N/A
			23'55'-TetraCB-(72)	2023/04/04		84	%	N/A
			23'5'6-TetraCB-(73)	2023/04/04		69	%	N/A
			33'44'-TetraCB-(77)	2023/04/04		94	%	60 - 145
			33'45-TetraCB-(78)	2023/04/04		114	%	N/A
			33'45'-TetraCB(79)	2023/04/04		103	%	N/A
			33'55'-TetraCB-(80)	2023/04/04		92	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			344'5-TetraCB-(81)	2023/04/04		99	%	60 - 145
			22'33'4-PentaCB-(82)	2023/04/04		104	%	N/A
			PentaCB-(83)+(99)	2023/04/04		91	%	N/A
			22'33'6-PentaCB-(84)	2023/04/04		83	%	N/A
			PentaCB-(85)+(116)+(117)	2023/04/04		88	%	N/A
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04		87	%	N/A
			PentaCB-(88)+(91)	2023/04/04		84	%	N/A
			22'346'-PentaCB-(89)	2023/04/04		98	%	N/A
			PentaCB-(90)+(101)+(113)	2023/04/04		88	%	N/A
			22'355'-PentaCB-(92)	2023/04/04		97	%	N/A
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04		78	%	N/A
			22'356'-PentaCB-(94)	2023/04/04		77	%	N/A
			22'35'6-PentaCB-(95)	2023/04/04		94	%	N/A
			22'366'-PentaCB-(96)	2023/04/04		83	%	N/A
			22'45'6-PentaCB-(103)	2023/04/04		84	%	N/A
			22'466'-PentaCB-(104)	2023/04/04		100	%	60 - 145
			233'44'-PentaCB-(105)	2023/04/04		106	%	60 - 145
			233'45-PentaCB-(106)	2023/04/04		111	%	N/A
			233'4'5-PentaCB-(107)	2023/04/04		91	%	N/A
			PentaCB-(108)+(124)	2023/04/04		98	%	N/A
			PentaCB-(110)+(115)	2023/04/04		99	%	N/A
			233'55'-PentaCB-(111)	2023/04/04		92	%	N/A
			233'56-PentaCB-(112)	2023/04/04		94	%	N/A
			2344'5-PentaCB-(114)	2023/04/04		104	%	60 - 145
			23'44'5-PentaCB-(118)	2023/04/04		97	%	60 - 145
			23'455'-PentaCB-(120)	2023/04/04		100	%	N/A
			23'45'6-PentaCB-(121)	2023/04/04		83	%	N/A
			233'4'5'-PentaCB-(122)	2023/04/04		125	%	N/A
			23'44'5'-PentaCB-(123)	2023/04/04		101	%	60 - 145
			33'44'5-PentaCB-(126)	2023/04/04		98	%	60 - 145
			33'455'-PentaCB-(127)	2023/04/04		107	%	N/A
			HexaCB-(128)+(166)	2023/04/04		92	%	N/A
			HexaCB-(129)+(138)+(163)	2023/04/04		98	%	N/A
			22'33'45'-HexaCB-(130)	2023/04/04		91	%	N/A
			22'33'46-HexaCB-(131)	2023/04/04		105	%	N/A
			22'33'46'-HexaCB-(132)	2023/04/04		89	%	N/A
			22'33'55'-HexaCB-(133)	2023/04/04		93	%	N/A
			HexaCB-(134)+(143)	2023/04/04		94	%	N/A
			HexaCB-(135)+(151)	2023/04/04		89	%	N/A
			22'33'66'-HexaCB-(136)	2023/04/04		84	%	N/A
			22'344'5-HexaCB-(137)	2023/04/04		86	%	N/A
			HexaCB-(139)+(140)	2023/04/04		86	%	N/A
			22'3455'-HexaCB-(141)	2023/04/04		94	%	N/A
			22'3456-HexaCB-(142)	2023/04/04		94	%	N/A
			22'345'6-HexaCB-(144)	2023/04/04		96	%	N/A
			22'3466'-HexaCB-(145)	2023/04/04		82	%	N/A
			22'34'55'-HexaCB-(146)	2023/04/04		90	%	N/A
			HexaCB-(147)+(149)	2023/04/04		87	%	N/A
			22'34'56'-HexaCB-(148)	2023/04/04		86	%	N/A
			22'34'66'-HexaCB-(150)	2023/04/04		80	%	N/A
			22'3566'-HexaCB-(152)	2023/04/04		82	%	N/A
			HexaCB-(153)+(168)	2023/04/04		87	%	N/A
			22'44'56'-HexaCB-(154)	2023/04/04		85	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'44'66'-HexaCB-(155)	2023/04/04		98	%	60 - 145
			HexaCB-(156)+(157)	2023/04/04		101	%	N/A
			233'44'6-HexaCB-(158)	2023/04/04		93	%	N/A
			233'455'-HexaCB-(159)	2023/04/04		91	%	N/A
			233'456-HexaCB-(160)	2023/04/04		97	%	N/A
			233'45'6-HexaCB-(161)	2023/04/04		88	%	N/A
			233'4'55'-HexaCB-(162)	2023/04/04		93	%	N/A
			233'4'5'6-HexaCB-(164)	2023/04/04		95	%	N/A
			233'55'6-HexaCB-(165)	2023/04/04		89	%	N/A
			23'44'55'-HexaCB-(167)	2023/04/04		105	%	60 - 145
			33'44'55'-HexaCB-(169)	2023/04/04		103	%	60 - 145
			22'33'44'5-HeptaCB-(170)	2023/04/04		87	%	60 - 145
			HeptaCB-(171)+(173)	2023/04/04		93	%	N/A
			22'33'455'-HeptaCB-(172)	2023/04/04		94	%	N/A
			22'33'456'-HeptaCB-(174)	2023/04/04		94	%	N/A
			22'33'45'6-HeptaCB-(175)	2023/04/04		86	%	N/A
			22'33'466'-HeptaCB-(176)	2023/04/04		84	%	N/A
			22'33'45'6'-HeptaCB-(177)	2023/04/04		90	%	N/A
			22'33'55'6-HeptaCB-(178)	2023/04/04		88	%	N/A
			22'33'566'-HeptaCB-(179)	2023/04/04		88	%	N/A
			HeptaCB-(180)+(193)	2023/04/04		99	%	N/A
			22'344'56-HeptaCB-(181)	2023/04/04		93	%	N/A
			22'344'56'-HeptaCB-(182)	2023/04/04		89	%	N/A
			22'344'5'6-HeptaCB-(183)	2023/04/04		92	%	N/A
			22'344'66'-HeptaCB-(184)	2023/04/04		82	%	N/A
			22'3455'6-HeptaCB-(185)	2023/04/04		87	%	N/A
			22'34566'-HeptaCB-(186)	2023/04/04		87	%	N/A
			22'34'55'6-HeptaCB-(187)	2023/04/04		90	%	N/A
			22'34'566'-HeptaCB-(188)	2023/04/04		100	%	60 - 145
			233'44'55'-HeptaCB-(189)	2023/04/04		100	%	60 - 145
			233'44'56-HeptaCB-(190)	2023/04/04		91	%	N/A
			233'44'5'6-HeptaCB-(191)	2023/04/04		92	%	N/A
			233'455'6-HeptaCB-(192)	2023/04/04		94	%	N/A
			22'33'44'55'-OctaCB-(194)	2023/04/04		100	%	N/A
			22'33'44'56-OctaCB-(195)	2023/04/04		103	%	N/A
			22'33'44'56'-OctaCB-(196)	2023/04/04		97	%	N/A
			22'33'44'66'OctaCB-(197)	2023/04/04		91	%	N/A
			OctaCB-(198)+(199)	2023/04/04		98	%	N/A
			22'33'4566'-OctaCB-(200)	2023/04/04		100	%	N/A
			22'33'45'66'-OctaCB-(201)	2023/04/04		89	%	N/A
			22'33'55'66'-OctaCB-(202)	2023/04/04		92	%	60 - 145
			22'344'55'6-OctaCB-(203)	2023/04/04		101	%	N/A
			22'344'566'-OctaCB-(204)	2023/04/04		87	%	N/A
			233'44'55'6-OctaCB-(205)	2023/04/04		92	%	60 - 145
			22'33'44'55'6-NonaCB-(206)	2023/04/04		91	%	60 - 145
			22'33'44'566'-NonaCB-(207)	2023/04/04		86	%	N/A
			22'33'455'66'-NonaCB-(208)	2023/04/04		93	%	60 - 145
			DecaCB-(209)	2023/04/04		108	%	60 - 145
8533813	CXU	Spiked Blank DUP	C13-2,44'-TriCB-(28)	2023/04/04		82	%	30 - 170
			C13-22'33'44'55'6-NonaCB-(206)	2023/04/04		100	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/04/04		106	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/04/04		95	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/04/04		91	%	40 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-22'33'55'6-HeptaCB-(178)	2023/04/04		83	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/04/04		102	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/04/04		71	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/04/04		56	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/04/04		66	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/04/04		41	%	15 - 145
			C13-22'6-TriCB-(19)	2023/04/04		52	%	40 - 145
			C13-22'-DiCB-(4)	2023/04/04		37	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/04/04		107	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/04/04		111	%	40 - 145
			C13-233'44'-PentaCB-(105)	2023/04/04		125 (1)	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/04/04		92	%	30 - 170
			C13-23'44'55'-HexaCB-(167)	2023/04/04		101	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/04/04		115	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/04/04		116	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/04/04		118	%	40 - 145
			C13-2-MonoCB-(1)	2023/04/04		39	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/04/04		112	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/04/04		134 (1)	%	40 - 145
			C13-33'44'-TetraCB-(77)	2023/04/04		113	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/04/04		110	%	40 - 145
			C13-344'-TriCB-(37)	2023/04/04		96	%	40 - 145
			C13-44'-DiCB-(15)	2023/04/04		75	%	15 - 145
			C13-4-MonoCB-(3)	2023/04/04		49 (1)	%	15 - 145
			C13-DecaCB-(209)	2023/04/04		85	%	40 - 145
			C13-HexaCB-(156)+(157)	2023/04/04		103	%	40 - 145
			2-MonoCB-(1)	2023/04/04		107	%	60 - 145
			3-MonoCB-(2)	2023/04/04		116	%	N/A
			4-MonoCB-(3)	2023/04/04		106	%	60 - 145
			22'-DiCB-(4)	2023/04/04		109	%	60 - 145
			2,3-DiCB-(5)	2023/04/04		96	%	N/A
			2,3'-DiCB-(6)	2023/04/04		95	%	N/A
			2,4-DiCB-(7)	2023/04/04		90	%	N/A
			2,4'-DiCB-(8)	2023/04/04		55	%	N/A
			2,5-DiCB-(9)	2023/04/04		94	%	N/A
			2,6-DiCB-(10)	2023/04/04		72	%	N/A
			3,3'-DiCB-(11)	2023/04/04		127	%	N/A
			DiCB-(12)+(13)	2023/04/04		102	%	N/A
			3,5-DiCB-(14)	2023/04/04		106	%	N/A
			4,4'-DiCB-(15)	2023/04/04		111	%	60 - 145
			22'3-TriCB-(16)	2023/04/04		77	%	N/A
			22'4-TriCB-(17)	2023/04/04		71	%	N/A
			TriCB-(18)+(30)	2023/04/04		61	%	N/A
			22'6-TriCB-(19)	2023/04/04		102	%	60 - 145
			TriCB-(20) + (28)	2023/04/04		97	%	N/A
			TriCB-(21)+(33)	2023/04/04		102	%	N/A
			234'-TriCB-(22)	2023/04/04		101	%	N/A
			235-TriCB-(23)	2023/04/04		93	%	N/A
			236-TriCB-(24)	2023/04/04		75	%	N/A
			23'4-TriCB-(25)	2023/04/04		106	%	N/A
			TriCB-(26)+(29)	2023/04/04		92	%	N/A
			23'6-TriCB-(27)	2023/04/04		66	%	N/A
			24'5-TriCB-(31)	2023/04/04		97	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			24'6-TriCB-(32)	2023/04/04		74	%	N/A
			23'5'-TriCB-(34)	2023/04/04		90	%	N/A
			33'4-TriCB-(35)	2023/04/04		117	%	N/A
			33'5-TriCB-(36)	2023/04/04		106	%	N/A
			344'-TriCB-(37)	2023/04/04		109	%	60 - 145
			345-TriCB-(38)	2023/04/04		112	%	N/A
			34'5-TriCB-(39)	2023/04/04		120	%	N/A
			TetraCB-(40)+(41)+(71)	2023/04/04		86	%	N/A
			22'34'-TetraCB-(42)	2023/04/04		97	%	N/A
			22'35-TetraCB-(43)	2023/04/04		90	%	N/A
			TetraCB-(44)+(47)+(65)	2023/04/04		87	%	N/A
			TetraCB-(45)+(51)	2023/04/04		73	%	N/A
			22'36'-TetraCB-(46)	2023/04/04		73	%	N/A
			22'45-TetraCB-(48)	2023/04/04		82	%	N/A
			TetraCB-(49)+TetraCB-(69)	2023/04/04		80	%	N/A
			TetraCB-(50)+(53)	2023/04/04		72	%	N/A
			22'55'-TetraCB-(52)	2023/04/04		87	%	N/A
			22'66'-TetraCB-(54)	2023/04/04		116	%	60 - 145
			233'4-TetraCB-(55)	2023/04/04		97	%	N/A
			233'4'-Tetra CB(56)	2023/04/04		99	%	N/A
			233'5-TetraCB-(57)	2023/04/04		90	%	N/A
			233'5'-TetraCB-(58)	2023/04/04		91	%	N/A
			TetraCB-(59)+(62)+(75)	2023/04/04		83	%	N/A
			2344'-TetraCB -(60)	2023/04/04		98	%	N/A
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04		99	%	N/A
			234'5-TetraCB-(63)	2023/04/04		96	%	N/A
			234'6-TetraCB-(64)	2023/04/04		96	%	N/A
			23'44'-TetraCB-(66)	2023/04/04		98	%	N/A
			23'45-TetraCB-(67)	2023/04/04		91	%	N/A
			23'45'-TetraCB-(68)	2023/04/04		91	%	N/A
			23'55'-TetraCB-(72)	2023/04/04		89	%	N/A
			23'5'6-TetraCB-(73)	2023/04/04		71	%	N/A
			33'44'-TetraCB-(77)	2023/04/04		98	%	60 - 145
			33'45-TetraCB-(78)	2023/04/04		116	%	N/A
			33'45'-TetraCB(79)	2023/04/04		105	%	N/A
			33'55'-TetraCB-(80)	2023/04/04		95	%	N/A
			344'5-TetraCB-(81)	2023/04/04		100	%	60 - 145
			22'33'4-PentaCB-(82)	2023/04/04		108	%	N/A
			PentaCB-(83)+(99)	2023/04/04		96	%	N/A
			22'33'6-PentaCB-(84)	2023/04/04		87	%	N/A
			PentaCB-(85)+(116)+(117)	2023/04/04		93	%	N/A
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04		92	%	N/A
			PentaCB-(88)+(91)	2023/04/04		89	%	N/A
			22'346'-PentaCB-(89)	2023/04/04		103	%	N/A
			PentaCB-(90)+(101)+(113)	2023/04/04		93	%	N/A
			22'355'-PentaCB-(92)	2023/04/04		101	%	N/A
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04		82	%	N/A
			22'356'-PentaCB-(94)	2023/04/04		80	%	N/A
			22'35'6-PentaCB-(95)	2023/04/04		103	%	N/A
			22'366'-PentaCB-(96)	2023/04/04		88	%	N/A
			22'45'6-PentaCB-(103)	2023/04/04		88	%	N/A
			22'466'-PentaCB-(104)	2023/04/04		102	%	60 - 145
			233'44'-PentaCB-(105)	2023/04/04		105	%	60 - 145

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			233'45-PentaCB-(106)	2023/04/04		112	%	N/A
			233'4'5-PentaCB-(107)	2023/04/04		96	%	N/A
			PentaCB-(108)+(124)	2023/04/04		101	%	N/A
			PentaCB-(110)+(115)	2023/04/04		104	%	N/A
			233'55'-PentaCB-(111)	2023/04/04		96	%	N/A
			233'56-PentaCB-(112)	2023/04/04		97	%	N/A
			2344'5-PentaCB-(114)	2023/04/04		106	%	60 - 145
			23'44'5-PentaCB-(118)	2023/04/04		103	%	60 - 145
			23'455'-PentaCB-(120)	2023/04/04		105	%	N/A
			23'45'6-PentaCB-(121)	2023/04/04		88	%	N/A
			233'4'5'-PentaCB-(122)	2023/04/04		128	%	N/A
			23'44'5'-PentaCB-(123)	2023/04/04		104	%	60 - 145
			33'44'5-PentaCB-(126)	2023/04/04		100	%	60 - 145
			33'455'-PentaCB-(127)	2023/04/04		109	%	N/A
			HexaCB-(128)+(166)	2023/04/04		97	%	N/A
			HexaCB-(129)+(138)+(163)	2023/04/04		103	%	N/A
			22'33'45'-HexaCB-(130)	2023/04/04		93	%	N/A
			22'33'46-HexaCB-(131)	2023/04/04		108	%	N/A
			22'33'46'-HexaCB-(132)	2023/04/04		92	%	N/A
			22'33'55'-HexaCB-(133)	2023/04/04		96	%	N/A
			HexaCB-(134)+(143)	2023/04/04		99	%	N/A
			HexaCB-(135)+(151)	2023/04/04		94	%	N/A
			22'33'66'-HexaCB-(136)	2023/04/04		92	%	N/A
			22'344'5-HexaCB-(137)	2023/04/04		85	%	N/A
			HexaCB-(139)+(140)	2023/04/04		90	%	N/A
			22'3455'-HexaCB-(141)	2023/04/04		98	%	N/A
			22'3456-HexaCB-(142)	2023/04/04		96	%	N/A
			22'345'6-HexaCB-(144)	2023/04/04		97	%	N/A
			22'3466'-HexaCB-(145)	2023/04/04		86	%	N/A
			22'34'55'-HexaCB-(146)	2023/04/04		93	%	N/A
			HexaCB-(147)+(149)	2023/04/04		91	%	N/A
			22'34'56'-HexaCB-(148)	2023/04/04		93	%	N/A
			22'34'66'-HexaCB-(150)	2023/04/04		84	%	N/A
			22'3566'-HexaCB-(152)	2023/04/04		87	%	N/A
			HexaCB-(153)+(168)	2023/04/04		91	%	N/A
			22'44'56'-HexaCB-(154)	2023/04/04		89	%	N/A
			22'44'66'-HexaCB-(155)	2023/04/04		103	%	60 - 145
			HexaCB-(156)+(157)	2023/04/04		105	%	N/A
			233'44'6-HexaCB-(158)	2023/04/04		96	%	N/A
			233'455'-HexaCB-(159)	2023/04/04		95	%	N/A
			233'456-HexaCB-(160)	2023/04/04		99	%	N/A
			233'45'6-HexaCB-(161)	2023/04/04		92	%	N/A
			233'4'55'-HexaCB-(162)	2023/04/04		97	%	N/A
			233'4'5'6-HexaCB-(164)	2023/04/04		104	%	N/A
			233'55'6-HexaCB-(165)	2023/04/04		91	%	N/A
			23'44'55'-HexaCB-(167)	2023/04/04		107	%	60 - 145
			33'44'55'-HexaCB-(169)	2023/04/04		106	%	60 - 145
			22'33'44'5-HeptaCB-(170)	2023/04/04		88	%	60 - 145
			HeptaCB-(171)+(173)	2023/04/04		96	%	N/A
			22'33'455'-HeptaCB-(172)	2023/04/04		98	%	N/A
			22'33'456'-HeptaCB-(174)	2023/04/04		96	%	N/A
			22'33'45'6-HeptaCB-(175)	2023/04/04		93	%	N/A
			22'33'466'-HeptaCB-(176)	2023/04/04		90	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'33'45'6'-HeptaCB-(177)	2023/04/04		93	%	N/A
			22'33'55'6-HeptaCB-(178)	2023/04/04		93	%	N/A
			22'33'566'-HeptaCB-(179)	2023/04/04		94	%	N/A
			HeptaCB-(180)+(193)	2023/04/04		103	%	N/A
			22'344'56-HeptaCB-(181)	2023/04/04		96	%	N/A
			22'344'56'-HeptaCB-(182)	2023/04/04		97	%	N/A
			22'344'5'6-HeptaCB-(183)	2023/04/04		88	%	N/A
			22'344'66'-HeptaCB-(184)	2023/04/04		86	%	N/A
			22'3455'6-HeptaCB-(185)	2023/04/04		103	%	N/A
			22'34566'-HeptaCB-(186)	2023/04/04		91	%	N/A
			22'34'55'6-HeptaCB-(187)	2023/04/04		96	%	N/A
			22'34'566'-HeptaCB-(188)	2023/04/04		103	%	60 - 145
			233'44'55'-HeptaCB-(189)	2023/04/04		104	%	60 - 145
			233'44'56-HeptaCB-(190)	2023/04/04		95	%	N/A
			233'44'5'6-HeptaCB-(191)	2023/04/04		95	%	N/A
			233'455'6-HeptaCB-(192)	2023/04/04		99	%	N/A
			22'33'44'55'-OctaCB-(194)	2023/04/04		101	%	N/A
			22'33'44'56-OctaCB-(195)	2023/04/04		102	%	N/A
			22'33'44'56'-OctaCB-(196)	2023/04/04		99	%	N/A
			22'33'44'66'OctaCB-(197)	2023/04/04		94	%	N/A
			OctaCB-(198)+(199)	2023/04/04		100	%	N/A
			22'33'4566'-OctaCB-(200)	2023/04/04		104	%	N/A
			22'33'45'66'-OctaCB-(201)	2023/04/04		92	%	N/A
			22'33'55'66'-OctaCB-(202)	2023/04/04		95	%	60 - 145
			22'344'55'6-OctaCB-(203)	2023/04/04		103	%	N/A
			22'344'566'-OctaCB-(204)	2023/04/04		91	%	N/A
			233'44'55'6-OctaCB-(205)	2023/04/04		93	%	60 - 145
			22'33'44'55'6-NonaCB-(206)	2023/04/04		93	%	60 - 145
			22'33'44'566'-NonaCB-(207)	2023/04/04		90	%	N/A
			22'33'455'66'-NonaCB-(208)	2023/04/04		97	%	60 - 145
			DecaCB-(209)	2023/04/04		115	%	60 - 145
8533813	CXU	RPD	2-MonoCB-(1)	2023/04/04	1.0		%	30
			3-MonoCB-(2)	2023/04/04	1.9		%	30
			4-MonoCB-(3)	2023/04/04	0.85		%	30
			22'-DiCB-(4)	2023/04/04	4.4		%	30
			2,3-DiCB-(5)	2023/04/04	3.6		%	30
			2,3'-DiCB-(6)	2023/04/04	0		%	30
			2,4-DiCB-(7)	2023/04/04	1.0		%	30
			2,4'-DiCB-(8)	2023/04/04	3.7		%	30
			2,5-DiCB-(9)	2023/04/04	2.3		%	30
			2,6-DiCB-(10)	2023/04/04	2.0		%	30
			3,3'-DiCB-(11)	2023/04/04	1.0		%	30
			DiCB-(12)+(13)	2023/04/04	0.29		%	30
			3,5-DiCB-(14)	2023/04/04	0.38		%	30
			4,4'-DiCB-(15)	2023/04/04	1.2		%	30
			22'3-TriCB-(16)	2023/04/04	9.8		%	30
			22'4-TriCB-(17)	2023/04/04	4.0		%	30
			TriCB-(18)+(30)	2023/04/04	2.5		%	30
			22'6-TriCB-(19)	2023/04/04	2.5		%	30
			TriCB-(20) + (28)	2023/04/04	4.3		%	30
			TriCB-(21)+(33)	2023/04/04	1.7		%	30
			234'-TriCB-(22)	2023/04/04	0.099		%	30
			235-TriCB-(23)	2023/04/04	3.2		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			236-TriCB-(24)	2023/04/04	7.4		%	30
			23'4-TriCB-(25)	2023/04/04	3.3		%	30
			TriCB-(26)+(29)	2023/04/04	1.4		%	30
			23'6-TriCB-(27)	2023/04/04	9.2		%	30
			24'5-TriCB-(31)	2023/04/04	3.2		%	30
			24'6-TriCB-(32)	2023/04/04	2.3		%	30
			23'5'-TriCB-(34)	2023/04/04	1.7		%	30
			33'4-TriCB-(35)	2023/04/04	1.5		%	30
			33'5-TriCB-(36)	2023/04/04	0		%	30
			344'-TriCB-(37)	2023/04/04	2.1		%	30
			345-TriCB-(38)	2023/04/04	2.4		%	30
			34'5-TriCB-(39)	2023/04/04	1.1		%	30
			TetraCB-(40)+(41)+(71)	2023/04/04	4.3		%	30
			22'34'-TetraCB-(42)	2023/04/04	2.5		%	30
			22'35-TetraCB-(43)	2023/04/04	6.9		%	30
			TetraCB-(44)+(47)+(65)	2023/04/04	4.6		%	30
			TetraCB-(45)+(51)	2023/04/04	5.5		%	30
			22'36'-TetraCB-(46)	2023/04/04	3.7		%	30
			22'45-TetraCB-(48)	2023/04/04	5.1		%	30
			TetraCB-(49)+TetraCB-(69)	2023/04/04	4.3		%	30
			TetraCB-(50)+(53)	2023/04/04	6.2		%	30
			22'55'-TetraCB-(52)	2023/04/04	7.4		%	30
			22'66'-TetraCB-(54)	2023/04/04	1.3		%	30
			233'4-TetraCB-(55)	2023/04/04	3.1		%	30
			233'4'-Tetra CB(56)	2023/04/04	2.0		%	30
			233'5-TetraCB-(57)	2023/04/04	4.1		%	30
			233'5'-TetraCB-(58)	2023/04/04	3.5		%	30
			TetraCB-(59)+(62)+(75)	2023/04/04	6.1		%	30
			2344'-TetraCB -(60)	2023/04/04	2.9		%	30
			TetraCB-(61)+(70)+(74)+(76)	2023/04/04	4.1		%	30
			234'5-TetraCB-(63)	2023/04/04	4.2		%	30
			234'6-TetraCB-(64)	2023/04/04	4.5		%	30
			23'44'-TetraCB-(66)	2023/04/04	1.8		%	30
			23'45-TetraCB-(67)	2023/04/04	1.6		%	30
			23'45'-TetraCB-(68)	2023/04/04	2.8		%	30
			23'55'-TetraCB-(72)	2023/04/04	5.7		%	30
			23'5'6-TetraCB-(73)	2023/04/04	3.7		%	30
			33'44'-TetraCB-(77)	2023/04/04	3.3		%	30
			33'45-TetraCB-(78)	2023/04/04	1.7		%	30
			33'45'-TetraCB(79)	2023/04/04	2.8		%	30
			33'55'-TetraCB-(80)	2023/04/04	3.5		%	30
			344'5-TetraCB-(81)	2023/04/04	1.8		%	30
			22'33'4-PentaCB-(82)	2023/04/04	3.5		%	30
			PentaCB-(83)+(99)	2023/04/04	5.9		%	30
			22'33'6-PentaCB-(84)	2023/04/04	4.5		%	30
			PentaCB-(85)+(116)+(117)	2023/04/04	5.1		%	30
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/04/04	5.0		%	30
			PentaCB-(88)+(91)	2023/04/04	6.0		%	30
			22'346'-PentaCB-(89)	2023/04/04	5.1		%	30
			PentaCB-(90)+(101)+(113)	2023/04/04	5.0		%	30
			22'355'-PentaCB-(92)	2023/04/04	3.6		%	30
			PentaCB-(93)+(98)+(100)+(102)	2023/04/04	5.5		%	30
			22'356'-PentaCB-(94)	2023/04/04	3.7		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'35'6-PentaCB-(95)	2023/04/04	8.8		%	30
			22'366'-PentaCB-(96)	2023/04/04	6.0		%	30
			22'45'6-PentaCB-(103)	2023/04/04	4.9		%	30
			22'466'-PentaCB-(104)	2023/04/04	1.6		%	30
			233'44'-PentaCB-(105)	2023/04/04	0.66		%	30
			233'45-PentaCB-(106)	2023/04/04	1.5		%	30
			233'4'5-PentaCB-(107)	2023/04/04	4.9		%	30
			PentaCB-(108)+(124)	2023/04/04	3.1		%	30
			PentaCB-(110)+(115)	2023/04/04	5.0		%	30
			233'55'-PentaCB-(111)	2023/04/04	4.0		%	30
			233'56-PentaCB-(112)	2023/04/04	4.0		%	30
			2344'5-PentaCB-(114)	2023/04/04	2.1		%	30
			23'44'5-PentaCB-(118)	2023/04/04	6.1		%	30
			23'455'-PentaCB-(120)	2023/04/04	5.4		%	30
			23'45'6-PentaCB-(121)	2023/04/04	6.6		%	30
			233'4'5'-PentaCB-(122)	2023/04/04	2.0		%	30
			23'44'5'-PentaCB-(123)	2023/04/04	3.4		%	30
			33'44'5-PentaCB-(126)	2023/04/04	2.3		%	30
			33'455'-PentaCB-(127)	2023/04/04	1.5		%	30
			HexaCB-(128)+(166)	2023/04/04	6.0		%	30
			HexaCB-(129)+(138)+(163)	2023/04/04	5.1		%	30
			22'33'45'-HexaCB-(130)	2023/04/04	2.4		%	30
			22'33'46-HexaCB-(131)	2023/04/04	2.8		%	30
			22'33'46'-HexaCB-(132)	2023/04/04	3.3		%	30
			22'33'55'-HexaCB-(133)	2023/04/04	2.7		%	30
			HexaCB-(134)+(143)	2023/04/04	4.9		%	30
			HexaCB-(135)+(151)	2023/04/04	5.0		%	30
			22'33'66'-HexaCB-(136)	2023/04/04	8.6		%	30
			22'344'5-HexaCB-(137)	2023/04/04	0.47		%	30
			HexaCB-(139)+(140)	2023/04/04	4.0		%	30
			22'3455'-HexaCB-(141)	2023/04/04	4.7		%	30
			22'3456-HexaCB-(142)	2023/04/04	2.2		%	30
			22'345'6-HexaCB-(144)	2023/04/04	1.8		%	30
			22'3466'-HexaCB-(145)	2023/04/04	4.7		%	30
			22'34'55'-HexaCB-(146)	2023/04/04	3.7		%	30
			HexaCB-(147)+(149)	2023/04/04	5.2		%	30
			22'34'56'-HexaCB-(148)	2023/04/04	7.8		%	30
			22'34'66'-HexaCB-(150)	2023/04/04	4.1		%	30
			22'3566'-HexaCB-(152)	2023/04/04	6.5		%	30
			HexaCB-(153)+(168)	2023/04/04	4.8		%	30
			22'44'56'-HexaCB-(154)	2023/04/04	5.4		%	30
			22'44'66'-HexaCB-(155)	2023/04/04	5.3		%	30
			HexaCB-(156)+(157)	2023/04/04	3.4		%	30
			233'44'6-HexaCB-(158)	2023/04/04	3.6		%	30
			233'455'-HexaCB-(159)	2023/04/04	4.4		%	30
			233'456-HexaCB-(160)	2023/04/04	2.2		%	30
			233'45'6-HexaCB-(161)	2023/04/04	4.2		%	30
			233'4'55'-HexaCB-(162)	2023/04/04	4.3		%	30
			233'4'5'6-HexaCB-(164)	2023/04/04	9.2		%	30
			233'55'6-HexaCB-(165)	2023/04/04	2.3		%	30
			23'44'55'-HexaCB-(167)	2023/04/04	1.2		%	30
			33'44'55'-HexaCB-(169)	2023/04/04	2.3		%	30
			22'33'44'5-HeptaCB-(170)	2023/04/04	1.4		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			HeptaCB-(171)+(173)	2023/04/04	3.9		%	30
			22'33'455'-HeptaCB-(172)	2023/04/04	4.6		%	30
			22'33'456'-HeptaCB-(174)	2023/04/04	1.9		%	30
			22'33'45'6-HeptaCB-(175)	2023/04/04	7.6		%	30
			22'33'466'-HeptaCB-(176)	2023/04/04	7.6		%	30
			22'33'45'6'-HeptaCB-(177)	2023/04/04	3.2		%	30
			22'33'55'6-HeptaCB-(178)	2023/04/04	5.2		%	30
			22'33'566'-HeptaCB-(179)	2023/04/04	6.6		%	30
			HeptaCB-(180)+(193)	2023/04/04	3.9		%	30
			22'344'56-HeptaCB-(181)	2023/04/04	3.9		%	30
			22'344'56'-HeptaCB-(182)	2023/04/04	8.6		%	30
			22'344'5'6-HeptaCB-(183)	2023/04/04	4.2		%	30
			22'344'66'-HeptaCB-(184)	2023/04/04	5.0		%	30
			22'3455'6-HeptaCB-(185)	2023/04/04	17		%	30
			22'34566'-HeptaCB-(186)	2023/04/04	4.4		%	30
			22'34'55'6-HeptaCB-(187)	2023/04/04	6.8		%	30
			22'34'566'-HeptaCB-(188)	2023/04/04	3.3		%	30
			233'44'55'-HeptaCB-(189)	2023/04/04	3.4		%	30
			233'44'56-HeptaCB-(190)	2023/04/04	4.3		%	30
			233'44'5'6-HeptaCB-(191)	2023/04/04	3.0		%	30
			233'455'6-HeptaCB-(192)	2023/04/04	5.1		%	30
			22'33'44'55'-OctaCB-(194)	2023/04/04	1.5		%	30
			22'33'44'56-OctaCB-(195)	2023/04/04	0.098		%	30
			22'33'44'56'-OctaCB-(196)	2023/04/04	2.2		%	30
			22'33'44'66'OctaCB-(197)	2023/04/04	2.5		%	30
			OctaCB-(198)+(199)	2023/04/04	1.7		%	30
			22'33'4566'-OctaCB-(200)	2023/04/04	3.6		%	30
			22'33'45'66'-OctaCB-(201)	2023/04/04	2.5		%	30
			22'33'55'66'-OctaCB-(202)	2023/04/04	3.6		%	30
			22'344'55'6-OctaCB-(203)	2023/04/04	2.2		%	30
			22'344'566'-OctaCB-(204)	2023/04/04	3.8		%	30
			233'44'55'6-OctaCB-(205)	2023/04/04	0.86		%	30
			22'33'44'55'6-NonaCB-(206)	2023/04/04	2.2		%	30
			22'33'44'566'-NonaCB-(207)	2023/04/04	4.3		%	30
			22'33'455'66'-NonaCB-(208)	2023/04/04	4.9		%	30
			DecaCB-(209)	2023/04/04	6.0		%	30
8533813	CXU	Method Blank	C13-2,44'-TriCB-(28)	2023/03/03		109	%	30 - 170
			C13-22'33'44'55'6-NonaCB-(206)	2023/03/03		89	%	40 - 145
			C13-22'33'44'5-HeptaCB-(170)	2023/03/03		118	%	40 - 145
			C13-22'33'455'66'-NonaCB-(208)	2023/03/03		94	%	40 - 145
			C13-22'33'55'66'-OctaCB-(202)	2023/03/03		94	%	40 - 145
			C13-22'33'55'6-HeptaCB-(178)	2023/03/03		76	%	40 - 145
			C13-22'344'55'-HeptaCB-(180)	2023/03/03		110	%	40 - 145
			C13-22'34'566'-HeptaCB-(188)	2023/03/03		69	%	40 - 145
			C13-22'44'66'-HexaCB-(155)	2023/03/03		48	%	40 - 145
			C13-22'466'-PentaCB-(104)	2023/03/03		67	%	40 - 145
			C13-22'66'-TetraCB-(54)	2023/03/03		56	%	15 - 145
			C13-22'6-TriCB-(19)	2023/03/03		52	%	40 - 145
			C13-22'-DiCB-(4)	2023/03/03		37	%	15 - 145
			C13-233'44'55'6-OctaCB-(205)	2023/03/03		109	%	40 - 145
			C13-233'44'55'-HeptaCB-(189)	2023/03/03		113	%	40 - 145
			C13-233'44'-PentaCB-(105)	2023/03/03		146 (1)	%	40 - 145
			C13-233'55'-PentaCB-(111)	2023/03/03		98	%	30 - 170

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			C13-23'44'55'-HexaCB-(167)	2023/03/03		96	%	40 - 145
			C13-2344'5-PentaCB-(114)	2023/03/03		139	%	40 - 145
			C13-23'44'5-PentaCB-(118)	2023/03/03		143	%	40 - 145
			C13-2'344'5-PentaCB-(123)	2023/03/03		143	%	40 - 145
			C13-2-MonoCB-(1)	2023/03/03		39	%	15 - 145
			C13-33'44'55'-HexaCB-(169)	2023/03/03		101	%	40 - 145
			C13-33'44'5-PentaCB-(126)	2023/03/03		151 (1)	%	40 - 145
			C13-33'44'-TetraCB-(77)	2023/03/03		86	%	40 - 145
			C13-344'5-TetraCB-(81)	2023/03/03		82	%	40 - 145
			C13-344'-TriCB-(37)	2023/03/03		80	%	40 - 145
			C13-44'-DiCB-(15)	2023/03/03		82	%	15 - 145
			C13-4-MonoCB-(3)	2023/03/03		49	%	15 - 145
			C13-DecaCB-(209)	2023/03/03		69	%	40 - 145
			C13-HexaCB-(156)+(157)	2023/03/03		96	%	40 - 145
			2-MonoCB-(1)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			3-MonoCB-(2)	2023/03/03	0.0087 U, EDL=0.0087		ng/L	
			4-MonoCB-(3)	2023/03/03	0.0083 U, EDL=0.0083		ng/L	
			22'-DiCB-(4)	2023/03/03	0.029 U, EDL=0.029		ng/L	
			2,3-DiCB-(5)	2023/03/03	0.0053 U, EDL=0.0053		ng/L	
			2,3'-DiCB-(6)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			2,4-DiCB-(7)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			2,4'-DiCB-(8)	2023/03/03	0.0062 J, EDL=0.0051		ng/L	
			2,5-DiCB-(9)	2023/03/03	0.0055 U, EDL=0.0055		ng/L	
			2,6-DiCB-(10)	2023/03/03	0.0097 U, EDL=0.0097		ng/L	
			3,3'-DiCB-(11)	2023/03/03	0.0834 J, EDL=0.0052		ng/L	
			DiCB-(12)+(13)	2023/03/03	0.0051 U, EDL=0.0051		ng/L	
			3,5-DiCB-(14)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			4,4'-DiCB-(15)	2023/03/03	0.0110 J, EDL=0.0053		ng/L	
			22'3-TriCB-(16)	2023/03/03	0.0279 J, EDL=0.0081		ng/L	
			22'4-TriCB-(17)	2023/03/03	0.0179 J, EDL=0.0061		ng/L	
			TriCB-(18)+(30)	2023/03/03	0.0176 J, EDL=0.0053		ng/L	
			22'6-TriCB-(19)	2023/03/03	0.0081 U, EDL=0.0081		ng/L	
			TriCB-(20) + (28)	2023/03/03	0.0548, EDL=0.0027		ng/L	
			TriCB-(21)+(33)	2023/03/03	0.0405 J, EDL=0.0029		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			234'-TriCB-(22)	2023/03/03	0.0213, EDL=0.0029		ng/L	
			235-TriCB-(23)	2023/03/03	0.0028 U, EDL=0.0028		ng/L	
			236-TriCB-(24)	2023/03/03	0.0048 U, EDL=0.0048		ng/L	
			23'4-TriCB-(25)	2023/03/03	0.0050 U, EDL=0.0050		ng/L	
			TriCB-(26)+(29)	2023/03/03	0.0111 J, EDL=0.0022		ng/L	
			23'6-TriCB-(27)	2023/03/03	0.0046 U, EDL=0.0046		ng/L	
			24'5-TriCB-(31)	2023/03/03	0.0613, EDL=0.0026		ng/L	
			24'6-TriCB-(32)	2023/03/03	0.0157 J, EDL=0.0043		ng/L	
			23'5'-TriCB-(34)	2023/03/03	0.0029 U, EDL=0.0029		ng/L	
			33'4-TriCB-(35)	2023/03/03	0.0030 U, EDL=0.0030		ng/L	
			33'5-TriCB-(36)	2023/03/03	0.0025 U, EDL=0.0025		ng/L	
			344'-TriCB-(37)	2023/03/03	0.0127 J, EDL=0.0031		ng/L	
			345-TriCB-(38)	2023/03/03	0.0029 U, EDL=0.0029		ng/L	
			34'5-TriCB-(39)	2023/03/03	0.0030 U, EDL=0.0030		ng/L	
			TetraCB-(40)+(41)+(71)	2023/03/03	0.029 J, EDL=0.015		ng/L	
			22'34'-TetraCB-(42)	2023/03/03	0.020 U, EDL=0.020		ng/L	
			22'35-TetraCB-(43)	2023/03/03	0.018 U, EDL=0.018		ng/L	
			TetraCB-(44)+(47)+(65)	2023/03/03	0.057 U, EDL=0.057 (2)		ng/L	
			TetraCB-(45)+(51)	2023/03/03	0.015 U, EDL=0.015		ng/L	
			22'36'-TetraCB-(46)	2023/03/03	0.017 U, EDL=0.017		ng/L	
			22'45-TetraCB-(48)	2023/03/03	0.015 U, EDL=0.015		ng/L	
			TetraCB-(49)+TetraCB-(69)	2023/03/03	0.051 J, EDL=0.013		ng/L	
			TetraCB-(50)+(53)	2023/03/03	0.014 U, EDL=0.014		ng/L	
			22'55'-TetraCB-(52)	2023/03/03	0.150, EDL=0.015		ng/L	
			22'66'-TetraCB-(54)	2023/03/03	0.025 U, EDL=0.025		ng/L	
			233'4-TetraCB-(55)	2023/03/03	0.0095 U, EDL=0.0095		ng/L	
			233'4'-Tetra CB(56)	2023/03/03	0.0176 J, EDL=0.0097		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			233'5-TetraCB-(57)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			233'5'-TetraCB-(58)	2023/03/03	0.0094 U, EDL=0.0094		ng/L	
			TetraCB-(59)+(62)+(75)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			2344'-TetraCB -(60)	2023/03/03	0.0121 J, EDL=0.0092		ng/L	
			TetraCB-(61)+(70)+(74)+(76)	2023/03/03	0.115 J, EDL=0.0086		ng/L	
			234'5-TetraCB-(63)	2023/03/03	0.0091 U, EDL=0.0091		ng/L	
			234'6-TetraCB-(64)	2023/03/03	0.028 J, EDL=0.013		ng/L	
			23'44'-TetraCB-(66)	2023/03/03	0.0394 J, EDL=0.0086		ng/L	
			23'45-TetraCB-(67)	2023/03/03	0.0080 U, EDL=0.0080		ng/L	
			23'45'-TetraCB-(68)	2023/03/03	0.0085 U, EDL=0.0085		ng/L	
			23'55'-TetraCB-(72)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			23'5'6-TetraCB-(73)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			33'44'-TetraCB-(77)	2023/03/03	0.0098 U, EDL=0.0098		ng/L	
			33'45-TetraCB-(78)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			33'45'-TetraCB(79)	2023/03/03	0.0084 U, EDL=0.0084		ng/L	
			33'55'-TetraCB-(80)	2023/03/03	0.0077 U, EDL=0.0077		ng/L	
			344'5-TetraCB-(81)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			22'33'4-PentaCB-(82)	2023/03/03	0.017 U, EDL=0.017		ng/L	
			PentaCB-(83)+(99)	2023/03/03	0.059 J, EDL=0.014		ng/L	
			22'33'6-PentaCB-(84)	2023/03/03	0.024, EDL=0.014		ng/L	
			PentaCB-(85)+(116)+(117)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			PentaCB-(86)(87)(97)(109)(119)(125)	2023/03/03	0.068 J, EDL=0.011		ng/L	
			PentaCB-(88)+(91)	2023/03/03	0.012 U, EDL=0.012		ng/L	
			22'346'-PentaCB-(89)	2023/03/03	0.016 U, EDL=0.016		ng/L	
			PentaCB-(90)+(101)+(113)	2023/03/03	0.206, EDL=0.011		ng/L	
			22'355'-PentaCB-(92)	2023/03/03	0.035 J, EDL=0.015		ng/L	
			PentaCB-(93)+(98)+(100)+(102)	2023/03/03	0.013 U, EDL=0.013		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'356'-PentaCB-(94)	2023/03/03	0.014 U, EDL=0.014		ng/L	
			22'35'6-PentaCB-(95)	2023/03/03	0.210, EDL=0.015		ng/L	
			22'366'-PentaCB-(96)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			22'45'6-PentaCB-(103)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			22'466'-PentaCB-(104)	2023/03/03	0.017 U, EDL=0.017		ng/L	
			233'44'-PentaCB-(105)	2023/03/03	0.0276 J, EDL=0.0052		ng/L	
			233'45-PentaCB-(106)	2023/03/03	0.0057 U, EDL=0.0057		ng/L	
			233'4'5-PentaCB-(107)	2023/03/03	0.0081 J, EDL=0.0043		ng/L	
			PentaCB-(108)+(124)	2023/03/03	0.0053 U, EDL=0.0053		ng/L	
			PentaCB-(110)+(115)	2023/03/03	0.122, EDL=0.011		ng/L	
			233'55'-PentaCB-(111)	2023/03/03	0.0092 U, EDL=0.0092		ng/L	
			233'56-PentaCB-(112)	2023/03/03	0.0091 U, EDL=0.0091		ng/L	
			2344'5-PentaCB-(114)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			23'44'5-PentaCB-(118)	2023/03/03	0.0962 J, EDL=0.0048		ng/L	
			23'455'-PentaCB-(120)	2023/03/03	0.0097 U, EDL=0.0097		ng/L	
			23'45'6-PentaCB-(121)	2023/03/03	0.0092 U, EDL=0.0092		ng/L	
			233'4'5'-PentaCB-(122)	2023/03/03	0.0070 U, EDL=0.0070		ng/L	
			23'44'5'-PentaCB-(123)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			33'44'5-PentaCB-(126)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			33'455'-PentaCB-(127)	2023/03/03	0.0054 U, EDL=0.0054		ng/L	
			HexaCB-(128)+(166)	2023/03/03	0.0124 J, EDL=0.0057		ng/L	
			HexaCB-(129)+(138)+(163)	2023/03/03	0.201, EDL=0.0064		ng/L	
			22'33'45'-HexaCB-(130)	2023/03/03	0.0072 J, EDL=0.0069		ng/L	
			22'33'46-HexaCB-(131)	2023/03/03	0.0083 U, EDL=0.0083		ng/L	
			22'33'46'-HexaCB-(132)	2023/03/03	0.0682, EDL=0.0069		ng/L	
			22'33'55'-HexaCB-(133)	2023/03/03	0.0071 U, EDL=0.0071		ng/L	
			HexaCB-(134)+(143)	2023/03/03	0.0135 J, EDL=0.0076		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			HexaCB-(135)+(151)	2023/03/03	0.143, EDL=0.013		ng/L	
			22'33'66'-HexaCB-(136)	2023/03/03	0.0455 J, EDL=0.0099		ng/L	
			22'344'5-HexaCB-(137)	2023/03/03	0.0065 U, EDL=0.0065		ng/L	
			HexaCB-(139)+(140)	2023/03/03	0.0060 U, EDL=0.0060		ng/L	
			22'3455'-HexaCB-(141)	2023/03/03	0.0545, EDL=0.0062		ng/L	
			22'3456-HexaCB-(142)	2023/03/03	0.0074 U, EDL=0.0074		ng/L	
			22'345'6-HexaCB-(144)	2023/03/03	0.022 J, EDL=0.013		ng/L	
			22'3466'-HexaCB-(145)	2023/03/03	0.0093 U, EDL=0.0093		ng/L	
			22'34'55'-HexaCB-(146)	2023/03/03	0.0310 J, EDL=0.0058		ng/L	
			HexaCB-(147)+(149)	2023/03/03	0.274, EDL=0.0055		ng/L	
			22'34'56'-HexaCB-(148)	2023/03/03	0.014 U, EDL=0.014		ng/L	
			22'34'66'-HexaCB-(150)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			22'3566'-HexaCB-(152)	2023/03/03	0.0094 U, EDL=0.0094		ng/L	
			HexaCB-(153)+(168)	2023/03/03	0.237, EDL=0.0050		ng/L	
			22'44'56'-HexaCB-(154)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			22'44'66'-HexaCB-(155)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			HexaCB-(156)+(157)	2023/03/03	0.0088 J, EDL=0.0035		ng/L	
			233'44'6-HexaCB-(158)	2023/03/03	0.0167 J, EDL=0.0042		ng/L	
			233'455'-HexaCB-(159)	2023/03/03	0.0033 U, EDL=0.0033		ng/L	
			233'456-HexaCB-(160)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			233'45'6-HexaCB-(161)	2023/03/03	0.0048 U, EDL=0.0048		ng/L	
			233'4'55'-HexaCB-(162)	2023/03/03	0.0032 U, EDL=0.0032		ng/L	
			233'4'5'6-HexaCB-(164)	2023/03/03	0.0103 J, EDL=0.0046		ng/L	
			233'55'6-HexaCB-(165)	2023/03/03	0.0052 U, EDL=0.0052		ng/L	
			23'44'55'-HexaCB-(167)	2023/03/03	0.0041 J, EDL=0.0035		ng/L	
			33'44'55'-HexaCB-(169)	2023/03/03	0.0038 U, EDL=0.0038		ng/L	
			22'33'44'5-HeptaCB-(170)	2023/03/03	0.0208 J, EDL=0.0054		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			HeptaCB-(171)+(173)	2023/03/03	0.013 U, EDL=0.013 (2)		ng/L	
			22'33'455'-HeptaCB-(172)	2023/03/03	0.0060 U, EDL=0.0060		ng/L	
			22'33'456'-HeptaCB-(174)	2023/03/03	0.0523, EDL=0.0054		ng/L	
			22'33'45'6-HeptaCB-(175)	2023/03/03	0.010 U, EDL=0.010		ng/L	
			22'33'466'-HeptaCB-(176)	2023/03/03	0.0140 J, EDL=0.0076		ng/L	
			22'33'45'6'-HeptaCB-(177)	2023/03/03	0.0308 J, EDL=0.0059		ng/L	
			22'33'55'6-HeptaCB-(178)	2023/03/03	0.014 J, EDL=0.011		ng/L	
			22'33'566'-HeptaCB-(179)	2023/03/03	0.0419 J, EDL=0.0074		ng/L	
			HeptaCB-(180)+(193)	2023/03/03	0.0737 J, EDL=0.0047		ng/L	
			22'344'56-HeptaCB-(181)	2023/03/03	0.0056 U, EDL=0.0056		ng/L	
			22'344'56'-HeptaCB-(182)	2023/03/03	0.0098 U, EDL=0.0098		ng/L	
			22'344'5'6-HeptaCB-(183)	2023/03/03	0.0419 J, EDL=0.0048		ng/L	
			22'344'66'-HeptaCB-(184)	2023/03/03	0.0073 U, EDL=0.0073		ng/L	
			22'3455'6-HeptaCB-(185)	2023/03/03	0.0058 U, EDL=0.0058		ng/L	
			22'34566'-HeptaCB-(186)	2023/03/03	0.0079 U, EDL=0.0079		ng/L	
			22'34'55'6-HeptaCB-(187)	2023/03/03	0.085, EDL=0.010		ng/L	
			22'34'566'-HeptaCB-(188)	2023/03/03	0.0080 U, EDL=0.0080		ng/L	
			233'44'55'-HeptaCB-(189)	2023/03/03	0.0039 U, EDL=0.0039		ng/L	
			233'44'56-HeptaCB-(190)	2023/03/03	0.0049 J, EDL=0.0043		ng/L	
			233'44'5'6-HeptaCB-(191)	2023/03/03	0.0042 U, EDL=0.0042		ng/L	
			233'455'6-HeptaCB-(192)	2023/03/03	0.0047 U, EDL=0.0047		ng/L	
			22'33'44'55'-OctaCB-(194)	2023/03/03	0.0078 U, EDL=0.0078		ng/L	
			22'33'44'56-OctaCB-(195)	2023/03/03	0.0084 U, EDL=0.0084		ng/L	
			22'33'44'56'-OctaCB-(196)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			22'33'44'66'OctaCB-(197)	2023/03/03	0.0081 U, EDL=0.0081		ng/L	
			OctaCB-(198)+(199)	2023/03/03	0.013 U, EDL=0.013		ng/L	
			22'33'4566'-OctaCB-(200)	2023/03/03	0.0082 U, EDL=0.0082		ng/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			22'33'45'66'-OctaCB-(201)	2023/03/03	0.0076 U, EDL=0.0076		ng/L	
			22'33'55'66'-OctaCB-(202)	2023/03/03	0.0090 U, EDL=0.0090		ng/L	
			22'344'55'6-OctaCB-(203)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			22'344'566'-OctaCB-(204)	2023/03/03	0.0075 U, EDL=0.0075		ng/L	
			233'44'55'6-OctaCB-(205)	2023/03/03	0.0060 U, EDL=0.0060		ng/L	
			22'33'44'55'6-NonaCB-(206)	2023/03/03	0.011 U, EDL=0.011		ng/L	
			22'33'44'566'-NonaCB-(207)	2023/03/03	0.0076 U, EDL=0.0076		ng/L	
			22'33'455'66'-NonaCB-(208)	2023/03/03	0.0079 U, EDL=0.0079		ng/L	
			DecaCB-(209)	2023/03/03	0.012 U, EDL=0.012		ng/L	
			Total PCB	2023/03/03	3.21, EDL=0.057		ng/L	
8534937	HBJ	Spiked Blank	13C2-4:2-Fluorotelomersulfonic Acid	2023/03/05		97	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/03/05		95	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/03/05		95	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/03/05		94	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/03/05		85	%	50 - 150
			13C2-Perfluorohexanoic acid	2023/03/05		99	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/03/05		81	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/03/05		89	%	50 - 150
			13C3-HFPO-DA	2023/03/05		100	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/03/05		96	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/03/05		98	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/03/05		97	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/03/05		97	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/03/05		96	%	50 - 150
			13C5-Perfluorononanoic acid	2023/03/05		95	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/03/05		98	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/03/05		92	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/03/05		100	%	50 - 150
			D3-MeFOSA	2023/03/05		79	%	50 - 150
			D3-MeFOSAA	2023/03/05		88	%	50 - 150
			D5-EtFOSA	2023/03/05		77	%	50 - 150
			D5-EtFOSAA	2023/03/05		81	%	50 - 150
			D7-MeFOSE	2023/03/05		84	%	50 - 150
			D9-EtFOSE	2023/03/05		82	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2023/03/05		89	%	70 - 130
			Perfluoropentanoic acid (PFPeA)	2023/03/05		90	%	70 - 130
			Perfluorohexanoic acid (PFHxA)	2023/03/05		90	%	70 - 130
			Perfluoroheptanoic acid (PFHpA)	2023/03/05		90	%	70 - 130
			Perfluorooctanoic acid (PFOA)	2023/03/05		90	%	70 - 130
			Perfluorononanoic acid (PFNA)	2023/03/05		90	%	70 - 130
			Perfluorodecanoic acid (PFDA)	2023/03/05		90	%	70 - 130
			Perfluoroundecanoic acid (PFUnA)	2023/03/05		88	%	70 - 130
			Perfluorododecanoic acid (PFDoA)	2023/03/05		90	%	70 - 130
			Perfluorotridecanoic acid (PFTRDA)	2023/03/05		93	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorotetradecanoic acid(PFTEDA)	2023/03/05		87	%	70 - 130
			Perfluorobutanesulfonic acid (PFBS)	2023/03/05		90	%	70 - 130
			Perfluoropentanesulfonic acid PFPes	2023/03/05		89	%	70 - 130
			Perfluorohexanesulfonic acid(PFHxS)	2023/03/05		88	%	70 - 130
			Perfluoroheptanesulfonic acid PFHpS	2023/03/05		87	%	70 - 130
			Perfluorooctanesulfonic acid (PFOS)	2023/03/05		90	%	70 - 130
			Perfluorononanesulfonic acid (PFNS)	2023/03/05		87	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2023/03/05		89	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2023/03/05		90	%	70 - 130
			EtFOSA	2023/03/05		91	%	70 - 130
			MeFOSA	2023/03/05		89	%	70 - 130
			EtFOSE	2023/03/05		88	%	70 - 130
			MeFOSE	2023/03/05		89	%	70 - 130
			EtFOSAA	2023/03/05		90	%	70 - 130
			MeFOSAA	2023/03/05		87	%	70 - 130
			4:2 Fluorotelomer sulfonic acid	2023/03/05		87	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2023/03/05		89	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2023/03/05		88	%	70 - 130
			Hexafluoropropyleneoxide dimer acid	2023/03/05		89	%	70 - 130
			4,8-Dioxa-3H-perfluorononanoic acid	2023/03/05		91	%	70 - 130
			9Cl-PF3ONS (F-53B Major)	2023/03/05		87	%	70 - 130
			11Cl-PF3OUdS (F-53B Minor)	2023/03/05		84	%	70 - 130
8534937	HBJ	Spiked Blank DUP	13C2-4:2-Fluorotelomersulfonic Acid	2023/03/05		93	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/03/05		90	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/03/05		93	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/03/05		95	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/03/05		86	%	50 - 150
			13C2-Perfluorohexanoic acid	2023/03/05		95	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/03/05		72	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/03/05		87	%	50 - 150
			13C3-HFPO-DA	2023/03/05		89	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/03/05		95	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/03/05		96	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/03/05		96	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/03/05		95	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/03/05		94	%	50 - 150
			13C5-Perfluorononanoic acid	2023/03/05		94	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/03/05		97	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/03/05		91	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/03/05		94	%	50 - 150
			D3-MeFOSA	2023/03/05		76	%	50 - 150
			D3-MeFOSAA	2023/03/05		85	%	50 - 150
			D5-EtFOSA	2023/03/05		77	%	50 - 150
			D5-EtFOSAA	2023/03/05		85	%	50 - 150
			D7-MeFOSE	2023/03/05		81	%	50 - 150
			D9-EtFOSE	2023/03/05		80	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2023/03/05		92	%	70 - 130
			Perfluoropentanoic acid (PFPeA)	2023/03/05		91	%	70 - 130
			Perfluorohexanoic acid (PFHxA)	2023/03/05		93	%	70 - 130
			Perfluoroheptanoic acid (PFHpA)	2023/03/05		91	%	70 - 130
			Perfluorooctanoic acid (PFOA)	2023/03/05		93	%	70 - 130
			Perfluorononanoic acid (PFNA)	2023/03/05		91	%	70 - 130
			Perfluorodecanoic acid (PFDA)	2023/03/05		91	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluoroundecanoic acid (PFUnA)	2023/03/05		92	%	70 - 130
			Perfluorododecanoic acid (PFDoA)	2023/03/05		90	%	70 - 130
			Perfluorotridecanoic acid (PFTRDA)	2023/03/05		102	%	70 - 130
			Perfluorotetradecanoic acid(PFTEDA)	2023/03/05		89	%	70 - 130
			Perfluorobutanesulfonic acid (PFBS)	2023/03/05		92	%	70 - 130
			Perfluoropentanesulfonic acid PFPes	2023/03/05		90	%	70 - 130
			Perfluorohexanesulfonic acid(PFHxS)	2023/03/05		92	%	70 - 130
			Perfluoroheptanesulfonic acid PFHpS	2023/03/05		90	%	70 - 130
			Perfluorooctanesulfonic acid (PFOS)	2023/03/05		93	%	70 - 130
			Perfluorononanesulfonic acid (PFNS)	2023/03/05		87	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2023/03/05		87	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2023/03/05		92	%	70 - 130
			EtFOSA	2023/03/05		91	%	70 - 130
			MeFOSA	2023/03/05		89	%	70 - 130
			EtFOSE	2023/03/05		91	%	70 - 130
			MeFOSE	2023/03/05		93	%	70 - 130
			EtFOSAA	2023/03/05		89	%	70 - 130
			MeFOSAA	2023/03/05		92	%	70 - 130
			4:2 Fluorotelomer sulfonic acid	2023/03/05		92	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2023/03/05		94	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2023/03/05		91	%	70 - 130
			Hexafluoropropyleneoxide dimer acid	2023/03/05		103	%	70 - 130
			4,8-Dioxa-3H-perfluorononanoic acid	2023/03/05		93	%	70 - 130
			9Cl-PF3ONS (F-53B Major)	2023/03/05		89	%	70 - 130
			11Cl-PF3OUdS (F-53B Minor)	2023/03/05		89	%	70 - 130
8534937	HBJ	RPD	Perfluorobutanoic acid (PFBA)	2023/03/05	2.9		%	30
			Perfluoropentanoic acid (PFPeA)	2023/03/05	1.2		%	30
			Perfluorohexanoic acid (PFHxA)	2023/03/05	3.1		%	30
			Perfluoroheptanoic acid (PFHpA)	2023/03/05	0.88		%	30
			Perfluorooctanoic acid (PFOA)	2023/03/05	3.2		%	30
			Perfluorononanoic acid (PFNA)	2023/03/05	0.97		%	30
			Perfluorodecanoic acid (PFDA)	2023/03/05	1.1		%	30
			Perfluoroundecanoic acid (PFUnA)	2023/03/05	4.5		%	30
			Perfluorododecanoic acid (PFDoA)	2023/03/05	0.25		%	30
			Perfluorotridecanoic acid (PFTRDA)	2023/03/05	9.8		%	30
			Perfluorotetradecanoic acid(PFTEDA)	2023/03/05	1.2		%	30
			Perfluorobutanesulfonic acid (PFBS)	2023/03/05	2.2		%	30
			Perfluoropentanesulfonic acid PFPes	2023/03/05	0.86		%	30
			Perfluorohexanesulfonic acid(PFHxS)	2023/03/05	4.9		%	30
			Perfluoroheptanesulfonic acid PFHpS	2023/03/05	2.9		%	30
			Perfluorooctanesulfonic acid (PFOS)	2023/03/05	2.8		%	30
			Perfluorononanesulfonic acid (PFNS)	2023/03/05	0.79		%	30
			Perfluorodecanesulfonic acid (PFDS)	2023/03/05	1.7		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2023/03/05	1.7		%	30
			EtFOSA	2023/03/05	0.73		%	30
			MeFOSA	2023/03/05	0.49		%	30
			EtFOSE	2023/03/05	2.6		%	30
			MeFOSE	2023/03/05	3.8		%	30
			EtFOSAA	2023/03/05	0.60		%	30
			MeFOSAA	2023/03/05	6.3		%	30
			4:2 Fluorotelomer sulfonic acid	2023/03/05	5.3		%	30
			6:2 Fluorotelomer sulfonic acid	2023/03/05	5.8		%	30
			8:2 Fluorotelomer sulfonic acid	2023/03/05	3.5		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Hexafluoropropyleneoxide dimer acid	2023/03/05	14		%	30
			4,8-Dioxa-3H-perfluorononanoic acid	2023/03/05	1.7		%	30
			9Cl-PF3ONS (F-53B Major)	2023/03/05	2.0		%	30
			11Cl-PF3OUdS (F-53B Minor)	2023/03/05	5.4		%	30
8534937	HBJ	Method Blank	13C2-4:2-Fluorotelomersulfonic Acid	2023/03/05		99	%	50 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2023/03/05		99	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2023/03/05		97	%	50 - 150
			13C2-Perfluorodecanoic acid	2023/03/05		90	%	50 - 150
			13C2-Perfluorododecanoic acid	2023/03/05		79	%	50 - 150
			13C2-Perfluorohexanoic acid	2023/03/05		97	%	50 - 150
			13C2-perfluorotetradecanoic acid	2023/03/05		45 (3)	%	50 - 150
			13C2-Perfluoroundecanoic acid	2023/03/05		83	%	50 - 150
			13C3-HFPO-DA	2023/03/05		97	%	50 - 150
			13C3-Perfluorobutanesulfonic acid	2023/03/05		99	%	50 - 150
			13C4-Perfluorobutanoic acid	2023/03/05		98	%	50 - 150
			13C4-Perfluoroheptanoic acid	2023/03/05		97	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2023/03/05		91	%	50 - 150
			13C4-Perfluorooctanoic acid	2023/03/05		95	%	50 - 150
			13C5-Perfluorononanoic acid	2023/03/05		93	%	50 - 150
			13C5-Perfluoropentanoic acid	2023/03/05		99	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2023/03/05		89	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2023/03/05		97	%	50 - 150
			D3-MeFOSA	2023/03/05		73	%	50 - 150
			D3-MeFOSAA	2023/03/05		84	%	50 - 150
			D5-EtFOSA	2023/03/05		76	%	50 - 150
			D5-EtFOSAA	2023/03/05		83	%	50 - 150
			D7-MeFOSE	2023/03/05		85	%	50 - 150
			D9-EtFOSE	2023/03/05		80	%	50 - 150
			Perfluorobutanoic acid (PFBA)	2023/03/05	0.0015 U, MDL=0.0015		ug/L	
			Perfluoropentanoic acid (PFPeA)	2023/03/05	0.0025 U, MDL=0.0025		ug/L	
			Perfluorohexanoic acid (PFHxA)	2023/03/05	0.0038 U, MDL=0.0038		ug/L	
			Perfluoroheptanoic acid (PFHpA)	2023/03/05	0.0018 U, MDL=0.0018		ug/L	
			Perfluorooctanoic acid (PFOA)	2023/03/05	0.0030 U, MDL=0.0030		ug/L	
			Perfluorononanoic acid (PFNA)	2023/03/05	0.0021 U, MDL=0.0021		ug/L	
			Perfluorodecanoic acid (PFDA)	2023/03/05	0.0016 U, MDL=0.0016		ug/L	
			Perfluoroundecanoic acid (PFUnA)	2023/03/05	0.0024 U, MDL=0.0024		ug/L	
			Perfluorododecanoic acid (PFDoA)	2023/03/05	0.0029 U, MDL=0.0029		ug/L	
			Perfluorotridecanoic acid (PFTRDA)	2023/03/05	0.0026 U, MDL=0.0026		ug/L	
			Perfluorotetradecanoic acid(PFTEDA)	2023/03/05	0.0016 U, MDL=0.0016		ug/L	
			Perfluorobutanesulfonic acid (PFBS)	2023/03/05	0.0021 U, MDL=0.0021		ug/L	
			Perfluoropentanesulfonic acid PFPes	2023/03/05	0.0023 U, MDL=0.0023		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorohexanesulfonic acid(PFHxS)	2023/03/05	0.0022 U, MDL=0.0022		ug/L	
			Perfluoroheptanesulfonic acid PFHpS	2023/03/05	0.0039 U, MDL=0.0039		ug/L	
			Perfluorooctanesulfonic acid (PFOS)	2023/03/05	0.0035 U, MDL=0.0035		ug/L	
			Perfluorononanesulfonic acid (PFNS)	2023/03/05	0.0037 U, MDL=0.0037		ug/L	
			Perfluorodecanesulfonic acid (PFDS)	2023/03/05	0.0048 U, MDL=0.0048		ug/L	
			Perfluorooctane Sulfonamide (PFOSA)	2023/03/05	0.0034 U, MDL=0.0034		ug/L	
			EtFOSA	2023/03/05	0.0095 U, MDL=0.0095		ug/L	
			MeFOSA	2023/03/05	0.0084 U, MDL=0.0084		ug/L	
			EtFOSE	2023/03/05	0.0070 U, MDL=0.0070		ug/L	
			MeFOSE	2023/03/05	0.0073 U, MDL=0.0073		ug/L	
			EtFOSAA	2023/03/05	0.0046 U, MDL=0.0046		ug/L	
			MeFOSAA	2023/03/05	0.0045 U, MDL=0.0045		ug/L	
			4:2 Fluorotelomer sulfonic acid	2023/03/05	0.0033 U, MDL=0.0033		ug/L	
			6:2 Fluorotelomer sulfonic acid	2023/03/05	0.0015 U, MDL=0.0015		ug/L	
			8:2 Fluorotelomer sulfonic acid	2023/03/05	0.0031 U, MDL=0.0031		ug/L	
			Hexafluoropropyleneoxide dimer acid	2023/03/05	0.0052 U, MDL=0.0052		ug/L	
			4,8-Dioxa-3H-perfluorononanoic acid	2023/03/05	0.0027 U, MDL=0.0027		ug/L	
			9Cl-PF3ONS (F-53B Major)	2023/03/05	0.0043 U, MDL=0.0043		ug/L	
			11Cl-PF3OUdS (F-53B Minor)	2023/03/05	0.0035 U, MDL=0.0035		ug/L	

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 (absolute difference <= 2x RDL).

(1) The extracted internal standard analyte exhibited high recovery and as such, may not have allowed for accurate recovery correction of the associated native compound. For results that were not detected (ND), this potential high bias has no impact.

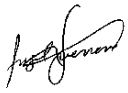
(2) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

(3) Extracted internal standard analyte recovery was below the defined lower control limit (LCL) which may result in increased variability of the associated native analyte result (PFTeDA, PFTrDA).La récupération de l'analyte standard interne extrait était inférieure à la limite de contrôle inférieure définie (LCL), ce qui peut entraîner une variabilité accrue du résultat de l'analyte natif associé (PFTeDA, PFTrDA).

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Angel Guerrero, Supervisor, Ultra Trace Analysis, HRMS and SVOC

Colm McNamara, Senior Analyst, Liquid Chromatography

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

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SUBCONTRACT ORDER

Apex Laboratories

AKK 2/21/23

A3B0674

JRM

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:

BV Labs / Maxxam
C/O FEDEX DEPOT 299 Cayuga Rd
Cheektowaga, NY 14225
Phone :(800) 668-0639
Fax: (905) 332-9169

Sample Name: MW1-20230220-GW-70 **Water** **Sampled: 02/20/23 10:26** (A3B0674-01)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	03/06/23 17:00	02/20/24 10:26	
1668C PCB Congeners (SUB)	03/06/23 17:00	02/20/24 10:26	
1699 Insecticides/Pesticides (SUB)	03/06/23 17:00	02/27/23 10:26	waters
537M - PFOAs (SUB)	03/06/23 17:00	02/27/23 10:26	
Containers Supplied:			
(F)Other-Non Preserved			
(G)Other-Non Preserved			
(Q)1 L Amber Glass - Non Preserved			
(R)1 L Amber Glass - Non Preserved			
(S)1 L Amber Glass - Non Preserved			
(T)1 L Amber Glass - Non Preserved			

Sample Name: MW2-20230220-GW-60 **Water** **Sampled: 02/20/23 14:41** (A3B0674-02)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	03/06/23 17:00	02/20/24 14:41	
1668C PCB Congeners (SUB)	03/06/23 17:00	02/20/24 14:41	
1699 Insecticides/Pesticides (SUB)	03/06/23 17:00	02/27/23 14:41	waters
537M - PFOAs (SUB)	03/06/23 17:00	02/27/23 14:41	
Containers Supplied:			
(F)Other-Non Preserved			
(G)Other-Non Preserved			
(Q)1 L Amber Glass - Non Preserved			
(R)1 L Amber Glass - Non Preserved			
(S)1 L Amber Glass - Non Preserved			
(T)1 L Amber Glass - Non Preserved			

22-Feb-23 12:20
Lori Dufour
C351279
KSS ENV-1648

Standard TAT *WATCH HOLD TIMES*

Released By — Date 2.21.23 — Received By — Date

Fed Ex (Shipper)

Released By — Date — Received By — Date 2023/02/22

Temp. B. 6.0/6.0/3.7 2.7/2.9/3.5 3.6/3.3/4.1 Temp. B 4.7/3.6/3.9 12:20

APPENDIX D

DATA VALIDATION MEMORANDA

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. M0830.03.006 | DECEMBER 16, 2022 | CITY OF ST. HELENS

Maul Foster & Alongi, Inc. (MFA), conducted an independent Stage 2A review of the quality of analytical results for a 50-part incremental sampling methodology (ISM) sediment sample collected by MFA from the wastewater treatment lagoon located at 451 Plymouth Street, St. Helens, Oregon, on August 10, 2022.

Apex Laboratories, LLC (Apex), Bureau Veritas (BV), and Weck Laboratories, Inc. (Weck), performed the analyses. MFA reviewed Apex report number A2H0382 and BV report number C2O0154. Portions of samples submitted to Apex were subcontracted to BV for dioxins and furans analysis and to Weck for chlorinated herbicides analysis. BV results were reported in C2O0154 and Weck analytical results were appended to Apex report A2H0382. The analyses performed and sample analyzed are listed below.

Analysis	References
Chlorinated herbicides	EPA 8151A
Diesel- and oil-range hydrocarbons	NWTPH-Dx
Dioxins and furans	EPA 8290A, EPA 1613B
Gasoline-range hydrocarbons	NWTPH-Gx
Hexavalent chromium	EPA 7196A
Organochlorine pesticides	EPA 8270E
Organophosphorus pesticides	EPA 8270E
Percent moisture	Carter, 2008
Percent solids	EPA 8000D
Polychlorinated biphenyls as congeners	EPA 1668C
Per- and polyfluoroalkyl substances	ASTM D7968-17A
Semivolatile organic compounds	EPA 8270E
Total metals	EPA 6020B
Volatile organic compounds	EPA 8260D, EPA 8260D-SIM

Notes
ASTM = ASTM International.
EPA = U.S. Environmental Protection Agency.
NWTPH = Northwest Total Petroleum Hydrocarbons.
SIM = selected ion monitoring.

Sample Analyzed
Reports A2H0382, C2O0154
DU1-20220810-ISM-COMP

DATA QUALIFICATION

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA 2014, 2020a, 2020b, 2020c) and appropriate laboratory- and method-specific guidelines (Apex 2022, BV 2021, EPA 1986, Weck 2020).

Data validation procedures were modified, as appropriate, to accommodate quality control requirements for methods that EPA data review procedures do not specifically address (e.g., Northwest Total Petroleum Hydrocarbons [NWTPH]-Dx).

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.
- R = result is rejected. The analyte may or may not be present in the sample.
- U = result is non-detect at the estimated detection limit (EDL), laboratory detection limit (LDL), method detection limit (MDL), or method reporting limit (MRL).
- UJ = result is non-detect with an estimated LDL or MRL.

According to report A2H0382, the NWTPH-Dx diesel-range hydrocarbons result for sample DU1-20220810-ISM-COMP and the associated laboratory duplicate sample (22H0779-DUP1) was flagged by Apex as having a chromatographic pattern that did not resemble the diesel fuel standard used for quantitation. The result was reported as diesel-range hydrocarbons instead of a specific fuel product; thus, qualification was not required.

According to report A2H0382, the EPA Method 8270E 3,3'-dichlorobenzidine result for sample DU1-20220810-ISM-COMP was flagged by Apex as estimated due to known erratic recoveries. Apex noted that the analyte may not have passed all quality control requirements for the method. The result has been qualified by the reviewer with R.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A2H0382	DU1-20220810-ISM-COMP	3,3'-Dichlorobenzidine	2,830 U	2,830 R

Notes
R = result is rejected. The analyte may or may not be present in the sample.
U = result is non-detect at the laboratory detection limit.
ug/kg = micrograms per kilogram.

According to report A2H0382, Apex noted that the EPA Method 7196A hexavalent chromium analysis for sample DU1-20220810-ISM-COMP included compensation for background color and/or sample turbidity, in accordance with the analytical method. Qualification was not required.

Positive identification of 2,3,7,8-TCDF cannot be achieved using typical EPA Method 1613B analytical columns; therefore, 2,3,7,8-TCDF results detected above the MRL are confirmed by analysis with a second column having 2,3,7,8-TCDF resolution capacity. The confirmation analysis is referenced by BV to both EPA Methods 8290A and 1613B. In report C2O0154, the following 2,3,7,8-TCDF result was confirmed by second column analysis and is considered the result of record:

Report	Sample	Component	Primary Analysis (pg/g)	Confirmation Analysis (pg/g)	Result of Record (pg/g)
C2O0154	DU1-20220810-ISM-COMP	2,3,7,8-TCDF	58.3	59.5	59.5
Note pg/g = picograms per gram.					

According to report C2O0154, the ASTM International (ASTM) Method D7968-17A perfluorohexanesulfonic acid (PFHxS) result for sample DU1-20220810-ISM-COMP was flagged by BV as estimated due to exceedance of confirmation criteria. The result has been qualified by the reviewer with J, as shown in the following table:

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
C2O0154	DU1-20220810-ISM-COMP	PFHxS	3.5	3.5 J
Notes J = result is estimated. ug/kg = micrograms per kilogram.				

SAMPLE CONDITIONS

Sample Custody

Sample custody was appropriately documented on the chain-of-custody (COC) forms accompanying the reports.

According to the subcontract COC form provided with report C2O0154, cooler custody seals were not observed on the sample coolers received by BV on August 23, 2022.

Holding Times

According to report A2H0382, the EPA Method 8260D-SIM analysis of sample DU1-20220810-ISM-COMP was performed two days after the 14-day method-recommended holding time. All associated results were non-detect and have been qualified by the reviewer

with R. The same analytes were also analyzed by EPA Method 8260D within the method-recommended holding time and were included in report A2H0382 to provide an unqualified analytical dataset. The EPA Method 8260D results will be used as the results of record. The EPA Method 8260D-SIM and 8260D data qualification and use is summarized in the following table:

Report A2H0382				
Sample	Component	EPA 8260D-SIM Original Result (ug/kg)	EPA 8260D-SIM Qualified Result (ug/kg)	EPA 8260D Result of Record (ug/kg)
DU1-20220810-ISM-COMP	Benzene	36.5 U	36.5 R	182 U
	Toluene	182 U	182 R	911 U
	Ethylbenzene	91.1 U	91.1 R	456 U
	m,p-Xylene	182 U	182 R	911 U
	o-Xylene	91.1 U	91.1 R	456 U
	1,2,4-Trimethylbenzene	182 U	182 R	911 U
	1,3,5-Trimethylbenzene	182 U	182 R	911 U
	Chloroform	182 U	182 R	911 U
	1,2-Dibromo-3-chloropropane	91.1 U	91.1 R	4,560 U
	1,2-Dibromoethane	36.5 U	36.5 R	911 U
	1,1-Dichloroethane	36.5 U	36.5 R	456 U
	1,2-Dichloroethane	36.5 U	36.5 R	456 U
	1,1-Dichloroethene	72.9 U	72.9 R	456 U
	cis-1,2-Dichloroethene	36.5 U	36.5 R	456 U
	trans-1,2-Dichloroethene	36.5 U	36.5 R	456 U
	1,2-Dichloropropane	36.5 U	36.5 R	456 U
	cis-1,3-Dichloropropene	36.5 U	36.5 R	911 U
	trans-1,3-Dichloropropene	36.5 U	36.5 R	911 U
	Methyl tert-butyl ether	36.5 U	36.5 R	911 U
	Tetrachloroethene	583 U	583 R	456 U
	1,1,2,2-Tetrachloroethane	91.1 U	91.1 R	911 U
	Trichloroethene	36.5 U	36.5 R	456 U
	1,2,3-Trichloropropane	91.1 U	91.1 R	911 U
	Vinyl chloride	182 U	182 R	456 U
	1,1,2-Trichloroethane	91.1 U	91.1 R	456 U

Note
EPA = U.S. Environmental Protection Agency.
R = result is rejected. The analyte may or may not be present in the sample.
SIM = selected ion monitoring.
U = result is non-detect at the laboratory detection limit.
ug/kg = micrograms per kilogram.

According to report A2H0382, the EPA Method 8270E organochlorine pesticide analysis was performed by Apex 33 days after the 14-day method-recommended holding time. Apex noted that the ISM-processed sample had been frozen at -18 degrees Celsius to extend the holding

time and when accounting for the time spent in frozen storage, the 14-day holding time had been met. The reviewer confirmed that the total amount of time that the sample spent in standard storage (at 4 degrees Celsius) was fewer than 14 days. Qualification based on holding time exceedance was not required.

According to the general comments provided with report C2O0154, ASTM D7968-17A batch 8213841 analysis for sample DU1-20220810-ISM-COMP was performed 9 days after the method-recommended holding time of 28 days. BV noted that a reanalysis was required for quality control purposes. BV also noted that due to their chemical nature, PFAS compounds are chemically and biologically stable in the environment, resist typical environmental degradation, and that reanalysis outside of the method-defined holding time should not have a significant impact on the data. The reviewer noted that there are no EPA guidelines for validation of PFAS analytical results. The associated sample results have been qualified with J for detected results and UJ for non-detect results.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
C2O0154	DU1-20220810-ISM-COMP	PFTrDA	3.9	3.9 J[a]
		PFTeDA	2.2	2.2 J[a]
		PFOSA	0.20 U	0.20 UJ[a]
		EtFOSA	0.31 U	0.31 UJ[a]
		MeFOSA	0.39 U	0.39 UJ[a]
		EtFOSE	1.7	1.7 J[a]
		MeFOSE	3.6	3.6 J

Notes
J = result is estimated.
U = result is non-detect at the method detection limit.
ug/kg = micrograms per kilogram.
UJ = result is non-detect with an estimated method detection limit.
[a]Result is also qualified based on labeled surrogate exceedance. Final qualification is shown.

The remaining extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

The reviewer confirmed with the MFA field sampler that sample DU1-20220810-ISM-COMP was collected as a 50-part ISM sample from St. Helens wastewater lagoon decision unit 1. Apex performed representative sampling methodology processing, as requested on the COC form provided with report A2H0382. Apex noted that the sample was processed prior to extraction and analysis; the reviewer confirmed representative sampling methodology was performed consistent with standard ISM guidance. Apex air-dried and ground the entire dried sample to 70-micron particle size. The reviewer confirmed with Apex that dried fragments of the sample were examined for debris and large pieces of visible trash had been removed prior to grinding. Gravel and sticks were not observed in the sample. Apex noted in a separate email communication that small particles of plastic and synthetic fibers had been observed in the

dried material, and at MFA's request, these small particles were retained and processed with the sample. The ground material was mixed and then subsampled for analysis. A separate 50-part ISM sample container with methanol preservative was submitted for NWTPH-Gx, EPA Method 8260D, and EPA Method 8260D-SIM analysis.

According to the general comments section of report C2O0154, the sample cooler received by BV on August 23, 2022, had an average temperature of 10.5 degrees Celsius. A temperature blank was also present and had an acceptable average temperature at 4.1 degrees Celsius. The reviewer confirmed that wet ice was also present in the cooler upon receipt. Based on the acceptable temperature blank temperature, qualification was not required. A second sample cooler received by BV on September 15, 2022, with the portion of sample provided for EPA Method 1668C polychlorinated biphenyl congener analysis had an average cooler temperature of 15.2 degrees Celsius. BV noted on the COC form that a temperature blank was not found. The reviewer confirmed that wet ice was present in the cooler when BV received it. Based on the presence of wet ice and known polychlorinated biphenyl congener thermal stability, the reviewer determined that qualification was not necessary.

The remaining samples were preserved and stored appropriately.

REPORTING LIMITS

Apex and Weck reported non-detect results to LDLs. Apex also raised some LDLs to MRLs, and these results are discussed below. BV reported non-detect EPA Method 1613B and 1668C results to EDLs and ASTM D7968-17A results to MDLs. Results detected between LDLs, EDLs, or MDLs and the associated MRLs were flagged by the laboratories with J as estimated. Samples requiring dilutions because of high analyte concentrations and/or matrix interferences were reported with raised detection and/or reporting limits. BV labeled MRLs as reporting detection limits.

The reviewer confirmed that NWTPH-Gx and EPA Method 8260D results were reported with a base dilution factor of 50 and EPA Method 8260D-SIM results were reported with a base dilution factor of 100 due to dilutions required for analysis.

According to report A2H0382, Apex raised NWTPH-Gx gasoline-range hydrocarbon and EPA Method 8260D bromomethane and 2-hexanone LDLs to MRLs. The reviewer confirmed that the gasoline-range hydrocarbon LDL had been raised due to matrix interference and that the bromomethane and 2-hexanone LDLs had been raised due to interference from coeluting organic compounds. No qualification was required.

According to report A2H0382, the EPA Method 8270E organophosphorus pesticide analysis of sample DU1-20220810-ISM-COMP and the associated laboratory duplicate was performed at a dilution of 40 due to requirements for sample preparation and/or analysis. The reviewer confirmed with Apex that the dilution was required due to matrix interference. LDLs for merphos, ethyl parathion, tetrachlorvinphos, and trichloroate were additionally raised by Apex to MRLs due to interference from coeluting organic compounds. The reviewer confirmed that LDLs for coumaphos, merphos, methyl parathion, monocrotophos were also raised to MRLs by Apex due to interference from coeluting organic compounds. No qualification was required.

According to report A2H0382, EPA Method 8270E organochlorine pesticide LDLs for dieldrin, endosulfan I, and endosulfan II for sample DU1-20220810-ISM-COMP were raised by Apex to the detected sample concentration due to interference from coeluting organic compounds. No qualification was required.

According to report A2H0382, the EPA Method 7196A analysis was performed at a dilution of 50. The reviewer confirmed that the dilution was performed due to matrix interference. No qualification was required.

According to report A2H0382, the EPA Method 8151A analysis was performed at a dilution of 10 due to matrix interference. The reviewer confirmed that Weck also diluted the sample prior to extraction due to matrix interference. No qualification was required.

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 A2H0382, the EPA Method 8260D-SIM batch 22H0946 laboratory method blank (22H0946-BLK1) had a detection of toluene between the LDL and MRL, at a concentration of 2.96 micrograms per kilogram, and a detection of tetrachloroethene above the MRL, at a concentration of 13.4 micrograms per kilogram. The associated sample results were non-detect; thus, qualification was not required.

According to report C2O0154 the EPA Method 1613B batch 8212445 laboratory method blank total HxCDD EDL was raised to 0.424 picograms per gram due to an estimated maximum potential concentration detection. The reviewer confirmed that the total HxCDD estimated maximum potential concentration was below the MRL. The reviewer applied validation guidance based on laboratory method blank evaluation of OCDD and OCDF so qualification was not required.

According to report C2O0154, the EPA Method 1668C batch 8239765 laboratory method blank analysis detected 3,3'-DiCB-11, TriCB-20+28, TetraCB-44+47+65, PentaCB-90+101+113, PentaCB-110+115, 2,3',4,4',5-PentaCB-118, HexaCB-129+138+163, HexaCB-147+149, and HexaCB-153+168 between EDLs and MRLs, ranging from concentrations of 0.00027 nanograms per gram to 0.00323 nanograms per gram. All associated sample results were detected above MRLs and significantly greater than the laboratory method blank concentrations; thus, qualification was not required.

All remaining laboratory method blank results were non-detect to LDLs, EDLs, or MDLs for all target analytes.

Equipment Rinsate Blanks

Equipment rinsate blanks are used to evaluate field equipment decontamination. These blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

Trip Blanks

Trip blanks are used to evaluate whether volatile organic compound contamination was introduced during sample storage and shipment between the sampling location and the laboratory.

Trip blank samples were not submitted for analysis. The associated sample was non-detect for all volatile organic compounds.

LABORATORY CONTROL SAMPLE AND LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample (LCS) and a laboratory control sample duplicate (LCSD) are spiked with target analytes to provide information about laboratory precision and accuracy. The LCS and LCSD samples were extracted and analyzed at the required frequency. LCSD results were not reported by Apex; batch precision was evaluated with laboratory duplicate sample results. BV labeled LCS and LCSD results as "spiked blank" and "spiked blank dup" results, respectively.

According to report A2H0382, the EPA Method 8260D batch 22H0476 LCS (22H0476-BS1) exceeded the upper percent recovery acceptance limit of 120 percent for acetone, bromomethane, chloroethane, and 2,2-dichloropropane, ranging from 122 percent to 139 percent. The associated sample results were non-detect; thus, qualification was not required. The LCS results for 2-hexanone and naphthalene were below the lower percent recovery acceptance limit of 80 percent, at 76 percent and 67 percent, respectively. Apex noted that MRL sensitivity had been confirmed for these two analytes. The associated sample LDL for 2-hexanone had been raised to the MRL by Apex. The reviewer raised the associated sample LDL for naphthalene to the MRL and qualified both the 2-hexanone and naphthalene results, which were non-detect, with UJ, at the MRL.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A2H0382	DU1-20220810-ISM-COMP	2-Hexanone	18,200 U	18,200 UJ
		Naphthalene	1,820 U	3,650 UJ
Notes U = result is non-detect at the laboratory detection limit or method reporting limit. ug/kg = micrograms per kilogram. UJ = result is non-detect with an estimated method reporting limit.				

According to report A2H0382, the EPA Method 8260D-SIM batch 22H0946 LCS (22H0946-BS1) exceeded the upper percent recovery acceptance limit of 120 percent for

tetrachloroethane, at 136 percent. The associated sample result was non-detect; thus, qualification was not required. The LCS result for 1,1-dichlorothene was below the lower percent recovery acceptance limit of 80 percent, at 67 percent. Apex noted that the associated sample result may be biased low. The associated sample result was already qualified by the reviewer as rejected based on analysis after the holding time; additional qualification was not required.

According to report A2H0382, the EPA Method 8270E batch 22H0777 LCS (22H0777-BS1) result for 3,3'-dichlorobenzidine exceeded the upper percent recovery acceptance limit of 121 percent, at 282 percent. Apex had also flagged the associated sample result as estimated based on known erratic quality control. The associated sample result is discussed by the reviewer in the Data Qualifications section above; additional qualification was not required.

All remaining LCS and LCSD results were within acceptance limits for percent recovery and relative percent difference (RPD).

LABORATORY DUPLICATE RESULTS

Laboratory duplicate results are used to evaluate laboratory precision. All laboratory duplicate samples were prepared and analyzed at the required frequency. When laboratory duplicate sample results were not reported, batch precision was evaluated with matrix spike (MS) and matrix spike duplicate (MSD) sample results.

Laboratory duplicate results greater than five times the MRL were evaluated using laboratory RPD control limits. Laboratory duplicate results less than five times the MRL, including non-detects, were evaluated using a control limit of the MRL of the parent sample; the absolute difference of the laboratory duplicate sample result and the parent sample result or the MRL for non-detects was compared to the MRL of the parent sample.

All laboratory duplicate results, including those flagged by the laboratory, met RPD acceptance criteria.

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE RESULTS

MS and MSD results are used to evaluate laboratory precision and accuracy as well as the effect of the sample matrix on sample preparation and analysis. When MS and MSD results were not reported, batch precision and accuracy were evaluated with laboratory duplicate and LCS results, respectively.

When MS and MSD were prepared from samples with high concentrations of target analytes, associated MS and/or MSD percent recovery and/or RPD control limit exceedances did not require qualification because spike concentrations could not be accurately quantified. High concentrations of target analytes are defined as four times the spike amount for all analyses.

When MS and MSD were prepared with samples from unrelated projects, the MS and/or MSD percent recovery and/or RPD control limit exceedances did not require qualification because these sample matrices were not representative of project sample matrices.

According to report A2H0382, Apex flagged the EPA Method 8260D batch 22H0476 MS (22H0476-MS1) because the associated parent sample was received by Apex at a temperature outside of the recommended storage temperature range. The MS was prepared with a sample from an unrelated project; thus, qualification was not required.

According to report A2H0382, a MS was not reported for EPA Method 8270E batch 22H0777 or 22H0778 because high dilutions had been required for analysis for the sample used to prepare the MSs; expected MS spike concentrations were below LDLs, so analyte recovery could not be calculated. Batch accuracy was evaluated with LCS results.

According to report A2H0382, the EPA Method 7196A batch 22H0747 MS (22H0747-MS1) had no hexavalent chromium recovery. A second MS (22H0747-MS2) that was analyzed at a higher dilution also had no hexavalent chromium recovery. Apex noted that MS recoveries were likely caused by reducing conditions present in the sample. Apex analyzed a post-digestion MS (22H0747-PS1), where the digested sample was spiked with hexavalent chromium prior to analysis. The post-digestion MS had acceptable hexavalent chromium recovery; thus, the associated sample result, which was non-detect, was qualified by the reviewer with UJ, as shown in the following table.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
A2H0382	DU1-20220810-ISM-COMP	Hexavalent chromium	10.7 U	10.7 UJ

Notes
U = result is non-detect at the laboratory detection limit.
mg/kg = milligrams per kilogram.
UJ = result is non-detect with an estimated laboratory detection limit.

According to report A2H0382, EPA Method 8151A batch W2H1928 MS (W2H1928-MS1) results for 2,4-D, 2,4-DB, 2,4,5-T, 2,4,5-TP, dalapon, dicamba, MCPP, pentachlorophenol, and pichloram were below lower percent recovery acceptance limits or were non-detect. The associated surrogate percent recovery was below the lower percent recovery acceptance limit of 13 percent, at 8 percent. Weck noted that the low MS and surrogate recoveries were likely caused by matrix interference. The associated MSD (W2H1928-MSD1) had acceptable percent recoveries for all chlorinated herbicides, ranging from 30 percent to 118 percent, and the surrogate, at 67 percent. The associated sample surrogate recovery was acceptable, at 67 percent, which indicates that matrix interference may have been minimal; however, based on the variable MS and MSD recoveries, all associated sample results, which were non-detect, have been qualified by the reviewer with UJ, as shown in the following table. MS and MSD RPDs provided by Weck appeared to be incorrect and so were recalculated by the reviewer. All MS and MSD RPDs exceeded the RPD control limit of 25 percent. The associated sample was non-detect for all chlorinated herbicides, so additional qualification based on MS and MSD RPD was not required.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A2H0382	DU1-20220810-ISM-COMP	2,4-D	330 U	330 UJ
		2,4-DB	580 U	580 UJ
		2,4,5-T	150 U	150 UJ
		2,4,5-TP (Silvex)	180 U	180 UJ
		Dalapon	260 U	260 UJ
		Dicamba	240 U	240 UJ
		Dichloroprop	240 U	240 UJ
		Dinoseb	83 U	83 UJ
		MCPA	54,000 U	54,000 UJ
		MCPP	140,000 U	140,000 UJ
		Pentachlorophenol	230 U	230 UJ
		Picloram	220 U	220 UJ

Notes
U = result is non-detect at the method detection limit.
UJ = result is non-detect with an estimated method detection limit.
ug/kg = micrograms per kilogram.

All remaining MS and MSD results were within acceptance limits for percent recovery and RPD.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance for individual samples. The laboratory appropriately documented and qualified surrogate outliers. The reviewer took no action on surrogate percent recoveries associated with high sample dilutions. The reviewer confirmed that batch quality assurance/quality control results for samples with surrogate outliers were within acceptance limits.

All remaining surrogate results were within percent recovery acceptance limits.

LABELED ANALOG RECOVERY RESULTS

According to report C2O0154, ASTM D7968-17A, EPA Method 1613B, and EPA Method 1668C samples were spiked with carbon-13 labeled standards to quantify the relative response of analytes in each sample. For EPA Method 1613B, a chlorine-37 labeled standard was also used to evaluate the efficiency of the extract cleanup process.

According to report C2O0154, ASTM D7968-17A, EPA Method 1613B, and EPA Method 1668C labeled standard percent recovery acceptance limits were not shown for sample DU1-20220810-ISM-COMP. The reviewer confirmed with BV that all sample DU1-20220810-ISM-COMP labeled standard percent recovery acceptance limits were shown with quality control

results and that all percent recovery exceedances were noted. No additional action was required.

According to report C2O0154, EPA Method 1668C labeled standard 13C-2,2'6,6'-TetraCB-54 and ^{13}C-2,2'-DiCB-4 results for the batch 8239765 laboratory method blank were flagged by BV as meeting method criteria. The review confirmed with BV that the labeled standard acceptance limits had been expanded based on labeled standard recovery in the LCS. The associated samples and LCS had acceptable labeled analog standard recoveries; thus, qualification was not required.

According to report C2O0154, the ASTM D7968-17A labeled standards $^{13}C_2$-perfluorotetradecanoic acid (PFTeDA), $^{13}C_8$-perfluorooctane sulfonamide (PFOSA), d3-N-methyl perfluorooctane sulfonamide (MeFOSA), d5-N-ethyl perfluorooctane sulfonamide (EtFOSA), and d9-N-ethyl perfluorooctane sulfonamido ethanol (EtFOSE) were below lower percent recovery acceptance limits of 50 percent, at 38 percent, 27 percent, 23 percent, 18 percent, and 17 percent, respectively, for sample DU1-20220810-ISM-COMP. The results were confirmed by reanalysis and are likely related to matrix interference. BV noted that PFTrDA sample results were also associated with the PFTeDA surrogate. The associated sample results have been qualified with J for detected results and UJ for non-detect results. All associated results were also qualified based on holding time exceedance, which is discussed in the Holding Times section above. Additional qualification was not required, but a summary of qualified results is presented for clarity:

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
C2O0154	DU1-20220810-ISM-COMP	Perfluorotridecanoic acid (PFTrDA)	3.9	3.9 J[a]
		Perfluorotetradecanoic acid (PFTeDA)	2.2	2.2 J[a]
		Perfluorooctane sulfonamide (PFOSA)	0.20 U	0.20 UJ[a]
		N-Ethyl perfluorooctane sulfonamide (EtFOSA)	0.31 U	0.31 UJ[a]
		N-Methyl perfluorooctane sulfonamide (MeFOSA)	0.39 U	0.39 UJ[a]
		N-Ethyl perfluorooctane sulfonamido ethanol (EtFOSE)	1.7	1.7 J[a]

Notes
J = result is estimated.
U = result is non-detect at the method detection limit.
ug/kg = micrograms per kilogram.
UJ = result is non-detect with an estimated method detection limit.
[a]Result is also qualified based on holding time exceedance. Final qualification is shown.

All remaining labeled standard recoveries were within acceptance limits.

CONTINUING CALIBRATION VERIFICATION RESULTS

Continuing calibration verification (CCV) results are used to demonstrate instrument precision and accuracy through the end of the sample batch. The laboratories did not report CCV

results, but appropriately flagged results associated with CCV exceedances. Surrogate or batch quality control results flagged by the laboratory based on CCV exceedances but meeting percent recovery and/or RPD acceptance criteria required no action from the reviewer.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. Duplicate and triplicate samples were not submitted for analysis.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

Chemical names provided in this report can be found in the referenced analytical methods or the United States National Institutes of Health National Library of Medicine PubChem database https://pubchem.ncbi.nlm.nih.gov/.

Report A2H0382 was amended and reissued by Apex on December 12, 2022, to include LDLs for EPA Method 8151A results and to correct the EPA Method 8270E merphos result for sample DU1-20220810-ISM-COMP.

According to the COC form provided with report A2H0382, EPA Method 8151A chlorinated herbicide analysis was requested twice for sample DU1-20220810-ISM-COMP. The reviewer confirmed that the second analysis had been requested in error and that along with the first request for EPA Method 8151A, the remaining analytical methods on the COC form represented the complete list of required laboratory analyses. No additional action was required.

According to the COC form provided with report A2H0382, EPA Method 537 modified was requested for the per- and polyfluoroalkylated substances analysis; however, ASTM Method D7968-17A was performed. The reviewer confirmed that ASTM Method D7968-17A was an appropriate analytical method for the analysis. No additional action was required.

According to the COC form provided with report A2H0382, EPA Method 1699 modified was requested for the organochlorine pesticide analysis; however, EPA Method 8270E was ultimately performed. The reviewer confirmed that EPA Method 8270E was an appropriate analytical method for the analysis. No additional action was required.

C2O0154 was revised and reissued by BV on November 16, 2022, with a correction to sample name DU1-20220810-ISM-COMP.

No additional issues were found.

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DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. M0830.03.006 | JUNE 7, 2023 | CITY OF ST. HELENS

Maul Foster & Alongi, Inc. (MFA), conducted an independent Stage 2A review of the quality of analytical results for groundwater, sediment, and associated quality control samples collected by MFA in January and February 2023 from the wastewater treatment lagoon located at 451 Plymouth Street, St. Helens, Oregon.

Apex Laboratories, LLC (Apex), Bureau Veritas (BV), and Weck Laboratories, Inc. (Weck), performed the analyses. MFA reviewed Apex report numbers A3A1010, A3B0217, A3B0522, and A3B0674. Portions of samples submitted to Apex were subcontracted to BV for dioxins and furans, polychlorinated biphenyl, and per- and polyfluoroalkylated substance analyses and to Weck for chlorinated herbicides analysis. MFA reviewed BV reports C338911, C338927, C347690, C347713, and C351279. Weck analytical results were appended to Apex reports. The analyses performed and the samples analyzed are listed in the following tables. Not all samples were analyzed for all the methods listed below.

Analysis	References
Chlorinated herbicides	EPA 8151A
Diesel- and oil-range hydrocarbons	NWTPH-Dx
Dioxins and furans	EPA 1613B, EPA 8290A
Gasoline-range hydrocarbons	NWTPH-Gx
Hexavalent chromium (sediment)	EPA 7196A
Hexavalent chromium (water)	EPA 218.6
Organochlorine pesticides (sediment)	EPA 8270E
Organochlorine pesticides (water)	EPA 1699
Organophosphorus pesticides	EPA 8270E
Percent moisture	Carter, 2008
Percent solids	EPA 8000D
Polychlorinated biphenyls as congeners	EPA 1668C
Per- and polyfluoroalkyl substances (sediment)	ASTM D7968-17A
Per- and polyfluoroalkyl substances (water)	EPA 537.1
Semivolatile organic compounds	EPA 8270E
Total metals	EPA 6020B
Volatile organic compounds	EPA 8260D, EPA 8260D-SIM

Notes
ASTM = ASTM International.
EPA = U.S. Environmental Protection Agency.
NWTPH = Northwest Total Petroleum Hydrocarbons.
SIM = selected ion monitoring.

Samples Analyzed		
Reports A3A1010, C338927, C347690,	**Reports A3B0217, C338911**	**Reports A3B0522, C347713**
MFA-B1-20230130-21.9[(a)]	MFA-B3A-20230207-GW-36.0	MW3-20230214-GW-35
MFA-B3-20230131-31.0[(a)]	Field Blank	MW3-20230214-GW-35-DUP
MFA-B2-20230131-23.0[(a)]	Trip Blank	MW5-20230214-GW-40
MFA-B4-20230202-SL-26.5[(a)]	--	MW4-20230214-GW-40
MFA-B5-20230203-SL-27.0[(a)]	--	MW6-20230214-GW-40.25
MFA-B1-B5-COMP-SL[(b)]	--	Field Blank-02
MFA-B1-B5-COMP-SL-PRO[(c)]	--	Trip Blank
Reports A3B0674, C351279	--	--
MW1-20230220-GW-70	--	--
MW2-20230220-GW-60	--	--
Trip Blank	--	--

Notes
-- = no value.
[(a)]Discrete sample submitted to laboratory for compositing.
[(b)]Sample composited by Apex Laboratories, LLC for gasoline-range hydrocarbon and volatile organic compound analysis and composited by Bureau Veritas for per- and polyfluoroalkylated substance analysis.
[(c)]Sample composited by Apex Laboratories, LLC and analyzed for all except per- and polyfluoroalkylated substances.

DATA QUALIFICATION

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA 2014, 2020a, 2020b, 2020c) and appropriate laboratory- and method-specific guidelines (Apex 2022, BV 2021, EPA 1986, Weck 2020).

Data validation procedures were modified, as appropriate, to accommodate quality control requirements for methods that EPA data review procedures do not specifically address (e.g., Northwest Total Petroleum Hydrocarbons [NWTPH]-Dx).

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 may be biased high.
- J- = result is estimated but may be biased low.
- R = result is rejected. The analyte may or may not be present in the sample.

- U = result is non-detect at the estimated detection limit (EDL), laboratory detection limit (LDL), method detection limit (MDL), or method reporting limit (MRL).
- UJ = result is non-detect with an estimated EDL, LDL, or MRL.
- UK = result is non-detect at the estimated maximum potential concentration.

According to report A3A1010, the NWTPH-Dx diesel-range hydrocarbon result for sample MFA-B1-B5-COMP-SL-PRO and the associated laboratory duplicate sample (23B07695-DUP1) were flagged by Apex as elevated because of the presence of individual analyte peaks within the diesel hydrocarbon quantitation range that were not representative of diesel fuel. Apex also noted that the diesel-range hydrocarbon chromatographic pattern was similar to weathered diesel, mineral oil, or a related component. The reviewer qualified the associated sample result with J+ as shown in the following table. The result was also qualified by the reviewer as estimated in the Holding Times section below based on holding time exceedance; the reviewer determined that a final qualification of J+ based on both holding time and the chromatographic pattern was appropriate.

Report	Sample	Component	Original Result (mg/kg)	Qualified Result (mg/kg)
A3A1010	MFA-B1-B5-COMP-SL-PRO	Diesel-range hydrocarbons	26,100	26,100 J+[a]

Notes
J+ = result is estimated but may be biased high.
mg/kg = milligrams per kilogram.
[a]Final qualification of J+ based on both chromatographic pattern and holding time exceedance.

According to report A3A1010, Apex flagged all 3,3'-dichlorobenzidine results for sample MFA-B1-B5-COMP-SL-PRO and associated quality control samples as estimated based on known erratic recovery. The reviewer qualified the sample result with UJ in the following table. The result was also qualified by the reviewer as estimated in the Holding Times section below based on holding time exceedance; the reviewer determined that a final qualification of UJ based on both holding time and known erratic recovery was appropriate.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A3A1010	MFA-B1-B5-COMP-SL-PRO	3,3'-Dichlorobenzidine	3,960 U	3,960 UJ[a]

Notes
ug/kg = micrograms per kilogram.
UJ = result is non-detect with an estimated laboratory detection limit.
[a]Final qualification of UJ based on both known erratic recovery and holding time exceedance.

According to reports A3B0217, A3B0522, and A3B0674, Apex flagged all results detected between MDLs or LDLs and MRLs with Ja. The reviewer qualified these results with J. Results that were additionally qualified by the review are discussed in this validation report.

According to report A3A1010, Apex noted that EPA Method 7196A analysis of sample MFA-B1-B5-COMP-SL-PRO included compensation for background color and/or turbidity, and that this was performed in accordance with the analytical method. No qualification was required.

According to report C338927, the ASTM International (ASTM) Method D7968-17A PFHxS result for sample MFA-B1-B5-COMP-SL was flagged by BV as estimated due to exceedance of ion ratio confirmation criteria. The result has been qualified by the reviewer with J, as shown in the following table:

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
C338927	MFA-B1-B5-COMP-SL	PFHxS	2.2	2.2 J
Notes J = result is estimated. ug/kg = micrograms per kilogram.				

In accordance with EPA Region 10 guidance for dioxin and furan data validation (EPA 2014) and EPA national functional guidelines for high-resolution Superfund methods data review (EPA 2020a), the reviewer qualified EPA Method 1613B results because of laboratory EMPC detections. The reviewer applied the same guidance to EPA Method 1613B, 1664C and 1699 results that were flagged by BV as EMPCs.

The following results were identified by BV as EMPCs and were reported by BV as non-detect at the EMPC value. The reviewer qualified results identified as EMPCs with UK, as shown in the following table.

Report	Sample	Analyte	Units	Original Results	Qualified Results
C338911	MFA-B3A-20230207-GW-36.0	Aldrin	ng/L	0.19 U	0.19 UK
		beta-BHC		0.13 U	0.13 UK
		Dieldrin		0.090 U	0.090 UK
		Endosulfan sulfate		0.091 U	0.091 UK
		Methoxychlor		1.8 U	1.8 UK
C347690	MFA-B1-B5-COMP-SL-PRO	1,2,3,7,8,9-HxCDF	pg/g	0.453 U	0.453 UK
C347713	MW4-20230214-GW-40	OCDD	ng/L	4.17 U	4.17 UK
C351279	MW1-20230220-GW-70	TetraCB-(45)+(51)	pg/L	0.020 U	0.020 UK
		PentaCB-(90)+(101)+(113)		0.016 U	0.016 UK
		22'466'-PentaCB-(104)		0.016 U	0.016 UK
		22'33'566'-HeptaCB-(179)		0.013 U	0.013 UK
		beta-BHC	ng/L	0.020 U	0.020 UK

Report	Sample	Analyte	Units	Original Results	Qualified Results
	MW2-20230220-GW-60	23'44'-TetraCB-(66)		0.011 U	0.011 UK
		HexaCB-(128)+(166)		0.011 U	0.011 UK

Notes
ng/L = nanograms per liter.
pg/g = picograms per gram.
pg/L = picograms per liter.
U = result is non-detect at the laboratory detection limit.
UK = result is non-detect at the estimated maximum potential concentration.

Positive identification of 2,3,7,8-TCDF cannot be achieved using typical EPA Method 1613B analytical columns; therefore, 2,3,7,8-TCDF results detected above the MRL are confirmed by analysis with a second column having 2,3,7,8-TCDF-resolution capacity. The confirmation analysis is referenced by BV to both EPA Methods 8290A and 1613B. In report C338911, the following 2,3,7,8-TCDF result was confirmed by second-column analysis and is considered the result of record:

Report	Sample	Component	Units	Primary Analysis	Confirmation Analysis	Result of Record
C338911	MFA-B3A-20230207-GW-36.0	2,3,7,8-TCDF	pg/L	48.6	51.5	51.5
C347690	MFA-B1-B5-COMP-SL-PRO		pg/g	498	440	440

Note
pg/g = picograms per gram.
pg/L = picograms per liter.

SAMPLE CONDITIONS

Sample Custody

According to reports C338927, C347690, and C347713, BV recorded sample receipt date and time on only the first page of multi-page chain-of-custody (COC) forms. The reviewer confirmed that all samples recorded on the COC forms had been received at the time recorded on the first page.

Sample custody was appropriately documented on the remaining COC forms accompanying the reports.

Holding Times

According to report A3A1010, Apex extracted sample MFA-B1-B5-COMP-SL-PRO for NWTPH-Dx, EPA Method 8270E semivolatile organic compounds, and EPA Method 8270E organophosphorus pesticides analyses eight days after the 14-day method-recommended extraction holding time. Apex extracted sample MFA-B1-B5-COMP-SL-PRO for EPA Method 8270E organochlorine pesticides 17 days after the 14-day method-recommended

holding time. The reviewer determined extraction holding times based on the earliest collection date of the composited component samples, which was January 30, 2023. The reviewer confirmed that, after the final composite component sample was received by Apex on February 6, 2023, all five component samples were air dried, which took approximately three days. Samples were then frozen at -18 degrees Celsius until the morning of the extraction date. All associated sample results have been qualified by the reviewer as estimated, with UJ applied to non-detect results and J applied to detected results. Results already qualified by Apex as estimated based on detection below the MRL did not require additional qualification.

Report	Sample	Analysis	Original Results	Qualification
A3A1010	MFA-B1-B5-COMP-SL-PRO	NWTPH-Dx	Non-Detect	UJ
			Detect	J
		EPA 8270E (SVOCs)	Non-Detect	UJ
			Detect	J
		EPA 8270E (OP Pest)	Non-Detect	UJ
			Detect	J
		EPA 8270E (OC Pest)	Non-Detect	UJ
			Detect	J

Notes
EPA = U.S. Environmental Protection Agency.
J = result is estimated.
NWTPH = Northwest Total Petroleum Hydrocarbon.
OC Pest = organochlorine pesticide.
OP Pest = organophosphorus pesticide.
SVOC = semivolatile organic compound.
UJ = result is non-detect with an estimated laboratory detection limit.

All remaining extractions and/or analyses were performed within the recommended holding times.

Preservation and Sample Storage

According to report A3A1010, samples MFA-B1-20230130-21.9, MFA-B3-20230131-31.0, MFA-B2-20230131-23.0, MFA-B4-20230202-SL-26.5, and MFA-B5-20230203-SL-27 were collected from January 30, 2023, to February 3, 2023, and submitted by MFA field staff to Apex in four sample delivery groups. Apex composited the five samples based on instructions provided on the COC form. A description of the composting process is summarized below:

According to report A3A1010, composite sample MFA-B1-B5-COMP-SL was prepared by Apex by combining equal volumes of methanol from the methanol-preserved volatile organics analysis containers for samples MFA-B1-20230130-21.9, MFA-B3-20230131-31.0, MFA-B2-20230131-23.0, MFA-B4-20230202-SL-26.5, and MFA-B5-20230203-SL-27. Sample MFA-B1-B5-COMP-SL was analyzed for NWTPH-Gx, EPA Method 8260D, and EPA Method 8260D-SIM. Apex noted that an average of discrete sample dry weights was used to calculate NWTPH-Gx, EPA Method 8260D, and EPA Method 8260D-SIM dry weight results.

According to report A3A1010, sample MFA-B1-B5-COMP-SL-PRO was prepared by Apex by combining equal weights of sample material from samples MFA-B1-20230130-21.9, MFA-B3-20230131-31.0, MFA-B2-20230131-23.0, MFA-B4-20230202-SL-26.5, and MFA-B5-20230203-SL-27. The composited sample was air dried, ground to approximately 70-micron particle size with a zirconia puck mill, and mixed to distribute the material prior to analysis. The sample name was appended with -PRO by Apex to distinguish the compositing processes. The reviewer referenced the Apex-modified sample name in the data validation report for clarity; however, sample name MFA-B1-B5-COMP-SL will be used for final reporting purposes.

According to report C338927, samples MFA-B1-20230130-21.9, MFA-B3-20230131-31.0, MFA-B2-20230131-23.0, MFA-B4-20230202-SL-26.5, and MFA-B5-20230203-SL-27.0 were air-dried and then composited by BV as requested on the original COC. The composited sample was assigned sample name MFA-B1-B5-COMP-SL.

According to the cooler receipt form provided with report A3B0217, all volatile organic analysis (VOA) containers received for sample MFA-B3A-20230207-GW-36.0 contained visible sediment. Qualification based on the presence of sediment was not required.

According to report A3B0217, the NWTPH-Gx, EPA Method 8260D, and EPA Method 8260D-SIM analyses of sample MFA-B3A-20230207-GW-36.0 were performed with a sample composited from multiple VOA containers due to the presence of sediment in the sample containers. The reviewer confirmed that the composite sample was prepared by pouring samples from the original VOA containers. Because sample preparation required opening the discrete sample VOAs, the results have been qualified by the reviewer as estimated. All associated non-detect sample results have been qualified with UJ and all associated detected sample results have been qualified with J, as shown in the following table. Results also flagged as estimated due to detection below the MRL did not require additional qualification.

Report	Sample	Analysis	Original Results	Qualification
A3B0217	MFA-B3A-20230207-GW-36.0	NWTPH-Gx	Detect	J
			Non-Detect	UJ
		EPA 8260D	Detect	J
			Non-Detect	UJ
		EPA 8260D-SIM	Detect	J[a]
			Non-Detect	UJ

Notes
EPA = U.S. Environmental Protection Agency.
J = result is estimated.
NWTPH = Northwest Total Petroleum Hydrocarbon.
SIM = selected ion monitoring.
UJ = result is non-detect with an estimated laboratory detection limit.
[a]EPA Method 8260D-SIM chloroform result qualified based on a trip blank detection; the final qualification is shown in the Trip Blanks section below.

According to report A3B0522, Apex flagged the NWTPH-Dx results for sample MW5-20230214-GW-40 because the sample was received by Apex with incomplete preservation. The sample pH was adjusted by Apex prior to extraction; thus, qualification was not required.

The remaining samples were preserved and stored appropriately.

REPORTING LIMITS

Apex reported results to LDLs. Weck reported results to MDLs. Samples that required dilutions because of high analyte concentrations, matrix interferences, and/or dilutions necessary for preparation and/or analysis were reported with raised LDLs, MDLs, and MRLs. Apex and Weck qualified results between the LDL or MDL and the MRL with J, as estimated.

According to report A3A1010, the sample MFA-B1-B5-COMP-SL-PRO LDLs for EPA Method 8270E organophosphorus pesticides coumaphos, merphos, ethyl parathion, tetrachlorvinphos, and trichloronate and the LDLs for EPA Method 8270E organochlorine pesticides alpha-hexachlorocyclohexane (reported by Apex as alpha-BHC), beta-hexachlorocyclohexane (reported by Apex as beta-BHC), 2,4'-DDD, heptachlor, dieldrin, endosulfan I, and endosulfan II were raised to MRLs because of interference from coeluting organic compounds present in the sample. No qualification was necessary.

According to report A3A1010, the EPA Method 7196A sample MFA-B1-B5-COMP-SL-PRO LDL and MRL were raised because the sample required a 1:50 dilution for analysis. The reviewer confirmed that the dilution was required due to matrix interference. No qualification was required.

According to report A3B0522, all EPA Method 8151A sample extracts were diluted 1:5 prior to analysis due to matrix interference. Additionally, EPA Method 218.6 hexavalent chromium analysis was performed at 1:5 dilution for samples MW5-20230214-GW-40, MW4-20230214-GW-40, and MW6-20230214-GW-40.25 due to matrix interference. No qualification was required.

According to the case narrative provided with report C338911, BV performed all analyses for sample MFA-B3A-20230207-GW-36.0 at a 1:10 dilution because of matrix interferences. No qualification was required.

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. Where an analyte was detected in both a sample and its associated blank, sample results were qualified if the concentration was less than five times the laboratory method blank concentration for organic method analyses or less than ten times the laboratory method blank concentration for inorganic method analyses. Non-detect sample results and sample results greater than five times the laboratory method blank (for organic methods) or ten times (for inorganic methods) did not require qualification.

According to report A3B0522, the EPA Method 8270D batch 23B0739 laboratory method blank (23B0739-BLK1) had detections of merphos and tetraethyl pyrophosphate (reported by Apex as TEPP) between the LDL and MRL, at 0.491 micrograms per liter (ug/L) and 0.346 ug/L, respectively. The associated sample results were non-detect; thus, qualification was not required.

According to report C338911, the EPA Method 1699 batch 8503096 laboratory method blank had a detection of endrin between the MDL and MRL, at 0.061 nanograms per liter. The associated sample result was detected above the MRL and was greater than five times the laboratory method blank concentration; thus, qualification was not required.

According to reports C338911, C347713, and C351279, the EPA Method 1668C batch 8533813 laboratory method blank had several detections between EDLs and MRLs, as well as some detections above MRLs. The reviewer qualified sample concentrations detected below MRLs and less than five times the laboratory method blank concentrations with UJ at the reported sample concentrations. The reviewer qualified sample concentrations detected above MRLs, below the laboratory method blank concentration, and less than five times the laboratory method blank concentration with U at the reported sample concentration. Sample concentrations detected above MRLs, above laboratory method blank concentrations, and less than five times the laboratory method blank concentration were qualified by the reviewer with J+. Associated non-detect sample results did not require qualification. The laboratory method blank results for tetraCB-(44)+(47)+(65) and HeptaCB-(171)+(173) were flagged by BV as non-detect and EMPCs. The reviewer confirmed that the associated tetraCB-(44)+(47)+(65) and HeptaCB-(171)+(173) sample results were non-detect and at detection limits that were higher than that of the laboratory method blank; qualification was not required based on the laboratory method blank EMPC results.

Report	Sample	Analyte	Method Blank Result (ng/L)	Original Result (ng/L)	Qualified Result (ng/L)
C338911	MFA-B3A-20230207-GW-36.0	3,3'-DiCB-(11)	0.0834 J	0.78 J	0.78 UJ
		PentaCB-(90)+(101)+(113)	0.206	0.43 J	0.43 UJ
		PentaCB-(110)+(115)	0.122	0.49 J	0.49 UJ
		23'44'5-PentaCB-(118)	0.0962 J	0.127 J	0.127 UJ
		HexaCB-(129)+(138)+(163)	0.201	0.52 J	0.52 UJ
		HexaCB-(153)+(168)	0.237	0.32 J	0.32 UJ
C347713	MW3-20230214-GW-35-DUP	3,3'-DiCB-(11)	0.0834 J	0.118 J	0.118 UJ
		TriCB-(20) + (28)	0.0548	0.0125 J	0.0125 UJ
		TriCB-(21)+(33)	0.0405 J	0.0078 J	0.0078 UJ
		24'5-TriCB-(31)	0.0613	0.012 J	0.012 UJ
		22'55'-TetraCB-(52)	0.15	0.02 J	0.02 UJ
		TetraCB-(61)+(70)+(74)+(76)	0.115 J	0.026 J	0.026 UJ
		23'44'-TetraCB-(66)	0.0394 J	0.0093 J	0.0093 UJ

Report	Sample	Analyte	Method Blank Result (ng/L)	Original Result (ng/L)	Qualified Result (ng/L)
		PentaCB-(86)(87)(97)(109)(119)(125)	0.068 J	0.0152 J	0.0152 UJ
		PentaCB-(90)+(101)+(113)	0.206	0.0361 J	0.0361 UJ
		22'35'6-PentaCB-(95)	0.21	0.033 J	0.033 UJ
		PentaCB-(110)+(115)	0.122	0.0241 J	0.0241 UJ
		23'44'5-PentaCB-(118)	0.0962 J	0.0144 J	0.0144 UJ
		HexaCB-(129)+(138)+(163)	0.201	0.025 J	0.025 UJ
		HexaCB-(147)+(149)	0.274	0.0323 J	0.0323 UJ
		HexaCB-(153)+(168)	0.237	0.0253 J	0.0253 UJ
		HeptaCB-(180)+(193)	0.0737 J	0.0089 J	0.0089 UJ
	MW5-20230214-GW-40	2,4'-DiCB-(8)	0.0062 J	0.0086 J	0.0086 UJ
		3,3'-DiCB-(11)	0.0834 J	0.117 J	0.117 UJ
		TriCB-(20) + (28)	0.0548	0.0084 J	0.0084 UJ
		PentaCB-(90)+(101)+(113)	0.206	0.013 J	0.013 UJ
	MW4-20230214-GW-40	3,3'-DiCB-(11)	0.0834 J	0.0738 J	0.0738 UJ
		TriCB-(20) + (28)	0.0548	0.0095 J	0.0095 UJ
		24'5-TriCB-(31)	0.0613	0.0076 J	0.0076 UJ
		PentaCB-(90)+(101)+(113)	0.206	0.018 J	0.018 UJ
		PentaCB-(110)+(115)	0.122	0.015 J	0.015 UJ
		HexaCB-(147)+(149)	0.274	0.013 J	0.013 UJ
		HexaCB-(153)+(168)	0.237	0.0128 J	0.0128 UJ
	MW6-20230214-GW-40.25	2,4'-DiCB-(8)	0.0062 J	0.0203 J	0.0203 UJ
		3,3'-DiCB-(11)	0.0834 J	0.139 J	0.139 UJ
		4,4'-DiCB-(15)	0.011 J	0.0092 J	0.0092 UJ
		TriCB-(18)+(30)	0.0176 J	0.0131 J	0.0131 UJ
		TriCB-(21)+(33)	0.0405 J	0.0168 J	0.0168 UJ
		344'-TriCB-(37)	0.0127 J	0.0101 J	0.0101 UJ
		22'55'-TetraCB-(52)	0.15	0.038 J	0.038 UJ
		TetraCB-(61)+(70)+(74)+(76)	0.115 J	0.047 J	0.047 UJ
		23'44'-TetraCB-(66)	0.0394 J	0.0204 J	0.0204 UJ
		TetraCB-(49)+TetraCB-(69)	0.051 J	0.017 J	0.017 UJ
		PentaCB-(90)+(101)+(113)	0.206	0.0692 J	0.0692 UJ
		22'35'6-PentaCB-(95)	0.21	0.058	0.058 U
		233'44'-PentaCB-(105)	0.0276 J	0.0178 J	0.0178 UJ
		PentaCB-(110)+(115)	0.122	0.0521 J	0.0521 UJ
		23'44'5-PentaCB-(118)	0.0962 J	0.0314 J	0.0314 UJ
		HexaCB-(129)+(138)+(163)	0.201	0.056 J	0.056 UJ

Report	Sample	Analyte	Method Blank Result (ng/L)	Original Result (ng/L)	Qualified Result (ng/L)
		22'33'46'-HexaCB-(132)	0.0682	0.019 J	0.019 UJ
		HexaCB-(135)+(151)	0.143	0.038 J	0.038 UJ
		22'3455'-HexaCB-(141)	0.0545	0.014 J	0.014 UJ
		HexaCB-(147)+(149)	0.274	0.063 J	0.063 UJ
		HexaCB-(153)+(168)	0.237	0.0594 J	0.0594 UJ
		22'33'456'-HeptaCB-(174)	0.0523	0.0101 J	0.0101 UJ
		22'33'566'-HeptaCB-(179)	0.0419 J	0.009 J	0.009 UJ
		HeptaCB-(180)+(193)	0.0737 J	0.018 J	0.018 UJ
		22'344'5'6-HeptaCB-(183)	0.0419 J	0.009 J	0.009 UJ
		22'34'55'6-HeptaCB-(187)	0.085	0.0191 J	0.0191 UJ
C351279	MW1-20230220-GW-70	2,4'-DiCB-(8)	0.0062 J	0.0091 J	0.0091 UJ
		3,3'-DiCB-(11)	0.0834 J	0.365	0.365 J+
		4,4'-DiCB-(15)	0.011 J	0.0138 J	0.0138 UJ
		TriCB-(18)+(30)	0.0176 J	0.0123	0.0123 U
		TriCB-(20) + (28)	0.0548	0.0059 J	0.0059 UJ
		TriCB-(21)+(33)	0.0405 J	0.0038 J	0.0038 UJ
		24'5-TriCB-(31)	0.0613	0.0114 J	0.0114 UJ
		22'55'-TetraCB-(52)	0.15	0.031 J	0.031 UJ
		TetraCB-(61)+(70)+(74)+(76)	0.115 J	0.032 J	0.032 UJ
		PentaCB-(86)(87)(97)(109)(119)(125)	0.068 J	0.026 J	0.026 UJ
		22'35'6-PentaCB-(95)	0.21	0.052	0.052 U
		233'44'-PentaCB-(105)	0.0276 J	0.01 J	0.01 UJ
		PentaCB-(110)+(115)	0.122	0.046 J	0.046 UJ
		23'44'5-PentaCB-(118)	0.0962 J	0.031 J	0.031 UJ
		HexaCB-(129)+(138)+(163)	0.201	0.061 J	0.061 UJ
		HexaCB-(135)+(151)	0.143	0.037 J	0.037 UJ
		HexaCB-(147)+(149)	0.274	0.072 J	0.072 UJ
		HexaCB-(153)+(168)	0.237	0.062 J	0.062 UJ
		HeptaCB-(180)+(193)	0.0737 J	0.023 J	0.023 UJ
		22'34'55'6-HeptaCB-(187)	0.085	0.022 J	0.022 UJ
	MW2-20230220-GW-60	3,3'-DiCB-(11)	0.0834 J	0.102 J	0.102 UJ
		TriCB-(20) + (28)	0.0548	0.0077 J	0.0077 UJ
		TriCB-(21)+(33)	0.0405 J	0.0047 J	0.0047 UJ
		234'-TriCB-(22)	0.0213	0.007 J	0.007 UJ
		24'5-TriCB-(31)	0.0613	0.0148 J	0.0148 UJ
		344'-TriCB-(37)	0.0127 J	0.0077 J	0.0077 UJ

Report	Sample	Analyte	Method Blank Result (ng/L)	Original Result (ng/L)	Qualified Result (ng/L)
		22'55'-TetraCB-(52)	0.15	0.049 J	0.049 UJ
		TetraCB-(61)+(70)+(74)+(76)	0.115 J	0.058 J	0.058 UJ
		22'33'6-PentaCB-(84)	0.024	0.019 J	0.019 UJ
		PentaCB-(86)(87)(97)(109)(119)(125)	0.068 J	0.05 J	0.05 UJ
		PentaCB-(90)+(101)+(113)	0.206	0.12 J	0.12 UJ
		22'35'6-PentaCB-(95)	0.21	0.104	0.104 U
		233'44'-PentaCB-(105)	0.0276 J	0.0196 J	0.0196 UJ
		PentaCB-(110)+(115)	0.122	0.102	0.102 UJ
		23'44'5-PentaCB-(118)	0.0962 J	0.0617 J	0.0617 UJ
		HexaCB-(129)+(138)+(163)	0.201	0.139 J	0.139 UJ
		22'33'46'-HexaCB-(132)	0.0682	0.044 J	0.044 UJ
		HexaCB-(135)+(151)	0.143	0.076 J	0.076 UJ
		22'33'66'-HexaCB-(136)	0.0455 J	0.023 J	0.023 UJ
		22'3455'-HexaCB-(141)	0.0545	0.029 J	0.029 UJ
		22'34'55'-HexaCB-(146)	0.031 J	0.018 J	0.018 UJ
		HexaCB-(147)+(149)	0.274	0.134	0.134 U
		HexaCB-(153)+(168)	0.237	0.125	0.125 U
		HexaCB-(156)+(157)	0.0088 J	0.0098 J	0.0098 UJ
		233'44'6-HexaCB-(158)	0.0167 J	0.0113 J	0.0113 UJ
		22'33'44'5-HeptaCB-(170)	0.0208 J	0.0163 J	0.0163 UJ
		22'33'456'-HeptaCB-(174)	0.0523	0.0298 J	0.0298 UJ
		22'33'45'6'-HeptaCB-(177)	0.0308 J	0.019 J	0.019 UJ
		22'33'566'-HeptaCB-(179)	0.0419 J	0.0204 J	0.0204 UJ
		HeptaCB-(180)+(193)	0.0737 J	0.0498 J	0.0498 UJ
		22'344'5'6-HeptaCB-(183)	0.0419 J	0.0193 J	0.0193 UJ
		22'34'55'6-HeptaCB-(187)	0.085	0.038 J	0.038 UJ

Notes
J = result is estimated.
J+ = result is estimated with a potential high bias.
ng/L = nanograms per liter.
U = result is non-detect with a raised reporting limit.
UJ = result is non-detect with an estimated detection limit.

According to report C347713, the EPA Method 1699 batch 8513671 laboratory method blank had a detection of 4,4'-DDE and endrin between EDLs and MRLs, at 0.012 nanograms per liter (ng/L) and 0.083 ng/L, respectively. Associated samples with 4,4'-DDE or endrin detections were qualified in the following table. Associated non-detect results did not require qualification.

Report	Sample	Analyte	Method Blank Result (ng/L)	Original Result (ng/L)	Qualified Result (ng/L)
C347713	MW3-20230214-GW-35	Endrin	0.083 J	0.048 J	0.048 UJ
	MW5-20230214-GW-40	4,4'-DDE	0.012 J	0.012 J	0.012 UJ
		Endrin	0.083 J	0.189 J	0.189 UJ
	MW4-20230214-GW-40	Endrin	0.083 J	0.101 J	0.101 UJ
		4,4'-DDE	0.012 J	0.012 J	0.012 UJ
	MW6-20230214-GW-40.25	Endrin	0.083 J	0.133 J	0.133 UJ
		4,4'-DDE	0.012 J	0.019 J	0.019 UJ

Notes
J = result is estimated.
ng/L = nanograms per liter.
UJ = result is non-detect with an estimated detection limit.

According to reports C347713 and C351279, the EPA Method 1613B batch 8524619 laboratory method blank had a detection of OCDD between the EDL and MRL, at 2.48 picograms per liter. Associated samples were qualified as shown in the following table.

Report	Sample	Analyte	Method Blank Result (pg/L)	Original Result (pg/L)	Qualified Result (ng/L)
C347713	MW3-20230214-GW-35	OCDD	2.48 J	2.11 J	2.11 UJ
	MW3-20230214-GW-35-DUP			3.24 J	3.24 UJ
	MW6-20230214-GW-40.25			7.62 J	7.62 UJ
C351279	MW2-20230220-GW-60			3.63 J	3.63 UJ

Notes
J = result is estimated.
pg/L = picograms per liter.
UJ = result is non-detect with an estimated detection limit.

According to report C347690, the EPA Method 1613B batch 8520730 laboratory method blank had detections of OCDD and OCDF between the EDL and MRL, at 0.514 picograms per gram (pg/g) and 0.268 pg/g, respectively. Additionally, BV raised the EDL for 1,2,3,4,6,7,8-Hepta CDD to 0.201 pg/g due to an EMPC detection. The associated sample results were all detected above the MRL at concentrations greater than five times the laboratory method blank detections and EMPCs. No qualification was required.

According to report C347690, the EPA Method 1668C batch 8576352 laboratory method blank had several detections between EDLs and MRLs, ranging from 0.0002 nanograms per gram to 0.0108 nanograms per gram. All associated sample results were detected at concentrations greater than five times the laboratory method blank concentrations; thus, qualification was not required.

According to report C351579, the EPA Method 1699 batch 8523575 laboratory method blank had a detection of endrin between the EDL and MRL, at 0.063 ng/L. Associated samples with

endrin detections were qualified in the following table. Associated non-detect results did not require qualification.

Report	Sample	Analyte	Method Blank Result (ng/L)	Original Result (ng/L)	Qualified Result (ng/L)
C347713	MW1-20230220-GW-70	Endrin	0.063 J	0.093 J	0.093 UJ

Notes
J = result is estimated.
ng/L = nanograms per liter.
UJ = result is non-detect with an estimated detection limit.

All remaining laboratory method blank results were non-detect to EDLs, LDLs, MDLs, or MRLs.

Equipment Rinsate Blanks

Equipment rinsate blanks are used to evaluate field equipment decontamination. These blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

Field Blanks

Field blanks are used to assess if contamination from field conditions was introduced during sampling, preservation, and shipment to the laboratory. Field blank samples were submitted with sample delivery groups A3B0217 and A3B0522 and subcontracted by Apex to BV for EPA Method 537.1 analysis. The results were reported in C338911 and C347713. The field blank was non-detect to EDLs for all per- and polyfluoroalkylated substance analytes.

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 (identified with sample name Trip Blank) were submitted with sample delivery groups A3B0217, A3B0522, and A3B0674 for EPA Method 8260D and 8260D-SIM analyses. According to reports A3B0217, A3B0522, and A3B0674, all trip blank samples had EPA Method 8260D-SIM detections of chloroform. Associated non-detect sample results did not require qualification. The sample MFA-B3A-20230207-GW-36.0 chloroform detection was also qualified based on sample preparation. The reviewer determined that final qualification with J+ based on both sample preparation and trip blank detection was appropriate. The final associated detected sample results were qualified by the reviewer in the following table.

Report	Sample	Analyte	Trip Blank Result (ug/L)	Original Result (ug/L)	Qualified Result (ug/L)
A3B0217	MFA-B3A-20230207-GW-36.0	Chloroform	0.0693 J	0.122	0.122 J+[a]
A3B0674	MW1-20230220-GW-70		0.202	0.0838 J	0.100 U

Notes
J = result is estimated.
J+ = result is estimated, but the result may be biased high.
U = result is non-detect at the reported sample value.
ug/L = micrograms per liter.
[a]Qualified based on both sample preparation and trip blank detection.

The remaining trip blank results were non-detect to LDLs.

LABORATORY CONTROL SAMPLE AND LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample (LCS) and a laboratory control sample duplicate (LCSD) are spiked with target analytes to provide information about laboratory precision and accuracy. The LCS and LCSD samples were extracted and analyzed at the required frequency. When LCSD results were not reported by the laboratory, batch precision was evaluated with laboratory duplicate sample results. BV labeled LCS and LCSD results as spiked blank and spiked blank dup results, respectively.

According to report A3A1010, the EPA Method 8260D batch 23B0290 LCS (23B0290-BS1) exceeded upper percent recovery acceptance limits of 120 percent for acetone, acrylonitrile, bromochloromethane, bromomethane, 2-butanone, 1,2-dichloroethane, and vinyl chloride, ranging from 123 percent to 209 percent. The associated sample results were non-detect; thus, qualification was not required. The LCS also had a result for chloroethane that was below the lower percent recovery acceptance limit of 80 percent, at 77 percent. Apex noted that reporting limit sensitivity was confirmed for chloroethane and it was reported with the LDL raised to the MRL. The reviewer qualified the associated sample result with UJ.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
A3A1010	MFA-B1-B5-COMP-SL-PRO	Chloroethane	5,330 U	5,330 UJ

Notes
ug/kg = micrograms per kilogram.
UJ = result is non-detect with an estimated laboratory detection limit.
U = result is non-detect at the method reporting limit.

According to report A3A1010, the EPA Method 8270E batch 23B0782 LCS (23B0782-BS1) and LCSD (23B0782-BSD1) results for 3,3'-dichlorobenzidine exceeded the upper percent recovery acceptance limit of 121 percent, at 189 percent and 184 percent, respectively. The associated sample result, which was non-detect, did not require qualification based on the LCS and LCSD percent recoveries. Apex also flagged the 3,3'-dichlorobenzidine LCS result due to

known erratic recovery; this flag and the associated data qualification are discussed in the Data Qualification section above.

According to report A3B0217, the EPA Method 8260D batch 23B0344 LCS (23B0344-BS1) results for chloroethane and trichlorofluoromethane were above the upper percent recovery acceptance limit of 120 percent, at 139 percent and 133 percent, respectively. The associated sample results were non-detect; thus, qualification was not required.

According to report A3B0217, the EPA Method 8260D batch 23B0509 LCS (23B0509-BS1) results for bromomethane, chloroethane, and trichlorofluoromethane were above the upper percent recovery acceptance limit of 120 percent, at 121 percent, 175 percent, and 137 percent, respectively. The associated sample results were non-detect; thus, qualification was not required.

According to report A3B0217, the EPA Method 8270D batch 23B0481 LCS (23B0481-BS1) results for acenaphthene, 1-methylnaphthalene, 2-methylnaphthalene, naphthene, dibenzofuran, 2-chloronaphthalene, 1,2,4-trichlorobenzene, 4-bromophenyl phenyl ether, 4-chlorophenyl phenyl ether, 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene were below lower percent recovery acceptance limits, ranging from 24 percent to 48 percent. The associated LCSD results were within percent recovery acceptance limits. An associated detected sample result was qualified by the reviewer with J-. The associated non-detect sample results were qualified with UJ. The LCS and LCSD 3,3'-dichlorobenzidine results exceeded upper percent recovery acceptance limits of 129 percent, at 182 percent and 189 percent, respectively. Apex also flagged these LCS and LCSD 3,3'-dichlorobenzidine results as estimated because they were associated with a continuing calibration verification result that exceeded upper control limits and 3,3'-dichlorobenzidine has known erratic recoveries. The associated sample results have been qualified by the reviewer with UJ. The LCS and LCSD exceeded relative percent difference (RPD) control limits of 30 percent for several semivolatile organic compounds, ranging from 32 percent to 45 percent. The associated sample results were either non-detect or were detected below the MRL and already flagged as estimated; thus, qualification based on RPD control limit exceedances was not required.

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
A3B0217	MFA-B3A-20230207-GW-36.0	Acenaphthene	0.0128 U	0.0256 UJ
		1-Methylnaphthalene	0.0256 U	0.0513 UJ
		2-Methylnaphthalene	0.0256 U	0.0513 UJ
		Naphthalene	0.0256 U	0.0513 UJ
		Dibenzofuran	0.0128 U	0.0256 UJ
		2-Chloronaphthalene	0.0128 U	0.0256 UJ
		1,2,4-Trichlorobenzene	0.0321 U	0.0641 UJ
		4-Bromophenyl phenyl ether	0.0321 U	0.0641 UJ
		4-Chlorophenyl phenyl ether	0.0321 U	0.0641 UJ
		3,3'-Dichlorobenzidine	0.641 U	0.641 UJ

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
		1,2-Dichlorobenzene	0.0321 U	0.0641 UJ
		1,3-Dichlorobenzene	0.0432 J	0.0432 J-
		1,4-Dichlorobenzene	0.0321 U	0.0641 U

Notes
J = result is estimated.
J- = result is estimated but may be biased low.
U = result is non-detect at the laboratory detection limit.
ug/L = micrograms per liter.
UJ = result is non-detect with an estimated laboratory detection limit.

According to reports C338911, C347713, and C351279, the EPA Method 1668C batch 8533813 LCS and LCSD were reported by BV with several polychlorinated biphenyl (PCB) congener results that had calculated percent recoveries but no control limits. The reviewer confirmed that LCS and LCSD quality control limits were reported for only a selected list of PCB congeners and that, due to limitations of the laboratory's reporting system, the entire list of PCB congeners had been reported. No additional action was required.

According to reports A3B0522 and A3B0674, the EPA Method 8260D batch 23B0828 LCS (23B0828-BS1) results for bromomethane, carbon tetrachloride, chloroethane, dichlorodifluoromethane, and trichlorofluoromethane were above the upper percent recovery acceptance limit of 120 percent, ranging from 121 percent to 169 percent. The associated sample results were non-detect; thus, qualification was not required. The LCS also had results for 2-hexanone and naphthalene below the lower percent recovery acceptance limit of 80 percent, at 79 percent and 75 percent, respectively. Apex noted that reporting limit sensitivity was confirmed for these compounds, and they were reported with LDLs raised to MRLs. These associated sample results were non-detect and have been qualified by the reviewer with UJ.

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
A3B0522	MW3-20230214-GW-35	2-Hexanone	10.0 U	10.0 UJ
		Naphthalene	2.00 U	2.00 UJ
	MW3-20230214-GW-35-DUP	2-Hexanone	10.0 U	10.0 UJ
		Naphthalene	2.00 U	2.00 UJ
	MW5-20230214-GW-40	2-Hexanone	10.0 U	10.0 UJ
		Naphthalene	2.00 U	2.00 UJ
	MW4-20230214-GW-40	2-Hexanone	10.0 U	10.0 UJ
		Naphthalene	2.00 U	2.00 UJ
	MW6-20230214-GW-40.25	2-Hexanone	10.0 U	10.0 UJ
		Naphthalene	2.00 U	2.00 UJ
	Trip Blank	2-Hexanone	10.0 U	10.0 UJ
		Naphthalene	2.00 U	2.00 UJ

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
A3B0674	MW1-20230220-GW-70	2-Hexanone	10.0 U	10.0 UJ
		Naphthalene	2.00 U	2.00 UJ
	MW2-20230220-GW-60	2-Hexanone	10.0 U	10.0 UJ
		Naphthalene	2.00 U	2.00 UJ
	Trip Blank	2-Hexanone	10.0 U	10.0 UJ
		Naphthalene	2.00 U	2.00 UJ

Notes
U = result is non-detect at the method reporting limit.
ug/L = micrograms per liter.
UJ = result is non-detect with an estimated method reporting limit.

According to report A3B0522, the EPA Method 8270E batch 23B0761 LCS (23B0761-BS1) and LCSD (23B0761-BSD1) results for 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, hexachlorobutadiene, hexachloroethane, 2-chloronaphthalene, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene were below lower percent recovery acceptance limits, ranging from 14 percent to 39 percent. The LCSD result for hexachlorocyclopentadiene was also below the lower percent recovery acceptance limit of 10 percent, at 9 percent. Associated non-detect sample results have been qualified by the reviewer with R and associated detected results, including those detected below MRLs, have been qualified by the reviewer with J-, as shown in the table below. These sample results were also associated with base/neutral EPA Method 8270E surrogate percent recovery exceedances; the reviewer determined that LCS and LCSD-based qualifications have precedence over those applied based on surrogate percent recovery exceedances. These qualified results are considered final and are shown in the following table:

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
A3B0522	MW3-20230214-GW-35	1-Methylnaphthalene	0.0239 J	0.0239 J-
		2-Methylnaphthalene	0.0192 U	R
		Naphthalene	0.0722	0.0722 J-
		Hexachlorobutadiene	0.0358 J	0.0358 J-
		Hexachlorocyclopentadiene	0.0481 U	R
		Hexachloroethane	0.0378 J	0.0378 J-
		2-Chloronaphthalene	0.0513	0.0513 J-
		1,2,4-Trichlorobenzene	0.0240 U	R
		1,2-Dichlorobenzene	0.0240 U	R
		1,3-Dichlorobenzene	0.0950	0.0950 J-
		1,4-Dichlorobenzene	0.0240 U	R
	MW3-20230214-GW-35-DUP	1-Methylnaphthalene	0.0189 U	R
		2-Methylnaphthalene	0.0189 U	R
		Naphthalene	0.0362 J	0.0362 J-

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
		Hexachlorobutadiene	0.0236 U	R
		Hexachlorocyclopentadiene	0.0472 U	R
		Hexachloroethane	0.0236 U	R
		2-Chloronaphthalene	0.0206	0.0206 J-
		1,2,4-Trichlorobenzene	0.0236 U	R
		1,2-Dichlorobenzene	0.0236 U	R
		1,3-Dichlorobenzene	0.0939	0.0939 J-
		1,4-Dichlorobenzene	0.0236 U	R
	MW5-20230214-GW-40	1-Methylnaphthalene	0.0235 U	R
		2-Methylnaphthalene	0.0235 U	R
		Naphthalene	0.0235 U	R
		Hexachlorobutadiene	0.0118 U	R
		Hexachlorocyclopentadiene	0.0294 U	R
		Hexachloroethane	0.0588 U	R
		2-Chloronaphthalene	0.0294 U	R
		1,2,4-Trichlorobenzene	0.0118 U	R
		1,2-Dichlorobenzene	0.0294 U	R
		1,3-Dichlorobenzene	0.108	0.108 J-
		1,4-Dichlorobenzene	0.0294 U	R
	MW4-20230214-GW-40	1-Methylnaphthalene	0.0247 U	R
		2-Methylnaphthalene	0.0247 U	R
		Naphthalene	0.0247 U	R
		Hexachlorobutadiene	0.0309 U	R
		Hexachlorocyclopentadiene	0.0617 U	R
		Hexachloroethane	0.0309 U	R
		2-Chloronaphthalene	0.0123 U	R
		1,2,4-Trichlorobenzene	0.0309 U	R
		1,2-Dichlorobenzene	0.0309 U	R
		1,3-Dichlorobenzene	0.122	0.122 J-
		1,4-Dichlorobenzene	0.0309 U	R
	MW6-20230214-GW-40.25	1-Methylnaphthalene	0.0222 U	R
		2-Methylnaphthalene	0.0222 U	R
		Naphthalene	0.0222 U	R
		Hexachlorobutadiene	0.0278 U	R
		Hexachlorocyclopentadiene	0.0556 U	R
		Hexachloroethane	0.0278 U	R
		2-Chloronaphthalene	0.0255	0.0255 J-
		1,2,4-Trichlorobenzene	0.0278 U	R

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
		1,2-Dichlorobenzene	0.0278 U	R
		1,3-Dichlorobenzene	0.0919	0.0919 J-
		1,4-Dichlorobenzene	0.0278 U	R

Notes
J = result is estimated.
J- = result is estimated but may be biased low.
R = result is rejected. The analyte may or may not be present in the sample.
U = result is non-detect at the laboratory detection limit.
ug/L = micrograms per liter.

According to report A3B0522, the EPA Method 8270D batch 23B0761 LCS (23B0761-BS1) and LCSD (23B0761-BSD1) results for 3,3'-dichlorobenzidine exceeded the upper percent recovery acceptance limit of 129 percent, at 159 percent and 151 percent, respectively. The results were also flagged by Apex as estimated because they were associated with continuing calibration verification that exceeded upper control limits and this chemical has known erratic recoveries. The associated 3,3'-dichlorobenzidine sample results were non-detect and have been qualified by the reviewer with UJ, as shown in the following table. The 3,3'-dichlorobenzidine results were also associated with EPA Method 8270E base/neutral surrogate percent recovery exceedances; the reviewer determined that qualifications based on LCS and LCSD percent recovery have precedence over those applied based on surrogate percent recovery exceedances. These qualified results are considered final and are shown in the following table:

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
A3B0522	MW3-20230214-GW-35	3,3'-Dichlorobenzidine	0.495 U	0.495 UJ
	MW3-20230214-GW-35-DUP		0.485 U	0.485 UJ
	MW5-20230214-GW-40		0.532 U	0.532 UJ
	MW4-20230214-GW-40		0.568 U	0.568 UJ
	MW6-20230214-GW-40.25		0.575 U	0.575 UJ

Notes
U = result is non-detect at the laboratory detection limit.
ug/L = micrograms per liter.
UJ = result is non-detect with an estimated laboratory detection limit.

According to report A3B0522, the EPA Method 8151A batch W3B1728 LCSD result for acifluorfen exceeded the upper percent recovery acceptance limit of 134 percent, at 150 percent and the LCS and LCSD exceeded the RPD control limit of 25 percent, at 34 percent. The associated sample results were non-detect; thus, qualification was not required.

According to report A3B0674, the EPA Method 8270D-SIM batch 23C0033 LCS (23C0033-BS1) result for 1,1,2,2-tetrachloroethane exceeded the upper percent recovery acceptance limit of 120 percent, at 126 percent. The associated sample results were non-detect; thus, qualification was not required.

According to report A3B0674, the EPA method 8270E batch 23B0916 LCS (23B0916-BS1) and LCSD (23B0916-BSD1) 3,3'-dichlorobenzidine results exceeded upper percent recovery acceptance limits of 129 percent, at 187 percent and 188 percent, respectively. Apex also flagged the LCS and LCSD 3,3'-dichlorobenzidine results as estimated because they were associated with continuing calibration verification that exceeded upper control limits and noted that 3,3'-dichlorobenzidine has known erratic recoveries. The associated 3,3'-dichlorobenzidine sample results were non-detect and have been qualified by the reviewer with UJ as shown in the following table. The LCSD also had results for hexachlorobutadiene, hexachloroethane, 1,24-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene below lower percent recovery acceptance limits, ranging from 17 percent to 55 percent. The batch 23B0916 LCS results were within percent recovery acceptance limit, but were also significantly low; thus, the associated sample results, which were non-detect, have been qualified by the reviewer with R, as shown in the following table. The LCS and LCSD exceeded the RPD control limit of 30 percent for N-nitrosodimethylamine and pyridine at 55 percent and 41 percent, respectively. The associated samples were non-detect for N-nitrosodimethylamine and pyridine; thus, qualification was not required.

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
A3B0674	MW1-20230220-GW-70	Hexachlorobutadiene	0.0253 U	R
		Hexachloroethane	0.0253 U	R
		1,2,4-Trichlorobenzene	0.0253 U	R
		3,3'-Dichlorobenzidine	0.505 U	0.505 UJ
		1,2-Dichlorobenzene	0.0253 U	R
		1,3-Dichlorobenzene	0.0253 U	R
		1,4-Dichlorobenzene	0.0253 U	R
	MW2-20230220-GW-60	Hexachlorobutadiene	0.0266 U	R
		Hexachloroethane	0.0266 U	R
		1,2,4-Trichlorobenzene	0.0266 U	R
		3,3'-Dichlorobenzidine	0.532 U	0.532 UJ
		1,2-Dichlorobenzene	0.0266 U	R
		1,3-Dichlorobenzene	0.0266 U	R
		1,4-Dichlorobenzene	0.0266 U	R

Notes
R = result is rejected. The analyte may or may not be present in the sample.
U = result is non-detect at the laboratory detection limit.
ug/L = micrograms per liter.
UJ = result is non-detect with an estimated method reporting limit.

According to report C347690, the EPA Method 1668C batch 8576352 LCS and LCSD exceeded RPD control limits of 30 percent for HexaCB-(128)+(166) and 22'345'6-HexaCB-(144), and 22'344'56-HeptaCB-(181), at 157 percent, 156 percent, and 194 percent respectively. The reviewer confirmed that these three PCB compounds were not part of the LCS and LCSD percent recovery evaluation but had been included in the final report with percent recoveries and RPDs due to reporting system constraints. All associated sample results were also qualified

by the reviewer based on labeled internal standard recovery, as discussed in the Labeled Analog Recovery Results section; additional qualification was not required.

All remaining LCS and LCSD results were within acceptance limits for percent recovery and relative percent difference (RPD).

LABORATORY DUPLICATE RESULTS

Laboratory duplicate results are used to evaluate laboratory precision. All laboratory duplicate samples were prepared and analyzed at the required frequency. When laboratory duplicate sample results were not reported, batch precision was evaluated with LCS and LCD results and/or matrix spike (MS) and matrix spike duplicate (MSD) sample results.

Laboratory duplicate results greater than five times the MRL were evaluated using laboratory RPD control limits. Laboratory duplicate results less than five times the MRL, including non-detects, were evaluated using a control limit of the MRL of the parent sample; the absolute difference of the laboratory duplicate sample result and the parent sample result, or the MRL for non-detects, was compared to the MRL of the parent sample.

According to report A3A1010, Apex noted that an NWTPH-Gx and EPA Method 8260D batch 23B0290 laboratory duplicate (23B0290-DUP1) was prepared by subsampling from the sample container within 48 hours of sample collection. The laboratory duplicate was prepared with a sample from an unrelated project and no qualification was required. All laboratory duplicate results met the acceptance criteria.

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. When MS and MSD results were not reported, batch precision and accuracy were evaluated with laboratory duplicate, LCS, and LCSD results.

When MS and MSD were prepared from samples with high concentrations of target analytes, associated MS and/or MSD percent recovery and/or RPD control limit exceedances did not require qualification because spike concentrations could not be accurately quantified. High concentrations of target analytes are defined as four times the spike amount for all analyses.

When MS and MSD were prepared with samples from unrelated projects, the MS and/or MSD percent recovery and/or RPD control limit exceedances did not require qualification because these sample matrices were not representative of project sample matrices.

According to report A3A1010, the EPA Method 8270E batch 23B0782 MS (23B0782-MS1) had several results that were non-detect or were below lower percent recovery acceptance limits. The reviewer confirmed that the MS had been analyzed at a 1:40 dilution, so many of the results were not detected or were at or near the MRL. Based on the MS dilution, qualification of the associated sample results was not required.

According to report A3A1010, the EPA Method 8270E batch 23B0783 MS (23B0783-MS1) had several results that were non-detect or were below lower percent recovery acceptance limits. The reviewer confirmed that the MS had been analyzed at a 1:40 dilution, so the expected MS results were below LDLs. Based on the MS dilution, qualification of the associated sample results was not required.

According to report A3A1010, an EPA Method 8270E batch 23C0074 MS was not reported because there was significant interference from organic compounds that were present in the sample used to prepare the MS.

According to report A3A1010, the EPA Method 6020B batch 23B0914 MS (23B0914-MS1) result for antimony was below the lower percent recovery acceptance limit of 75 percent, at 71 percent. The reviewer qualified the associated sample result with J-.

Report	Sample	Analyte	Original Result (mg/kg)	Qualified Result (mg/kg)
A3A1010	MFA-B1-B5-COMP-SL-PRO	Antimony	0.944	0.944 J-

Notes
J- = result is estimated but may be biased low.
mg/kg = milligrams per kilogram.

According to reports A3B0217 and A3B0522, the EPA Method 8260D-SIM batch 23B0743 MS (23B0743-MS1) had several results below lower percent recovery acceptance limits, ranging from 66 percent to 78 percent. The associated sample results were non-detect. The reviewer raised the associated sample LDLs to MRLs and qualified the results with UJ, as shown in the following table:

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
A3B0522	MW6-20230214-GW-40.25	Ethylbenzene	0.0500 U	0.100 UJ
		m,p-Xylene	0.100 U	0.200 UJ
		o-Xylene	0.0500 U	0.100 UJ
		1,2,4-Trimethylbenzene	0.0500 U	0.100 UJ
		1,3,5-Trimethylbenzene	0.0500 U	0.100 UJ
		1,2-Dibromoethane	0.0100 U	0.0200 UJ
		1,1,2-Trichloroethane	0.0100 U	0.0200 UJ

Notes
U = result is non-detect at the laboratory detection limit.
ug/L = micrograms per liter.
UJ = result is non-detect with an estimated method reporting limit.

According to report A3B0674, the EPA Method 8260D-SIM MS (23C0033-MS1) exceeded upper percent recovery acceptance limits for benzene, chloroform, 1,1-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloropropane, and vinyl chloride, ranging from 128 percent to 163 percent. The associated sample result for benzene has been qualified by the reviewer with J. The remaining associated sample results were non-detect and so did not require qualification.

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
A3B0674	MW2-20230220-GW-60	Benzene	0.176	0.176 J

Notes
J = result is estimated.
ug/L = micrograms per liter.

The remaining MS and MSD results were within acceptance limits for percent recovery and RPD.

LABELED ANALOG RECOVERY RESULTS

According to reports C338911, C338927, C347713, C347690, and C351279, the samples were spiked with carbon-13 labeled standards to quantify the relative response of analytes in each sample for the ASTM D7968-17A, EPA Method 537.1, EPA Method 1613B, EPA Method 1668C, and EPA Method 1699 analyses.

According to report C338911, the EPA Method 537.1 labeled standard $^{13}C_2$-PFTeDA was below lower percent recovery acceptance limits of 50 percent, at 46 percent, for sample MFA-B3A20230207-GW-36.0. The reviewer confirmed with BV that the samples were not reanalyzed to confirm the recoveries and that the recoveries demonstrated sufficient instrument sensitivity. BV noted that the associated analytes, PFTrDA and PFTeDA may have had increased variability. The associated sample results were non-detect and have been qualified by the reviewer with UJ, as shown in the following table.

Report	Sample	Component	Original Result (ug/L)	Qualified Result (ug/L)
C338911	MFA-B3A-20230207-GW-36.0	PFTrDA	0.0026 U	0.0026 UJ
		PFTeDA	0.0016 U	0.0016 UJ

Notes
U = result is non-detect at the estimated detection limit.
ug/L = micrograms per liter.
UJ = result is non-detect with an estimated detection limit.

According to reports C338911, C347713, and C351279 the EPA Method 1668C batch 8533813 LCS labeled standards C_{13}-2,44'-TriCB-(28), C_{13}-233'44'-PentaCB-(105), C_{13}-23'44'5-PentaCB-(118), C_{13}-2'344'5-PentaCB-(123), C_{13}-33'44'5-PentaCB-(126), and C_{13}-344'-TriCB-(37), and the LCSD labeled standards C_{13}-4-MonoCB-(3), C_{13}-233'44'-PentaCB-(105), and C_{13}-33'44'5-PentaCB-(126) were flagged by BV as estimated with high bias due to association with an internal standard that exceeded upper recovery acceptance limits. All labeled standard results were within percent recovery acceptance limits; thus, qualification was not required.

According to reports C338911 and C347713, the EPA Method 1668C batch 8533813 laboratory method blank labeled standards C_{13}-233'44'-PentaCB-(105) and C_{13}-33'44'5-PentaCB-(126) exceeded upper recovery acceptance limits of 145 percent, at 146 percent and 151 percent, respectively. The laboratory method blank had some detected results, which are addressed in the Method Blanks section above. No additional action was required.

According to report C338927, the ASTM D7968-17A labeled standards $^{13}C_2$-PFDA and $^{13}C_2$-PFTeDA were below lower percent recovery acceptance limits of 50 percent, at 47 percent and 37 percent, respectively, for sample MFA-B1-B5-COMP-SL. The reviewer confirmed with BV that the internal standard recoveries demonstrated sufficient instrument sensitivity to report the associated sample results. BV noted that the associated analytes, PFDA, PFDS, PFTrDA, and PFTeDA may have had increased variability. The sample results have been qualified by the reviewer with J for detected results, as shown in the following table. Results already flagged by BV as estimated due to detection below the MRL did not require additional qualification but are included in the table for clarity.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
C338927	MFA-B1-B5-COMP-SL	PFDA	1.5	1.5 J
		PFDS	0.92 J	0.92 J[a]
		PFTrDA	0.61 J	0.61 J[a]
		PFTeDA	0.46 J	0.46 J[a]

Notes
J = result is estimated.
MRL = method reporting limit.
ug/kg = micrograms per kilogram.
[a]Result qualified as estimated based on detection below the MRL. Additional qualification not required.

According to report C347690, most EPA Method 1668C labeled standards associated with the analysis of sample MFA-B1-B5-COMP-SL-PRO had results below lower percent recovery acceptance limits, ranging from 5.0 percent to 39 percent. Due to significantly low recovery of labeled standards C_{13}-2-MonoCB-(1) and C_{13}-22'-DiCB-(4), at 5.0 percent, BV did not report the associated mono- and di-chlorinated PCB congeners (PCB-001 through PCB-014). The reviewer confirmed that the low recoveries were caused by matrix interference, and that the sample had been re-extracted and reanalyzed to confirm the matrix interference. BV also attempted additional extract cleanup. Due to widespread internal standard recovery issues, all associated detected sample results were qualified by the reviewer with J- and all non-detect results were qualified with R.

Report	Sample	Analysis	Original Results	Qualification
C347690	MFA-B1-B5-COMP-SL-PRO	EPA 1668C	Detected	J-
			Non-detect	R
Notes J- = result is estimated but may be biased low. R = result is rejected. The analyte may or may not be present in the sample.				

According to report C347690, the EPA Method 1613B batch 8520730 MS labeled standards C_{13}-123678 HxCDD and C_{13}-123678 HxCDF exceeded upper percent recovery acceptance limits, at 137 percent, and 125 percent, respectively. The reviewer confirmed that the MS had been prepared by BV with a sample from an unrelated project. No qualification was required.

According to report C347690, the EPA Method 1668C batch 8576352 laboratory method blank labeled standard C_{13}-22'44'66'-HexaCB-(155) result was below the lower percent recovery acceptance limit of 40 percent, at 37 percent. The reviewer confirmed that the remaining hexachlorobiphenyl labeled standards had acceptable percent recoveries. Qualification of sample results based on the laboratory method blank labeled standard recovery was not required.

According to report C347713, the EPA Method 537.1 labeled standards D_3-MeFOSA and D_5-EtFOSA were below lower percent recovery acceptance limits of 50 percent, at 44 percent and 43 percent, respectively, for sample MFA-20230214-GW-40 and both were at 47 percent for sample MW4-20230214-GW-40. BV noted that the associated analytes, MeFOSA and EtFOSA may have had increased variability. The associated sample results were non-detect and have been qualified by the reviewer with UJ, as shown in the following table.

Report	Sample	Component	Original Result (ug/L)	Qualified Result (ug/L)
C347713	MFA5-20230214-GW-40	MeFOSA	0.0084 U	0.0084 UJ
		EtFOSA	0.0095 U	0.0095 UJ
	MFA4-20230214-GW-40	MeFOSA	0.0084 U	0.0084 UJ
		EtFOSA	0.0095 U	0.0095 UJ

Notes
U = result is non-detect at the estimated detection limit.
ug/L = micrograms per liter.
UJ = result is non-detect with an estimated detection limit.

According to report C347713, the EPA Method 1668C labeled standard $^{13}C_{12}$-22'6-TriCB-(19) results for samples MW3-20230214-GW-35-DUP and MW4-20230214-GW-40 were below lower percent recovery acceptance limits of 40 percent, at 35 percent and 39 percent, respectively. The reviewer confirmed with BV that the internal standard recoveries demonstrated sufficient instrument sensitivity to report the associated sample results. The associated non-detect results were qualified by the reviewer with UJ. The associated detected sample results were already flagged by BV as estimated due to detection below the MRL; additional qualification of detected sample results was not required. The qualified results are shown in the following table:

Report	Sample	Component	Original Result (ng/L)	Qualified Result (ng/L)
C347713	MW3-20230214-GW-35-DUP	22'6-TriCB-(19)	0.017 U	0.017 UJ
		234'-TriCB-(22)	0.0060 U	0.0060 UJ
		235-TriCB-(23)	0.0061 U	0.0061 UJ
		236-TriCB-(24)	0.0074 U	0.0074 UJ
		23'4-TriCB-(25)	0.0061 U	0.0061 UJ
		TriCB-(26)+(29)	0.0056 U	0.0056 UJ
		23'6-TriCB-(27)	0.0069 U	0.0069 UJ
	MW4-20230214-GW-40	22'6-TriCB-(19)	0.019 U	0.019 UJ
		TriCB-(21)+(33)	0.0076 U	0.0076 UJ
		234'-TriCB-(22)	0.0076 U	0.0076 UJ
		235-TriCB-(23)	0.0077 U	0.0077 UJ
		236-TriCB-(24)	0.0094 U	0.0094 UJ
		23'4-TriCB-(25)	0.0078 U	0.0078 UJ
		TriCB-(26)+(29)	0.0071 U	0.0071 UJ
		23'6-TriCB-(27)	0.0088 U	0.0088 UJ

Notes
ng/L = nanograms per liter.
U = result is non-detect at the estimated detection limit.
UJ = result is non-detect with an estimated detection limit.

According to report C347713, the EPA Method 1699 labeled standard $^{13}C_{10}$-heptachlor results for samples MW3-20230214-GW-35, MW3-20230214-GW-35-DUP, MW4-20230214-GW-40, and the MS prepared with sample MW3-20230214-GW-35-DUP exceeded the upper percent recovery acceptance limit of 120 percent, at 164 percent, 160 percent, and 125 percent, respectively. The labeled standard ^{13}C-methoxychlor results for samples MW3-20230214-GW-35 and MW3-20230214-GW-35-DUP also exceeded the upper percent recovery acceptance limit of 120 percent, both at 140 percent. The associated non-detect sample results did not require qualification. The associated detected sample results were qualified by the reviewer with J+ in the following table:

Report	Sample	Component	Original Result (ng/L)	Qualified Result (ng/L)
C347713	MW3-20230214-GW-35	Methoxychlor	0.085 J	0.085 J+
	MW3-20230214-GW-35-DUP		0.065 J	0.065 J+
Notes J = result is estimated. J+ = result is estimated but may be biased high. ng/L = nanograms per liter.				

According to report C351279, the EPA Method 1699 labeled standard ^{13}C-methoxychlor result for the batch 8523575 MS prepared with sample MW1-20230220-GW-70 exceeded the upper percent recovery acceptance limit of 120 percent, at 125 percent. The ^{13}C-methoxychlor recovery for sample MW1-20230220-GW-70 was within percent recovery acceptance limits; thus, qualification was not required.

According to report C351279, the EPA Method 537.1 labeled standard $^{13}C_2$-PFTeDA was below lower percent recovery acceptance limits of 50 percent, at 45 percent, for the batch 8534937 laboratory method blank. BV indicated that the associated laboratory method blank PFTeDA and PFTrDA results may have increased variability. The laboratory method blank was non-detect for PFTeDA and PFTrDA and the associated sample had acceptable labeled standard recovery; thus, qualification was not required.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance for individual samples for organic analyses.

The laboratory appropriately documented and qualified surrogate outliers. When surrogate percent recoveries were outside of acceptance limits because of dilutions necessary to quantify high concentrations of target analytes, qualification by the reviewer was not required. The reviewer confirmed that batch quality control results for samples with surrogate outliers were within acceptance limits.

The reviewer associated EPA Method 8270E acid-fraction surrogates phenol-d6, 2-fluorophenol, and 2,4,6-tribromophenol with all phenolic semivolatile organic compounds, benzoic acid, and benzyl alcohol. The base/neutral fraction surrogates nibrobenzene-d5, 2-fluorobiphenyl, and p-terphenyl were associated with all remaining semivolatile organic compounds.

According to report A3B0217, the EPA Method 8270E base/neutral surrogate 2-fluorobiphenyl result for sample MFA-B3A-20230207-GW-36.0 was below the lower percent recovery acceptance limit of 44 percent, at 40 percent. The remaining two base/neutral surrogate results were within percent recovery acceptance limits; thus, qualification was not required.

According to report A3B0522, samples MW3-20230214-GW-35 and MW3-20230214-GW-35-DUP had EPA Method 8270E nibrobenzene-d5 and 2-fluorobiphenyl surrogate results

that were below lower percent recovery acceptance limits, ranging from 27 percent to 42 percent. Because two of the three base/neutral surrogates for each sample exceeded percent recovery acceptance limits, all associated base/neutral semivolatile organic compound results are considered estimated. The reviewer qualified non-detect results with UJ and detected results with J-. The sample results that were also associated LCS and LCSD percent recovery exceedances were previously qualified by the reviewer in the Laboratory Control Sample and Laboratory Control Sample Duplicate Results section above; the LCS and LCSD qualifications take precedent over surrogate qualifications and are considered final; additional qualifications were not required for these compounds. The following results were qualified by the reviewer:

Analyte	MW3-20230214-GW-35		MW3-20230214-GW-35-DUP	
	Original Result (ug/L)	Qualified Result (ug/L)	Original Result (ug/L)	Qualified Result (ug/L)
Acenaphthene	0.0419	0.0419 J-	0.0167	0.0167 J-
Acenaphthylene	0.034	0.034 J-	0.0129	0.0129 J-
Anthracene	0.0165	0.0165 J-	0.00943 U	0.00943 UJ
Benz(a)anthracene	0.00962 U	0.00962 UJ	0.00943 U	0.00943 UJ
Benzo(a)pyrene	0.0144 U	0.0144 UJ	0.0142 U	0.0142 UJ
Benzo(b)fluoranthene	0.0144 U	0.0144 UJ	0.0142 U	0.0142 UJ
Benzo(k)fluoranthene	0.0144 U	0.0144 UJ	0.0142 U	0.0142 UJ
Benzo(g,h,i)perylene	0.00962 U	0.00962 UJ	0.00943 U	0.00943 UJ
Chrysene	0.00962 U	0.00962 UJ	0.00943 U	0.00943 UJ
Dibenz(a,h)anthracene	0.00962 U	0.00962 UJ	0.00943 U	0.00943 UJ
Fluoranthene	0.024	0.024 J-	0.0106	0.0106 J-
Fluorene	0.0586	0.0586 J-	0.0201	0.0201 J-
Indeno(1,2,3-cd)pyrene	0.00962 U	0.00962 UJ	0.00943 U	0.00943 UJ
Phenanthrene	0.00962 U	0.00962 UJ	0.00943 U	0.00943 UJ
Pyrene	0.00962 U	0.00962 UJ	0.00943 U	0.00943 UJ
Carbazole	0.0178	0.0178 J-	0.0142 U	0.0142 UJ
Dibenzofuran	0.0174	0.0174 J-	0.00943 U	0.00943 UJ
Bis(2-ethylhexyl)phthalate	0.192 U	0.192 UJ	0.189 U	0.189 UJ
Butyl benzyl phthalate	0.192 U	0.192 UJ	0.189 U	0.189 UJ
Diethylphthalate	0.192 U	0.192 UJ	0.189 U	0.189 UJ
Dimethylphthalate	0.192 U	0.192 UJ	0.189 U	0.189 UJ
Di-n-butylphthalate	0.192 U	0.192 UJ	0.189 U	0.189 UJ
Di-n-octyl phthalate	0.192 U	0.192 UJ	0.189 U	0.189 UJ
N-Nitrosodimethylamine	0.024 U	0.024 UJ	0.0236 U	0.0236 UJ
N-Nitroso-di-n-propylamine	0.024 U	0.024 UJ	0.0236 U	0.0236 UJ
N-Nitrosodiphenylamine	0.0257	0.0257 J-	0.0236 U	0.0236 UJ
Bis(2-Chloroethoxy) methane	0.0623	0.0623 J-	0.0257	0.0257 J-
Bis(2-Chloroethyl) ether	0.0407	0.0407 J-	0.0236 U	0.0236 UJ

Analyte	MW3-20230214-GW-35		MW3-20230214-GW-35-DUP	
	Original Result (ug/L)	Qualified Result (ug/L)	Original Result (ug/L)	Qualified Result (ug/L)
2,2'-Oxybis(1-Chloropropane)	0.0264	0.0264 J-	0.0236 U	0.0236 UJ
Hexachlorobenzene	0.0179	0.0179 J-	0.00943 U	0.00943 UJ
4-Bromophenyl phenyl ether	0.0493	0.0493 J-	0.0236 U	0.0236 UJ
4-Chlorophenyl phenyl ether	0.0507	0.0507 J-	0.0236 U	0.0236 UJ
Aniline	0.0481 U	0.0481 UJ	0.0472 U	0.0472 UJ
4-Chloroaniline	0.024 U	0.024 UJ	0.0236 U	0.0236 UJ
2-Nitroaniline	0.192 U	0.192 UJ	0.189 U	0.189 UJ
3-Nitroaniline	0.192 U	0.192 UJ	0.189 U	0.189 UJ
4-Nitroaniline	0.192 U	0.192 UJ	0.189 U	0.189 UJ
Nitrobenzene	0.0962 U	0.0962 UJ	0.0943 U	0.0943 UJ
2,4-Dinitrotoluene	0.0962 U	0.0962 UJ	0.0943 U	0.0943 UJ
2,6-Dinitrotoluene	0.0962 U	0.0962 UJ	0.0943 U	0.0943 UJ
Isophorone	0.0272	0.0272 J-	0.0236 U	0.0236 UJ
Azobenzene	0.024 U	0.024 UJ	0.0236 U	0.0236 UJ
Bis(2-Ethylhexyl) adipate	0.240 U	0.24 UJ	0.236 U	0.236 UJ
1,2-Dinitrobenzene	0.240 U	0.240 UJ	0.236 U	0.236 UJ
1,3-Dinitrobenzene	0.240 U	0.240 UJ	0.236 U	0.236 UJ
1,4-Dinitrobenzene	0.240 U	0.240 UJ	0.236 U	0.236 UJ
Pyridine	0.0962 U	0.0962 UJ	0.0943 U	0.0943 UJ

Notes
J- = the result is estimated but may be biased low.
U = result is non-detect at the estimated detection limit.
ug/L = micrograms per liter.
UJ = result is non-detect with an estimated detection limit.

All remaining surrogate results were within percent recovery acceptance limits.

INITIAL AND CONTINUING CALIBRATION VERIFICATION RESULTS

Initial calibration verification and continuing calibration verification (CCV) results are used to demonstrate instrument precision and accuracy prior to analysis and through the end of analysis of a sample batch. The laboratories did not report CCV results, but appropriately flagged results associated with CCV exceedances. Surrogate or batch quality control results flagged by the laboratory based on CCV exceedances but meeting percent recovery and/or RPD acceptance criteria required no action from the reviewer.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. The following field duplicate and parent sample pair were submitted for analysis:

Reports	Parent Sample	Field Duplicate Sample
A3B0522, C347713	MW3-20230214-GW-35	MW3-20230214-GW-35-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. RPD was not evaluated when both results in the sample pair were non-detect. When one result in the sample pair was non-detect, RPD was evaluated using the EDL, LDL, MDL or MRL of the non-detect result. Field duplicate results that exceeded the acceptance criteria were qualified by the reviewer with J for detected results and UJ for non-detect results, as shown in the following table. All detected EPA Method 1668C sample MW3-20230214-GW-35-DUP results were qualified by the reviewer in the Method Blanks section above. These results are included in the table below with final qualifiers based on both laboratory method blank and field blank qualification. Results already reported as estimated due to detection below the MRL did not require additional qualification but are included in the table below for clarity.

Report	Sample	Analyte	RPD (%)	Original Result (ng/L)	Qualified Result (ng/L)
C347713	MW3-20230214-GW-35	3,3'-DiCB-(11)	189	0.0032 U	0.0032 UJ
	MW3-20230214-GW-35-DUP			0.118 J	0.118 UJ[a]
	MW3-20230214-GW-35	TriCB-(20) + (28)	116	0.0033 U	0.0033 UJ
	MW3-20230214-GW-35-DUP			0.0125 J	0.0125 UJ[a]
	MW3-20230214-GW-35	24'5-TriCB-(31)	116	0.0032 U	0.0032 UJ
	MW3-20230214-GW-35-DUP			0.0120 J	0.0120 UJ[a]
	MW3-20230214-GW-35	TetraCB-(61)+(70)+(74)+(76)	111	0.0074 U	0.0074 UJ
	MW3-20230214-GW-35-DUP			0.0260 J	0.0260 UJ[a]
	MW3-20230214-GW-35	PentaCB-(90)+(101)+(113)	132	0.0074 U	0.0074 UJ
	MW3-20230214-GW-35-DUP			0.0361 J	0.0361 UJ[a]
	MW3-20230214-GW-35	22'35'6-PentaCB-(95)	108	0.0099 U	0.0099 UJ
	MW3-20230214-GW-35-DUP			0.033 J	0.033 UJ[a]
	MW3-20230214-GW-35	PentaCB-(110)+(115)	113	0.0067 U	0.0067 UJ
	MW3-20230214-GW-35-DUP			0.0241 J	0.0241 UJ[a]
	MW3-20230214-GW-35	23'44'5-PentaCB-(118)	100	0.0048 U	0.0048 UJ
	MW3-20230214-GW-35-DUP			0.0144 J	0.0144 UJ[a]
	MW3-20230214-GW-35	HexaCB-(129)+(138)+(163)	108	0.0075 U	0.0075 UJ
	MW3-20230214-GW-35-DUP			0.025 J	0.025 UJ[a]
	MW3-20230214-GW-35	HexaCB-(147)+(149)	128	0.0071 U	0.0071 UJ
	MW3-20230214-GW-35-DUP			0.0323 J	0.0323 UJ[a]
	MW3-20230214-GW-35	HexaCB-(153)+(168)	123	0.0060 U	0.0060 UJ
	MW3-20230214-GW-35-DUP			0.0253 J	0.0253 UJ[a]

Report	Sample	Analyte	RPD (%)	Original Result (ng/L)	Qualified Result (ng/L)
Notes J = result is estimated. ng/L = nanograms per liter. RPD = relative percent difference. U = result is non-detect at the estimated detection limit. UJ = result is non-detect with an estimated detection limit. [a]Result also qualified as non-detect based on laboratory method blank detection, as described in the Method Blanks section above.					

All remaining field duplicate results met the RPD acceptance criteria.

DATA PACKAGE

The data package was reviewed for transcription errors, omissions, and anomalies.

According to report A3A1010, sample MFA-B1-20230130-21.9 was recorded on the COC form as MFA-B1-2023013-21.9. The sample name was corrected by MFA project manager request after samples had been received by Apex. No additional action was required.

The reviewer confirmed that, for report A3A1010, the EPA Method 8151A chlorinated herbicide analysis was canceled for composite sample MFA-B1-B5-COMP-SL-PRO because insufficient sample material was available for the analysis.

Report A3B0522 was amended and reissued on May 2, 2023, to replace EPA Method 8270E results that had been extracted after the method-recommended holding time (batch 23B0895) with results from the original extraction and analysis (batch 23B0761) that were extracted within the holding time but had low LCS recoveries. The results associated with batch 23B0761 were reported and are qualified in the Laboratory Control Sample and Laboratory Control Sample Duplicate Results section above.

Report C338927 was reissued by BV on April 20, 2023, to correct an internal standard reference.

According to report C338927, a sample identified as MFA-SL-Composite was listed on the COC form but was crossed out and annotated by Apex that it would be shipped the following week. The reviewer confirmed that this sample had not been included in the C338927 sample delivery group. The reviewer confirmed that compositing instructions were provided to BV in a separate email communication, in which BV was instructed to composite samples MFA-B1-20230130-21.9, MFA-B3-20230131-31.0, MFA-B2-20230131-23.0, MFA-B4-20230202-SL-26.5, and MFA-B5-20230203-SL-27.0, name the composite sample as MFA-B1-B5-COMP-SL, and air dry the composited sample prior to ASTM D7968-17A extraction and analysis. Percent moisture of the composited sample was also performed by BV for dry-weight reporting purposes.

According to report C347690, the COC form referenced samples MFA-B1-20230130-21.9, MFA-B3-20230131-31.0, MFA-B2-20230131-23.0, MFA-B4-20230202-SL-26.5, and MFA-B5-20230203-SL-27.0, which had already been received by BV with sample delivery group

C338927. These sample names were appropriately crossed out and annotated by Apex as having already been received by BV. The reviewer confirmed that only one sample MFA-SL-Composite After Processing was included in the sample delivery group for report C347690. Report C347690 was reissued by BV on June 6, 2023, to correct sample ID MFA-SL-Composite After Processing to MFA-B1-B5-COMP-SL-PRO.

Report C347713 was reissued on May 17, 2023, to include the complete list of EPA Method 537.1 per- and polyfluoroalkylated substances.

No additional issues were found.

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EPA. 2020a. *National Functional Guidelines for Inorganic Superfund Methods Data Review.* EPA 542-R-20-006. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation: Washington, DC. November.

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EPA. 2020c. *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: Washington, DC. November.

Weck. 2020. *Quality Assurance Manual.* Rev. 20.6. Weck Laboratories, Inc.: Industry, CA. April 17.

APPENDIX E
PHOTO LOG

Photographs

Project Name: Phase IB Environmental Investigation
Project Number: M0830.03.006
Location: St. Helens, Oregon

Photo No. 1.

Description

ISM sampling set up: a ponar sampler is attached to a wench line on the front of a small barge.

Photo No. 2.

Description

Shallow lagoon sludge sample retained inside ponar sampler.

Photographs

Project Name: Phase IB Environmental Investigation
Project Number: M0830.03.006
Location: St. Helens, Oregon

Photo No. 3.

Description

Representative photo of shallow lagoon sludge collected with ponar, emptied into a stainless steel bowl.

Photo No. 4.

Description

50-point ISM shallow lagoon sludge sample at lab prior to drying.

Photographs

Project Name: Phase IB Environmental Investigation
Project Number: M0830.03.006
Location: St. Helens, Oregon

Photo No. 5.

Description

Representative photo of deeper sludge at boring MFA B-1.

Photo No. 6.

Description

Representative photo of deeper sludge at boring MFA B-3.

Photographs

Project Name: Phase IB Environmental Investigation
Project Number: M0830.03.006
Location: St. Helens, Oregon

Photo No. 7.

Description

Boring MFA B-3A. Representative sand layers where the reconnaissance groundwater sample was collected are shown to the far right in the top two cores tubes and to the far left in the bottom core tube. The underlying silt is at the right in the bottom core tube.

Photo No. 8.

Description

Representative photo of silt in boring MFA B-4.

Photographs

Project Name: Phase IB Environmental Investigation
Project Number: M0830.03.006
Location: St. Helens, Oregon

Photo No. 9.

Description

Weathered basalt bedrock at refusal depth in boring MFA B-1.

Photo No. 10.

Description

Vesicular basalt at refusal depth in boring MFA B-2.

Photographs

Project Name: Phase IB Environmental Investigation
Project Number: M0830.03.006
Location: St. Helens, Oregon

Photo No. 11.

Description

Vesicular basalt at refusal depth in boring MFA B-5.

Photo No. 12.

Description

Barge and direct-push drilling rig set-up.

APPENDIX F

GRI REPORT

Preliminary Phase I Geotechnical Investigation Wastewater Lagoon Repurposing

City of St. Helens, Oregon

September 15, 2023

Prepared for

Maul Foster & Alongi, Inc.
3140 NE Broadway Street
Portland, OR 97232

Prepared by

16520 SW Upper Boones Ferry Road, Suite 100
Tigard, OR 97224-7661
(503) 641-3478 | www.gri.com

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APPENDICES

1 INTRODUCTION

At your request, GRI completed a preliminary Phase I geotechnical investigation as part of the Oregon Department of Environmental Quality (DEQ) Phase I Site Characterization for the proposed Wastewater Lagoon Repurposing in St. Helens, Oregon. The Vicinity Map, Figure 1, shows the general location of the site. The purpose of our investigation was to evaluate subsurface conditions at the site and develop preliminary geotechnical conclusions and recommendations for site improvements associated with filling in the existing wastewater treatment plant (WWTP) lagoon as part of the Phase I Site Characterization, along with recommendations for additional geotechnical explorations and analysis for Phase II Site Characterization. The investigation included a review of available geologic and geotechnical information for the area, subsurface explorations, laboratory testing, and engineering analyses. This report describes the work accomplished and provides our preliminary conclusions and recommendations regarding foundation support, slope stability, seismic design considerations, and ground improvement.

In addition, GRI reviewed boring logs completed by Maul Foster & Alongi, Inc. (MFA) as part of their work for the Phase I Site Characterization and older boring and test-pit logs completed prior to construction of the Aeration Lagoon.

2 PROJECT DESCRIPTION

The proposed project includes repurposing the existing 43-acre WWTP as a sediment disposal facility for the City of St. Helens (City). As part of the plan, the existing lagoon will be drained, and the solids from it will be collected and stored in cells within the facility. The lagoon will be partially to fully filled with sediment, soil, and the City's wastewater treatment sludge as fill material. Imported materials will likely be delivered to the site by barges that dock at either the existing Boise Cascade dock structure south of the lagoon or a new dock structure near the existing Boise Cascade dock, and/or by train and truck.

Based on review of MFAs October 5, 2020, report titled "Preliminary Conceptual Site Development Plan," the existing lagoon will be dredged to about elevation 10 feet (North American Vertical Datum of 1988 [NAVD88]) with cut slopes of 2H:1V (Horizontal to Vertical) on the west side of the excavation and cut slopes of 3H:1V on the north, east, and south sides of the excavation. All elevations referenced in this report refer to NAVD88 unless otherwise stated. As part of the excavation, the previously installed PVC liner located over a portion of the bottom of the lagoon will be removed, and the lagoon will be drained to allow sludge removal and filling. A layer of clean soil or sand fill will be installed at the bottom of the excavation and overlain by a Geosynthetic Clay Liner (GCL). Above the GCL, a 60-mil High-Density Polyethylene (HDPE) linear or low-density polyethylene geomembrane liner would be installed and overlain by a drainage rock layer, covered by

a non-woven geotextile fabric separation layer, and then capped with a layer of clean sand prior to filling.

The team is proposing excavating and filling the lagoon in two phases. The initial phase, Design Phase 1, will include excavating and filling the southern portion, approximately 1,700 feet of the lagoon (approximate fill area of 19 acres), with fill to about elevation 35 feet. The west, south, and east sides of Phase 1 would be supported by the existing sidewalls of the lagoon and levee. The north side of the fill area will be supported by a geotube cutoff berm. The cutoff berm would be installed from elevation 10 feet to elevation 35 feet in a generally east-west direction along the entire width of the lagoon and would be constructed with top dimensions of about 25 feet wide and sideslopes of 3H:1V. The berm would be constructed of geotubes, permeable engineered textile bags into which sludge materials from the lagoon would be pumped and allowed to drain, which would require maintaining groundwater levels below the bottom of the geotubes during construction. The concept drawings indicate the geotubes would be installed in an overlapping pyramid structure. The new GCL liner would be constructed below the bottom of the berm, and the HDPE liner would extend up the south face of the berm.

Phase 2 excavation and filling will begin following completion of Phase 1 filling. As part of Phase 2, the northern 30 acres of the lagoon to the north of the cutoff berm will be excavated and backfilled, similar to Phase 1. Following excavation and dewatering, the GCL cap installed for Phase 2 would be tied into the GCL liner installed in Phase 1. The HDPE liner would be installed over the bottom of the Phase 2 excavation and up the north side of the geotube berm. Following filling of the northern 30 acres to elevation 35 feet additional filling will be completed over the entire footprint of the previous lagoon to raise grades in the northern portion of the lagoon to a top elevation of 66 feet and grades in the Phase 1 area to a top elevation 54 feet. Final slopes for the project have not been finalized but will be less than 5H:1V above the existing east and south levee.

As part of Phase 1 and 2 filling, a dewatering system that includes horizontal drainage layers with vertical sumps would be installed to collect and discharge leachate from the fill materials placed as fill. The top of the fills will be capped with a non-woven geotextile-fabric backed GCL and geosynthetic membrane to limit water infiltration. In addition, the top of the fill will be sloped to drain, and a pipe collection system is planned on the west side of the lagoon to collect groundwater from the basalt surface to the west. Control of groundwater has not been evaluated at this time but will be an important consideration for final design of the project.

Following filling to final grades, the facility will be repurposed by the City as a park. Park improvements may include an amphitheater, ball fields, paved access roads and parking lots, and ancillary buildings.

3 SITE DESCRIPTION

3.1 General

The WWTP is bordered by S 6th Street to the north, residential developments and grassy fields to the west, the Cascade Tissue Group mill (formerly Boise Cascade) to the south, and the Multnomah Channel to the east. The majority of the site is occupied by the large WWTP lagoon. The WWTP is located adjacent to the northern edge of the lagoon. Based on review of existing as-built drawings, the bottom of the WWTP lagoon is at about elevation 7 feet (vertical datum unknown). An impoundment levee is located along the eastern edge of the lagoon, with a top-of-levee elevation of about elevation 34 feet. The levee is about 10 feet wide at the top, surfaced with asphalt concrete (AC) pavement, and is used as an access road for vehicular traffic for plant operations. The levee side slopes are surfaced with large, angular basalt fragments with side slopes of about 2H:1V on the eastern (Multnomah Channel) side of the levee. An abandoned rail line is located at the toe of the eastern side of the levee, over about the southern 2,200 feet of the levee. A heavily wooded strip of land separates the rail line from the Multnomah Channel. On the western (lagoon) side of the levee, slopes of the levee range from about 3H:1V above elevation 20 feet to about 5.5H:1V below elevation 20 feet. The bottom of the lagoon is partially lined with a PVC liner. An existing, near-vertical basalt cliff is located on the west side of the lagoon, with elevations above the cliff ranging from about elevation 80 feet towards the northern end of the lagoon to about elevation 35 feet near the southwest end of the lagoon. An existing condition survey of the project site completed by AKS Engineering & Forestry, LLC is provided in Appendix A.

3.2 Geologic Setting

The project site is located on the western bank of the Multnomah Channel near the confluence with the Columbia River, just downstream of the entrance to Scappoose Bay. Warrior Point, the northernmost tip of Sauvie Island, is located beyond the mouth of Multnomah Channel to the east. The Cascadia Subduction Zone (CSZ) and associated Cascadia fold and fault belt are approximately 120 miles to the west. Published geologic mapping indicates the western portion of the project site is underlain by the Sentinel Bluffs member of the Grand Ronde Basalt, which is part of the Columbia River Basalt Group (Evarts, 2004). The Sentinel Bluffs member is in turn underlain by the Winter Water Basalt Group, shown in cross section to underlie the eastern portion of the project site (beyond the extent of mapped Sentinel Bluffs), which is mantled by Quaternary-age alluvium at the surface. A narrow strip of artificial fill is mapped along the eastern boundary of the WWTP lagoon (west of the alluvium), coincident with the location of the retention berm/levee. A

northwest-southeast-trending fault is shown on the geologic map (Evarts, 2004) approximately 1.5 miles northeast of the site; however, this fault is not included in the USGS Quaternary Fold and Fault Database (USGS, 2006). The closest identified Quaternary-age fault is the Portland Hills Fault, located approximately 13.5 kilometers southwest of the site (USGS, 2006). No mapped or historic landslides were identified at the project site or in the immediate vicinity on the Oregon Department of Geology and Mineral Industries (DOGAMI) statewide landslide hazard database (SLIDO). DOGAMI is the state agency responsible for geologic hazard mapping in Oregon. Landslide hazard ratings at the site range from low (landsliding unlikely) to high (landsliding likely), with areas of greater hazard generally corresponding to areas of steeper relief, such as the western portion of the project site (Burns and Watzig, 2014).

3.3 Geologic Reconnaissance

An Oregon-registered geologist from GRI conducted a walking geologic reconnaissance of the project site on September 23, 2019. GRI conducted the reconnaissance to evaluate surface conditions at the site for obvious indications of potential slope instability and other geologic hazards relative to the site. The following text summarizes observations made on site.

An impoundment levee is present along the northern portion of the site and extends approximately 0.5 miles to the southwest, then extends approximately 0.1 mile to the west along the southern end of the site. An inlet approximately 100 feet to 250 feet wide from the Multnomah Channel is located near the northeastern corner of the lagoon, within about 100 feet of the bottom of the levee. The ground surface east of the levee is relatively flat to gently undulating and is about 230 feet to 250 feet wide, with ground surface elevations ranging from about elevation 15 feet to 25 feet to the crest of the Multnomah Channel. Dense vegetation, including grasses, shrubs, and young to mature trees, covers the ground surface. An abandoned rail track runs along the base of the levee in a generally northeast-southwest direction.

A steeply sloping to near-vertical rock cliff is located along the western edge of the lagoon; the western portion of the project site is shown on the geologic map as Sentinel Bluffs basalt. Elevations along the top of the cliff range from about elevation 80 feet near the northern end of the lagoon to about elevation 35 feet near the southern end of the lagoon. The ground surface above the rock cliff is vegetated with grass and mature trees, with visible basalt outcrops. Portions of the near-vertical cliff face in the northern portion of the site exhibited evidence of past rockfall events (accumulated talus material at the base of the cliff and possible source areas visible on the cliff face). A historical topographic map reviewed by GRI identified the project site as a quarry, and past quarrying at the site may have influenced the cliff face slopes. Obvious evidence of large-scale, active, deep-seated

slope instability was not observed at the site. GRI observed areas of ponded water and hummocky topography above the cliffs, possibly a result of near-surface bedrock. A drainage channel enters the lagoon near the southwestern corner of the site, with water levels in the drainage channel apparently controlled by a weir system.

4 SUBSURFACE CONDITIONS

4.1 General

Subsurface materials and conditions at the site were investigated during two separate mobilizations. During the initial mobilization between July 29 and August 2, 2019, two mud-rotary borings, designated B-1 and B-2, and three cone penetration test (CPT) probes, designated CPT-1 through CPT-3, were completed. The borings were advanced to depths ranging from about 156.5 feet to 201.5 feet, and the CPT probes to depths ranging from about 22 feet to 158 feet. During the second mobilization between February 27, 2023, and March 2, 2023, one mud-rotary boring, designated B-3, was completed to a depth of approximately 261.5 feet. Approximate locations of the explorations performed for this investigation are provided on the Site Map, Figure 2. Logs of the borings and CPT probes are provided on Figures 1B through 7B. The field and laboratory programs conducted to evaluate the physical engineering properties of the materials encountered in the explorations are described in Appendix B. The terms and symbols used to describe the soils and rocks encountered in the explorations are defined in Tables 1B through 4B and on the attached legend. A resistivity and seismic refraction survey, completed by Earth Dynamics LLC, is provided in Appendix D. The locations of the geophysical profile lines are shown on Figure 2.

In addition, GRI reviewed available geotechnical data from MFA for their recent work on site for the Phase I Site Characterization and Shannon and Wilson's logs provided in the January 26, 1972, construction plans for the WWTP lagoon. Figure 2 shows the locations of the nearby borings, and logs of the borings are provided in Appendices E and G, respectively. Atterberg Limits testing completed by GRI on samples of soil collected during MFA's recent explorations within the lagoon is provided in Appendix F. The subsurface conditions encountered in the previous borings are in general agreement with the subsurface information obtained during our recent investigation.

GRI also reviewed the U.S. Department of Agriculture (USDA) Web Soil Survey Map covering the project area and the surrounding vicinity, which includes soil survey areas within Clark County, Washington (Version 17, September 16, 2019), Cowlitz County, Washington (Version 20, September 16, 2019), and Columbia County, Oregon (Version 16, September 10, 2019). The USDA map provided in Appendix H indicates the project site east of the lagoon and impoundment berm is mantled by *Sauvie silt loam*, while the area west of the lagoon is described as *Rock outcrop – Xerumbrepts complex, undulating surface*.

The mapped USDA soil units generally agree with GRI's observations and review of surface and subsurface conditions at the project site.

4.2 Soils

For the purpose of discussion, the materials disclosed by the investigation have been grouped into the following major units based on their physical characteristics and engineering properties:

a. FILL
b. SAND
c. SILT
d. BASALT

The following paragraphs provide a description of the soil units and a discussion of the groundwater conditions at the site.

a. FILL

Boring B-1 was drilled next to existing railroad tracks and encountered about 10 inches of crushed rock at the ground surface. Probes CPT-2 and CPT-3 were drilled through crushed-rock surfacing, and CPT-1 was drilled through an existing AC-surfaced parking lot. The thickness of fill in the CPT probes was not measured.

b. SAND

Sand was encountered at the ground surface in boring B-3 and below the crushed-rock surfacing or pavement in explorations B-1 and CPT-1 through CPT-3 and extends to depths ranging from about 13.8 feet to 25 feet. The sand is gray to brown, fine to medium grained, and contains a variable silt content ranging from trace to some silt. Wood debris was encountered within the sand in boring B-1 below a depth of about 17.5 feet. Based on SPT N-values and CPT tip-resistance values, the relative density of the sand typically ranges from loose to medium dense.

c. SILT

Silt was encountered at the ground surface in boring B-2 and beneath the sand in explorations B-1, B-3, and CPT-1 through CPT-3 and extends to depths ranging from about 21.5 feet to 261.5 feet. Borings B-1 and B-3 were terminated in the silt at a depth of about 201.5 feet and 261.5 feet, respectively. The silt is brown to gray and contains variable percentages of clay and sand, ranging from a trace of clay to clayey and a trace of fine-grained sand to sandy. The silt generally contains wood debris or organics. A 12-foot-thick layer of silty sand was encountered at a depth of about 138 feet in boring B-1; 5-foot to 7-foot-thick layers of silty sand were encountered in boring B-2 at depths of about 70 feet and 145 feet; a 5-foot-thick layer of silty sand was encountered at a depth of 165 feet in

boring B-3; a 1-inch-thick layer of sand was encountered at a depth of about 38 feet in boring B-3; 1-inch thick interbedded layers of sand were encountered between 47 feet and 48.5 feet in boring B-3; and interbedded layers of sand were encountered within the silt below depths of about 65 feet in probe CPT-3. An approximately 5-foot-thick and 2-inch-thick layer of very stiff, fine-grained ash was encountered at a depth of 75 feet and 80.5 feet, respectively, in boring B-3. Based on SPT N-values, Torvane shear-strength values, and CPT tip-resistance values, the relative consistency of the silt ranges from very soft to hard and is generally soft to medium stiff. Below a depth of 115 feet in boring B-3, the relative consistency of the silt typically ranges from very stiff to hard. Atterberg-limits testing completed on samples of silt is summarized on Figures 13B through 19B and indicates the silt has a low to high plasticity.

Consolidation tests were conducted on samples of silt and indicate the soil is normally to slightly overconsolidated and has a moderate to high compressibility in the normally consolidated range of stresses and a low compressibility in the preconsolidated range of stresses; see Figures 20B through 28B. Secondary compression testing completed on samples of silt from borings B-1 and B-3 indicates a low to moderate rate of secondary compression in both the preconsolidated and normally consolidated ranges of stresses. The results of the secondary compression tests are shown on Figures 29B and 30B.

Two multistage, triaxial shear-strength tests indicate this soil unit exhibits an effective angle of internal friction, ϕ', of about 34°, as indicated on Figures 31B and 32B. In addition, strain-controlled cyclic direct simple shear (DSS) testing was completed on samples of silt from a depth of approximately 39 feet in boring B-1, approximately 64 feet in boring B-2, and approximately 36 feet and 61 feet in boring B-3. The samples were tested at cyclic shear strains varying from 0.5% to 1.6%, and the tabulated results are provided in Appendix B.

d. BASALT

Basalt was encountered beneath the silt in explorations B-2 and CPT-1 through CPT-3. These explorations were terminated in the basalt at depths ranging from about 22 feet to 158 feet. The basalt encountered in boring B-2 is dark gray and predominantly decomposed, with slightly weathered inclusions. The basalt is very soft to soft (R1 to R2). Geophysical testing completed near the toe of the east side of the levee indicates basalt was interpreted at about elevation -50 feet over the southern 600 feet of the lagoon. Further to the north, the depth to basalt increases significantly to elevations on the order of elevation -350 feet between borings B-1 and B-3. The depth to basalt then decreases rapidly to about elevation -100 feet about 50 feet to the north of boring B-1. Additional geophysical testing completed about 150 feet and 250 feet to the east of the railroad tracks interpreted basalt at about elevation -100 feet to elevation -150 feet over the

southern about 1300 feet of the profiles and deeper than elevation -200 feet over the northern about 900 feet of the profiles.

4.3 Groundwater

The borings were completed using mud-rotary drilling techniques, which do not allow an accurate measurement of the groundwater level during drilling. Pore-pressure dissipation testing completed in probes CPT-1 through CPT-3 indicates groundwater at depths ranging from about 1.7 feet to 10.4 feet (elevation 21.4 feet to elevation 12.1 feet) below the ground surface; see Figures 8B through 12B. Based on information provided by MFA, the 100-year flood elevation for the site ranges from about elevation 23.3 feet to elevation 24.7 feet. We anticipate groundwater closely reflects water levels in the nearby Columbia River and Multnomah Channel. However, shallow perched groundwater conditions may develop in the fill during periods of prolonged precipitation. It is our understanding that water levels within the existing, partially PVC-lined wastewater lagoon are generally maintained at about elevation 28 feet.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 General

Based on the explorations and geophysical testing completed for this investigation and review of existing subsurface information, the eastern portion of the lagoon near the existing containment levee is underlain by a variable thickness of sand, underlain by a significant thickness of highly compressible alluvial silt. Interbedded layers of sand were encountered within the silt between depths of about 65 feet and 152 feet. The silt is underlain by basalt. The depth to basalt from the toe of the levee varies significantly across the length of the site and ranges from a depth of about 23 feet and 63 feet near the northern and southern ends of the levee, respectively, to over 350 feet deep about 500 feet south of the northern edge of the lagoon. The western edge of the lagoon consists of a near-vertical basalt cliff. The depth of basalt slopes downward from west to east across the lagoon.

Our preliminary studies indicate the existing, loose to medium-dense, unimproved sand and low-plasticity silt below the groundwater level have the potential to liquefy or strain soften during a design-level earthquake. Liquefaction and soil strain softening of these unimproved soils would result in reduced soil strength and potentially significant settlement. Without the use of ground improvement to improve the existing soil conditions, this reduction in soil strength would also result in seismic instability of the proposed embankment slope during a design-level earthquake. Our studies indicate ground-improvement methods can be used to improve the seismic stability of the proposed fills. In addition, the existing, unimproved alluvial soils are highly compressible, and the placement of new fill is estimated to result in significant total and differential

short-term (primary) and long-term (secondary) settlements. Additional settlement and slope stability of the fill soils will also be a geotechnical design consideration and will be highly dependent on placement and compaction methods for new fills in the lagoon.

The proposed excavation levels (described in the Project Description) relative to the fluctuation of groundwater and Columbia River and Multnomah Channel levels are anticipated to be a significant design and construction consideration for the project. The following sections of this report provide our preliminary conclusions and recommendations for conceptual-level design of the facility.

5.2 Seismic Considerations

5.2.1 Site-Response Analysis

5.2.1.1 General

We understand the seismic design for the project is being completed in accordance with RCRA Subtitle D (258), Seismic Design Guidance for Municipal Solid Waste Landfill Facilities. This document requires the seismic design for landfill facilities to consider an earthquake event that has a 10% probability of being exceeded in 250 years (i.e., an average return period of 2,373 years).

A site-specific site response analysis was completed for the project using nonlinear total stress analysis procedures as part of this investigation. The dynamic site-response modeling primarily consists of three primary components: 1) review of U.S. Geological Survey (USGS) Probabilistic Seismic Hazard Analysis to support selection of target response spectra at the base of the soil column; 2) selection and scaling of ground-motion acceleration time histories to match the target response spectra over the period range of interest; and 3) one-dimensional site-response modeling to evaluate the site-specific influence of subsurface conditions on the resulting ground motions. The results from the site response analysis include peak acceleration, stress, and strain profiles. The peak acceleration provides an indication of the maximum expected ground motion that could occur during a seismic event. The stress and strain profiles offer insights into how the soil would deform under various loading conditions, which is critical for designing structures that can withstand these forces.

5.2.1.2 Development of Target Spectra

The site-response analysis requires developing target spectra at the base of the soil column (hereafter referred to as "target bedrock spectra") prior to selecting and scaling the input earthquake-acceleration time histories. As previously discussed, the RCRA Subtitle D standard requires seismic evaluation to be considered for an earthquake event with 2,373 years of return period, which corresponds to the ground motion with a 10% probability of exceedance in 250 years. This ground motion is comparable to the ASCE 7

probabilistic earthquake with a 2% probability of exceedance over 50 years (equivalent to a return period of 2,475 years). Therefore, the target spectrum was derived for a 2,475-year return period based on 2014 USGS Unified Hazard Tool (UHT) for Site Class B/C boundary conditions was used for this study. Table 5-1 summarizes the site-specific uniform hazard spectral values at the project site utilized as target bedrock spectra.

Table 5-1: SITE-SPECIFIC 2,475-YEAR SPECTRAL VALUES FOR B/C BOUNDARY CONDITION

Period, sec	Spectral Acceleration, g 2,475-yr
PGA	0.41
0.1	0.87
0.2	0.90
0.3	0.75
0.5	0.55
0.75	0.43
1	0.34
2	0.19
3	0.13
4	0.09
5	0.07

5.2.1.3 Ground-Motion Selection and Scaling

For the site-response analysis, a suite of seven recorded horizontal ground-motion acceleration time histories were selected from earthquakes having magnitudes, frequency contents, and spectral shapes consistent with those that control the target spectrum. The 2014 USGS deaggregation of probabilistic ground motions at the site indicates the CSZ interface and crustal sources are the primary contributors to the potential seismicity of the site. Therefore, crustal and subduction-zone earthquake records were selected and scaled to the target spectrum for use in the site-response modeling. The selected time histories used for the site-response modeling are summarized in Table 5-2.

Table 5-2: SUMMARY OF GROUND-MOTION RECORDS SELECTED FOR SITE-RESPONSE ANALYSES

No.	Earthquake and Year	Mag. M_W	Station Name	Record ID	Record Source	Seed Record PGA, g	Sampling Frequency, Hz	Record Length, sec	Scaling Factor
1	Tohoku 2011	9.0	Iwaki	FKS011EW	KNET	0.33	100	300	1.1
2	Tohoku 2011	9.0	Sawara	CHB004NS	KNET	0.29	100	300	1.4
3	Maule 2010	8.8	Santiago La Florida	SlaFloridaNS	RENADIC	0.25	200	208	2.2
4	Maule 2010	8.8	Santiago Centro	SCentroEW	RENADIC	0.22	200	205	1.9
5	Michoacan 1985	8.1	CaletaDeCampos	CaletaDeCamposNS	UNR	0.14	200	51	3.1
6	Iwate 2008	6.9	IWT010	IWT010NS	PEER	0.28	100	238	1.5
7	Chuetsu-oki 2007	6.8	Joetsu Ogataku	65011EW	PEER	0.20	100	60	1.8

Following selection of the time histories, the input bedrock motions were linearly modified using amplitude scaling so that the mean response spectra of the recordings reasonably matched the target bedrock spectrum. The amplitude scaling process involves selecting a single scaling factor for each time history and multiplying the entire acceleration time history by this factor so its response spectrum approximates the input target spectra.

5.2.1.4 Modeling Method

The site-response modeling was performed using a 1D, non-linear, site-response analysis in the DEEPSOIL program (Hashash et al., 2016) developed by the University of Illinois. The program employs a time-domain site-response analysis capable of incorporating the non-linear hysteretic soil behavior that is observed during cyclic loading and unloading. The program computes the dynamic response of a layered soil profile to vertically propagating shear waves using a built-in total stress or effective stress analysis option. The program uses the pressure-dependent modified hyperbolic constitutive model initially developed by Kondner and Zelasko (1963; Modified Kondner and Zelasko [MKZ] model) and the General Quadratic/Hyperbolic (GQ/H) strength-controlled constitutive model recently introduced by Groholski et al. (2015). The GQ/H model allows the shear strength at failure to be defined while still providing the flexibility to represent small-strain soil behavior. Therefore, the GQ/H material model was used since it provides a better approximation of

modulus reduction and damping and higher levels of shear strain approaching the ultimate shear strength while still maintaining small-strain nonlinearity.

The GQ/H parameters are generally obtained by fitting the hyperbolic model to published empirical modulus reduction and damping curves such as Vucetic and Dobry (1991), EPRI (1993), and Darendeli (2001). The conventional approach for defining unloading-reloading criteria and behavior under general cyclic-loading conditions (hysteretic damping) is based on the Masing criteria (Masing, 1926) and extended Masing criteria (Pyke, 1979; and Vucetic, 1990). An exact match of the target modulus reduction and damping curves is not concurrently possible using the Masing or extended Masing rules (i.e., one must match the target modulus reduction curve as accurately as possible and accept the misfit of damping or optimize the fit of both simultaneously). Phillips and Hashash (2009) developed an alternative non-Masing model by introducing a reduction factor that effectively alters the Masing rules and allows for both modulus reduction and damping curves to be fitted simultaneously. This model is implemented in DEEPSOIL as the Modulus Reduction and Damping Factor (MRDF) Pressure-Dependent Hyperbolic model (Phillips and Hashash, 2009).

In general, DEEPSOIL allows the user to create a discretized soil profile and input a variety of soil-modeling parameters derived from subsurface and laboratory testing and established correlations in geotechnical literature. The selected suite of scaled earthquake records is then input into the program and propagated up through the soil column to the ground surface.

5.2.1.5 Input Simplified Soil Profile and Dynamic Properties

Two simplified subsurface profiles were developed at the project site for the existing site conditions based on the subsurface exploration and laboratory testing programs completed for the project, supplemented with available subsurface information for the project area. Profile 1 was developed at cross section B-B' (Figure 2) based on boring MW-4 and CPT-3, while profile 2 was developed at cross-section C-C' (Figure 2) based on boring MW-3 and CPT-2. The shear wave velocity measurements were conducted for CPT-2 probe, and the shear wave velocity for the CPT-3 probe was derived based on correlation with tip resistances measured during testing. The elastic half-space boundary condition at the base of the model was assumed for profiles 1 and 2 at depths of about 160 feet and 60 feet, respectively. The half-space boundary condition at the base of the model was represented by a visco-elastic boundary with a unit weight of 130 pounds per cubic foot (pcf) and a shear-wave velocity of 2,500 feet/second.

The dynamic properties of each soil layer were estimated using published relationships on similar materials and local experience. The total stress analyses were completed using

modified EPRI (1993) and Vucetic and Dobry (1991) modulus and damping curves. The sand layers encountered throughout the soil profile were assigned the depth-dependent EPRI (1993) deep cohesionless soil modulus and damping curves that account for the effects of confining pressure. The silty and clayey layers were assigned the plasticity index-dependent Vucetic and Dobry (1991) modulus and damping curves.

5.2.1.6 Results of the Site Response Analysis

The site-response analyses for the two profiles were completed using a suite of scaled ground-motion records listed in the preceding tables and the generalized soil profiles developed for the site. The results of the analyses are presented on Results of the Dynamic Response Analysis for V_s Profile 1, Figure 3 and Results of the Dynamic Response Analysis for V_s Profile 2, Figure 4. The figures show the profiles of the maximum acceleration, maximum normalized shear stress, and maximum shear strain with depth for individual earthquake motions (shown in gray) and their mean values (shown in black). The maximum acceleration and normalized shear stress profiles are mostly observed to vary with depth between 0.2 and 0.4. The maximum shear strain values are generally observed to be less than 1.2%.

5.2.2 Liquefaction, Cyclic Softening and Liquefaction-induced Settlements

Liquefaction is a process through which saturated non-plastic to low-plasticity silts and granular materials, such as sand, temporarily lose strength during and immediately after a seismic event. Liquefaction occurs as seismic shear stresses propagate through saturated soil and distort the soil structure, causing loosely packed groups of particles to contract or collapse. If drainage is impeded and cannot occur quickly, the collapsing soil structure increases the porewater pressure between the soil grains. If the porewater pressure increases to a level approaching the weight of the overlying soil, the soil temporarily behaves as a viscous liquid rather than a solid.

Cyclic softening is a term that describes a relatively gradual and progressive increase in shear strain with load cycles. Excess pore pressures may increase due to cyclic loading but will generally not approach the total overburden stress. Shear strains accumulate with additional loading cycles, but an abrupt or sudden decrease in shear stiffness is not typically expected. Settlement due to post-seismic consolidation can occur, particularly in lower-plasticity silts. Large shear strains can develop, and strength loss related to soil sensitivity may be a concern.

The potential for liquefaction and/or cyclic softening is typically evaluated by comparing the cyclic shear stresses induced within a soil profile during an earthquake to the ability of the soils to resist these stresses. In this procedure, earthquake-induced shear stress is characterized by the cyclic stress ratio (CSR), and soil resistance is characterized by the cyclic resistance ratio (CRR). The CSR can be estimated based on empirical correlations or

the results of site-response modeling. The CRR of soils is dependent on several factors, including the number of loading cycles, relative density, confining stress, plasticity, natural water content, stress history, age, depositional environment (fabric), and composition. The CRR of soils is evaluated using in situ testing in conjunction with laboratory index testing, which may also include monotonic and cyclic laboratory strength tests. The CRR for sandy soils is typically estimated based on soil shear strength as characterized by SPT N-values or CPT probe tip resistances, with various corrections to account for fines contents and other factors. For clay-like soils, the cyclic resistance is typically evaluated using estimates of the undrained shear strength, overconsolidation ratio (OCR), and sensitivity, or directly from cyclic laboratory tests.

The factor of safety against liquefaction and/or cyclic softening is calculated as the ratio of the CRR to CSR on a layer-by-layer basis within the soil profile. As the factor of safety decreases to 1.0, there is an increased risk of liquefaction or soil-strength loss. For the purpose of these evaluations, we assumed a groundwater elevation of about 9 feet, which corresponds to a depth of about 25 feet at borings MW-3 and MW-4 locations. For this project, the CSR profiles were developed based on the results of the site-response analyses performed using the DEEPSOIL program. The DEEPSOIL analyses normally yield the maximum computed shear stress normalized by the initial vertical effective stress (τ_{max}/σ'_v). The DEEPSOIL normalized shear stress was multiplied by 0.65 to convert to an equivalent uniform value (i.e., representative value) of CSR.

Our liquefaction analyses indicate the sandy soils below the groundwater surface are generally susceptible to liquefaction. The maximum depth of liquefaction and risks to a project can be a topic of debate since the case histories used to develop the simplified procedure are limited to a depth of about 60 feet. The risks of liquefaction and the resulting consequences at these greater depths are not well understood. For the purposes of this study, we have assumed that the potential for additional vertical settlements due to liquefaction of the silty sand underlying the alluvium below 90 feet is unlikely.

In addition, as part of our seismic studies, GRI conducted static and cyclic DSS testing to evaluate the static and seismic behaviors of the silt soils that underlie the project site. The cyclic DSS tests were conducted in our laboratory to evaluate the cyclic resistance, degradation potential, and post-cyclic behavior of the silt. The laboratory testing program focused on a series of static and cyclic DSS tests with supporting standard indexes and consolidation tests. Based on the laboratory test results, the silt encountered at depths of about 35 feet and 60.5 feet in boring B-3, and our interpretation of the OCR profile for the silt at 39 feet in boring B-1 and 64 feet in boring B-2, is slightly overconsolidated with an estimated OCR of 1.5. Strain-controlled cyclic DSS testing at shear strains ranging from 0.5% to 1.6% was completed on samples of the silt. The cyclic DSS testing identified a

potential reduction in shear strength (softening) of the silt soils below the groundwater level during a design-level seismic event at shear strains that we anticipate could occur during a design-level seismic event (less than 1.6% strain). The post-cyclic shear strengths used in our analysis were based on 3% strain to reduce deformation. The testing completed to date indicates the measured reduction in shear strength is significantly less than would be anticipated for low-plasticity silts based on conventional methods for predicting strength loss where the silts would be considered sand like. However, we recommend additional cyclic DSS testing be completed as the project progresses. The results of the cyclic DSS testing are provided in Appendix B.

The potential of liquefaction-induced settlement of sand-like soils was estimated using an empirical approach method described by Yoshimine et al. (2006), which is based on case histories of areas that have experienced liquefaction. Using this procedure, we estimate up to 10 inches of free-field liquefaction settlement at the site. This seismically induced settlement excludes additional vertical settlements that may occur due to the lateral spreading hazard or cyclic softening of the fine-grained soils that should be further evaluated as part of the Phase II geotechnical investigation.

5.2.3 Newmark Slope Deformation Analyses

The Newmark rigid-block analysis (Newmark, 1965) provides an estimation of the anticipated horizontal slope movements based on a double integration of the duration that the acceleration time history of the slide mass exceeds a specific yield acceleration (ky). In general, this decoupled analysis involves: (1) a dynamic response analysis to compute the "average" accelerations experienced by the slide mass, followed by (2) a displacement analysis using the Newmark (1965) double-integration procedure with the average acceleration time history as the input motion. The average acceleration computed in the first step is commonly referred to as the horizontal equivalent acceleration (HEA) time history and represents a spatial average of the accelerations acting on the slide mass (i.e., horizontal shear-stress time history normalized by the total vertical overburden stress).

The potential seismic displacement was developed for cross-sections B-B′ and C-C′ (Figure 2). The critical pseudo-static surfaces for each cross-sections B-B′ and C-C′ were initially determined based on conventional limit equilibrium analysis. Subsequently, HEA time histories were computed along the critical failure surface using site-response analysis, and the HEA time history was directly input into a Newmark seismic-displacement analysis to calculate the permanent seismic displacement as a function of the seismic yield acceleration. Permanent Seismic Displacement Curves, Figure 5 shows the resulting displacement curves versus yield acceleration (Ky) for cross-sections B-B′ and C-C′. As described in Section 5.4.2, an allowable slope deformation of 24 inches was assumed for

this initial phase I geotechnical analysis. As shown on the figure, the yield acceleration corresponding to the 24-inch allowable deformation is approximately 0.07g.

5.3 Embankment Stability Under Seismic Loading

5.3.1 General

GRI evaluated embankment stability under seismic loading conditions for three cross sections, identified as cross sections A-A', B-B', and C-C' on Figure 2. As an initial check of post-earthquake stability, the models were run with a pseudo-static acceleration, k_h, of zero. The models were run assuming a drained soil strength parameter, ϕ' of 28° for the dredged fill placed within the lagoon. In addition, the models assumed a liquified soil strength, $S_u/\sigma_{v'}$ = 0.1 for the submerged sand soils below the groundwater surface base on the simplified procedure by Idriss and Boulanger (2008) and undrained soil strengths, $S_u/\sigma_{v'}$ varying between 0.17 and 0.20 for the submerged silt. The $S_u/\sigma_{v'}$ of 0.17 is based on the average post-cyclic DSS testing completed for the project, and the $S_u/\sigma_{v'}$ of 0.20 is based on a 20% reduction in the full undrained shear strength to account for cyclic softening assuming the silts exhibit a *clay-like* behavior (Idriss and Boulanger 2008) based on 3% strain to limit deformations. Factors of safety of less than 1.0 were obtained, indicating a high risk of flow failure and that methods to improve the shear strength of the soil, such as ground improvement, will be required to improve the seismic slope stability.

5.3.2 Seismic Slope Stability Modeling with Ground Improvement

Ground improvement will be required on the channel side of the existing east side levee to improve seismic slope stability and reduce the risk of large slope movements or flow failures. For our Phase I geotechnical investigation, it is our understanding that about 24 inches of seismic slope movement is acceptable for the embankments. This allowable slope movement will need to be further analyzed during our Phase II geotechnical investigation. As discussed in the Newmark Slope Deformation section, a Newmark Analysis was completed to evaluate a yield acceleration (ky) equivalent to 24 inches of slope movement. Our analysis indicates a mean yield acceleration of 0.07 g, which corresponds to approximately 24 inches of seismically induced lateral deformation in the embankment.

Due to the high fines content of the soils in the depths of interest, deep cement-soil-mixed columns (DSM) were considered for preliminary ground improvement design. The composite shear strength of the ground improvement buttress can be estimated by combining the shear strengths of the treated and untreated soils. The treated soil strength can be estimated as the product of the ground-improvement area replacement ratio and the 365-day shear strength of the ground-improvement columns. The untreated soils

(between the ground improvement grids) were assigned a conservative shear strength of 500 pounds per square foot (psf).

For our preliminary seismic analysis, we assumed a 28-day compressive strength of the DSM columns of 200 pounds per square inch (psi) and an area replacement ratio of about 35%. In accordance with the guidelines established by the Federal Highway Administration (FHWA) design manual (Bruce et al., 2013), we estimate a composite shear strength of the DSM improved block of at least 5,725 psf.

GRI re-evaluated embankment stability under seismic loading conditions for the three cross sections, identified as cross sections A-A', B-B', and C-C' on Figure 2 previously discussed above. The models were run assuming a drained soil strength parameter, ϕ' of 28° for the dredged fill, a liquified soil strength, $S_u/\sigma_{v'}$ = 0.1 for the submerged sand soils below the groundwater surface, and a composite shear strength of 5,725 psf for the DSM improved block. Each model was run assuming two soil conditions for the submerged silt. The two conditions analyzed included 1) an undrained soil shear strength, $S_u/\sigma_{v'}$ = 0.20 for the saturated silts below the groundwater level based on a 20% reduction from the full undrained soil shear strength and 2) an average cyclic-softened undrained soil strength, $S_u/\sigma_{v'}$ = 0.17 for the silts encountered below the groundwater level based on cyclic DSS testing at shear strains between 0.5% and 1.6%. The intention of the two conditions analyzed was to develop a profile based on the average results of the cyclic DSS testing as well as a potential "best case" profile if the majority of the silt encountered at the site is shown to have higher plasticity and therefore a reduced risk of cyclic softening based on additional testing as part of the Phase II geotechnical investigation. We anticipate modeling completed as part of the Phase II geotechnical investigation could also include several undrained soil strength, $S_u/\sigma_{v'}$ values within each model if more refined soil profiles are developed following completion of additional subsurface explorations and laboratory testing.

The soil parameters used in the global slope-stability modeling are presented with the seismic stability models provided on Slope Stability Model, Figures 6 through 11. For the models, a factor of safety against instability for seismic loading conditions was computed for potential failure surfaces that could extend beyond the toe of the existing levee along the east side of the lagoon. The computed factor of safety against instability is defined as the ratio of the forces (or moments) tending to resist failure to the forces (or moments) tending to cause failure. A ground improvement buttress located on the channel side of the east levee was modeled and then widened towards the channel and deepened until a minimum factor of safety of 1.0 was obtained for failures occurring upslope of the existing toe of the levee on the east side of the lagoon. As previously discussed, this approach assumes deformations through the lagoon of up to 24 inches are acceptable during the

design-level seismic event. It should be noted that greater movements will occur on the channel side of the levee.

The ground improvement block dimensions required to limit slope movement of the proposed embankment to about 24 inches in the models are provided on Figures 6 through 11 and are summarized in Table 5-3, below.

Table 5-3: MODELED DSM COLUMNS IMPROVEMENT BLOCK DIMENSIONS

Cross Section	Average Silt Shear Strength, $S_u/s_{v'}$	DSM Block Width, ft	DSM Block Depth, ft
A-A′	0.20	155	280
A-A′	0.17	255 [(a)]	295
B-B′	0.20	65	165
B-B′	0.17	100	165
C-C′	0.20	15	55
C-C′	0.17	25	65

Note:

a. Ground Improvement extends at least 5 feet below the existing levee along the east side of lagoon.

It should be noted that the softened silt profile at cross section A-A′ required installation of ground improvements beneath the existing levee. DSM columns are typically installed on level ground, and this configuration would likely require the removal of a portion of the existing levee to allow installation of ground improvements.

The modeling approach used for this phase of work does not inherently address overturning. For this reason, we recommend assuming the block width is at least one-half of the block height. Initial models were also completed with no restrictions on the potential slope failure depths. As part of the Phase II geotechnical investigation, we recommend completing more robust modeling, such as finite difference or finite element numerical modeling, to better model the ground improvement in a deep, relatively soft soil profile. Based on past experience, we anticipate that this additional modeling could result in a significant reduction in ground improvement. It should also be noted that ground improvement depths greater than about 150 feet will limit ground improvement types and costs will increase significantly. Table 5-4 presents assumed ground improvement widths and depths for this phase of the project. These dimensions should be re-evaluated as part of the Phase II geotechnical investigation.

Table 5-4: CONCEPT-LEVEL DSM COLUMNS IMPROVEMENT BLOCK DIMENSIONS

Cross Section	DSM Block Width, ft	DSM Block Depth, ft
A-A′	150	150
B-B′	100	150
C-C′	35	65

As part of the Phase II geotechnical investigation, additional explorations, including borings and CPT probes, should be completed within the lagoon and east and south of the existing lagoon berm to evaluate the depth to basalt, soil properties, and layering of soils above the basalt. The work should include additional cyclic DSS testing to further evaluate potential softening of the submerged silt. In addition, Atterberg Limits testing completed on samples obtained from MFA's borings completed within the lagoon indicates the soils beneath the lagoon may have higher plasticity than the soils encountered on the channel side of the berm and should be further evaluated as part of the Phase II geotechnical investigation. Additional discussion regarding the proposed Phase II investigation is provided in Section 5.9.

5.4 Embankment Stability Under Static Loading

It is anticipated that the dredged spoils used to fill the lagoon will be saturated and highly variable. Depending on pretreatment prior to placement, compacting these dredged soils as structural fill will likely be impractical. As previously discussed, our seismic slope stability models were completed assuming a long-term drained soil strength parameter, ϕ' of 28° for the dredged fill assuming the subsurface drainage program planned for this project will be drained to reduce the risk of excess pore pressure generation and reduction of strength during a design-level earthquake. A geotube cutoff berm is proposed between the Phase 1 and Phase 2 site filling. The proposed location and dimensions of the cutoff berm are discussed in the Project Description section of this report. The engineering properties of the geotubes will require further evaluation prior to slope stability evaluation. As part of the Phase II geotechnical investigation, the process for fill placement, excess water removal, compaction, geotube properties, and geotube performance requirements will need to be further evaluated prior to completion of static slope stability modeling of the geotube berm and existing levee during and after site filling.

5.5 Settlements

The proposed construction sequence assumes up to 56 feet of fill will be required to achieve a final site grade of about elevation 66 feet. The majority of new fill will consist of sediment, soil, and the City's wastewater treatment sludge. As part of the Phase II geotechnical investigation, the processes for fill placement, compaction, and settlement monitoring will need to be further evaluated. As described previously, it is anticipated that

the dredged spoils used to fill the lagoon will be saturated and highly variable, and that initially compacting these dredged soils as structural fill will likely be impractical. For this Phase I geotechnical investigation, we have assumed the fill will be placed with limited compactive effort and will have an average unit weight of 100 pcf following placement.

Settle3D software by Rocscience, Inc., was utilized to model the proposed fill heights. The models were constructed for three separate loading conditions. The three conditions analyzed included 1) areal settlements following Phase 1 filling to elevation 35 feet for the southern 19 acres of the lagoon; 2) areal settlements following Phase 2 filling to elevation 66 feet with maximum sideslopes of 10H:1V, 12H:1V, 12H:1V and 3H:1V on the east, south, west, and north sides of the fill, respectively; and 3) following final grading to level the fill area at about the maximum fill levels placed as part of the Phase 2 filling but with sideslopes of 5H:1V or flatter along the east side of the filled area.

The models estimate up to about 1.5 feet, 7.5 feet, and 9 feet of total settlement following Phase 1 filling, Phase 2 filling, and final site grading, respectively. Based on the limited number of explorations that extend below a depth of about 120 feet, zones of sandier and/or stiffer silt soils may be present below this depth. If these sandier or stiffer soils are consistently located below 120 feet across the deeper portions of the site, our models indicate the settlement estimates provided above would be reduced by about 2 feet for the Phase 2 filling and final site grading, respectively.

As previously mentioned, the depth to basalt increases from west to east across the lagoon. For the northern portion of the lagoon, basalt was encountered at elevations ranging from about elevation 3.5 feet to elevation 11 feet for the western approximately two-thirds of the lagoon. East of the east levee, towards the north end of the lagoon, geophysical testing indicates basalt may be encountered at elevations on the order of elevation -350 feet. This significant elevation change was observed over a horizontal distance of about 500 feet. Explorations completed between these areas were drilled to elevations of about -104 feet to -109.5 feet and did not encounter basalt. For preliminary design, we recommend assuming the basalt depth may drop nearly vertical within the northeast portion of the existing lagoon. Since negligible settlements are estimated in portions of the lagoon where fill is placed directly on basalt, we estimate differential settlements may approach the total settlement estimates discussed above for all three models.

For the Phase II geotechnical investigation, additional borings and CPTs should be completed in the eastern portion of the lagoon, with particular emphasis on the northeastern portion of the lagoon to evaluate the depth to basalt and identify potential sandier layers that would allow additional drainage paths to increase the time rate of

consolidation of the soils. Time rates of settlement estimates and a settlement monitoring program will be evaluated as part of the Phase II geotechnical investigation following completion of additional explorations within the lagoon.

A Geosynthetic Clay Liner (GCL) and a 60-mil HDPE, or linear low-density polyethylene geomembrane liner, are planned along the bottom of the lagoon at about elevation 10 feet. In addition, a geotube cutoff berm is proposed in an east-west direction across the bottom of the lagoon, separating the northern and southern portions of the lagoon. The total settlements and differential settlements discussed above are applicable to these planned improvements. As part of the Phase II geotechnical investigation, differential and total settlement tolerances for these improvements will require further evaluation. However, we anticipate these settlement estimates will be excessive for these improvements, and additional measures such as a surcharge program or ground improvement within the lagoon could be required to reduce these settlements. A surcharge program and ground improvement design will be evaluated as part of the Phase II geotechnical investigation to reduce these differential settlements.

5.6 Groundwater Management

A Geosynthetic Clay Liner (GCL) and a 60-mil HDPE, or linear low-density polyethylene geomembrane liner, are planned along the bottom of the lagoon at about elevation 10 feet. The ordinary high water (OHW) for the project site was not available at the time of this report. Based on information provided by MFA, the 100-year flood elevation for the site ranges from about elevation 23.3 feet to elevation 24.7 feet. We anticipate groundwater closely reflects water levels in the nearby Columbia River and Multnomah Channel. We anticipate filling the lagoon with sediment above the 100-year flood elevation will take several years to complete. Based on the depth of excavation, the installation of an HDPE liner, and water levels in the nearby Multnomah channel, we anticipate significant risks of floating the HDPE liner when river levels exceed fill levels within the lagoon. Considerations for potentially flooding the lagoon to maintain equivalent groundwater levels on both sides of the lagoon or raising the bottom elevation of the HDPE liner may be required to reduce the risk of floating the liner and should be further analyzed during the Phase II geotechnical investigation. In addition, groundwater levels during geotube construction and dewatering of the soils within the tube will need to be kept below the level of the tubes to allow geotube dewatering.

5.7 Foundation Support

As previously discussed, the site is underlain by a significant thickness of compressible silt soils. In addition, up to 56 feet of potentially uncontrolled fill is planned to be placed on the site. Our experience indicates foundations supported on uncontrolled fill can experience excessive total and differential settlement that can lead to structural distress to

the buildings. Additional geotechnical explorations should be completed to assist in evaluating settlement implications for new buildings that may be part of a future site condition. For preliminary design, we anticipate new buildings will be supported on a deep-foundation system such as steel-pipe piles driven to the basalt or ground improvement consisting of deep soil mixing.

5.8 Workplan for Phase II Geotechnical Investigation

5.8.1 General

We recommend completion of an additional geotechnical field exploration program and engineering analyses to support advancement of the Phase II geotechnical investigation and to inform the appropriate level of seismic mitigation needed for design of the wastewater lagoon repurposing facility. Supplemental subsurface explorations consisting of CPTs and borings are recommended to further characterize the soil properties and subsurface profile. Specifically, we recommend CPT explorations be completed to further delineate the thickness and engineering properties of the silt soils and depth to basalt. In addition to CPT explorations, borings should be completed to obtain relatively undisturbed samples of silt for additional laboratory analysis. A limited suite of cyclic testing of the silty soils was completed for this phase of work. Additional cyclic testing will be an important consideration in estimating the seismic performance of the site. For our Phase II Geotechnical Investigation, we recommend the following field exploration and laboratory testing programs.

5.8.2 Recommended Phase II Subsurface Explorations

We recommend subsurface materials and conditions for the Phase II geotechnical site investigation be evaluated with eight mud-rotary borings and 11 CPT probes. We recommend three of the borings and five of the CPT probes be completed in the eastern portion of the lagoon to evaluate the depth to basalt and engineering properties of the soils above the basalt. These explorations will require the use of a barge for completion. We recommend three of the borings and three of the CPT probes be completed near the toe of the eastern side of the levee and one boring be completed on the south side of the levee on the south side of the lagoon. Finally, we recommend the completion of three CPT probes and one boring about halfway between the existing railroad tracks and Multnomah Channel. Shear-wave velocity testing should be completed in one of the CPT probes where basalt is anticipated to be encountered at significant depth. The borings and CPT probes should extend to the top of basalt. In the mud-rotary borings, samples should be collected using a standard split-spoon sampler and/or undisturbed Shelby tube sampler at 5-foot intervals of depth up to 100 feet and 10-foot intervals of depth below 100 feet. The borings and CPT probes should be well spaced to provide information on the depth to basalt and subsurface conditions above the basalt.

5.8.3 Recommended Phase II Laboratory Testing

Laboratory tests will be conducted to provide data on the important physical characteristics of the subsoils, which are essential for engineering studies and analyses. The laboratory tests will include standard classification tests, such as natural water content and unit weight determinations, as well as strength and consolidation testing. The latter will provide the qualitative data necessary for the various foundation design studies, such as foundation types and estimated settlements. In addition, we recommend cyclic direct simple shear tests be performed on six additional soil samples to further evaluate static and seismic shear strengths.

5.8.4 Additional Phase II Field Investigation Activities

The bathymetry of the small channel near the northeastern edge of the lagoon should be gathered to facilitate slope stability modeling.

6 LIMITATIONS

This report presents the results of a preliminary Phase I geotechnical investigation of the proposed St. Helens Wastewater Lagoon Repurposing. The information presented herein is preliminary and provides our general conclusions regarding the feasibility of the project with respect to the observed site conditions. This information is intended for planning and preliminary estimation purposes. A more detailed geotechnical investigation, including subsurface explorations, laboratory testing, and engineering analyses, should be completed as part of the Phase II geotechnical investigation in order to further evaluate the appropriate level of seismic mitigation needed to accommodate the lagoon repurposing design.

We have included the Geoprofessional Business Association (GBA) guidance document "Important Information about This Geotechnical-Engineering Report/Geoenvironmental Report" to assist you and others in understanding the use and limitations of this report, included as Appendix I. We recommend you read this document.

Please contact the undersigned if you have any questions about our preliminary design recommendations.

Submitted for GRI,

Renews 02/2024

Renews 12/2023

Scott M. Schlechter, PE, GE Principal	George A. Freitag, CEG Principal	Brian J. Bayne, PE Associate

This document has been submitted electronically.

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BASEMAP PROVIDED BY ESRI, 2023

0 0.5 1 Miles

MAUL, FOSTER, AND ALONGI
WASTEWATER LAGOON REPURPOSING

VICINITY MAP

SEP. 2023 JOB NO. 6771-A FIG. 1

B-2/MW-2 [72]

MFA-B1 [6]

B-4 [11]*

MW-1 [59]

B-5 [41]

TP-7 [10]*

TP-9 [10]*

MFA-B2 [3.5]*

MFA-B5 [-24]

MFA-B3 AND B3A [NE]

MFA-B4 [NE]

B-1 [1]*

CPT-1 [3]

MW-3 [-45.5]

MW-5 [-69]

MW-4 [NE]

B-3 [NE]

MW-6 [NE]

CPT-2 [-36.5]

S1B-2140

S1A-1410

S1B-1200

CPT-3 [-136]

B-1 [NE]

S1A-0

R2-0

B-2 [-128]

R2-2109

R1-2109

R1-0

A

A'

B

B'

C

C'

N

BASEMAP PROVIDED BY AKS

LEGEND:

- BORING COMPLETED BY GRI (FEBRUARY 27 - MARCH 2, 2023)
- BORING COMPLETED BY GRI (JULY 29 - AUGUST 2, 2019)
- CONE PENETRATION TEST COMPLETED BY GRI (JULY 30-31, 2019)
- BORING COMPLETED BY MAIL FOSTER ALONGI (2023)
- BORING COMPLETED BY MAUL FOSTER ALONGI (2019)
- EXPLORATION COMPLETED BY SHANNON & WILSON (1968-1969)
- A A' CROSS SECTIONS
- GEOPHYSICAL PROFILE ALIGNMENTS (MARCH 6, AND MAY 2 AND 3, 2023)
- **[B]** BASALT ELEVATION
- **[NE]** NOT ENCOUNTERED

NOTES:

1. VERTICAL DATUM (NAVD 88) WITH EXCEPTION OF [#]* WHICH USES VERTICAL DATUM MEAN SEA LEVEL.

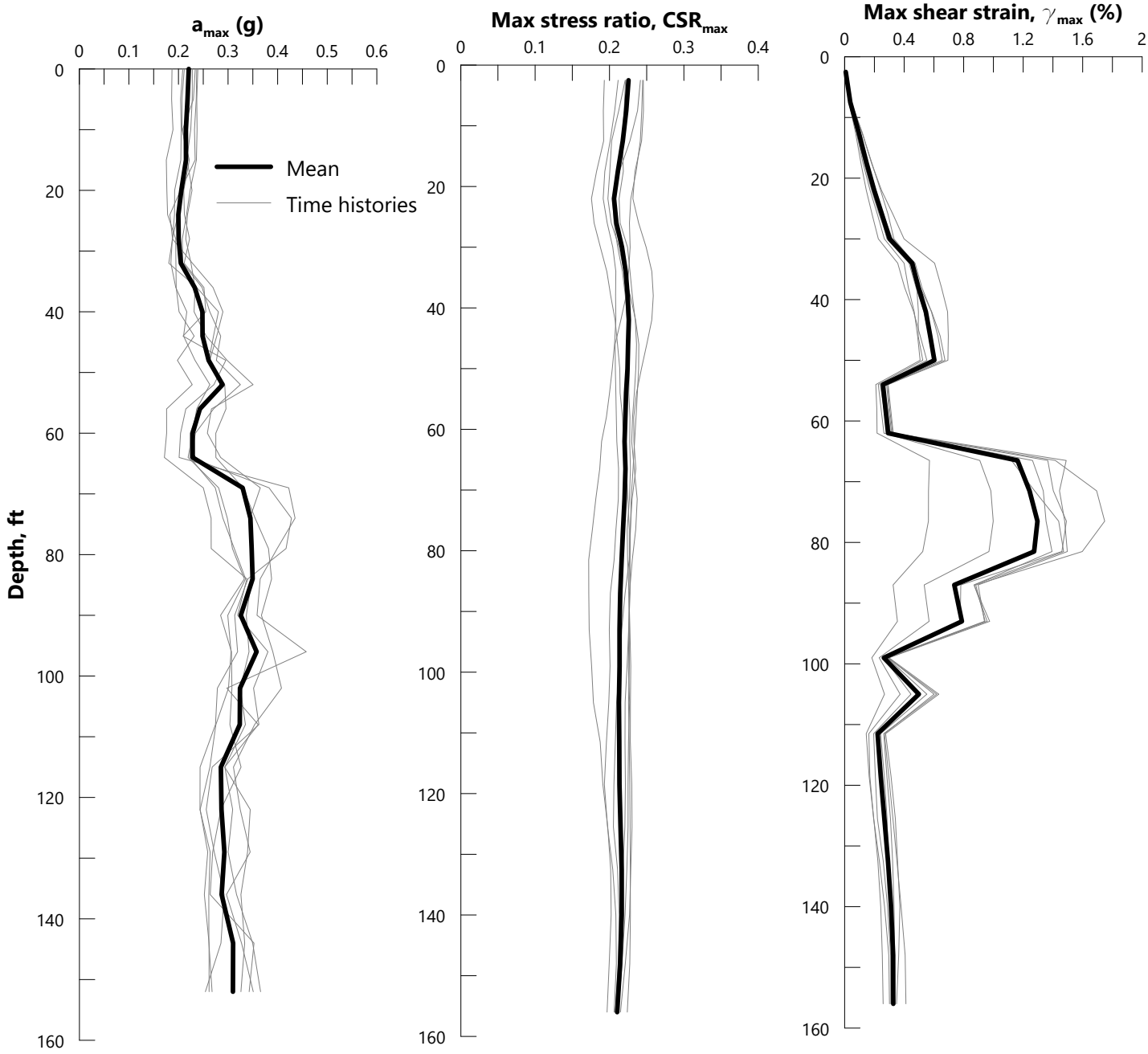
0 250 500 FEET

GRI

MAUL, FOSTER AND ALONGI
WASTEWATER LAGOON REPURPOSING

SITE MAP

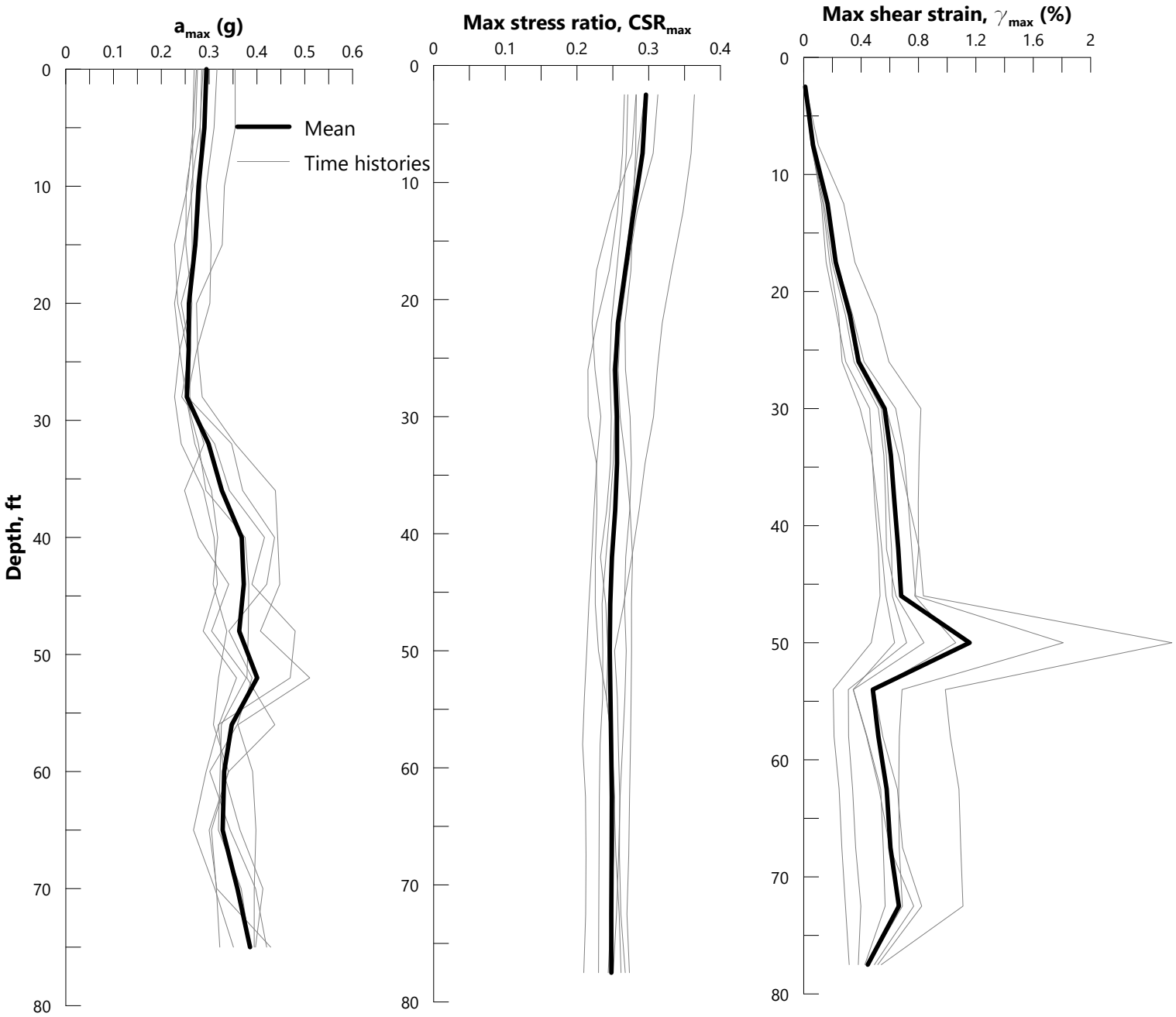
SEP. 2023 JOB NO. 6771-A FIG. 2



MAUL, FOSTER, AND ALONGI
WASTEWATER LAGOON REPURPOSING

RESULTS OF THE DYNAMIC RESPONSE ANALYSIS FOR V_S PROFILE 1

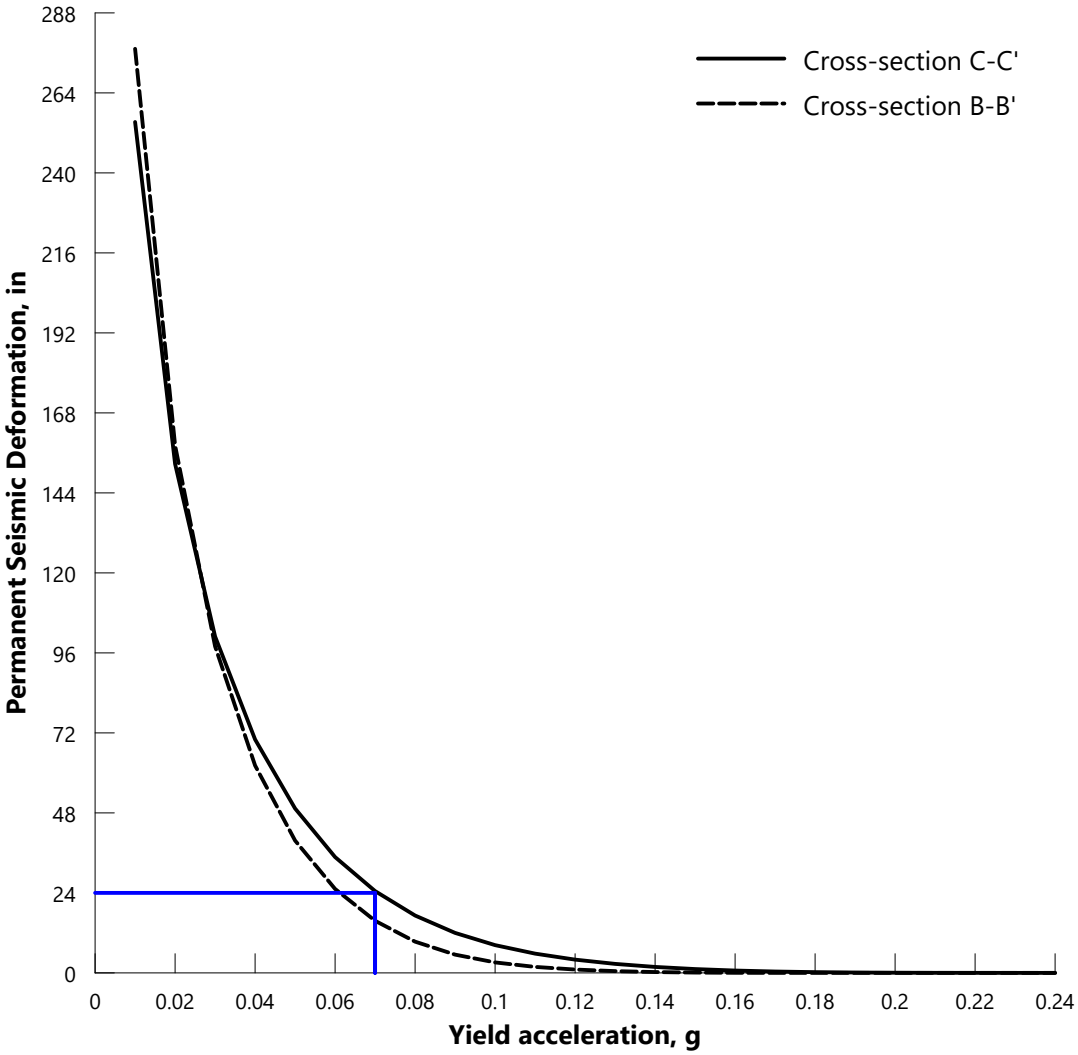
SEP. 2023 JOB NO. 6771-A FIG. 3



GRI MAUL, FOSTER, AND ALONGI
WASTEWATER LAGOON REPURPOSING

RESULTS OF THE DYNAMIC RESPONSE ANALYSIS FOR V_S PROFILE 2

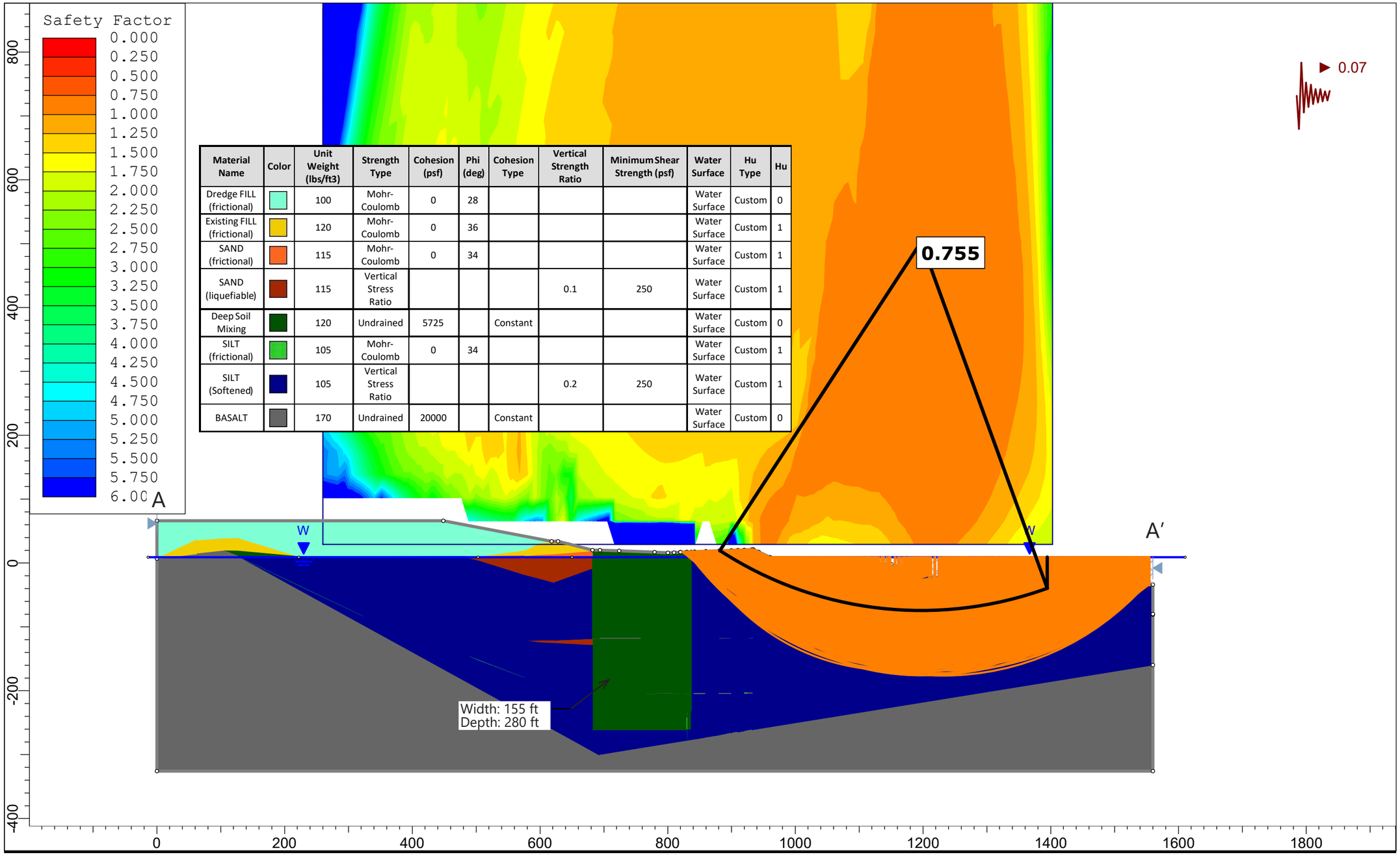
SEP. 2023 JOB NO. 6771-A FIG. 4



MAUL, FOSTER, AND ALONGI
WASTEWATER LAGOON REPURPOSING

PERMANENT SEISMIC DISPLACEMENT CURVES

SEP. 2023 JOB NO. 6771-A FIG. 5

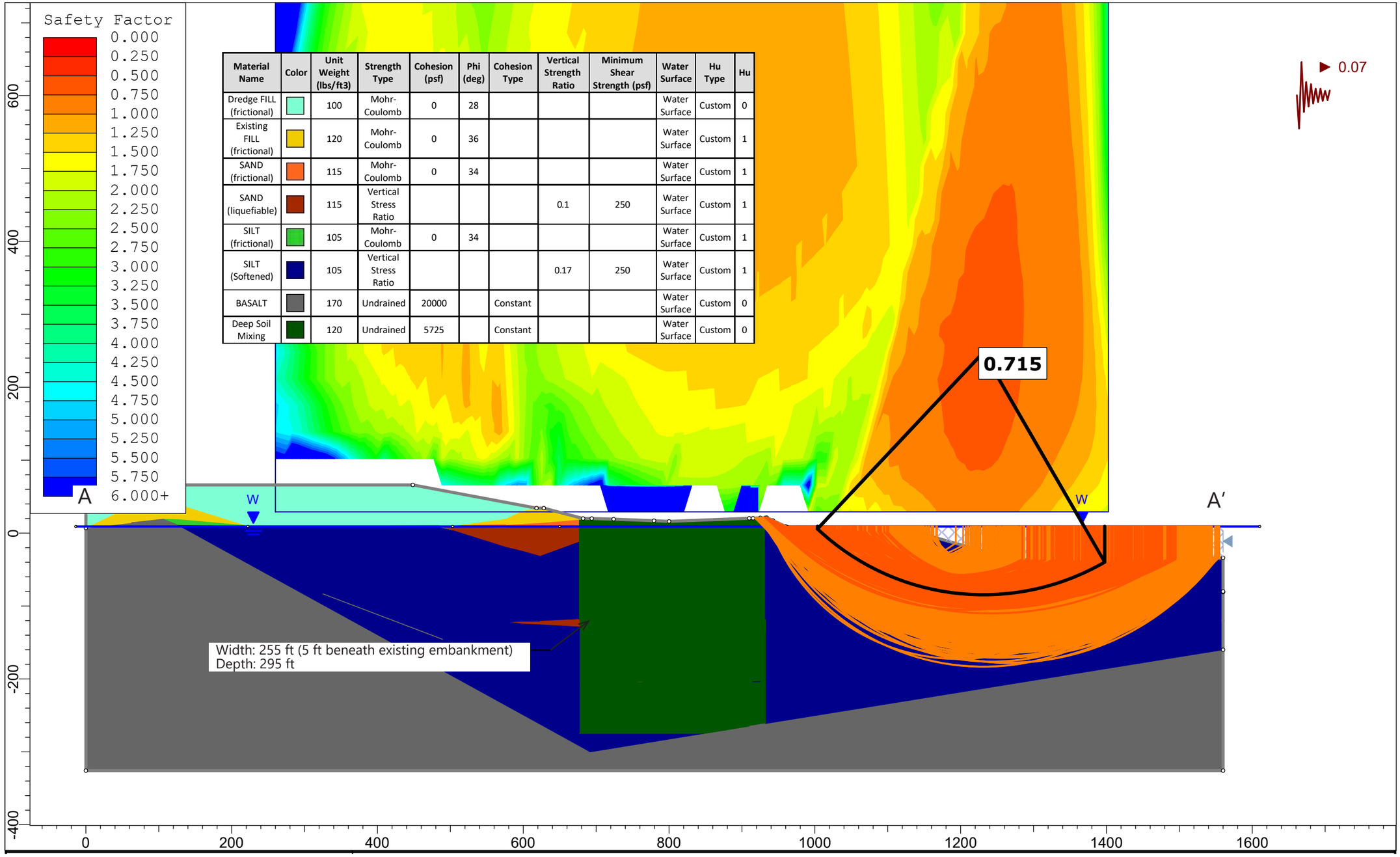


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion Type	Vertical Strength Ratio	Minimum Shear Strength (psf)	Water Surface	Hu Type	Hu
Dredge FILL (frictional)		100	Mohr-Coulomb	0	28				Water Surface	Custom	0
Existing FILL (frictional)		120	Mohr-Coulomb	0	36				Water Surface	Custom	1
SAND (frictional)		115	Mohr-Coulomb	0	34				Water Surface	Custom	1
SAND (liquefiable)		115	Vertical Stress Ratio				0.1	250	Water Surface	Custom	1
Deep Soil Mixing		120	Undrained	5725		Constant			Water Surface	Custom	0
SILT (frictional)		105	Mohr-Coulomb	0	34				Water Surface	Custom	1
SILT (Softened)		105	Vertical Stress Ratio				0.2	250	Water Surface	Custom	1
BASALT		170	Undrained	20000		Constant			Water Surface	Custom	0

GRI MAUL, FOSTER, AND ALONGI
WASTEWATER LAGOON REPURPOSING

CROSS SECTION A-A′
(SEISMIC, PARTIALLY SOFTENED UNDRAINED SHEAR STRENGTH)

SEP. 2023 JOB NO. 6771-A FIG. 6

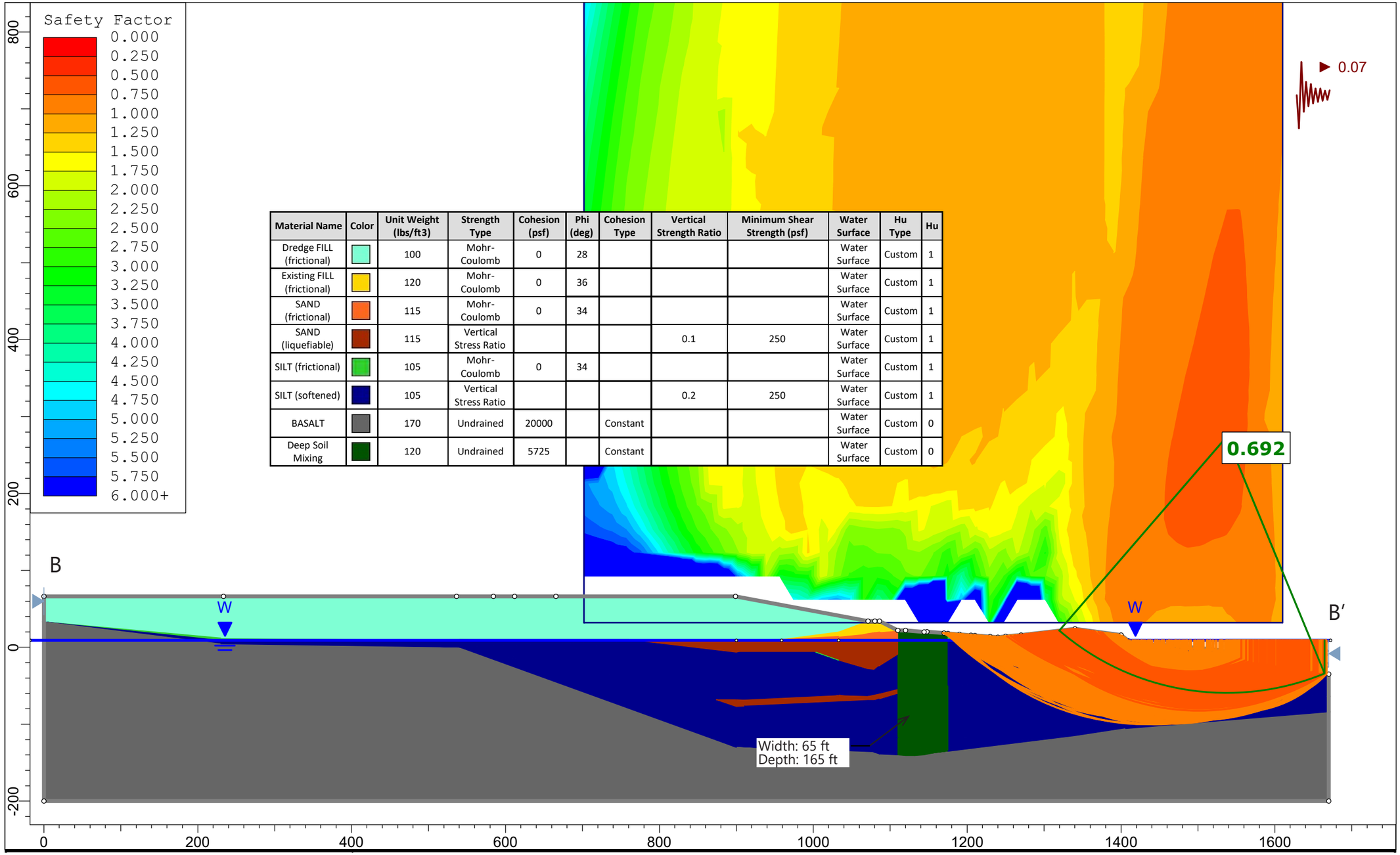


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion Type	Vertical Strength Ratio	Minimum Shear Strength (psf)	Water Surface	Hu Type	Hu
Dredge FILL (frictional)		100	Mohr-Coulomb	0	28				Water Surface	Custom	0
Existing FILL (frictional)		120	Mohr-Coulomb	0	36				Water Surface	Custom	1
SAND (frictional)		115	Mohr-Coulomb	0	34				Water Surface	Custom	1
SAND (liquefiable)		115	Vertical Stress Ratio				0.1	250	Water Surface	Custom	1
SILT (frictional)		105	Mohr-Coulomb	0	34				Water Surface	Custom	1
SILT (Softened)		105	Vertical Stress Ratio				0.17	250	Water Surface	Custom	1
BASALT		170	Undrained	20000		Constant			Water Surface	Custom	0
Deep Soil Mixing		120	Undrained	5725		Constant			Water Surface	Custom	0

MAUL, FOSTER, AND ALONGI
WASTEWATER LAGOON REPURPOSING

CROSS SECTION A-A′ (SEISMIC, SOFTENED UNDRAINED SHEAR STRENGTH)

SEP. 2023 JOB NO. 6771-A FIG. 7

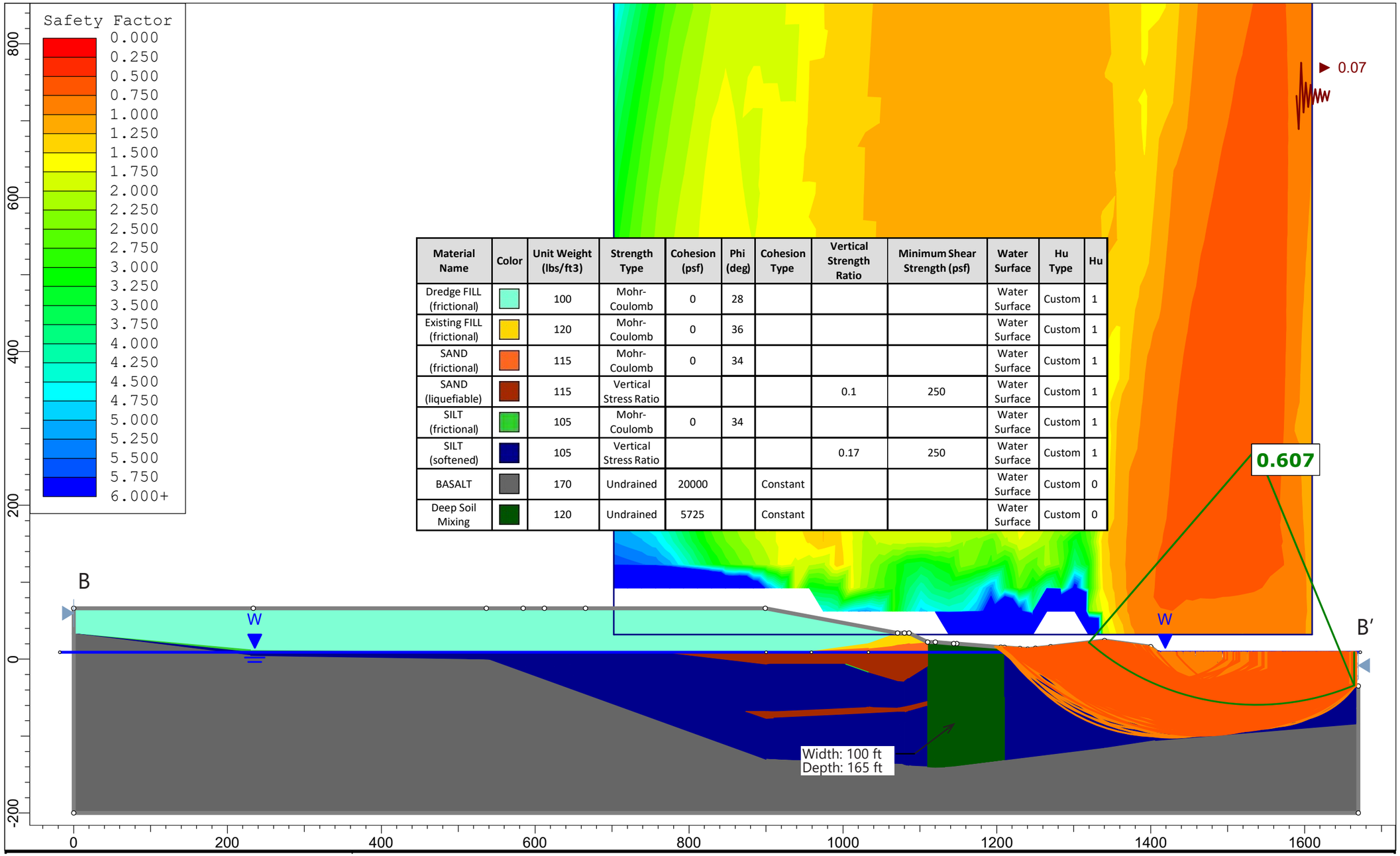


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion Type	Vertical Strength Ratio	Minimum Shear Strength (psf)	Water Surface	Hu Type	Hu
Dredge FILL (frictional)		100	Mohr-Coulomb	0	28				Water Surface	Custom	1
Existing FILL (frictional)		120	Mohr-Coulomb	0	36				Water Surface	Custom	1
SAND (frictional)		115	Mohr-Coulomb	0	34				Water Surface	Custom	1
SAND (liquefiable)		115	Vertical Stress Ratio				0.1	250	Water Surface	Custom	1
SILT (frictional)		105	Mohr-Coulomb	0	34				Water Surface	Custom	1
SILT (softened)		105	Vertical Stress Ratio				0.2	250	Water Surface	Custom	1
BASALT		170	Undrained	20000		Constant			Water Surface	Custom	0
Deep Soil Mixing		120	Undrained	5725		Constant			Water Surface	Custom	0

GRI MAUL, FOSTER, AND ALONGI
WASTEWATER LAGOON REPURPOSING

CROSS SECTION B-B'
(SEISMIC, PARTIALLY SOFTENED UNDRAINED SHEAR STRENGTH)

SEP. 2023 JOB NO. 6771-A FIG. 8



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion Type	Vertical Strength Ratio	Minimum Shear Strength (psf)	Water Surface	Hu Type	Hu
Dredge FILL (frictional)		100	Mohr-Coulomb	0	28				Water Surface	Custom	1
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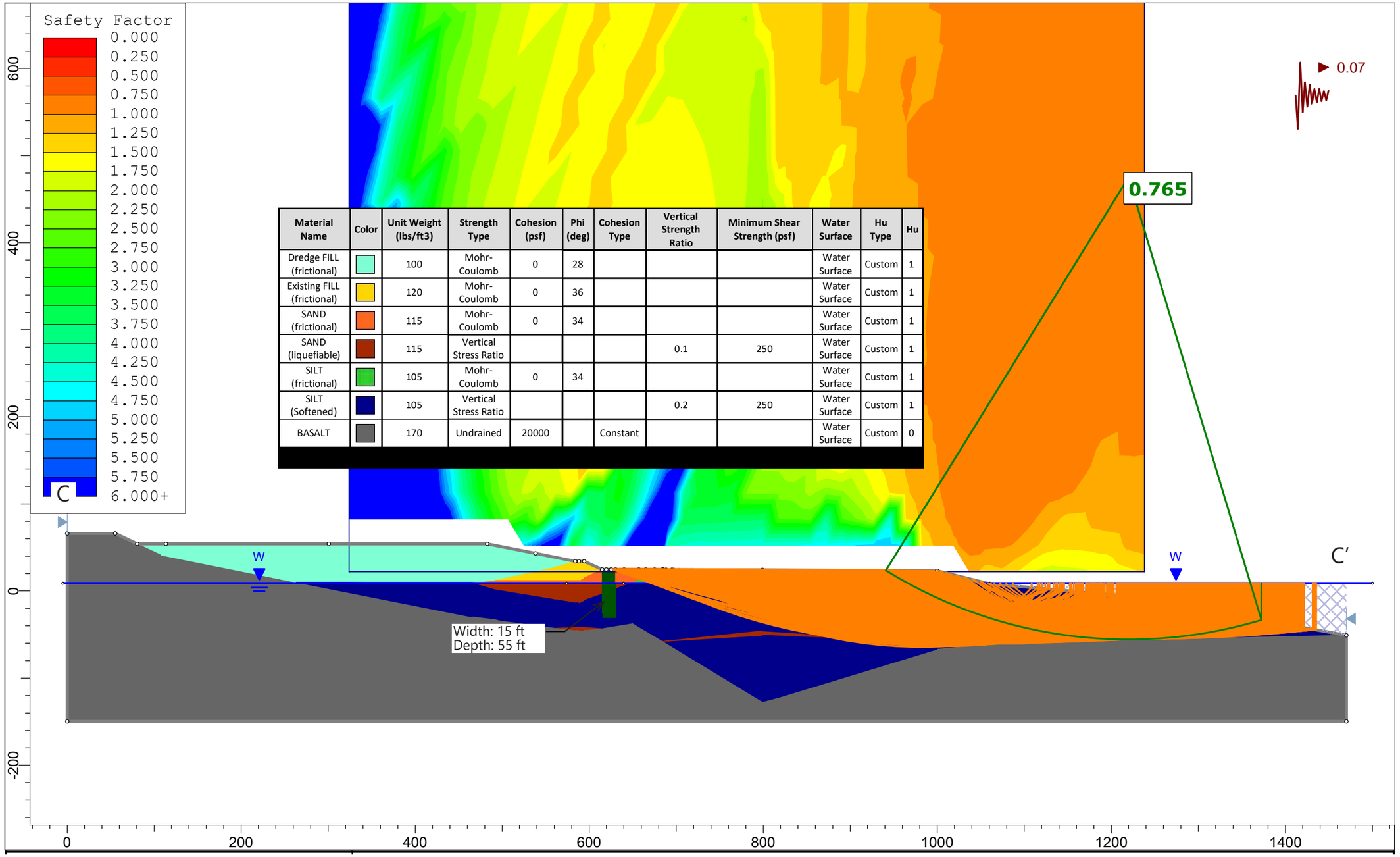
SAND (frictional)		115	Mohr-Coulomb	0	34				Water Surface	Custom	1
SAND (liquefiable)		115	Vertical Stress Ratio				0.1	250	Water Surface	Custom	1
SILT (frictional)		105	Mohr-Coulomb	0	34				Water Surface	Custom	1
SILT (softened)		105	Vertical Stress Ratio				0.17	250	Water Surface	Custom	1
BASALT		170	Undrained	20000		Constant			Water Surface	Custom	0
Deep Soil Mixing		120	Undrained	5725		Constant			Water Surface	Custom	0

GRI MAUL, FOSTER, AND ALONGI
WASTEWATER LAGOON REPURPOSING

CROSS SECTION B-B'
(SEISMIC, SOFTENED UNDRAINED SHEAR STRENGTH)

SEP. 2023 JOB NO. 6771-A FIG. 9



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion Type	Vertical Strength Ratio	Minimum Shear Strength (psf)	Water Surface	Hu Type	Hu
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SAND (frictional)		115	Mohr-Coulomb	0	34				Water Surface	Custom	1
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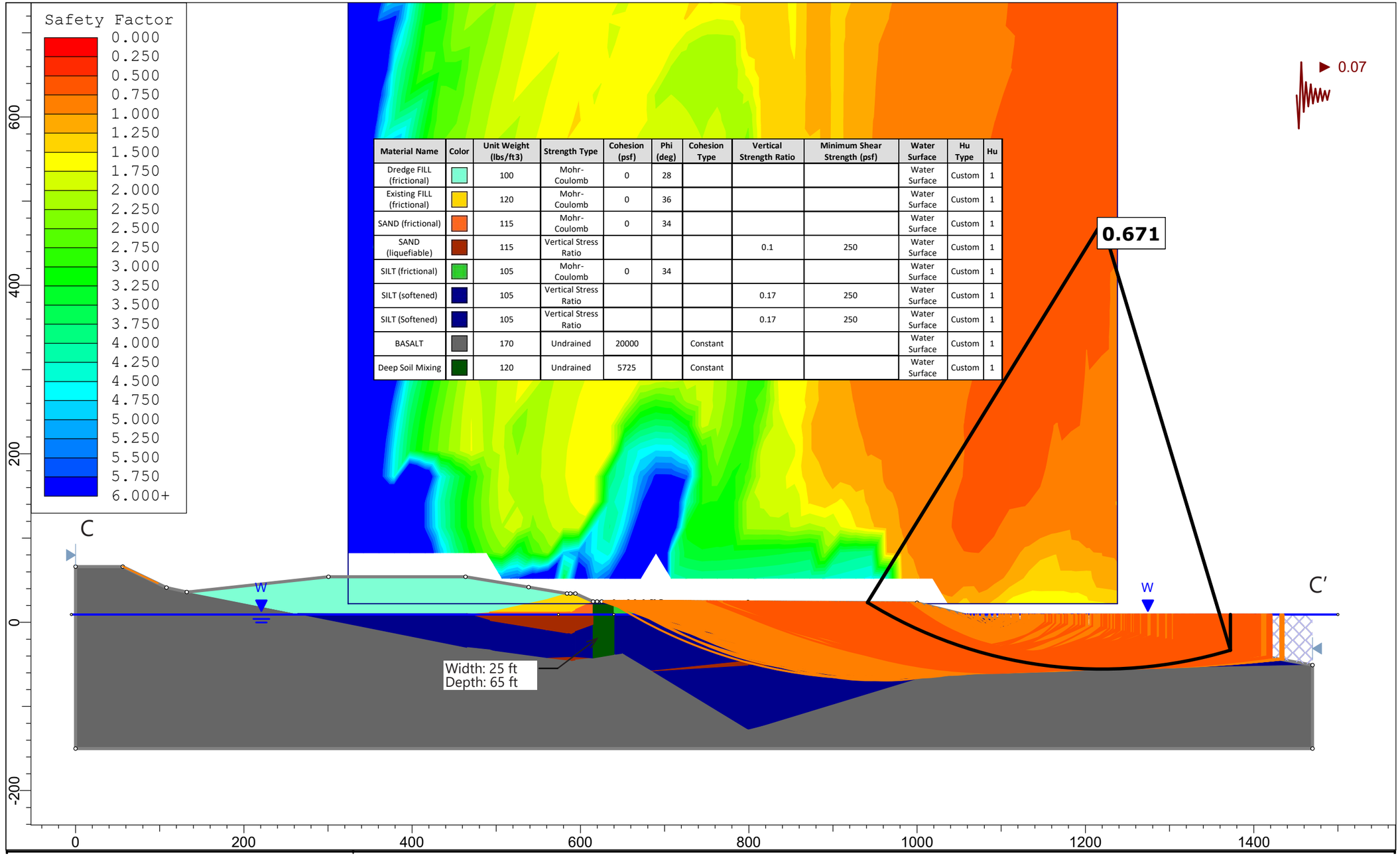
SILT (frictional)		105	Mohr-Coulomb	0	34				Water Surface	Custom	1
SILT (Softened)		105	Vertical Stress Ratio				0.2	250	Water Surface	Custom	1
BASALT		170	Undrained	20000		Constant			Water Surface	Custom	0

GRI MAUL, FOSTER, AND ALONGI
WASTEWATER LAGOON REPURPOSING

CROSS SECTION C-C′
(SEISMIC, PARTIALLY SOFTENED UNDRAINED SHEAR STRENGTH)

SEP. 2023 JOB NO. 6771-A FIG. 10



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion Type	Vertical Strength Ratio	Minimum Shear Strength (psf)	Water Surface	Hu Type	Hu
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Existing FILL (frictional)		120	Mohr-Coulomb	0	36				Water Surface	Custom	1
SAND (frictional)		115	Mohr-Coulomb	0	34				Water Surface	Custom	1
SAND (liquefiable)		115	Vertical Stress Ratio				0.1	250	Water Surface	Custom	1
SILT (frictional)		105	Mohr-Coulomb	0	34				Water Surface	Custom	1
SILT (softened)		105	Vertical Stress Ratio				0.17	250	Water Surface	Custom	1
SILT (Softened)		105	Vertical Stress Ratio				0.17	250	Water Surface	Custom	1
BASALT		170	Undrained	20000		Constant			Water Surface	Custom	1
Deep Soil Mixing		120	Undrained	5725		Constant			Water Surface	Custom	1

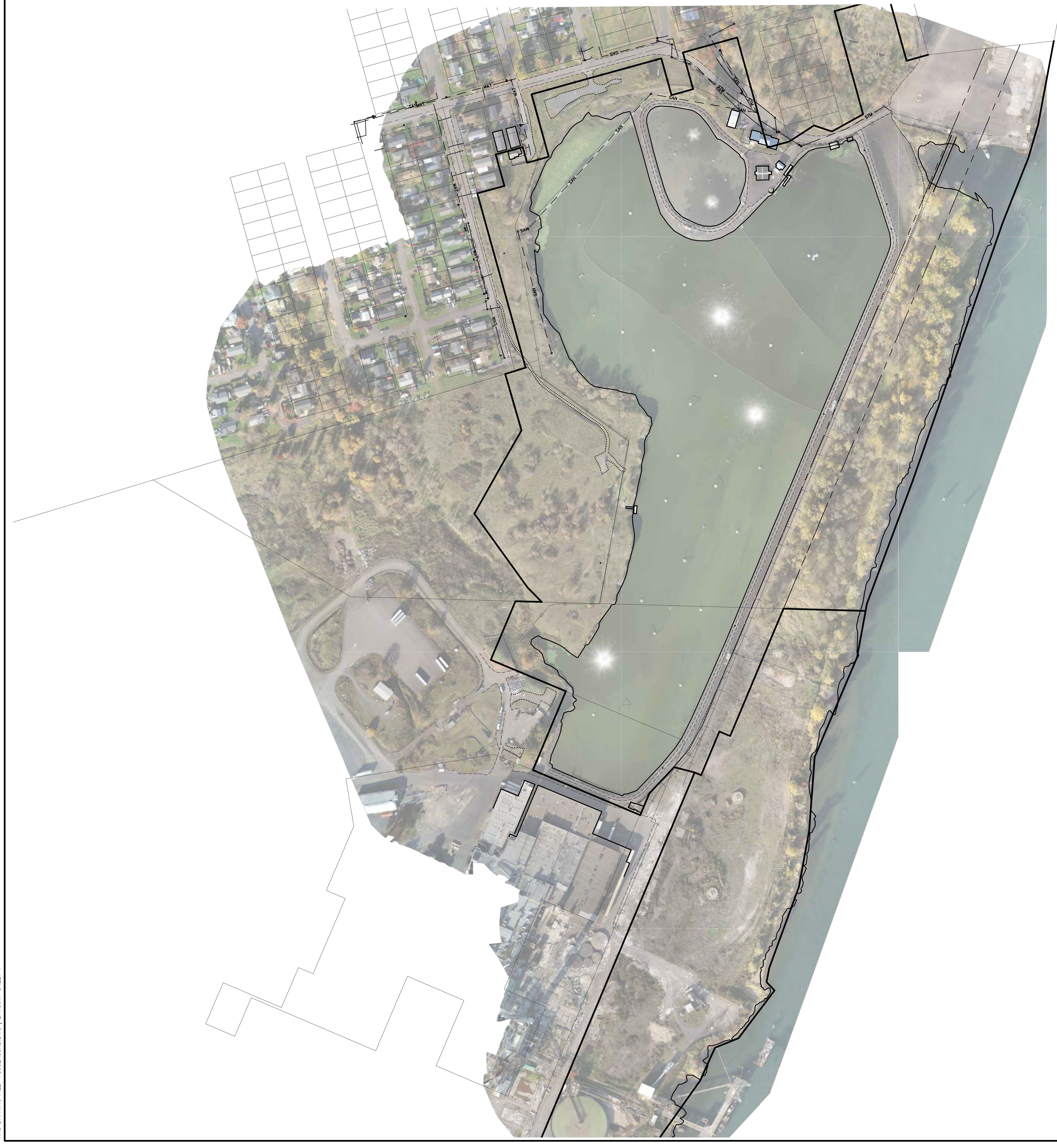
GRI MAUL, FOSTER, AND ALONGI
WASTEWATER LAGOON REPURPOSING

CROSS SECTION C-C′ (SEISMIC, SOFTENED UNDRAINED SHEAR STRENGTH)

SEP. 2023 JOB NO. 6771-A FIG. 11

APPENDIX A

Existing Conditions Survey (AKS Engineering and Forestry, 2019)



NOTES:

1. UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, PROVIDED PER UTILITY LOCATE TICKET NUMBER 19311213. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.

2. FIELD WORK WAS CONDUCTED NOVEMBER 2019.

3. VERTICAL DATUM: ELEVATIONS ARE BASED ON NGS BENCHMARK NO. RD4218. LOCATED AT THE NW CORNER OF THE LAGOON. ELEVATION = 78.3 FEET (NAVD 88).

4. THIS IS NOT A BOUNDARY SURVEY TO BE RECORDED WITH THE COUNTY. BOUNDARIES ARE PRELIMINARY AND SHOULD BE CONFIRMED WITH THE STAMPING SURVEYOR PRIOR TO RELYING ON FOR DETAILED DESIGN OR CONSTRUCTION. THE BOUNDARY SHOWN HEREON IS PARTIALLY BASED ON GIS DATA FROM THE CITY OF ST. HELENS WEBSITE AND SHOULD BE USED FOR VISUAL PURPOSES ONLY.

5. CONTOUR INTERVAL IS 1 FOOT.

6. BATHYMETRIC INFORMATION WAS PROVIDED BY MAUL FOSTER & ALONGI, INC. AND COMBINED WITH LIDAR DATA FROM THE STATE OF OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES WEBSITE.

4. HORIZONTAL DATUM: A LOCAL DATUM PLANE DERIVED FROM STATE PLANE OREGON NORTH 3601 NAD83(2011)EPOCH:2010.0000 BY MULTIPLYING BY A PROJECT MEAN GROUND COMBINED SCALE FACTOR OF 1.0000328962 AT A CENTRAL PROJECT POINT WITH INTERNATIONAL FOOT STATE PLANE GRID COORDINATES N805128.443 E7614876.336 AND A MERIDIAN CONVERGENCE ANGLE OF −1°38'04" STATE PLANE COORDINATES WERE DERIVED FROM GPS OBSERVATIONS USING THE ORGN NETWORK. DISTANCES SHOWN ARE INTERNATIONAL FOOT GROUND VALUES.

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ST HELENS LAGOON

CITY OF ST HELENS OREGON
TAX LOT 200 TAX MAP 4N1W300

EXISTING CONDITIONS PLAN - COVER SHEET

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MANAGED BY: NSW
CHECKED BY: TJA
DATE: 12/09/2019

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
JANUARY 9, 2007
NICK WHITE
70652LS
RENEWS: 6/30/20

REVISIONS

JOB NUMBER
7835

SHEET
1 OF 11

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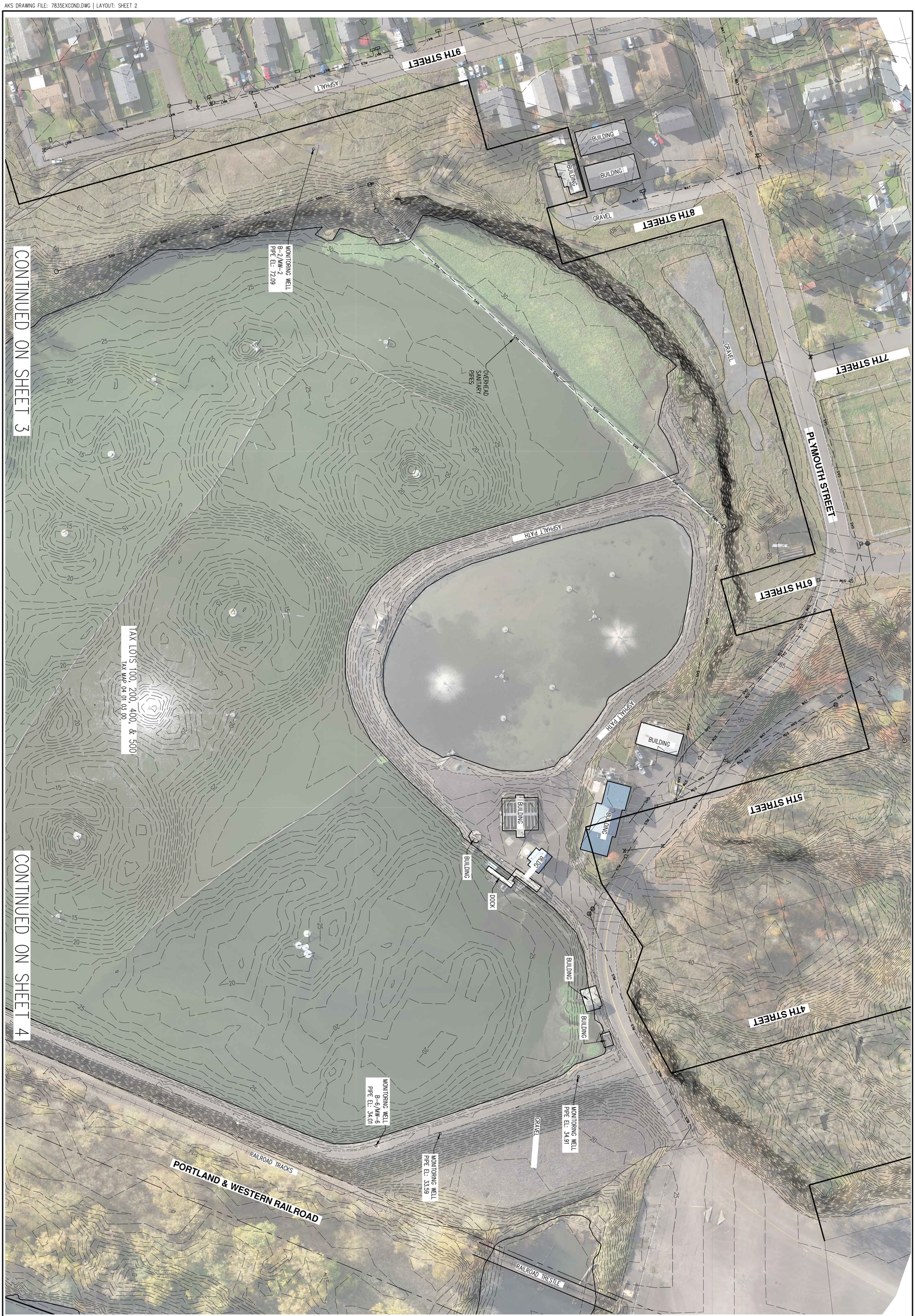
AKS DRAWING FILE: 7835EXCOND.DWG | LAYOUT: SHEET 2



EXISTING CONDITIONS AERIAL PLAN

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EXISTING CONDITIONS AERIAL PLAN

ST HELENS LAGOON

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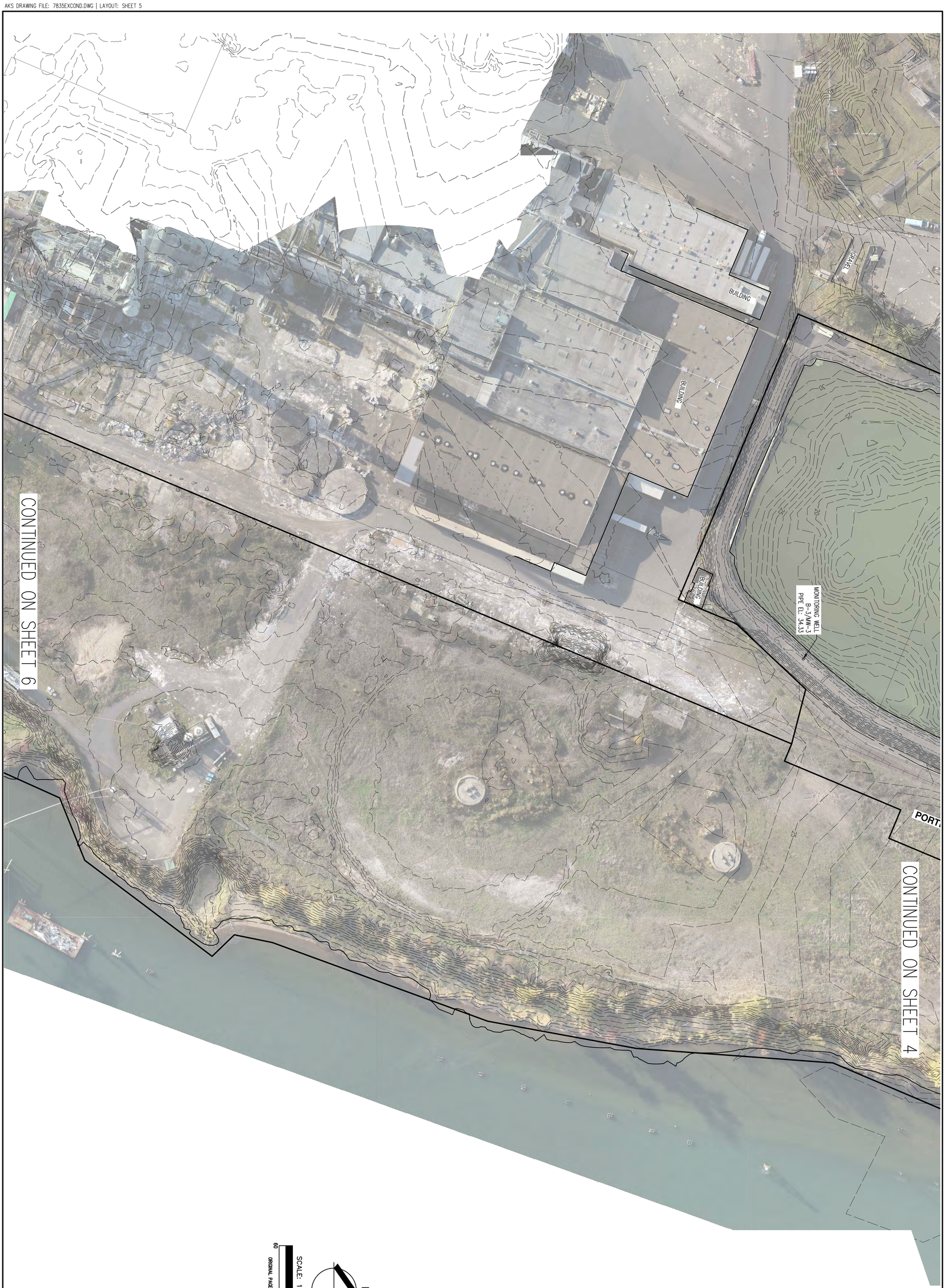

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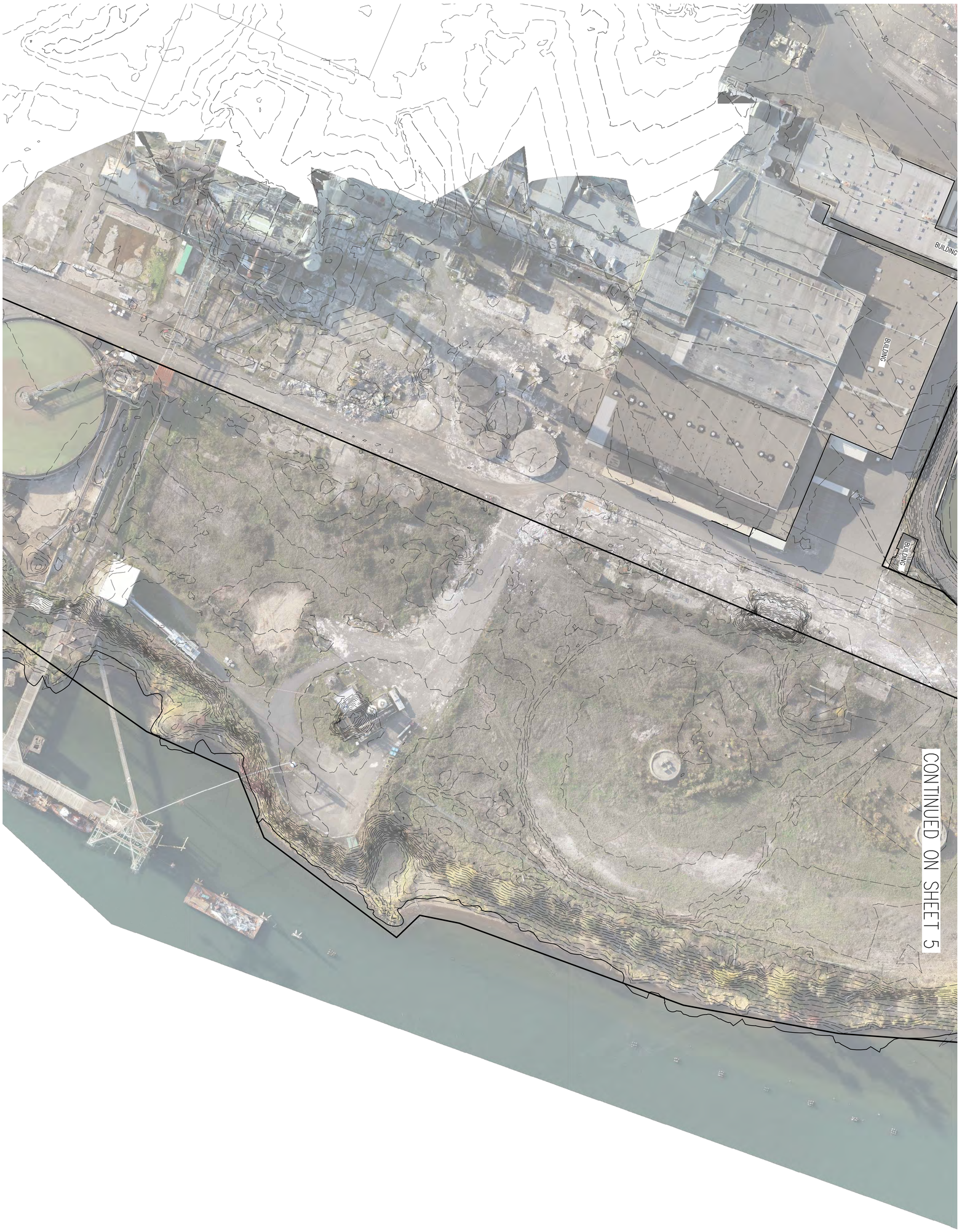

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EXISTING CONDITIONS AERIAL PLAN

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EXISTING CONDITIONS PLAN

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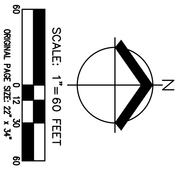

EXISTING CONDITIONS PLAN

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SHEET 11 OF 11

APPENDIX B

Field Explorations and Laboratory Testing

APPENDIX B

FIELD EXPLORATIONS AND LABORATORY TESTING

B.1 FIELD EXPLORATIONS

B.1.1 General

Subsurface materials and conditions at the site were investigated by GRI during two separate mobilizations. During the initial mobilization between July 29 and August 2, 2019, two mud-rotary borings, designated B-1 and B-2, and three cone penetration test (CPT) probes, designated CPT-1 through CPT-3, were completed. During the second mobilization between February 27 and March 2, 2023, one mud-rotary boring, designated B-3, was completed. The locations of the borings and probes are shown on Figure 2. The above fieldwork is discussed in more detail below.

B.1.2 Mud-Rotary Borings

Borings B-1 through B-3 were advanced to depths ranging from about 156.5 feet to 261.5 feet using mud-rotary drilling techniques using a CME 55 HT or CME 850 track-mounted drill rig provided and operated by Western States Soil Conservation, Inc., of Hubbard, Oregon. Disturbed samples were obtained from the borings at about 2.5-foot intervals of depth to a depth of about 15 feet, 5-foot intervals from 15 feet to 80 feet of depth, and 5-foot to 10-foot intervals below 80 feet of depth. Boring B-3 was blind-drilled from a depth of 221.5 feet to 260 feet. Disturbed samples were obtained using a 2-inch outside-diameter (O.D.) standard split-spoon sampler. Standard Penetration Tests (SPT) were conducted by driving the sampler into the soil a distance of 18 inches using a 140-pound hammer dropped 30 inches. The number of blows required to drive the standard split-spoon sampler the last 12 inches is known as the Standard Penetration Resistance, or SPT N-value. The SPT N-values provide a measure of the relative density of granular soils and the relative consistency of cohesive soils. Samples obtained from the borings were placed in airtight jars and returned to our laboratory for further classification and testing. In addition, relatively undisturbed samples were collected by pushing a 3-inch-O.D. Shelby tube into the undisturbed soil a maximum distance of 24 inches using the hydraulic ram of the drill rig. The soil exposed in the ends of the Shelby tubes was examined and classified in the field. After classification, the tubes were sealed with rubber caps and returned to our laboratory for further examination and testing. All samples were returned to our laboratory for further examination and testing.

Logs of the mud-rotary borings are provided on Figures 1B through 3B. Each log presents a descriptive summary of the various types of materials encountered in the boring and notes the depth at which the materials and/or characteristics of the materials change. To the right of the descriptive summary, the numbers and types of samples taken during the

drilling operation are indicated. Farther to the right, SPT N-values are shown graphically along with the natural moisture contents, Torvane shear-strength values, fines contents, Atterberg-limits determinations, and dry densities of soil samples. The terms and symbols used to describe the soil and rock encountered in the borings are defined in Tables 1B and 2B and the attached legend.

B.1.3 Cone Penetrometer Test Probes

Probes CPT-1 through CPT-3 were advanced to depths of about 21.2 feet to 158 feet, where refusal installation conditions were encountered, using a truck-mounted electrical cone provided and operated by Oregon Geotechnical Explorations, Inc., of Keizer, Oregon. During a CPT, a steel cone is forced vertically into the soil at a constant rate of penetration. The force required to cause penetration at a constant rate can be related to the bearing capacity of the soil immediately surrounding the point of the penetrometer cone. This force is measured and recorded every 4 inches. In addition to the cone measurements, measurements are obtained of the magnitude of force required to force a friction sleeve attached above the cone through the soil. The force required to move the friction sleeve can be related to the undrained shear strength of fine-grained soils. The dimensionless ratio of sleeve friction to point-bearing capacity indicates the type of soil penetrated. The cone penetration resistance can be used to evaluate the relative consistency or density of cohesionless and cohesive soils, respectively. In addition, a piezometer fitted between the cone and the sleeve measures changes in water pressure as the probe is advanced and can also be used to measure the depth of the top of the groundwater surface. CPT-1 included shear-wave velocity testing. For this test, an accelerometer is placed in the cone equipment, which allows measurement of the arrival times of shear waves at the cone base from impulses generated at the ground surface that can then be used to calculate shear-wave velocities in the soil profile. The logs of CPTs are provided on Figures 4B through 7B. The shear-wave velocity measurements for CPT-2 are provided on Figure 6B. Graphical data from pore-pressure dissipation tests are provided on Figures 8B through 12B. Interpretations of the soil types encountered by the probe are shown graphically on the logs. Guidelines for the classification of soils in the CPT probe are provided in Table 3B.

B.2 LABORATORY TESTING

B.2.1 General

All samples obtained from the field were returned to our laboratory, where the physical characteristics of the samples were noted and the field classifications modified where necessary. At the time of classification, the natural moisture content of each soil sample was determined. Additional testing included Torvane shear strength, dry unit weight, washed-sieve analysis (percent passing the U.S. No. 200 sieve), Atterberg limits, one-dimensional consolidation, unconfined compression strength, triaxial compression testing,

and cyclic direct simple shear (DSS) testing. The following paragraphs describe the testing program in more detail.

B.2.2 Natural Moisture Content

Natural moisture content determinations were made in conformance with ASTM International (ASTM) D2216. The results are shown on Figures 1B through 3B and summarized in Table 4B.

B.2.3 Torvane Shear Strength

The approximate undrained shear strengths of relatively undisturbed, fine-grained soil samples were determined using a Torvane shear device. The Torvane is a hand-held apparatus with vanes that are inserted into the soil. The torque required to fail the soil in shear around the vanes is measured using a calibrated spring. The results of the Torvane shear-strength test are summarized on Figures 1B through 3B.

B.2.4 Dry Unit Weight

The dry unit weight of undisturbed soil samples was determined in the laboratory in accordance with ASTM D2937 by cutting a cylindrical specimen of soil from a Shelby tube sample. The dimensions of the specimen were carefully measured, the volume calculated, and the specimen weighed. After oven-drying, the specimen was reweighed and the water content was calculated. The dry unit weight was then computed. The dry unit weight is shown on Figures 1B through 3B and summarized in Table 4B.

B.2.5 Washed-Sieve Analysis

Washed-sieve analyses were performed on selected samples of the soil to assist in their classification. The test is performed by taking a sample of known dry weight and washing it over a No. 200 sieve. The material retained on the sieve is oven-dried and weighed. The percentage of material passing that passes the No. 200 sieve is then calculated. The results are summarized on Figures 1B through 3B and in Table 4B.

B.2.6 Atterberg Limits

Atterberg limits tests were performed on 28 samples of the fine-grained soil in substantial conformance with ASTM D4318. The test data are shown on Figures 1B through 3B and summarized in Table 4B. The results are also shown graphically on Figures 13B through 19B.

B.2.7 One-Dimensional Consolidation

One-dimensional consolidation testing was performed in accordance with ASTM D2435 to obtain data on the compressibility characteristics of nine relatively undisturbed samples of fine-grained soil. Test results are summarized on Figures 20B through 28B in the form

of a curve showing effective stress versus percent strain. The initial moisture content and unit weight of the sample are also provided on the figure.

B.2.8 Unconfined Compression

An unconfined compression test was performed on a selected sample of silt. The test was conducted in accordance with ASTM D2166. The test results are summarized below.

Boring	Sample	Depth, ft	Unconfined Compressive Strength, psf	Undrained Shear Strength, psf
B-1	S-10	28.3	1,270	635

B.2.9 Triaxial Compression Test

Two isotropically consolidated, undrained (CIU) triaxial compression tests with pore-pressure measurements were performed on selected samples of soil from borings B-1 and B-2. Samples for these tests were collected with a relatively undisturbed 2.85-inch inside-diameter (I.D.) Shelby tube. The specimens were extruded from the tubes, the ends of the sample were trimmed square, and the samples were encapsulated in a protective rubber membrane and mounted into a triaxial cell. Vertical filter paper drains were placed on the sides of each sample to enhance drainage and reduce the equalization time of strain-induced pore pressures.

Upon completion of sample preparation, the samples were saturated under an effective confining pressure of approximately 1 psi to 2 psi, with a back pressure of at least 40 psi to achieve timely saturation. Subsequently, the effective confining stress was increased, and the sample was allowed to consolidate with the drainage line open. Following consolidation, the drainage line was closed, and the sample was sheared undrained at a constant rate of strain while measurements were made of axial load, axial strain, and shear-induced pore pressure. The peak deviator stress ($\sigma_1 - \sigma_3$) was selected as the point of failure for each stage on the Mohr-Coulomb envelope.

The test results are summarized on Figures 31B and 32B. A graphical summary of deviator stress, effective stress ratio, and change in pore pressure versus axial strain is shown on the left side of the figure. Farther to the right, on the top half of the figure, is the modified Mohr-Coulomb envelope based on maximum effective shear stress and the corresponding effective normal stress at failure. A summary of the test data, including sample identification and initial and final moisture content of the samples, is tabulated below the modified Mohr-Coulomb plot.

B.2.10 Cyclic Direct Simple Shear

Strain-controlled, cyclic DSS tests were performed in conformance with standard of practice and ASTM D6528 on relatively undisturbed soil samples extruded from a Shelby

tube. The test provides data on the cyclic resistance, degradation potential, and post-cyclic behavior of the underlying fine-grained soils, which is necessary for seismic and slope-stability studies. The cyclic tests were completed at a frequency of 0.1 Hz, and the post-cyclic shear-strength tests were completed at a shear-strain rate of 5%/hour. The results of the cyclic DSS tests are tabulated below.

Boring	Depth, ft	Confining Pressure [1], psf	Overconsolidation Ratio (OCR)	Shear Strain, %	Ru at 60 Cycles	Max Ru at 200 Cycles	Static Shear Strength, psf	Post Cyclic Shear Strength, psf	Post-cyclic/Static Su/ $s_{v'}$ At 3% Strain
B-1	39.0	2,500	1.5[2,3]	Static	N/A	N/A	930	N/A	0.25
B-1	39.2	2,500	1.5[2,3]	0.5	0.35	0.42	N/A	1,040	0.25
B-1	39.8	2,500	1.5[2,3]	0.8	0.59	0.64	N/A	1,000	0.23
B-1	39.6	2,500	1.5[2,3]	1.6	0.84	0.88	N/A	965	0.19
B-1	39.4	7,500	1.0[4]	0.8	0.32	0.39	N/A	2,023	0.21
B-2	64.3	3,500	1.5[2,3]	Static	N/A	N/A	1,240	N/A	0.25
B-2	64.0	3,500	1.5[2,3]	0.8	0.42	0.45	N/A	1,200	0.25
B-2	63.8	3,500	1.5[2,3]	1.6	0.78	0.85	N/A	1,110	0.21
B-2	63.6	3,500	3.1[5]	1.6	0.26	0.39	N/A	2,330	0.47
B-3	36.7	2,350	1.5[2,3]	Static	N/A	N/A	928	N/A	0.22
B-3	35.5	2,350	1.5[2,3]	0.8	0.56	0.63	N/A	940	0.19
B-3	36.4	2,350	1.5[2,3]	1.2	0.78	0.84	N/A	1,027	0.13
B-3	36.25	2,350	1.5[2,3]	1.6	0.83	0.89	N/A	921	0.15
B-3	60.9	3,500	1.5[2,3]	Static	N/A	N/A	1,174	N/A	0.19
B-3	61.2	3,500	1.5[2,3]	0.6	0.35	0.40	N/A	1,200	0.18
B-3	60.4	3,500	1.5[2,3]	0.8	0.40	0.45	N/A	1,017	0.13
B-3	61.2	3,500	1.5[2,3]	1.2	0.57	0.67	N/A	1,267	0.16
B-3	60.2	3,500	1.5[2,3]	1.6	0.72	0.79	N/A	932	0.16

Notes:

1) Confinement pressure was equivalent to existing overburden pressure with the exception of B-1 at 39.4 ft, which was consolidated to a confinement pressure of approximately 3 times the overburden pressure.
2) OCR interpolated from consolidation testing.
3) Specimen consolidated to existing overburden pressure and then tested.
4) Specimen consolidated to confining pressure and then tested at confining pressure.
5) Specimen consolidated to 11,000 psf and then tested at confining pressure.

Table 1B

GUIDELINES FOR CLASSIFICATION OF SOIL

Description of Relative Density for Granular (Coarse-Grained) Soil

Relative Density	Standard Penetration Resistance (N-values) blows/foot	3-Inch Sampler (140-lb Hammer) (N-values) blows/foot	3-Inch Sampler (300-lb Hammer) (N-values) blows/foot
Very Loose	0 - 4	0 - 11	0 - 4
Loose	4 - 10	11 - 26	4 - 10
Medium Dense	10 - 30	26 - 74	10 - 30
Dense	30 - 50	74 - 120	30 - 47
Very Dense	over 50	over 120	over 47

Description of Relative Consistency for Cohesive (Fine-Grained) Soils

Consistency	Standard Penetration Resistance (N-values) blows per ft	3-Inch Sampler (140-lb Hammer) (N-values) blows/foot	3-Inch Sampler (300-lb Hammer) (N-values) blows/foot	Torvane or Undrained Shear Strength, tsf
Very Soft	0 - 2	0 - 3	0 - 2	less than 0.125
Soft	2 - 4	3 - 6	2 - 5	0.125 - 0.25
Medium Stiff	4 - 8	6 - 12	5 - 9	0.25 - 0.50
Stiff	8 - 15	12 - 25	9 - 19	0.50 - 1.0
Very Stiff	15 - 30	25 - 65	19 - 31	1.0 - 2.0
Hard	over 30	over 65	over 31	over 2.0

Grain-Size Classification	Modifier for Subclassification		
Boulders: >12 inches *Cobbles:* 3 inches - 12 inches *Gravel:* ¼ inch - ¾ inch (fine) ¾ inch- 3 inches (coarse) *Sand:* No. 200 - No. 40 sieve (fine) No. 40 - No. 10 sieve (medium) No. 10 - No. 4 sieve (coarse) *Silt/Clay:* Pass No. 200 sieve	Adjective	Primary Constituent SAND or GRAVEL Percentage of Other Material (By Weight)	Primary Constituent SILT or CLAY Percentage of Other Material (By Weight)
	trace:	5 - 15 (sand, gravel)	5 - 15 (sand, gravel)
	some:	15 - 30 (sand, gravel)	15 - 30 (sand, gravel)
	sandy, gravelly:	30 - 50 (sand, gravel)	30 - 50 (sand, gravel)
	trace:	<5 (silt, clay)	*Relationship of clay and silt determined by plasticity index test*
	some:	5 - 12 (silt, clay)	
	silty, clayey:	12 - 50 (silt, clay)	

Table 2B

GUIDELINES FOR CLASSIFICATION OF ROCK

Relative Rock Weathering Scale

Term	Field Identification
Fresh	Crystals are bright. Discontinuities may show some minor surface staining. No discoloration in rock fabric.
Slightly Weathered	Rock mass is generally fresh. Discontinuities are stained and may contain clay. Some discoloration in rock fabric. Decomposition extends up to 1 in. into rock.
Moderately Weathered	Rock mass is decomposed 50% or less. Significant portions of rock show discoloration and weathering effects. Crystals are dull and show visible chemical alteration. Discontinuities are stained and may contain secondary mineral deposits.
Predominantly Decomposed	Rock mass is more than 50% decomposed. Rock can be excavated with geologist's pick. All discontinuities exhibit secondary mineralization. Complete discoloration of rock fabric. Surface of core is friable and usually pitted due to washing out of highly altered minerals by drilling water.
Decomposed	Rock mass is completely decomposed. Original rock "fabric" may be evident. May be reduced to soil with hand pressure.

Relative Rock Hardness Scale

Term	Hardness Designation	Field Identification	Approximate Unconfined Compressive Strength
Extremely Soft	R0	Can be indented with difficulty by thumbnail. May be moldable or friable with finger pressure.	< 100 psi
Very Soft	R1	Crumbles under firm blows with point of a geology pick. Can be peeled by a pocketknife and scratched with fingernail.	100 - 1,000 psi
Soft	R2	Can be peeled by a pocketknife with difficulty. Cannot be scratched with fingernail. Shallow indentation made by firm blow of geology pick.	1,000 - 4,000 psi
Medium Hard	R3	Can be scratched by knife or pick. Specimen can be fractured with a single firm blow of hammer/geology pick.	4,000 - 8,000 psi
Hard	R4	Can be scratched with knife or pick only with difficulty. Several hard hammer blows required to fracture specimen.	8,000 - 16,000 psi
Very Hard	R5	Cannot be scratched by knife or sharp pick. Specimen requires many blows of hammer to fracture or chip. Hammer rebounds after impact.	> 16,000 psi

RQD and Rock Quality

Relation of RQD and Rock Quality	
RQD (Rock Quality Designation), %	Description of Rock Quality
0 - 25	Very Poor
25 - 50	Poor
50 - 75	Fair
75 - 90	Good
90 - 100	Excellent

Terminology for Planar Surface		
Bedding	Joints and Fractures	Spacing
Laminated	Very Close	< 2 in.
Thin	Close	2 in. – 12 in.
Medium	Moderately Close	12 in. – 36 in.
Thick	Wide	36 in. – 10 ft
Massive	Very Wide	> 10 ft

Table 3B

CONE PENETRATION TEST (CPT) CORRELATIONS

Cohesive Soils

Cone Tip Resistance, tsf	Consistency
<5	Very Soft
5 to 15	Soft to Medium Stiff
15 to 30	Stiff
30 to 60	Very Stiff
>60	Hard

Cohesionless Soils

Cone Tip Resistance, tsf	Relative Density
<20	Very Loose
20 to 40	Loose
40 to 120	Medium
120 to 200	Dense
>200	Very Dense

Reference

Kulhawy, F. H., and Mayne, P. W., 1990, Manual on Estimating Soil Properties for Foundation Design, Electric Power Research Institute, EL-6800.

Table 4B

SUMMARY OF LABORATORY RESULTS

Sample Information						Atterberg Limits			
Location	Sample	Depth, ft	Elevation, ft	Moisture Content, %	Dry Unit Weight, pcf	Liquid Limit, %	Plasticity Index, %	Fines Content, %	Soil Type
B-1	S-2	5.0	15.0	22	--	--	--	--	SAND
	S-3	7.5	12.5	19	--	--	--	6	SAND
	S-4	10.0	10.0	27	--	--	--	--	SAND
	S-5	12.5	7.5	30	--	--	--	4	SAND
	S-6	15.0	5.0	29	--	--	--	--	SAND
	S-7	17.5	2.5	28	--	--	--	7	SAND
	S-8	20.0	0.0	29	--	--	--	7	SAND
	S-9	25.0	-5.0	57	--	--	--	--	SILT
	S-10	28.3	-8.3	55	68	--	--	--	SILT
	S-10	29.5	-9.5	52	--	--	--	96	SILT
	S-11	30.0	-10.0	52	--	56	16	94	SILT
	S-12	35.0	-15.0	50	--	--	--	--	SILT
	S-13	38.5	-18.5	46	75	--	--	--	SILT
	S-13	39.5	-19.5	46	--	46	3	81	SILT
	S-14	40.0	-20.0	51	--	51	9	--	SILT
	S-15	45.0	-25.0	50	--	--	--	82	SILT
	S-16	49.5	-29.5	49	--	--	--	81	SILT
	S-17	50.0	-30.0	47	--	51	9	--	SILT
	S-18	55.0	-35.0	51	--	--	--	--	SILT
	S-19	60.0	-40.0	49	--	44	11	72	SILT
	S-20	65.0	-45.0	51	--	--	--	--	SILT
	S-21	70.0	-50.0	42	--	--	--	--	SILT
	S-22	75.0	-55.0	54	--	44	11	62	Sandy SILT
	S-23	80.0	-60.0	37	--	48	7	--	SILT
	S-24	90.0	-70.0	45	--	--	--	--	SILT
	S-25	100.0	-80.0	52	--	53	20	96	SILT
	S-27	120.0	-100.0	48	--	--	--	--	SILT
	S-28	130.0	-110.0	68	--	68	15	97	SILT
	S-29	140.0	-120.0	33	--	--	--	27	Silty SAND
	S-30	150.0	-130.0	39	--	--	--	--	SILT
	S-31	160.0	-140.0	38	--	35	1	82	SILT
	S-33	180.0	-160.0	42	--	41	5	96	SILT
	S-35	200.0	-180.0	42	--	--	--	--	SILT
B-2	S-1	3.5	20.5	76	--	--	--	--	Clayey SILT
	S-3	7.0	17.0	48	--	--	--	92	Clayey SILT
	S-4	10.0	14.0	44	--	47	18	--	Clayey SILT
	S-5	14.5	9.5	50	--	--	--	--	Clayey SILT
	S-6	15.0	9.0	50	--	--	--	--	Clayey SILT
	S-7	20.0	4.0	52	--	--	--	86	Clayey SILT
	S-8	24.3	-0.3	53	70	--	--	97	Clayey SILT

Table 4B

SUMMARY OF LABORATORY RESULTS

Sample Information						Atterberg Limits			
Location	Sample	Depth, ft	Elevation, ft	Moisture Content, %	Dry Unit Weight, pcf	Liquid Limit, %	Plasticity Index, %	Fines Content, %	Soil Type
B-2	S-9	25.0	-1.0	55	--	57	18	--	Clayey SILT
	S-10	30.0	-6.0	53	--	--	--	--	Clayey SILT
	S-12	35.0	-11.0	48	--	--	--	--	SILT
	S-13	40.0	-16.0	50	--	--	--	--	SILT
	S-15	45.0	-21.0	68	--	--	--	--	SILT
	S-16	50.0	-26.0	68	--	87	47	97	SILT
	S-18	55.0	-31.0	82	--	--	--	--	SILT
	S-19	60.0	-36.0	52	--	--	--	--	SILT
	S-20	63.4	-39.4	47	78	--	--	84	SILT
	S-20	64.0	-40.0	48	--	50	16	78	SILT
	S-21	65.0	-41.0	46	--	55	11	--	SILT
	S-22	70.0	-46.0	37	--	--	--	29	Silty SAND
	S-23	75.0	-51.0	41	--	43	4	--	SILT
	S-24	80.0	-56.0	41	--	--	--	--	SILT
	S-25	85.0	-61.0	46	--	--	--	61	SILT
	S-26	90.0	-66.0	48	--	54	7	--	SILT
	S-27	95.0	-71.0	45	--	--	--	--	SILT
	S-28	100.0	-76.0	56	--	56	9	--	SILT
	S-29	105.0	-81.0	51	--	--	--	--	SILT
	S-30	115.0	-91.0	40	--	42	5	--	SILT
	S-31	125.0	-101.0	37	--	--	--	64	SILT
	S-32	135.0	-111.0	37	--	--	--	--	SILT
	S-33	145.0	-121.0	37	--	--	--	--	Silty SAND

Table 4B

SUMMARY OF LABORATORY RESULTS

Sample Information						Atterberg Limits			
Location	Sample	Depth, ft	Elevation, ft	Moisture Content, %	Dry Unit Weight, pcf	Liquid Limit, %	Plasticity Index, %	Fines Content, %	Soil Type
B-3	S-1	5.0	14.0	23	--	--	--	--	SAND
	S-2	10.0	9.0	25	--	--	--	5	SAND
	S-3	15.0	4.0	28	--	--	--	--	SAND
	S-4	20.0	-1.0	29	--	--	--	--	Clayey SILT
	S-6	27.0	-8.0	55	--	59	27	83	Clayey SILT
	S-7	30.0	-11.0	54	--	--	--	--	Clayey SILT
	S-8	35.0	-16.0	47	75	--	--	--	Clayey SILT
	S-8	35.5	-16.5	48	--	--	--	82	Clayey SILT
	S-9	37.0	-18.0	51	--	41	9	88	Clayey SILT
	S-10	40.0	-21.0	51	--	--	--	--	SILT
	S-12	47.0	-28.0	50	--	46	13	80	SILT
	S-13	55.0	-36.0	45	--	--	--	--	SILT
	S-14	60.0	-41.0	53	69	--	--	--	SILT
	S-15	65.0	-46.0	63	--	51	15	93	SILT
	S-16	70.0	-51.0	49	--	--	--	--	SILT
	S-17	75.0	-56.0	43	--	--	--	--	PEAT
	S-17b	75.5	-56.5	62	--	--	--	--	PEAT
	S-18	80.0	-61.0	58	--	--	--	--	SILT
	S-19	85.0	-66.0	45	--	41	5	90	SILT
	S-21	90.0	-71.0	46	--	--	--	--	SILT
	S-22	95.0	-76.0	43	--	--	--	--	SILT
	S-23	100.0	-81.0	41	--	--	--	--	SILT
	S-24	105.0	-86.0	48	--	--	--	--	SILT
	S-25	110.0	-91.0	42	--	36	8	89	SILT
	S-26	115.0	-96.0	38	--	--	--	--	SILT
	S-27	120.0	-101.0	48	--	--	--	--	SILT
	S-28	125.0	-106.0	40	--	--	--	--	SILT
	S-29	130.0	-111.0	55	--	--	--	--	SILT
	S-30	135.0	-116.0	34	--	--	--	61	Sandy SILT
	S-31	140.0	-121.0	47	--	--	--	--	SILT
	S-32	145.0	-126.0	45	--	41	12	89	SILT
	S-34	150.0	-131.0	39	--	--	--	--	SILT
	S-35	155.0	-136.0	35	--	--	--	68	Sandy SILT
	S-36	160.0	-141.0	30	--	--	--	--	Sandy SILT
	S-37	165.0	-146.0	32	--	--	--	--	Silty SAND
	S-38	170.0	-151.0	35	--	--	--	--	SILT
	S-39	175.0	-156.0	46	--	43	11	96	SILT
	S-40	180.0	-161.0	46	--	--	--	--	SILT
	S-41	185.0	-166.0	31	--	--	--	--	SILT
	S-42	190.0	-171.0	41	--	--	--	--	SILT

Table 4B

SUMMARY OF LABORATORY RESULTS

Sample Information						Atterberg Limits			
Location	Sample	Depth, ft	Elevation, ft	Moisture Content, %	Dry Unit Weight, pcf	Liquid Limit, %	Plasticity Index, %	Fines Content, %	Soil Type
B-3	S-44	210.0	-191.0	36	--	--	--	--	SILT
	S-44b	211.0	-192.0	32	--	--	--	--	SILT
	S-45	220.0	-201.0	39	--	--	--	--	SILT
	S-46	260.0	-241.0	37	--	--	--	--	SILT

BORING AND TEST PIT LOG LEGEND

SOIL SYMBOLS

Symbol	Typical Description
	LANDSCAPE MATERIALS
	FILL
	GRAVEL; clean to some silt, clay, and sand
	Sandy GRAVEL; clean to some silt and clay
	Silty GRAVEL; up to some clay and sand
	Clayey GRAVEL; up to some silt and sand
	SAND; clean to some silt, clay, and gravel
	Gravelly SAND; clean to some silt and clay
	Silty SAND; up to some clay and gravel
	Clayey SAND; up to some silt and gravel
	SILT; up to some clay, sand, and gravel
	Gravelly SILT; up to some clay and sand
	Sandy SILT; up to some clay and gravel
	Clayey SILT; up to some sand and gravel
	CLAY; up to some silt, sand, and gravel
	Gravelly CLAY; up to some silt and sand
	Sandy CLAY; up to some silt and gravel
	Silty CLAY; up to some sand and gravel
	PEAT

BEDROCK SYMBOLS

Symbol	Typical Description
	BASALT
	MUDSTONE
	SILTSTONE
	SANDSTONE

SURFACE MATERIAL SYMBOLS

Symbol	Typical Description
	Asphalt concrete PAVEMENT
	Portland cement concrete PAVEMENT
	Crushed rock BASE COURSE

SAMPLER SYMBOLS

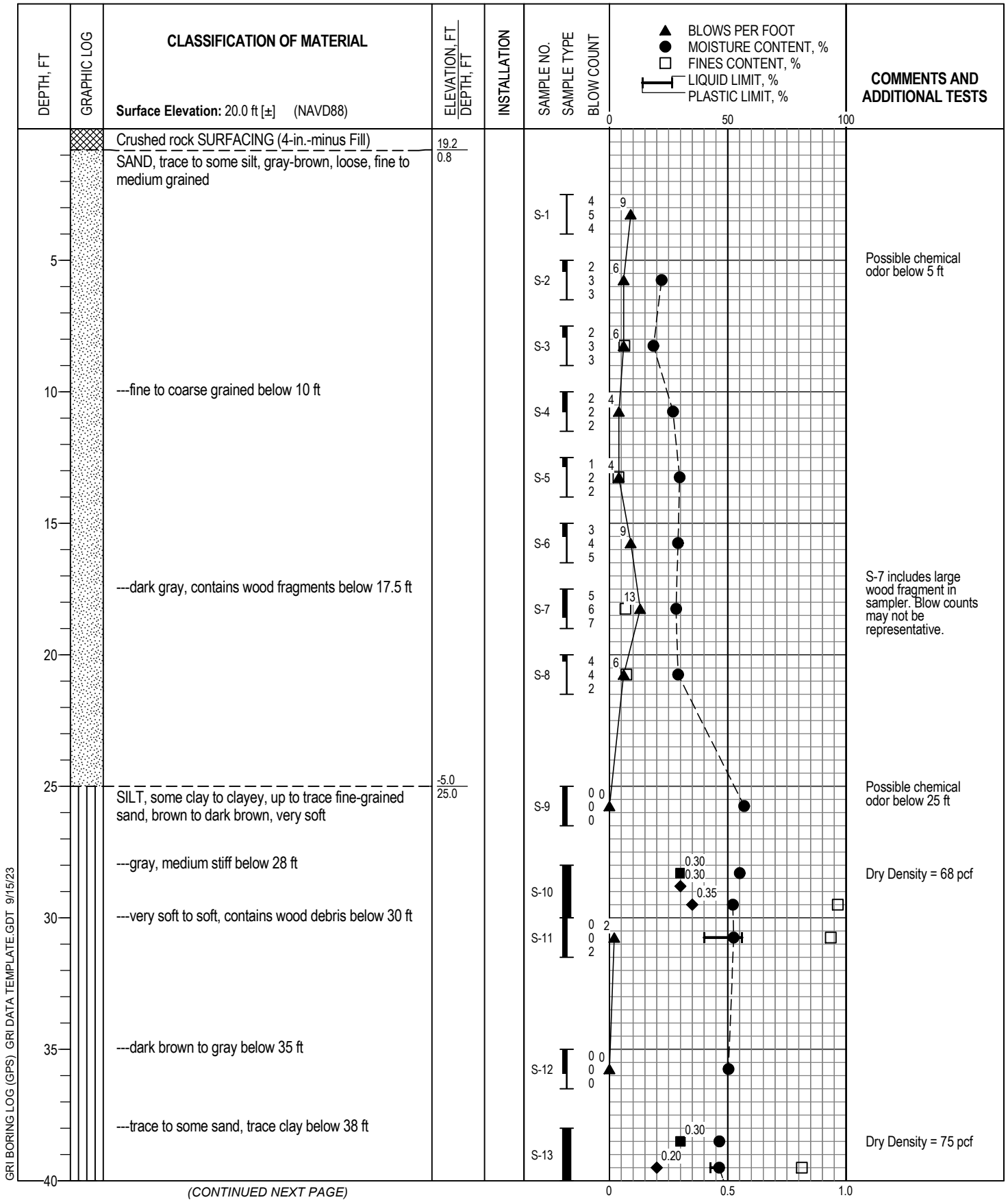
Symbol	Sampler Description
	2.0 in. O.D. split-spoon sampler and Standard Penetration Test with recovery (ASTM D1586)
	Shelby tube sampler with recovery (ASTM D1587)
	3.0 in. O.D. split-spoon sampler with recovery (ASTM D3550)
	Grab Sample
	Rock core sample interval
	Sonic core sample interval
	Push probe sample interval

INSTALLATION SYMBOLS

Symbol	Symbol Description
	Flush-mount monument set in concrete
	Concrete, well casing shown where applicable
	Bentonite seal, well casing shown if applicable
	Filter pack, machine-slotted well casing shown where applicable
	Grout, vibrating-wire transducer cable shown where applicable
	Vibrating-wire pressure transducer
	1-in.-diameter solid PVC
	1-in.-diameter hand-slotted PVC
	Grout, inclinometer casing shown where applicable

FIELD MEASUREMENTS

Symbol	Typical Description
	Groundwater level during drilling and date measured
	Groundwater level after drilling and date measured
	Rock/sonic core or push probe recovery (%)
	Rock quality designation (RQD, %)



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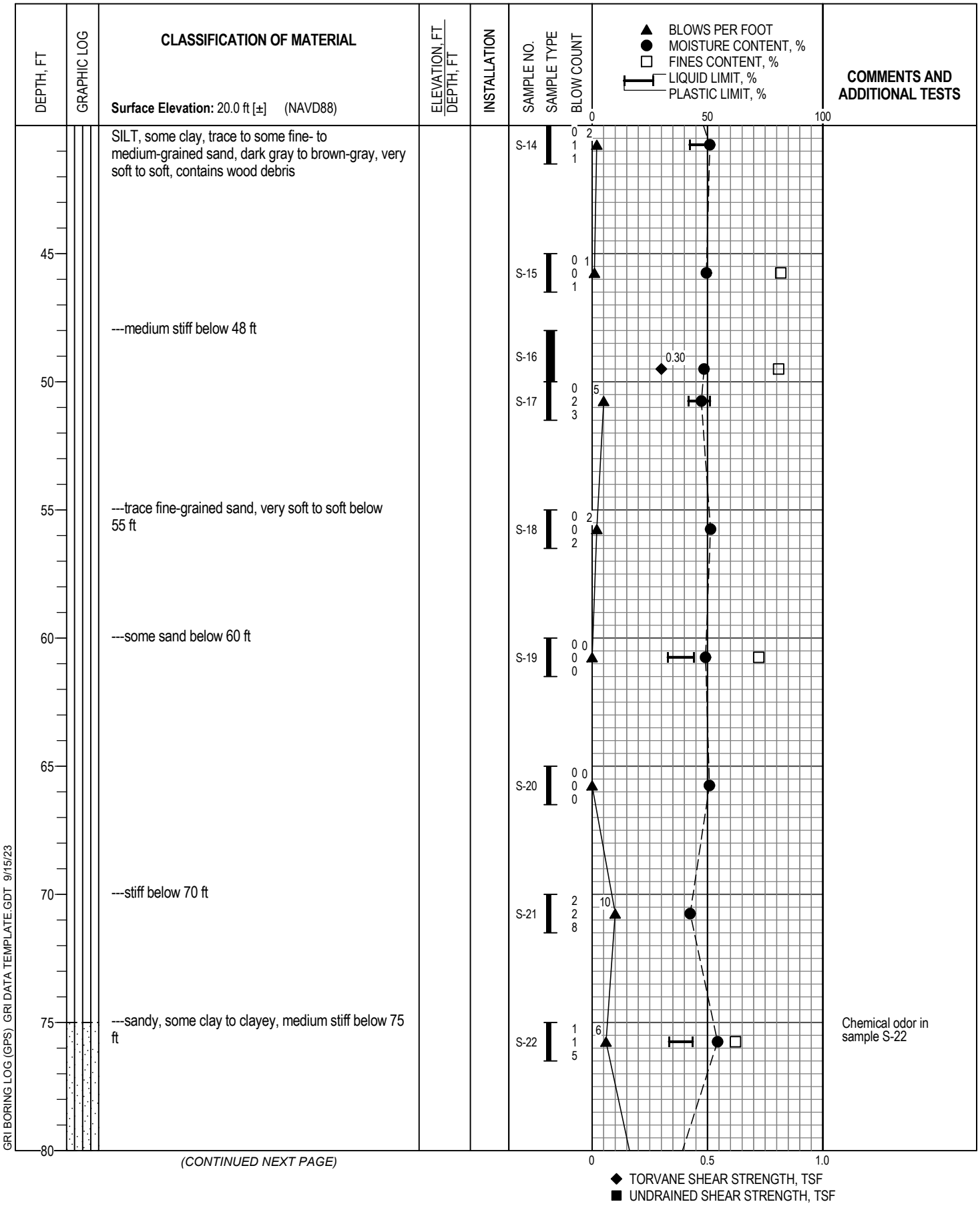
GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

Logged By: G. Martin	**Drilled by:** Western States Soil Conservation, Inc.
Date Started: 7/31/19	**GPS Coordinates:** 45.8552° N -122.7976° W (WGS 84)
Drilling Method: Mud Rotary **Equipment:** CME 55 HT Track-Mounted Drill Rig **Hole Diameter:** 5 in.	**Hammer Type:** Auto Hammer **Weight:** 140 lb **Drop:** 30 in. **Energy Ratio:** 76%
Note: See Legend for Explanation of Symbols	

BORING B-1

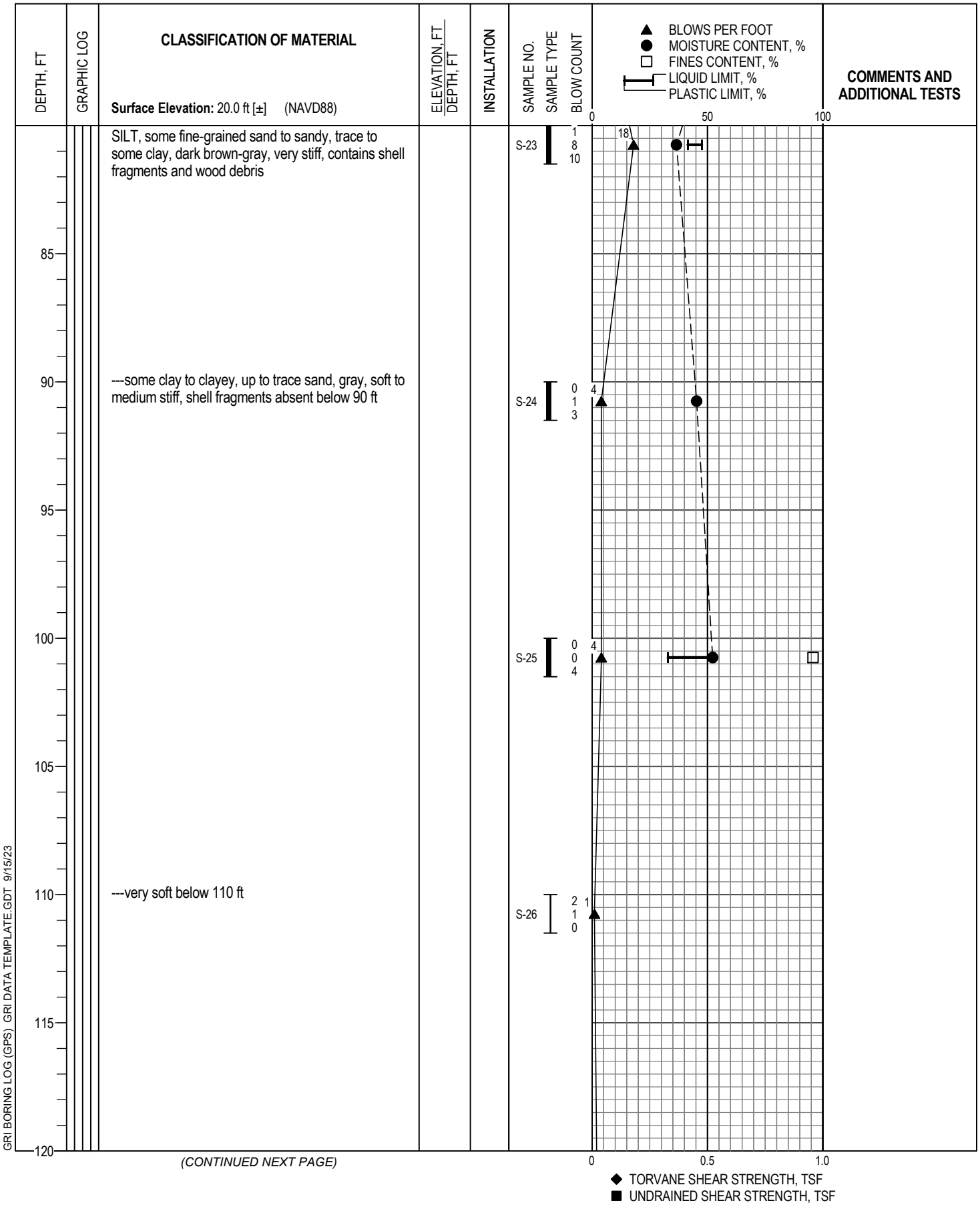
SEP. 2023 JOB NO. 6771-A FIG. 1B



GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-1

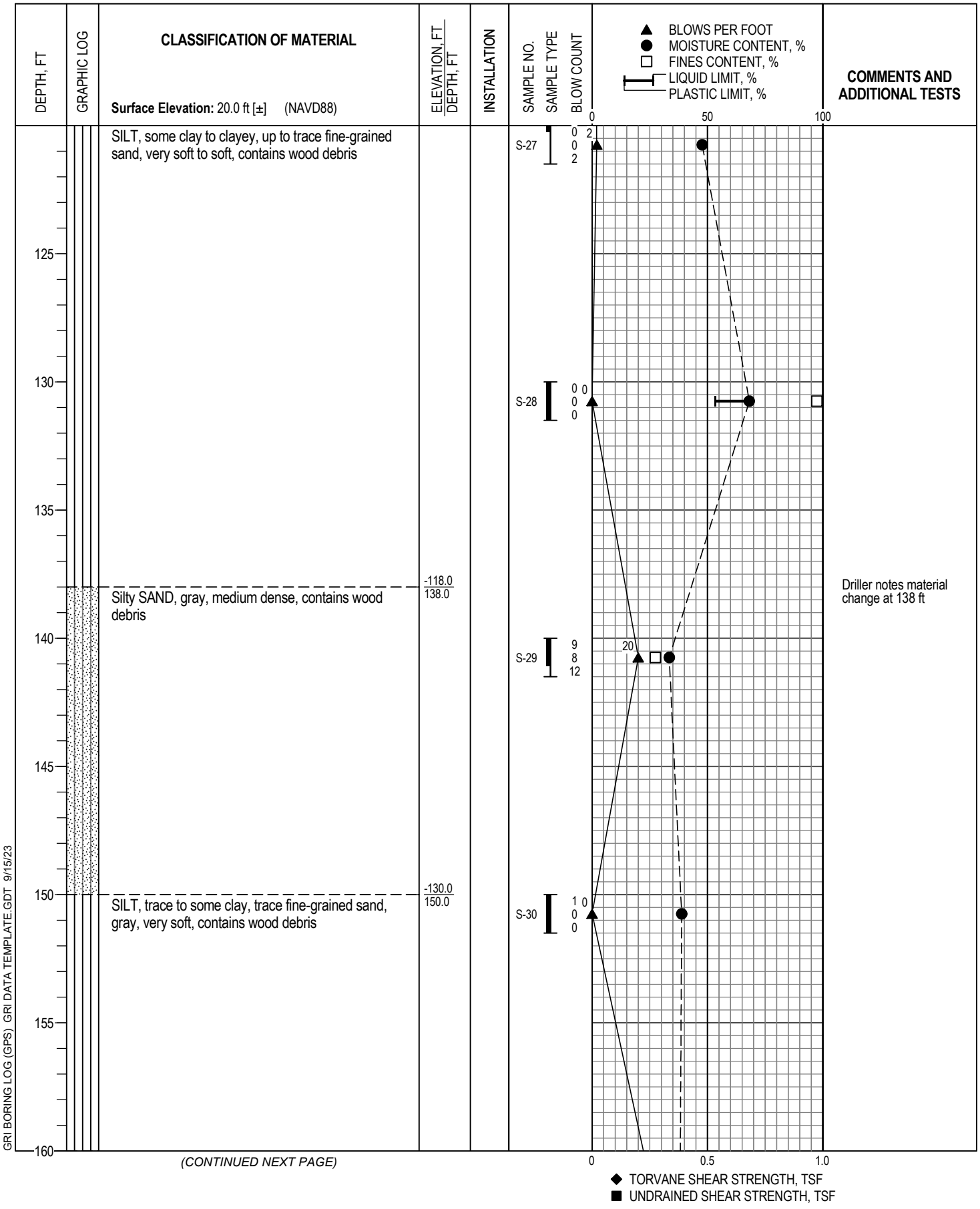
SEP. 2023 JOB NO. 6771-A FIG. 1B



GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-1

SEP. 2023 JOB NO. 6771-A FIG. 1B



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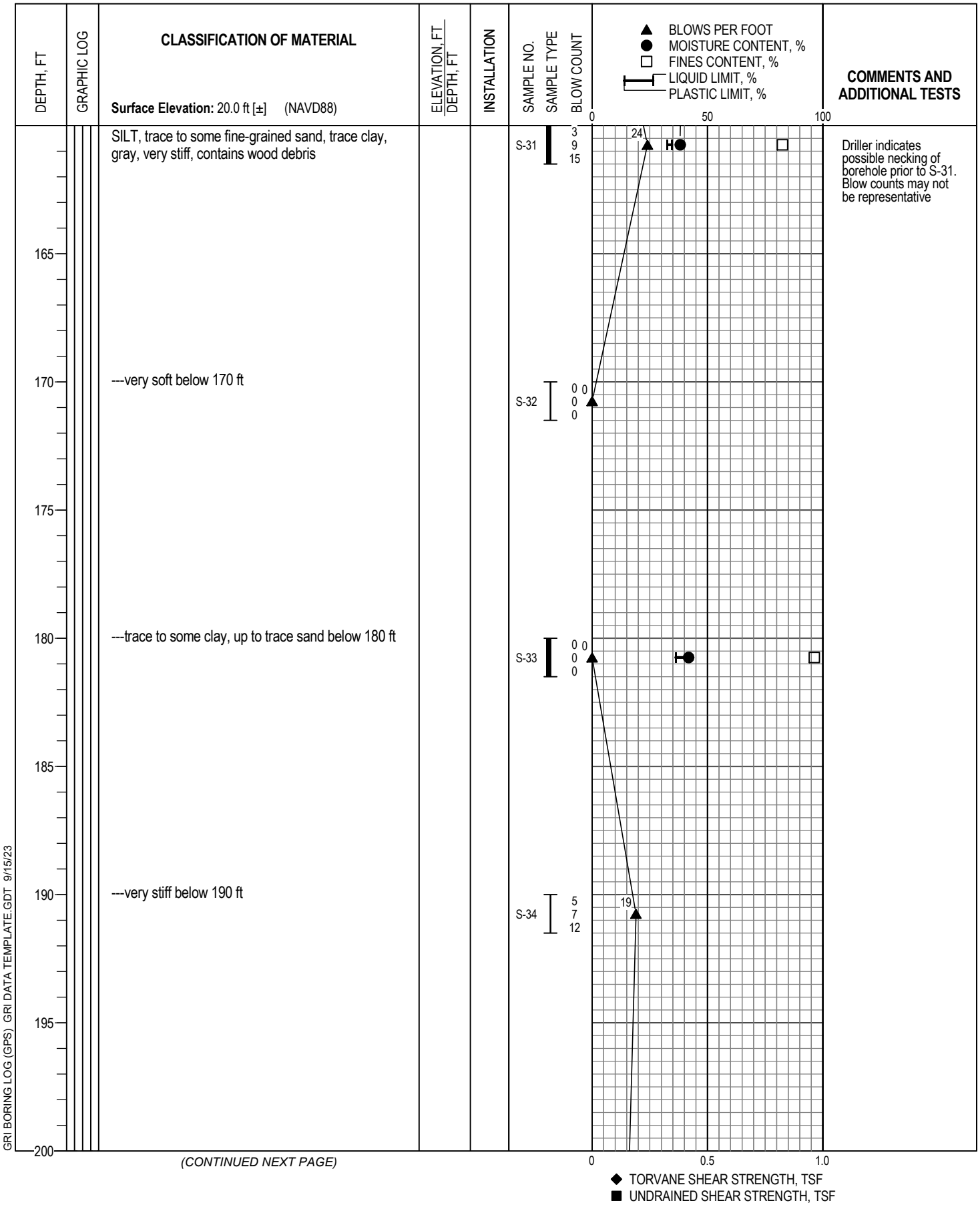
GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-1

SEP. 2023 JOB NO. 6771-A FIG. 1B

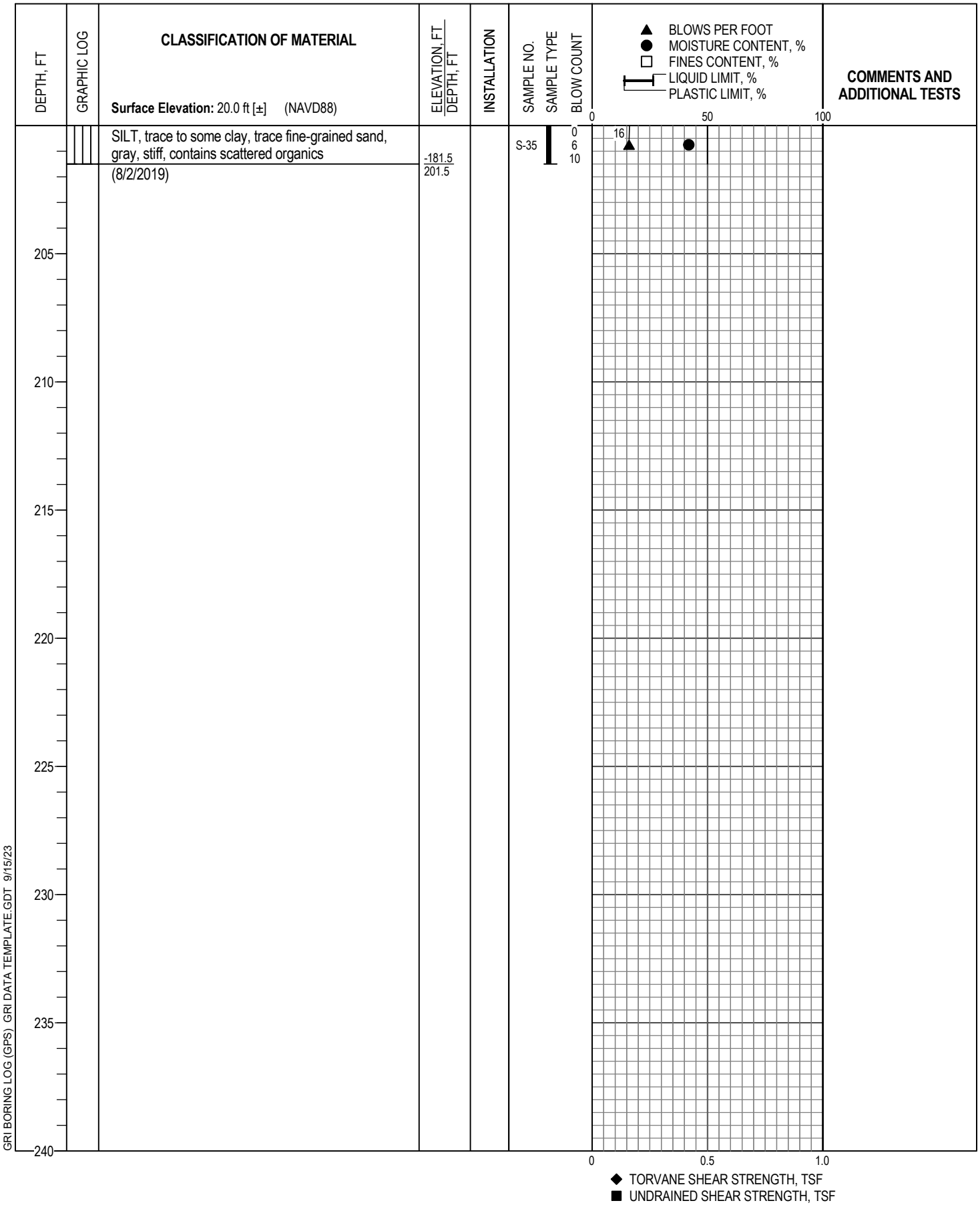


(CONTINUED NEXT PAGE)

GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-1

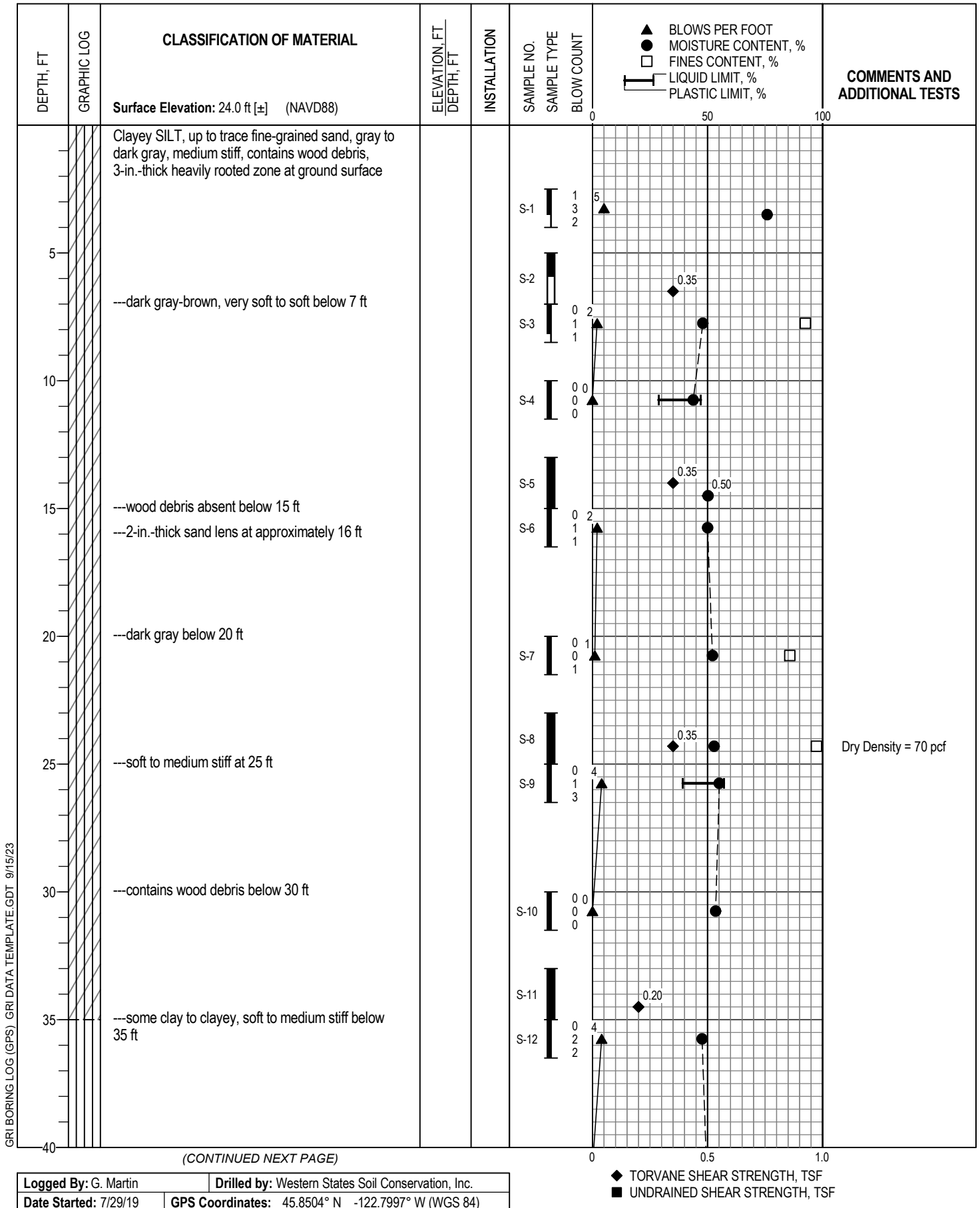
SEP. 2023 JOB NO. 6771-A FIG. 1B



GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-1

SEP. 2023 JOB NO. 6771-A FIG. 1B



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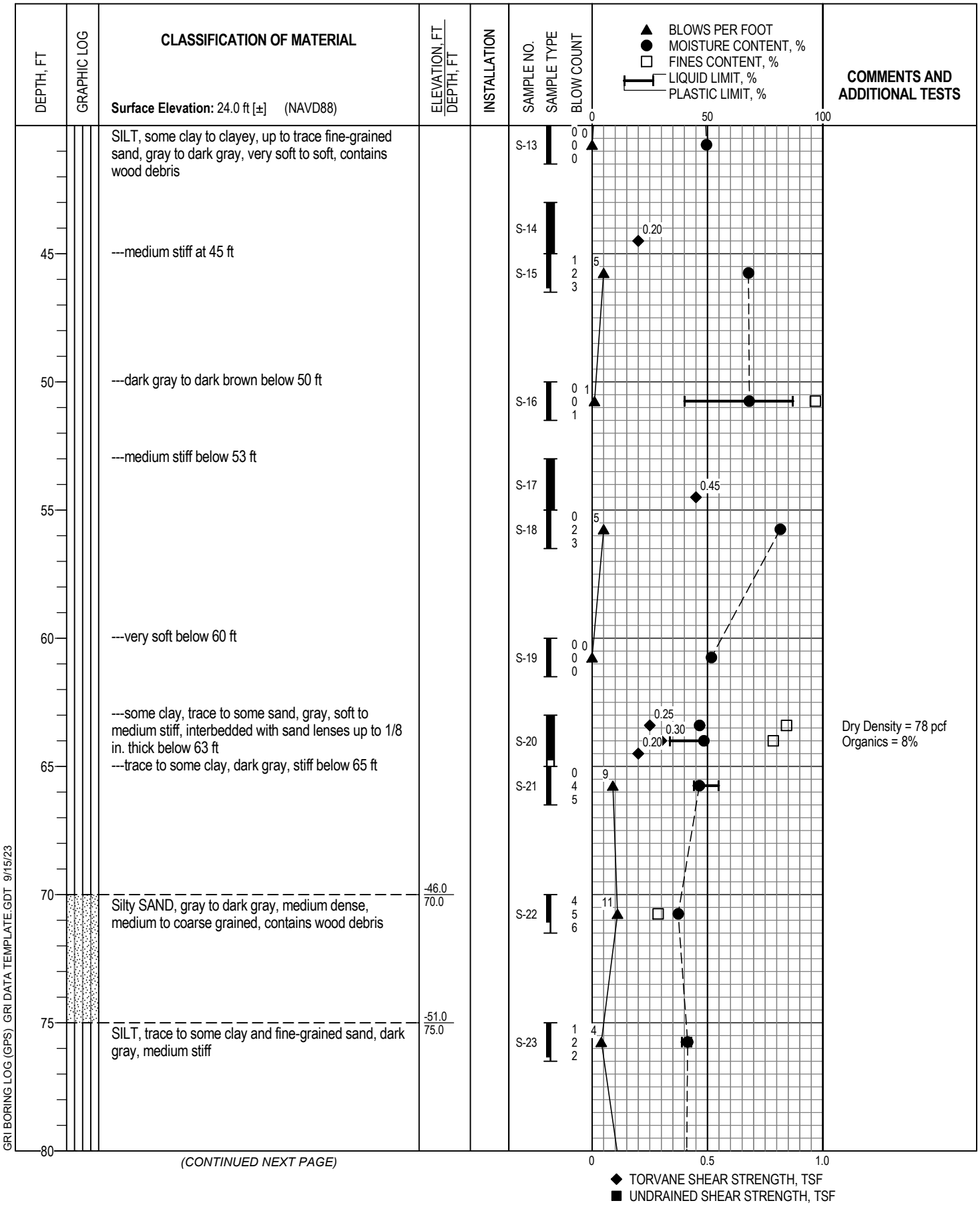
Logged By: G. Martin	**Drilled by:** Western States Soil Conservation, Inc.
Date Started: 7/29/19	**GPS Coordinates:** 45.8504° N -122.7997° W (WGS 84)
Drilling Method: Mud Rotary **Equipment:** CME 55 HT Track-Mounted Drill Rig **Hole Diameter:** 5 in.	**Hammer Type:** Auto Hammer **Weight:** 140 lb **Drop:** 30 in. **Energy Ratio:** 76%
Note: See Legend for Explanation of Symbols	

BORING B-2

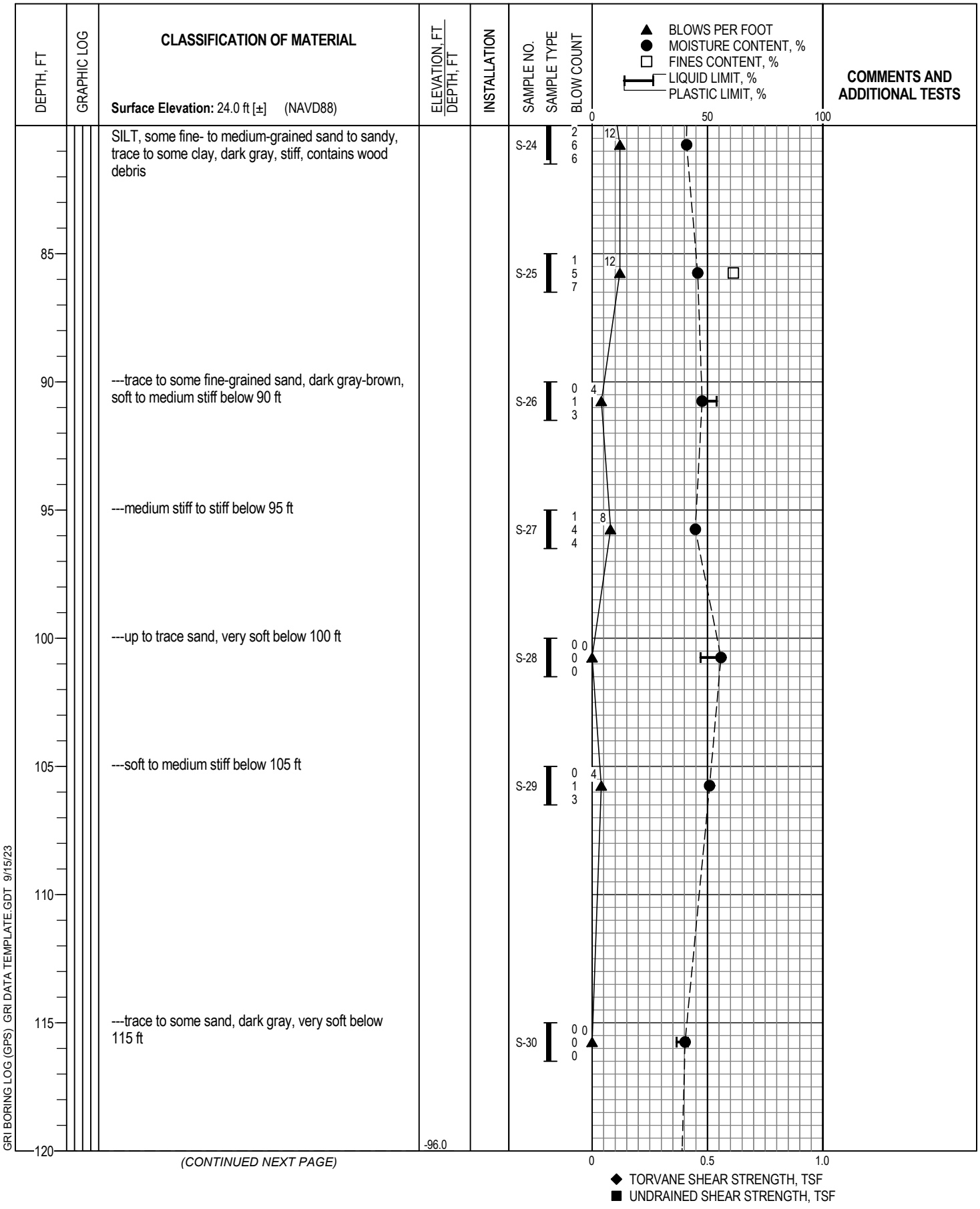
SEP. 2023 JOB NO. 6771-A FIG. 2B

GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23



BORING B-2

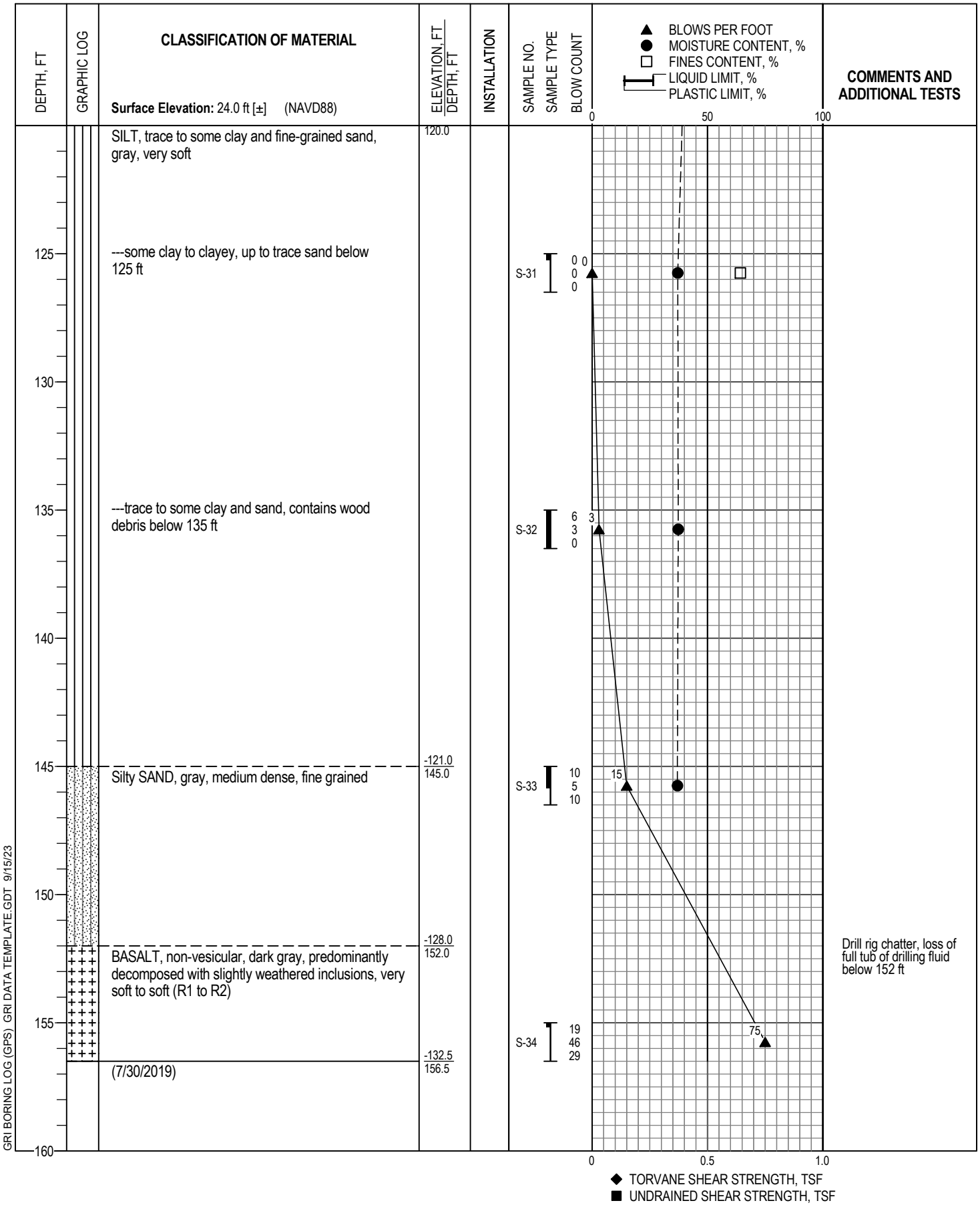
SEP. 2023 JOB NO. 6771-A FIG. 2B



GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-2

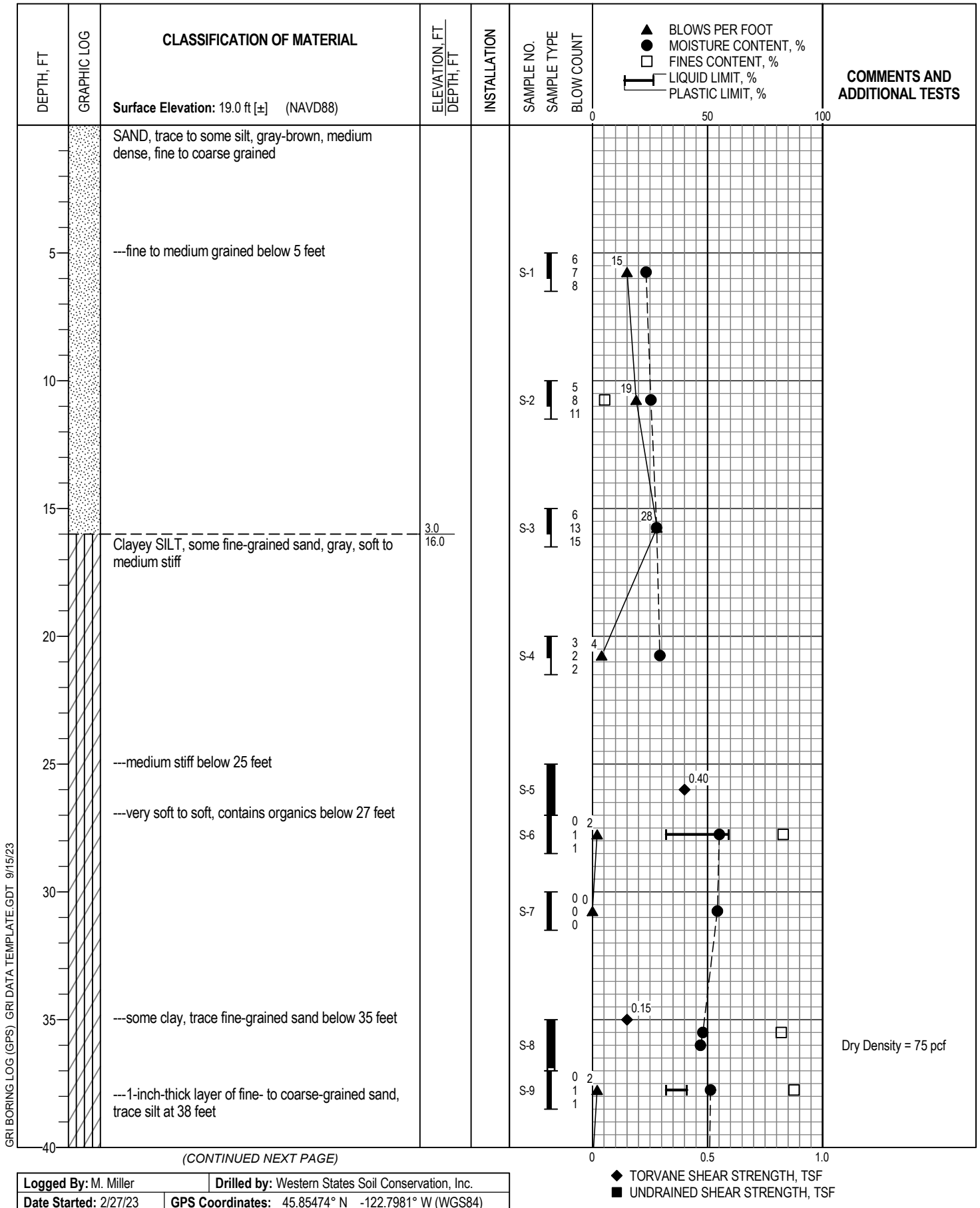
SEP. 2023 JOB NO. 6771-A FIG. 2B



GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-2

SEP. 2023 JOB NO. 6771-A FIG. 2B



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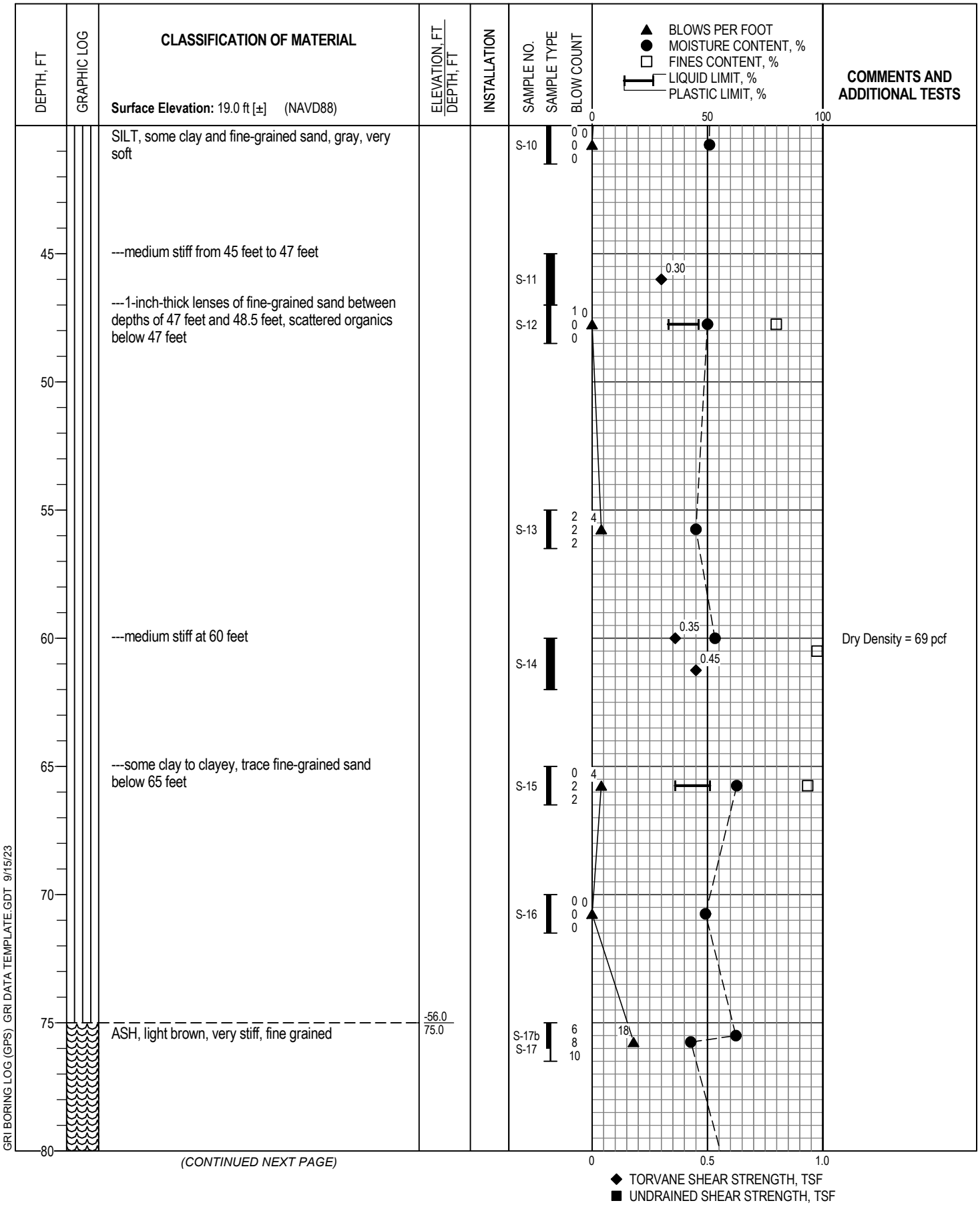
Logged By: M. Miller	**Drilled by:** Western States Soil Conservation, Inc.
Date Started: 2/27/23	**GPS Coordinates:** 45.85474° N -122.7981° W (WGS84)
Drilling Method: Mud Rotary **Equipment:** CME 850 Track-Mounted Drill Rig **Hole Diameter:** 5 in.	**Hammer Type:** Auto Hammer **Weight:** 140 lb **Drop:** 30 in. **Energy Ratio:**
Note: See Legend for Explanation of Symbols	

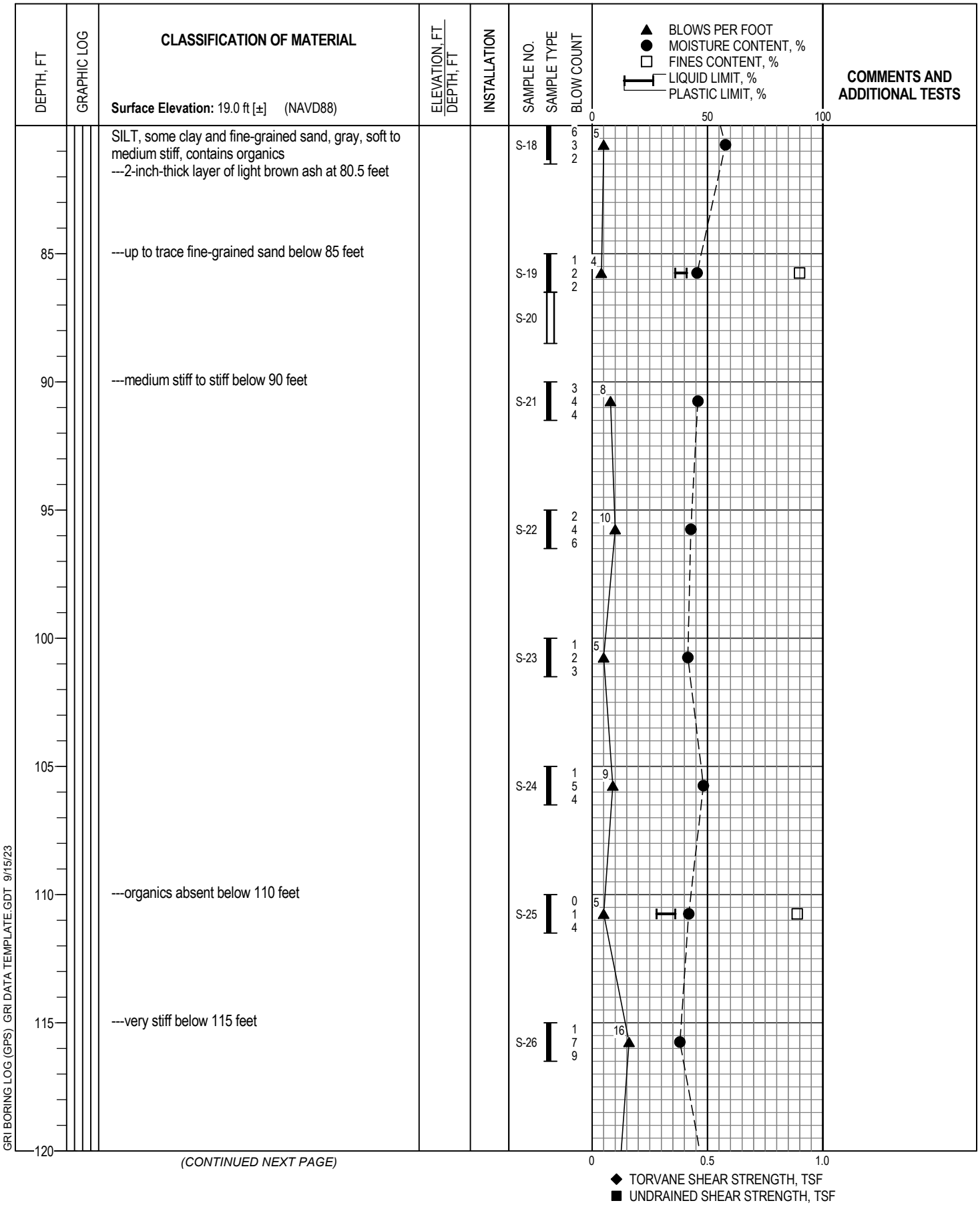
BORING B-3

SEP. 2023 JOB NO. 6771-A FIG. 3B



BORING B-3

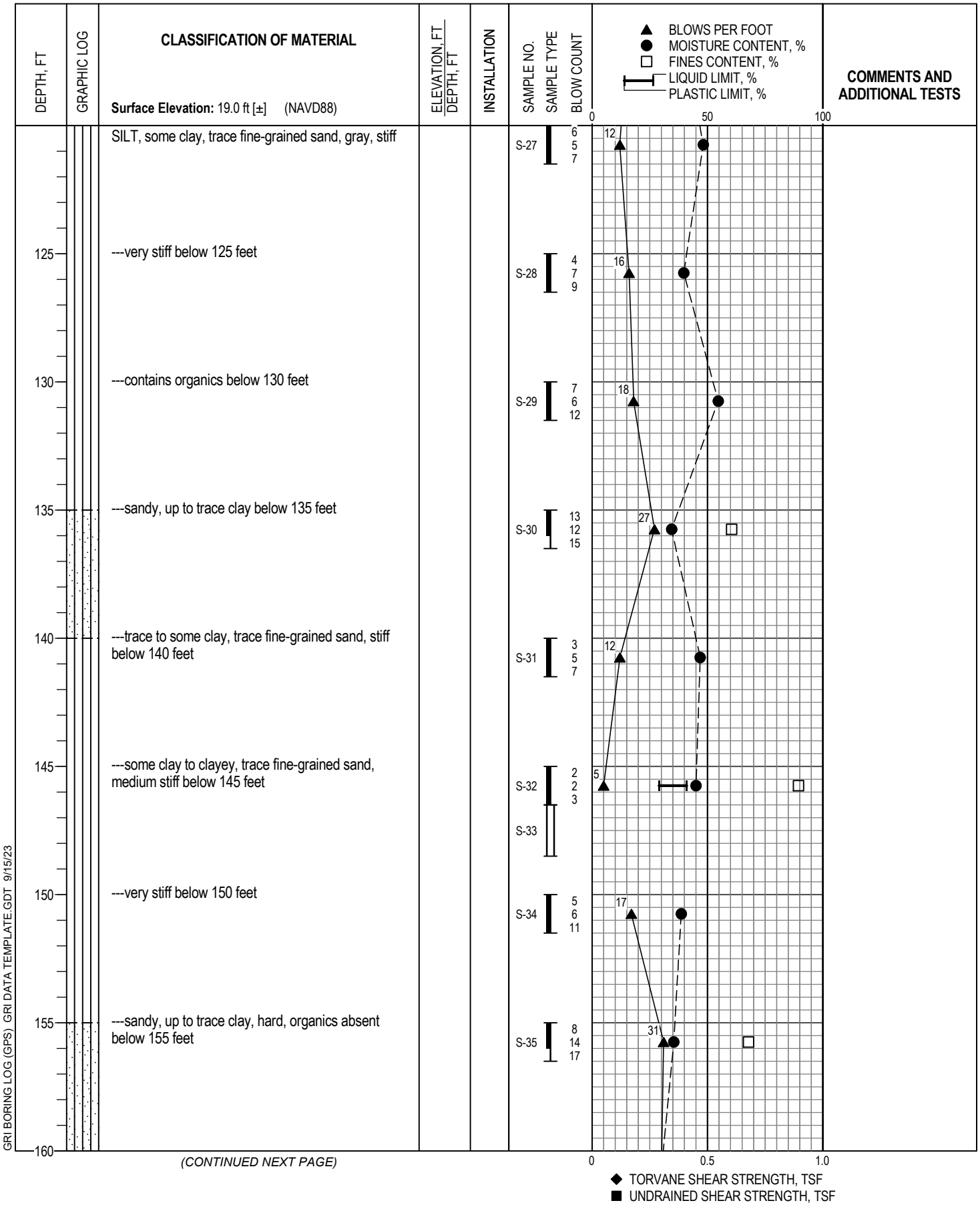
SEP. 2023 JOB NO. 6771-A FIG. 3B



GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-3

SEP. 2023 JOB NO. 6771-A FIG. 3B

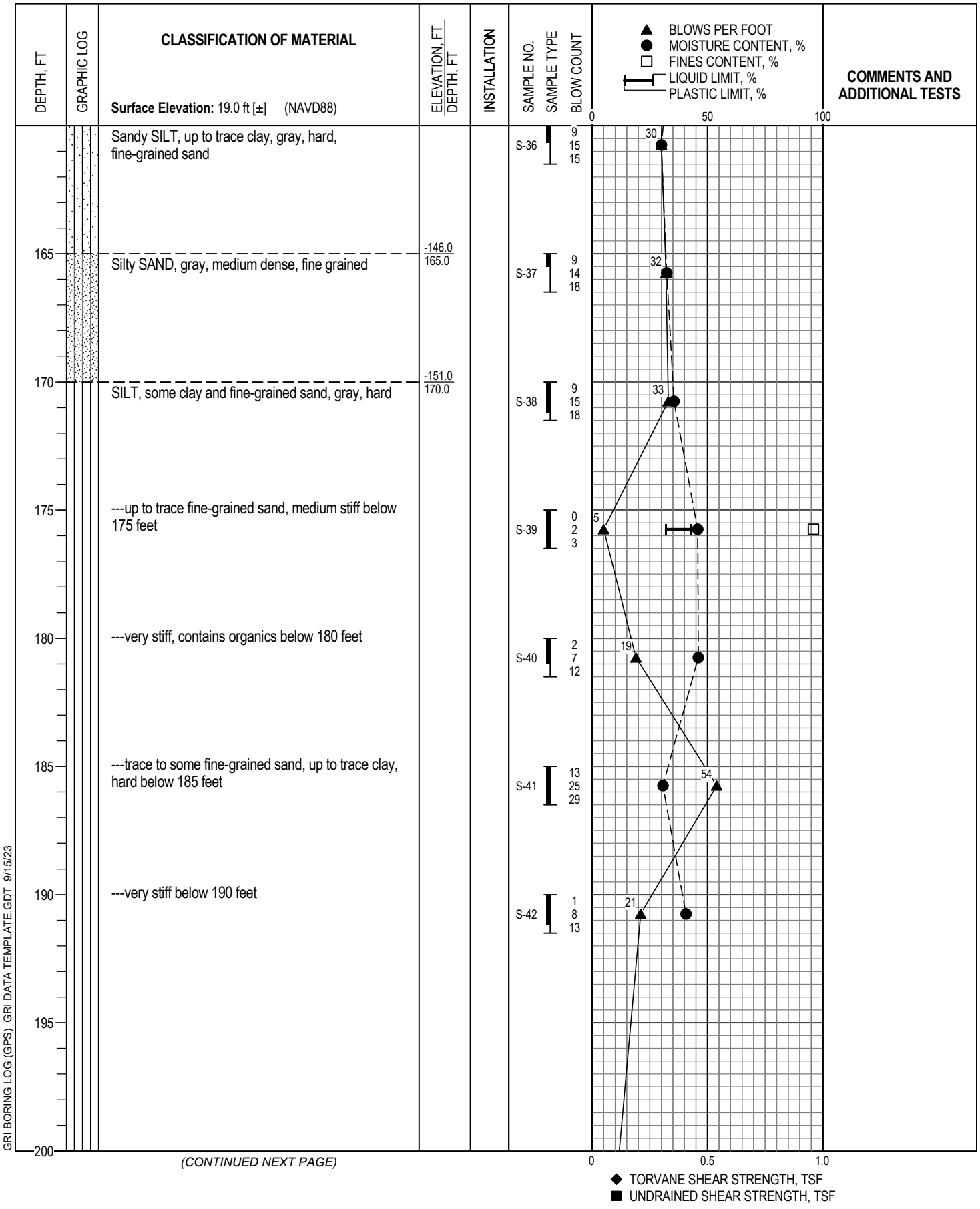


(CONTINUED NEXT PAGE)

GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-3

SEP. 2023 JOB NO. 6771-A FIG. 3B

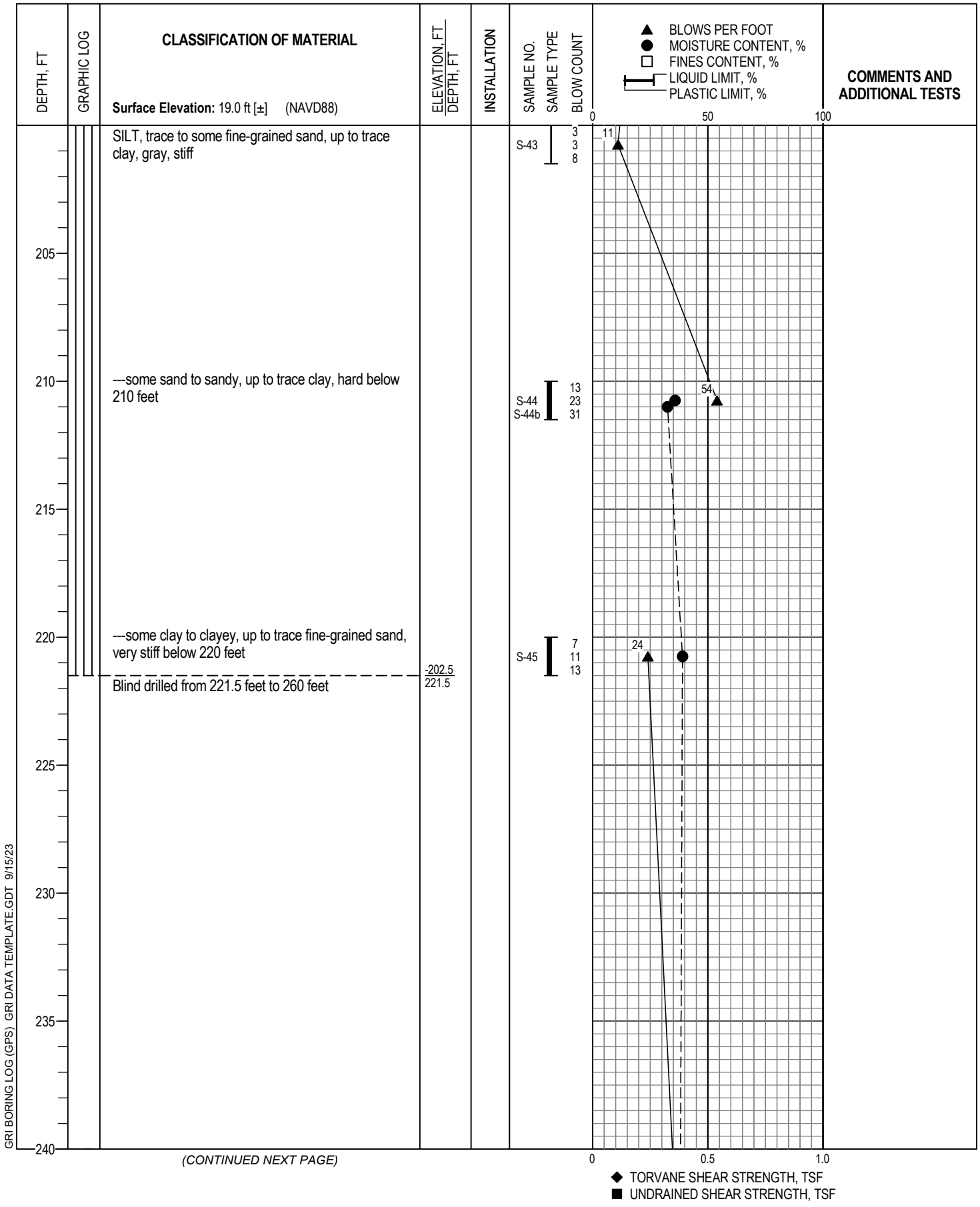


(CONTINUED NEXT PAGE)

GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-3

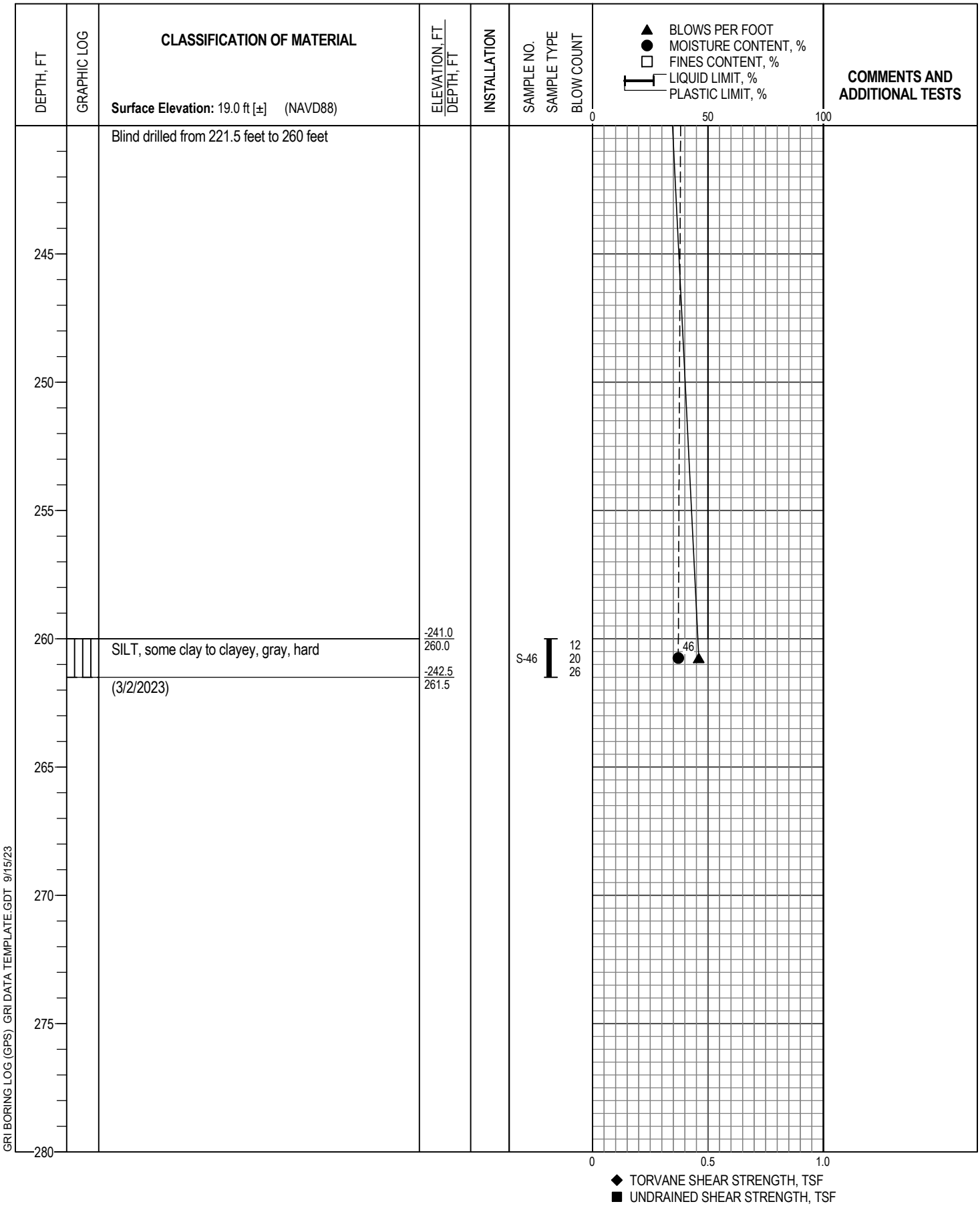
SEP. 2023 JOB NO. 6771-A FIG. 3B



GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-3

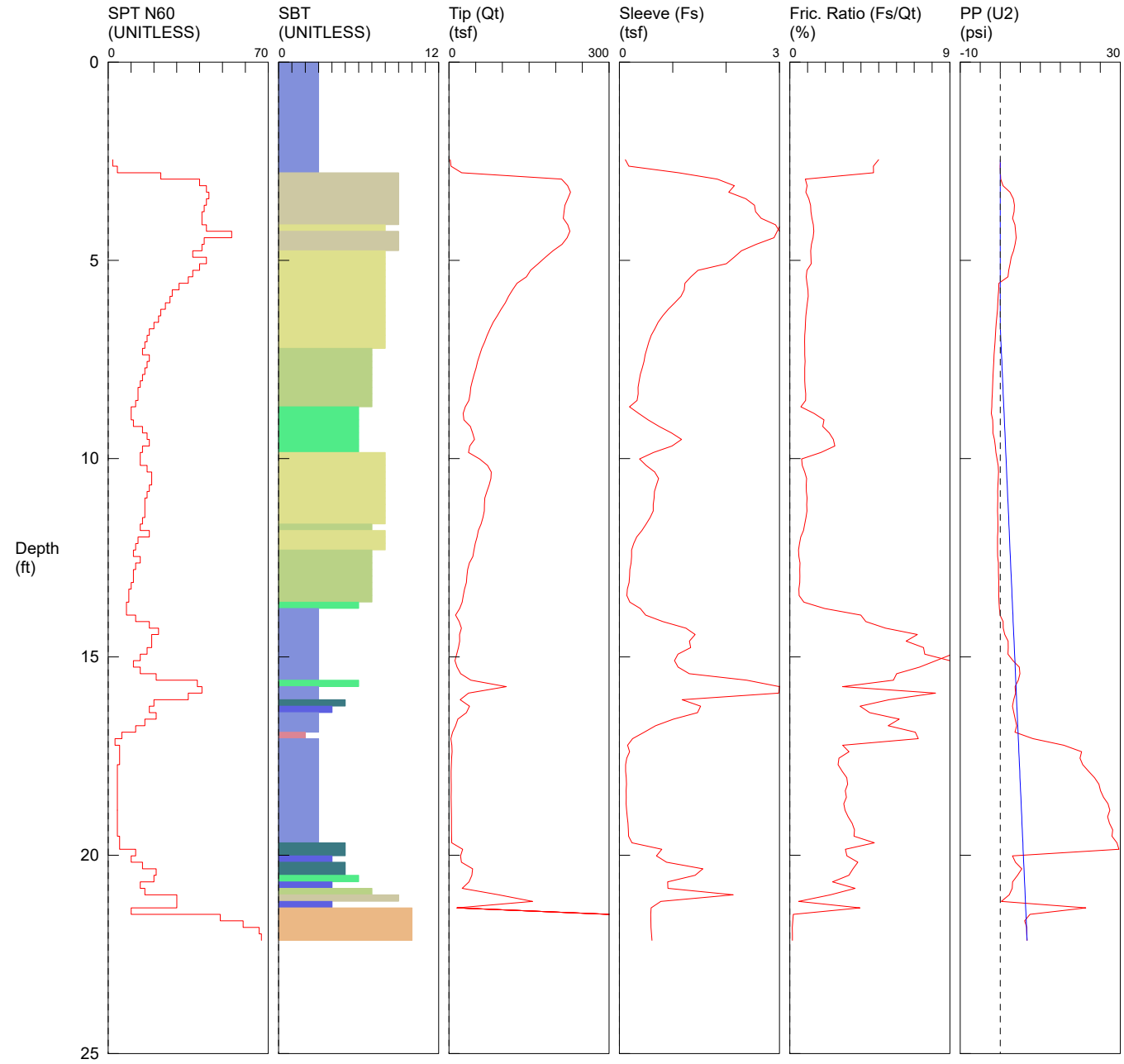
SEP. 2023 JOB NO. 6771-A FIG. 3B



GRI BORING LOG (GPS) GRI DATA TEMPLATE.GDT 9/15/23

BORING B-3

SEP. 2023 JOB NO. 6771-A FIG. 3B

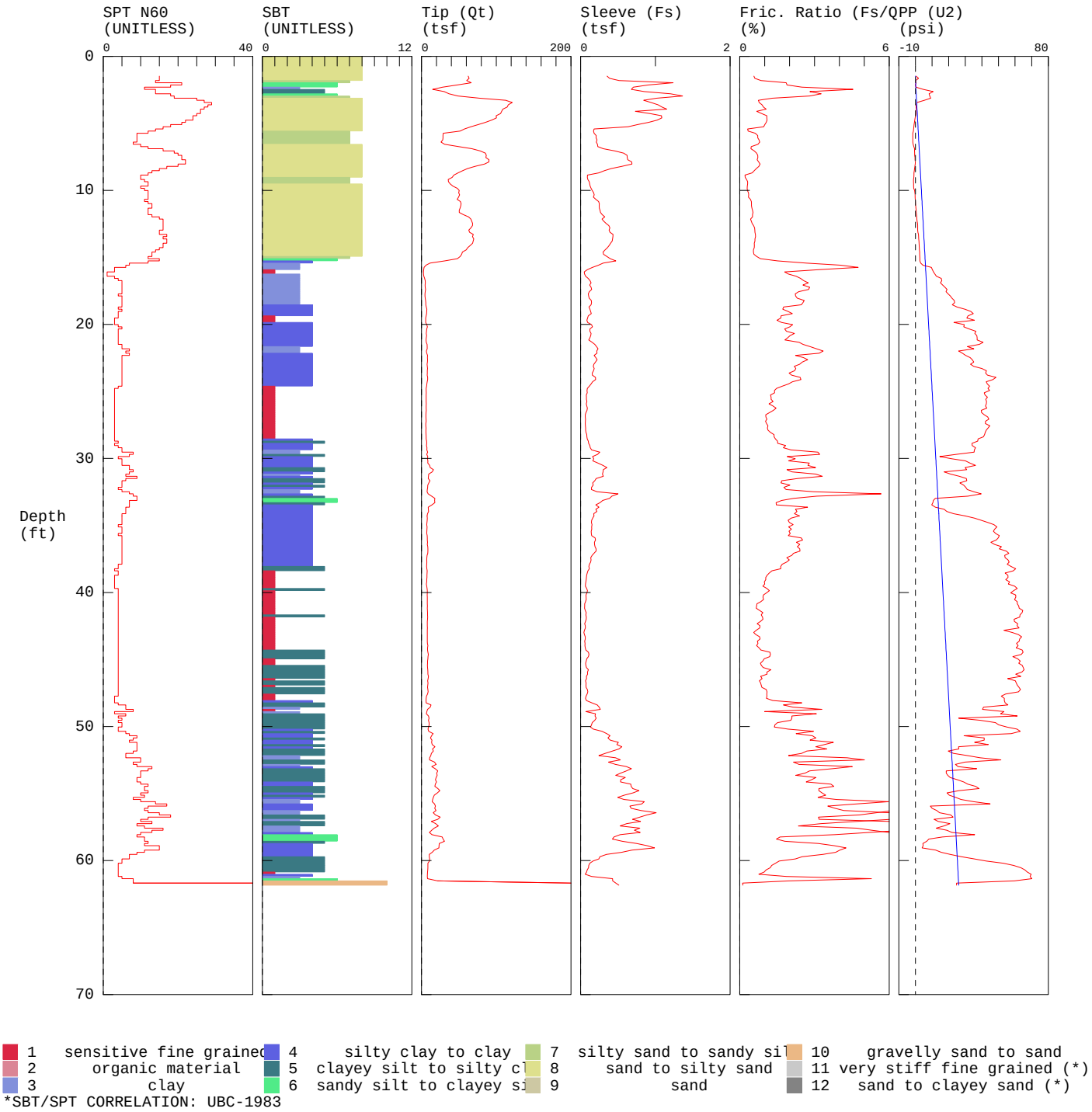


Observed By: G. Martin	Advanced By: Oregon Geotechnical Explorations, Inc.
Date Started: 07/30/19	Ground Surface Elevation: 25ft (NAVD 88)
Coordinates: Not Available	

GRI

CONE PENETRATION TEST
CPT-1

SEP. 2023 JOB NO. 6771-A FIG. 4B

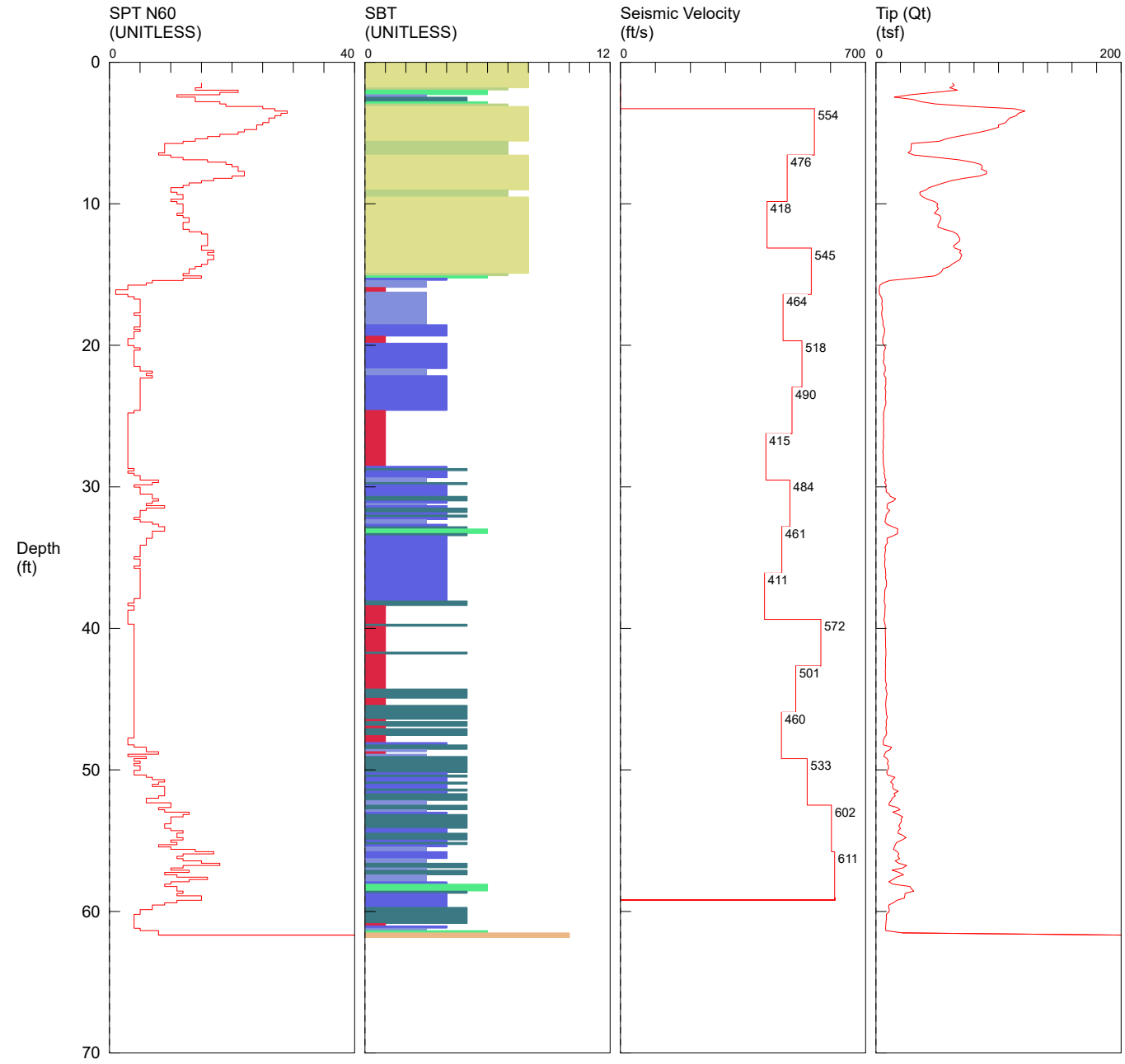


Observed By: G. Martin	Advanced By: Oregon Geotechnical Explorations, Inc.
Date Started: 07/30/19	Ground Surface Elevation: 25ft (NAVD 88)
Coordinates: Not Available	

GRI

CONE PENETRATION TEST
CPT-2

SEP. 2023 JOB NO. 6771-A FIG. 5B



1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

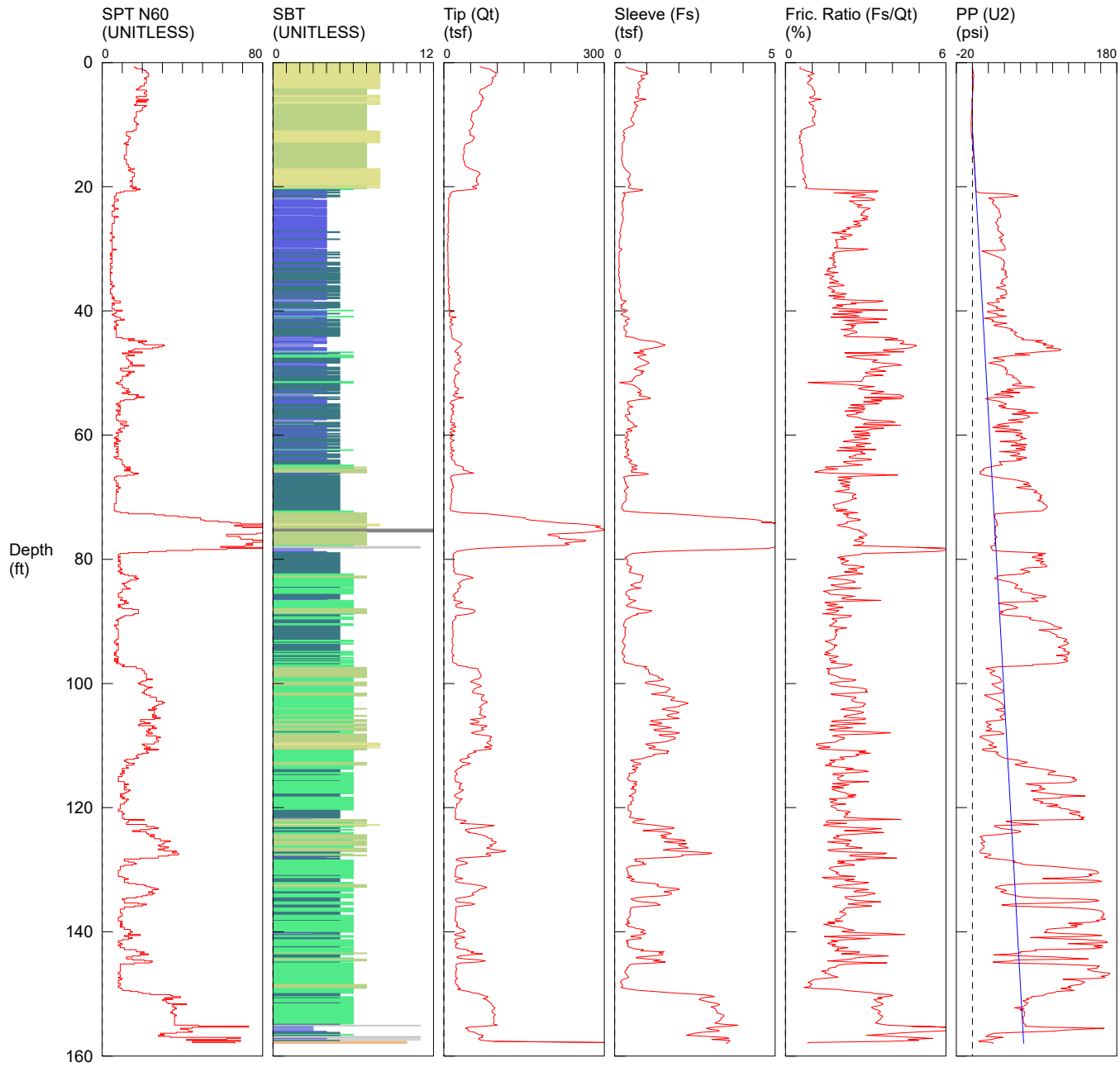
*SBT/SPT CORRELATION: UBC-1983

Observed By: G. Martin	Advanced By: Oregon Geotechnical Explorations, Inc.
Date Started: 07/30/19	Ground Surface Elevation: 22ft (NAVD 88)
Coordinates: Not Available	

GRI

CONE PENETRATION TEST
CPT-2
(SEISMIC VELOCITY PROFILE)

SEP. 2023 JOB NO. 6771-A FIG. 6B

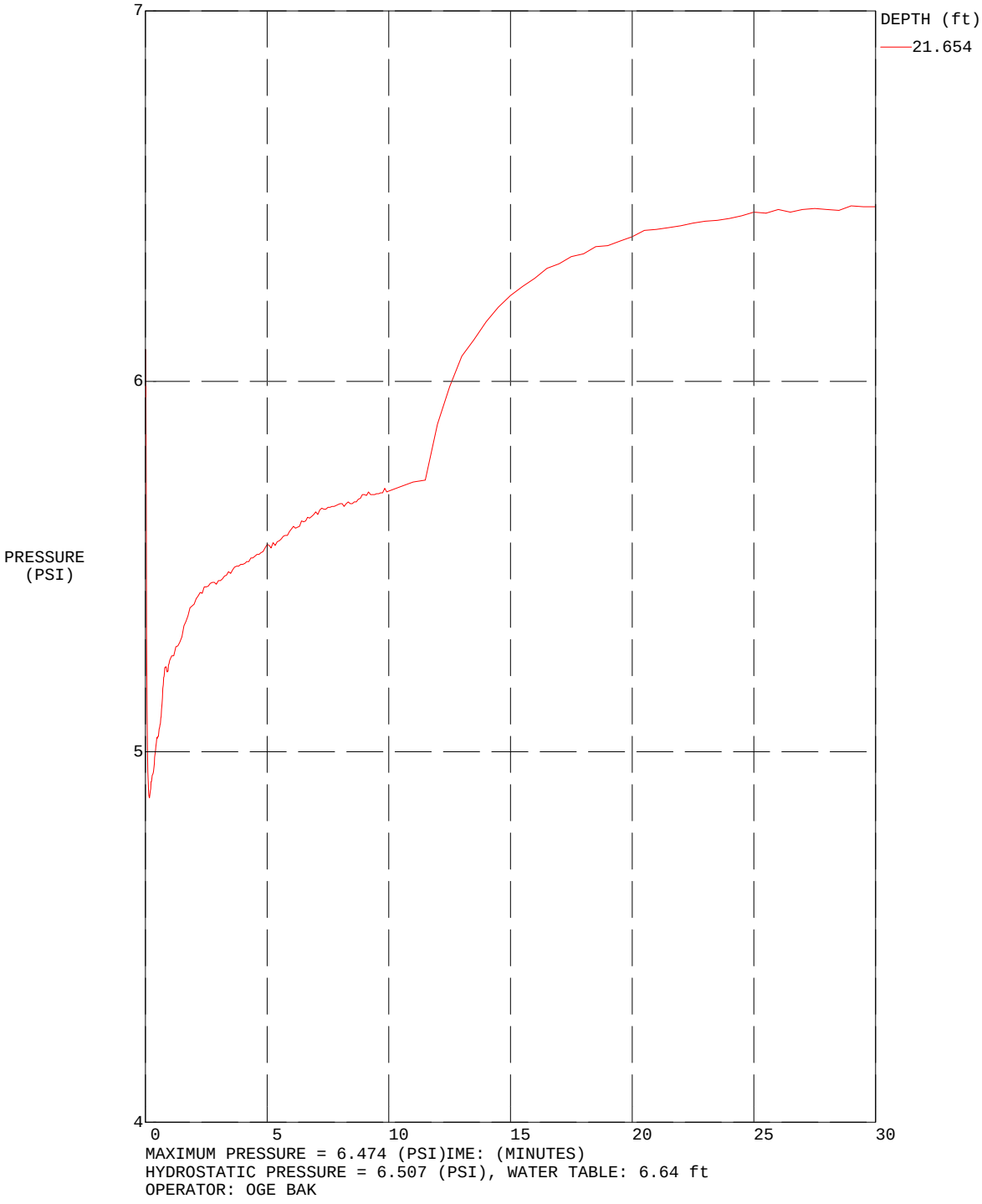


Observed By: G. Martin	Advanced By: Oregon Geotechnical Explorations, Inc.
Date Started: 07/31/19	Ground Surface Elevation: 25ft (NAVD 88)
Coordinates: Not Available	

GRI

CONE PENETRATION TEST
CPT-3

SEP. 2023 JOB NO. 6771-A FIG. 7B

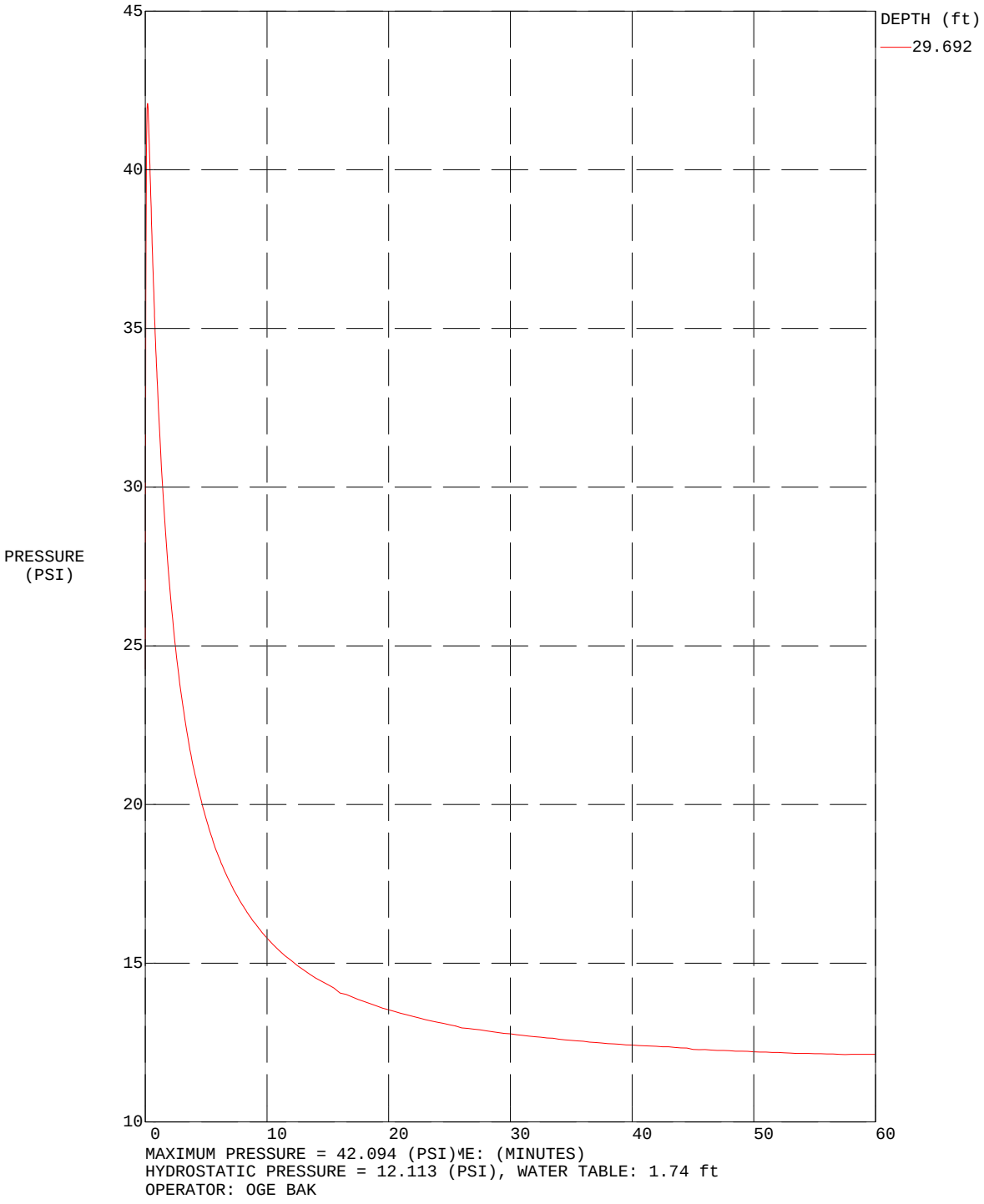


Observed By: G. Martin	Advanced By: Oregon Geotechnical Explorations, Inc.
Date Started: 07/30/19	Ground Surface Elevation: 25ft (NAVD 88)
Coordinates: Not Available	

GRI

CONE PENETRATION TEST
CPT-1
(PORE PRESSURE DISSIPATION)

SEP. 2023 JOB NO. 6771-A FIG. 8B

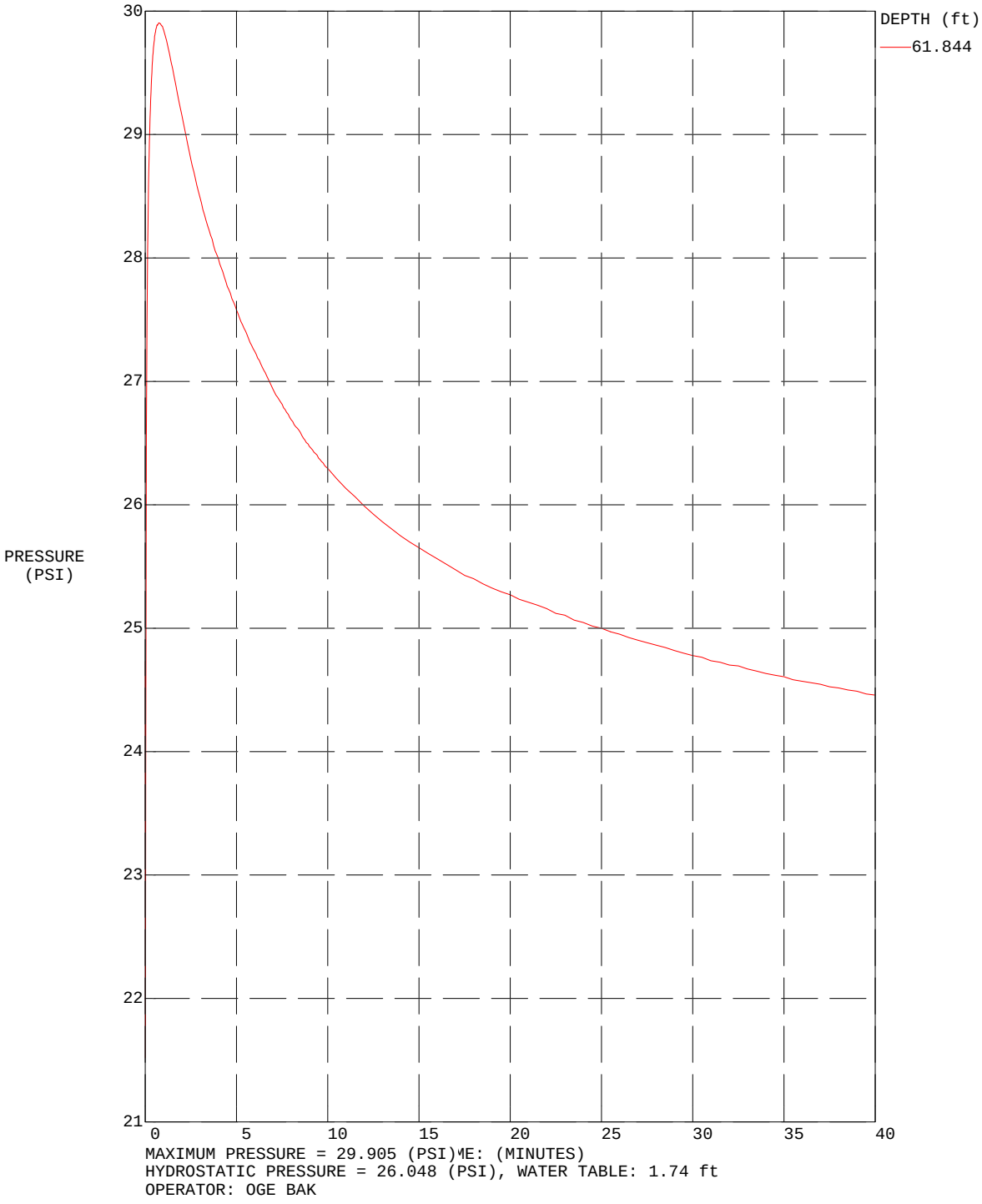


Observed By: G. Martin	Advanced By: Oregon Geotechnical Explorations, Inc.
Date Started: 07/30/19	Ground Surface Elevation: 25ft (NAVD 88)
Coordinates: Not Available	

GRI

CONE PENETRATION TEST
CPT-2
(PORE PRESSURE DISSIPATION)

SEP. 2023 JOB NO. 6771-A FIG. 9B

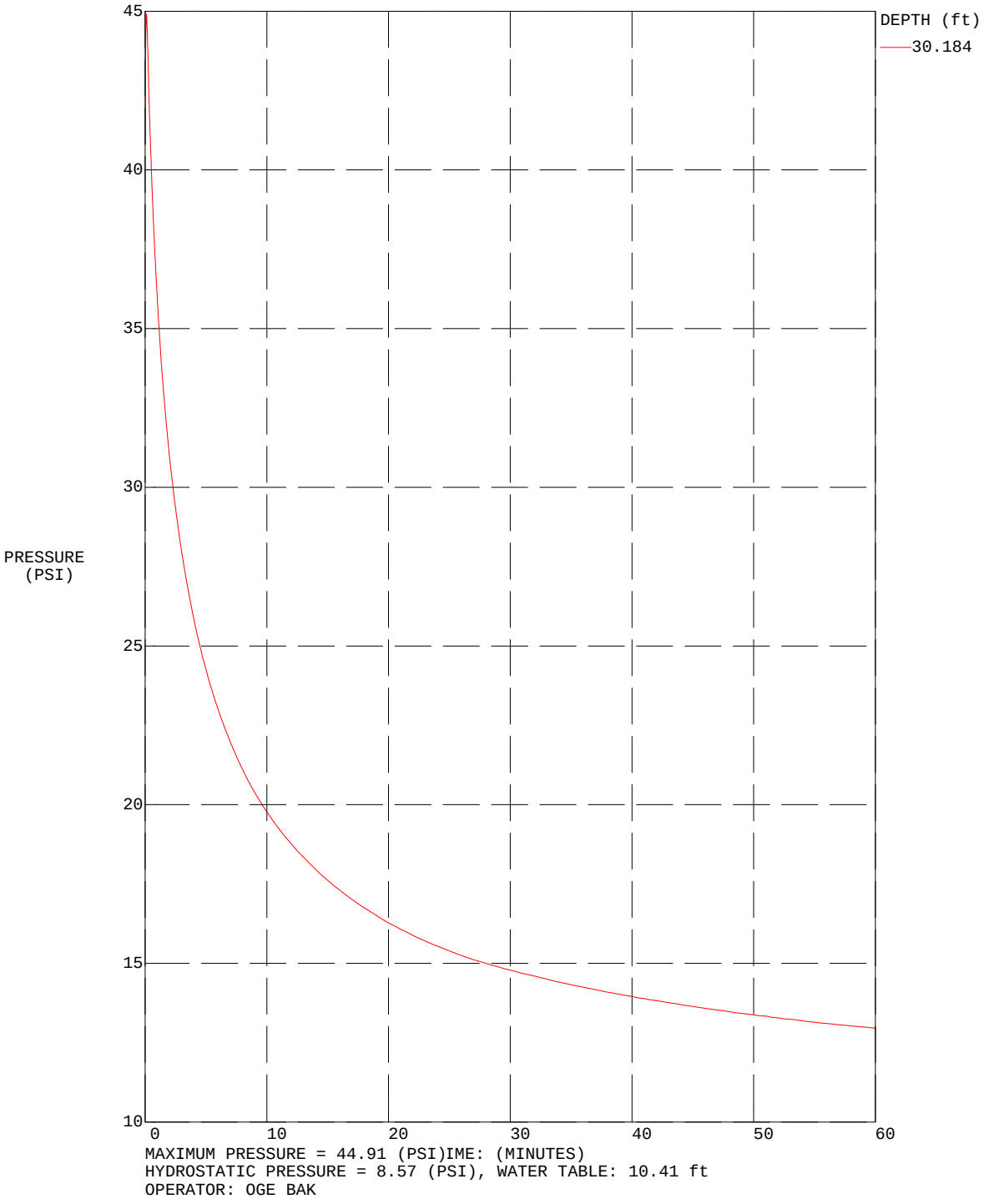


Observed By: G. Martin	Advanced By: Oregon Geotechnical Explorations, Inc.
Date Started: 07/30/19	Ground Surface Elevation: 25ft (NAVD 88)
Coordinates: Not Available	

GRI

CONE PENETRATION TEST
CPT-2
(PORE PRESSURE DISSIPATION)

SEP. 2023 JOB NO. 6771-A FIG. 10B

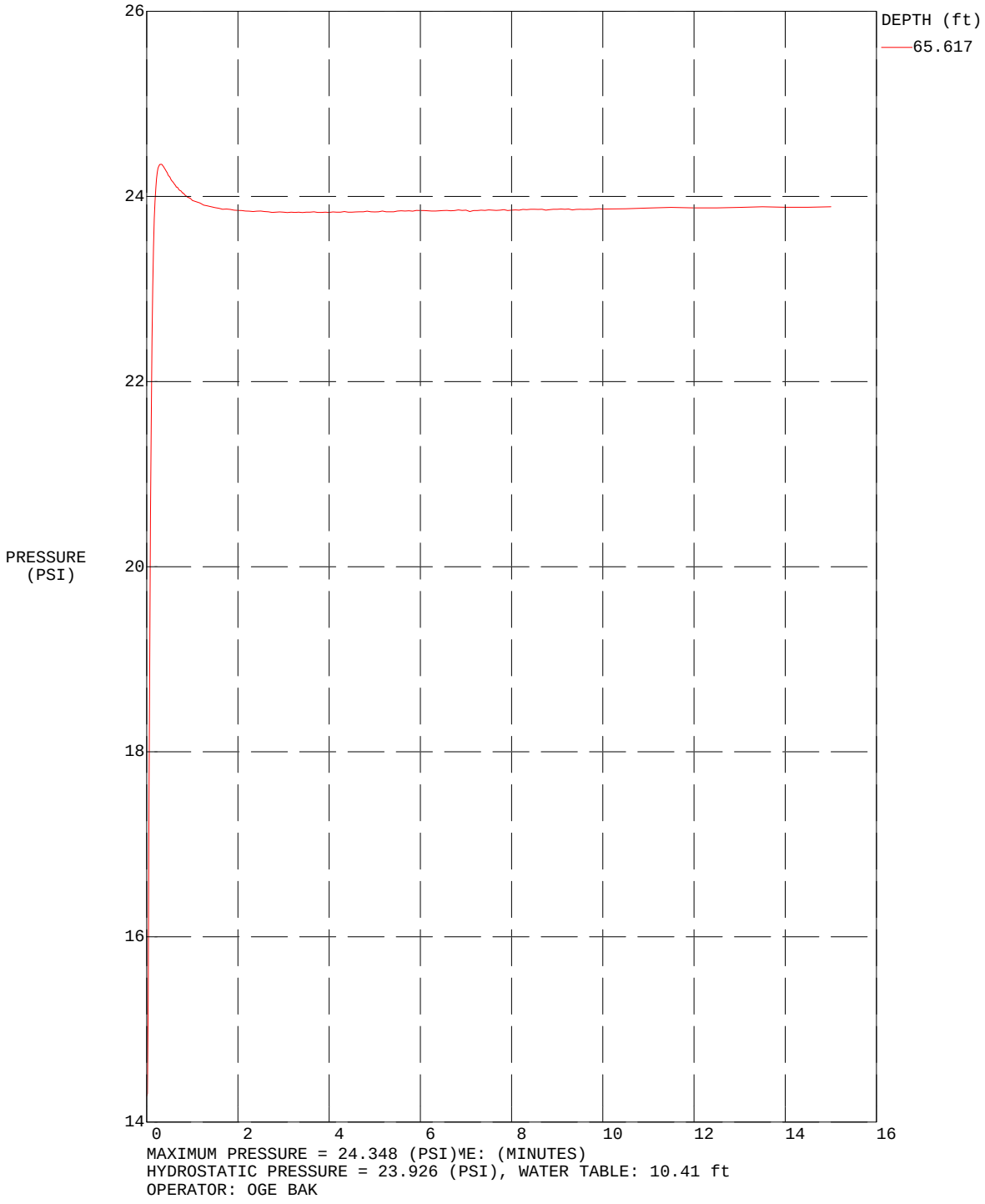


Observed By: G. Martin	Advanced By: Oregon Geotechnical Explorations, Inc.
Date Started: 07/31/19	Ground Surface Elevation: 22ft (NAVD 88)
Coordinates: Not Available	

GRI

CONE PENETRATION TEST
CPT-3
(PORE PRESSURE DISSIPATION)

SEP. 2023 JOB NO. 6771-A FIG. 11B



Observed By: G. Martin	Advanced By: Oregon Geotechnical Explorations, Inc.
Date Started: 07/31/19	Ground Surface Elevation: 22ft (NAVD 88)
Coordinates: Not Available	

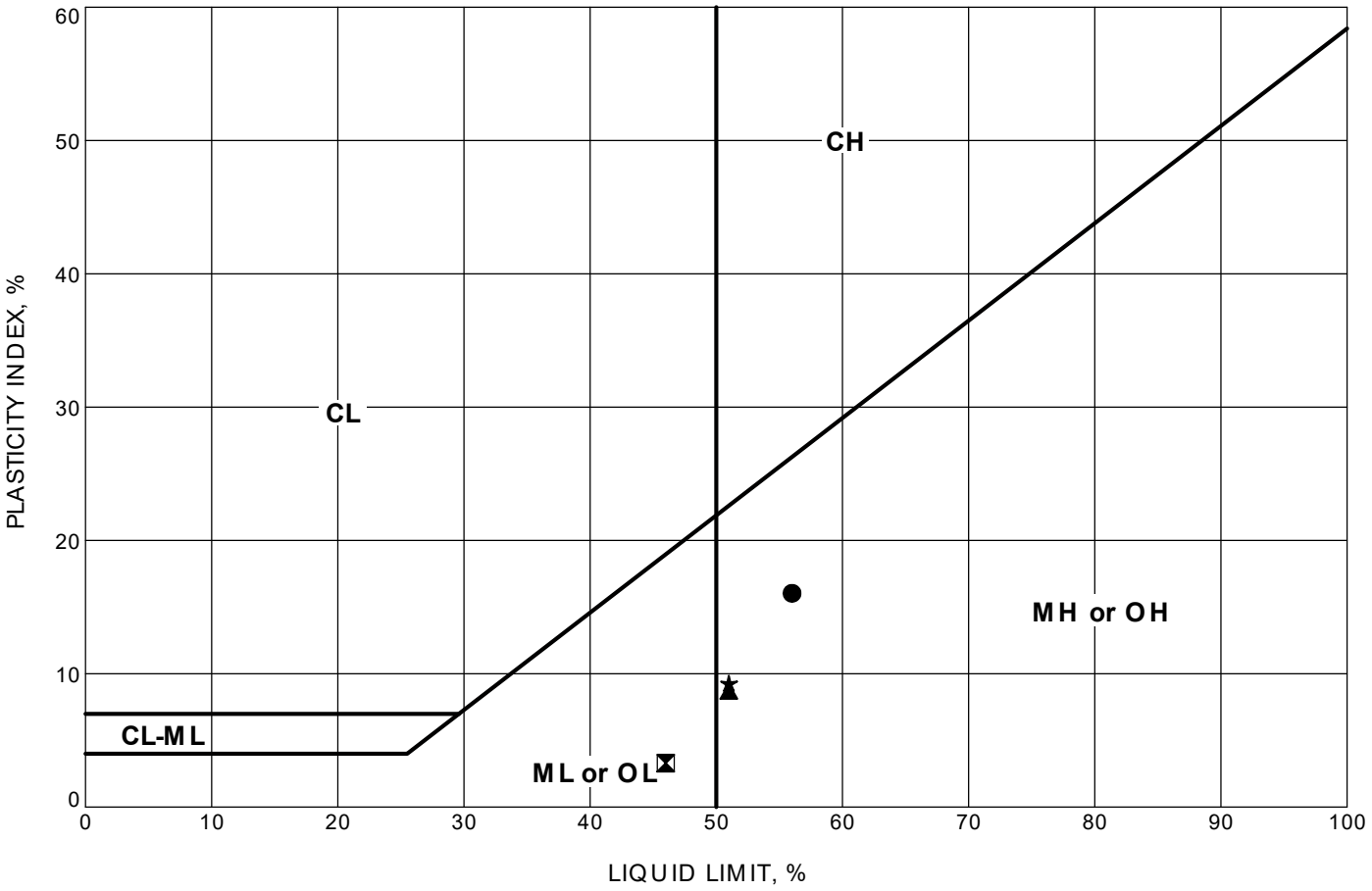
GRI

CONE PENETRATION TEST
CPT-3
(PORE PRESSURE DISSIPATION)

SEP. 2023 JOB NO. 6771-A FIG. 12B

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILT
CH	INORGANIC CLAYS OF HIGH PLASTICITY



	Location	Sample	Depth, ft	Classification	LL	PL	PI	MC, %
●	B-1	S-11	30.0	SILT, some clay to clayey, up to a trace of fine-grained sand, brown to dark-brown	56	40	16	52
⊠	B-1	S-13	39.5	SILT, some fine-grained sand, trace clay, gray	46	43	3	46
▲	B-1	S-14	40.0	SILT, some clay, trace to some fine- to medium-grained sand, dark gray to brown-gray	51	42	9	51
★	B-1	S-17	50.0	SILT, some clay, trace to some fine- to medium-grained sand, dark gray to brown-gray	51	42	9	47

GRI

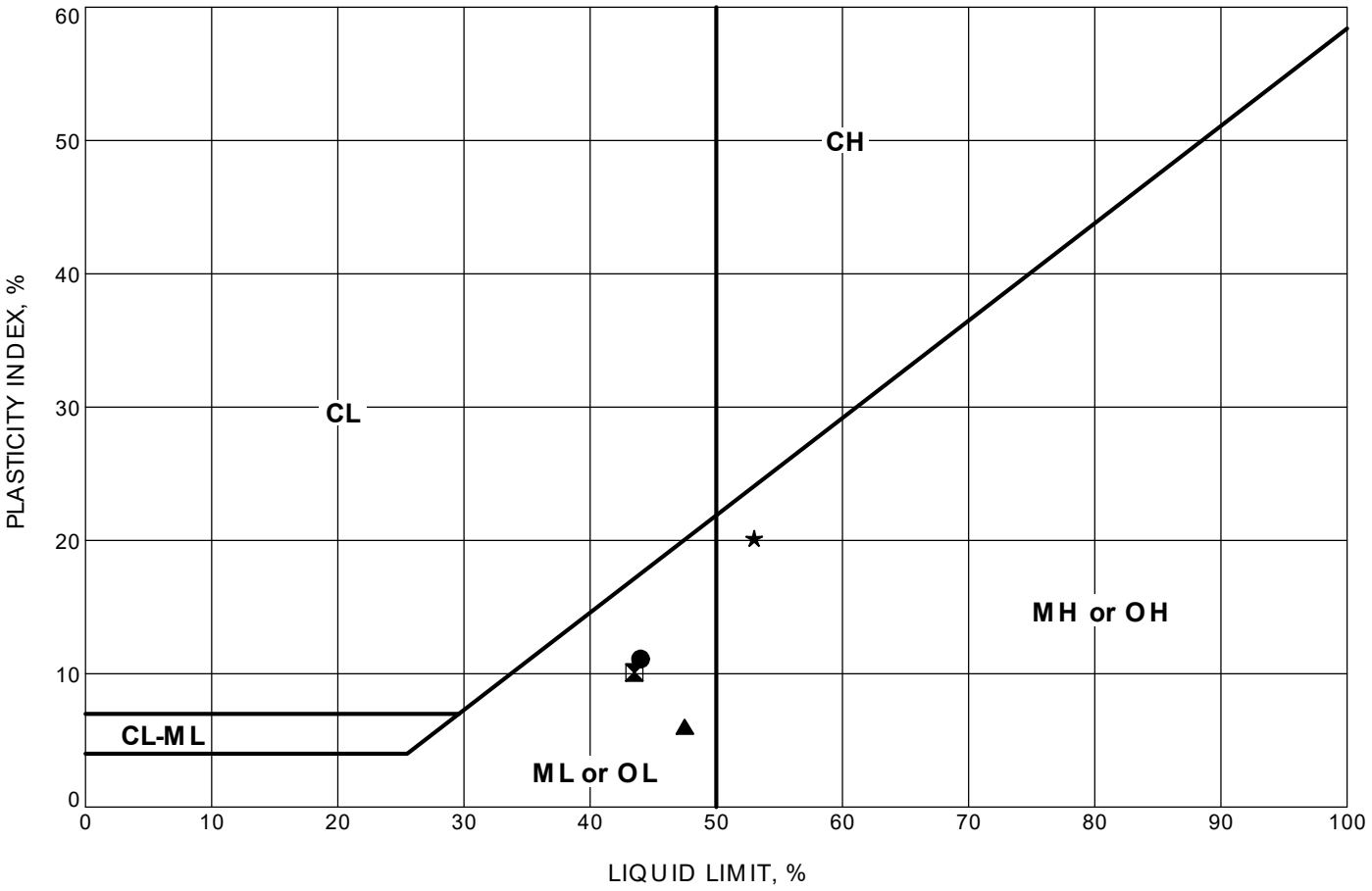
PLASTICITY CHART

SEP. 2023 JOB NO. 6771-A FIG. 13B

ATTERBERG-PLASTICITY 4 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILT
CH	INORGANIC CLAYS OF HIGH PLASTICITY



	Location	Sample	Depth, ft	Classification	LL	PL	PI	MC, %
●	B-1	S-19	60.0	SILT, some clay and fine-grained sand, dark gray	44	33	11	49
⊠	B-1	S-22	75.0	Sandy SILT, some clay to clayey, dark gray, fine-grained sand	44	33	11	54
▲	B-1	S-23	80.0	SILT, some fine-grained sand to sandy, trace to some clay, dark brown-gray	48	41	7	37
★	B-1	S-25	100.0	SILT, some clay to clayey, up to trace fine-grained sand, gray	53	33	20	52

GRI

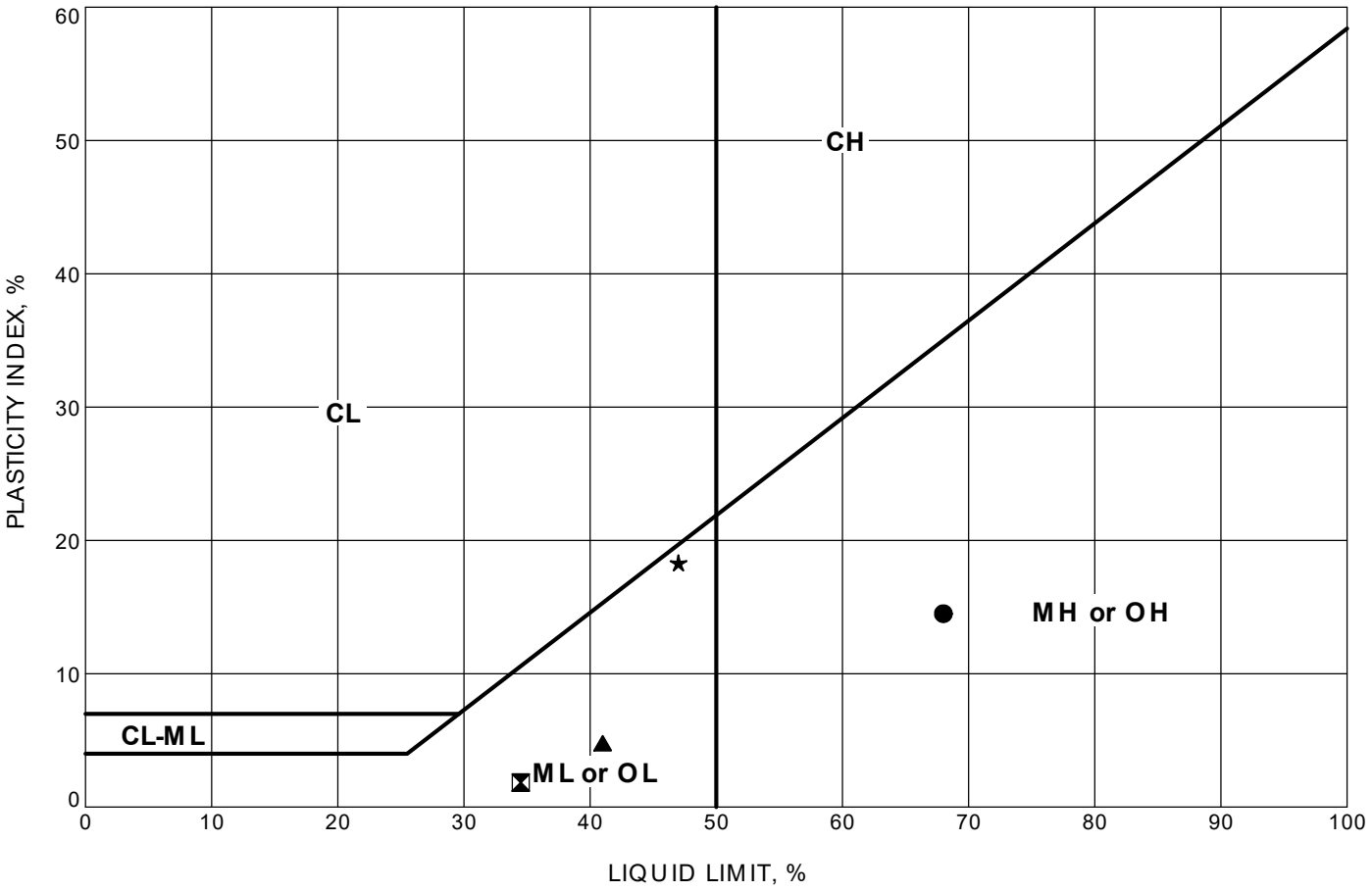
PLASTICITY CHART

SEP. 2023 JOB NO. 6771-A FIG. 14B

ATTERBERG-PLASTICITY 4 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILT
CH	INORGANIC CLAYS OF HIGH PLASTICITY



	Location	Sample	Depth, ft	Classification	LL	PL	PI	MC, %
●	B-1	S-28	130.0	SILT, some clay to clayey, up to trace fine-grained sand	68	53	15	68
⊠	B-1	S-31	160.0	SILT, trace to some fine-grained sand, trace clay, gray	35	33	1	38
▲	B-1	S-33	180.0	SILT, trace to some clay, up to trace fine-grained sand, gray	41	36	5	42
★	B-2	S-4	10.0	Clayey SILT, up to trace fine-grained sand, dark gray-brown	47	29	18	44

GRI

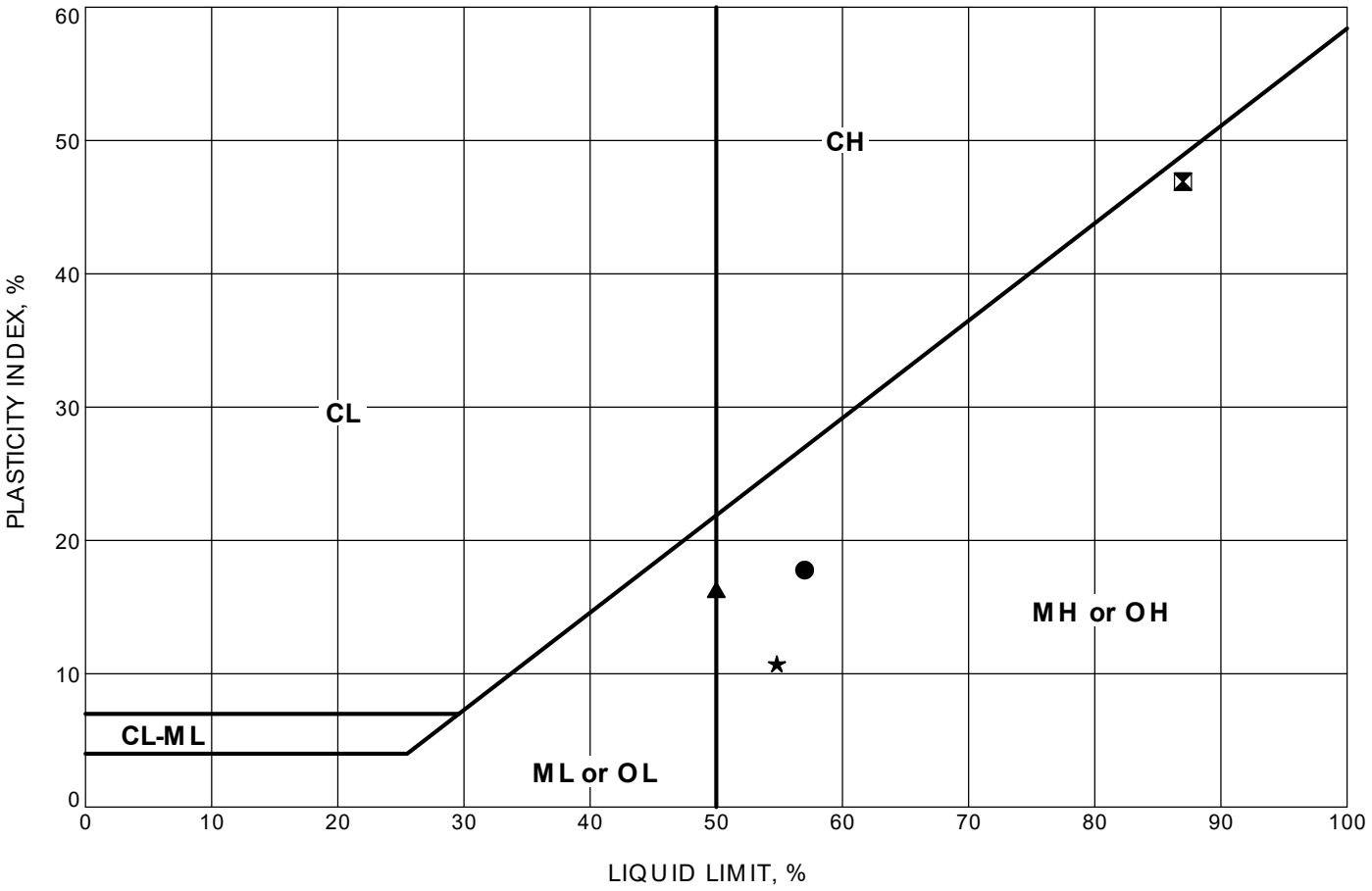
PLASTICITY CHART

SEP. 2023 JOB NO. 6771-A FIG. 15B

ATTERBERG-PLASTICITY 4 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILT
CH	INORGANIC CLAYS OF HIGH PLASTICITY



	Location	Sample	Depth, ft	Classification	LL	PL	PI	MC, %
●	B-2	S-9	25.0	Clayey SILT, up to trace fine-grained sand, dark gray	57	39	18	55
⊠	B-2	S-16	50.0	Clayey SILT, up to trace fine-grained sand, dark gray to dark brown	87	40	47	68
▲	B-2	S-20	64.0	SILT, some clay, trace to some fine-grained sand, gray	50	34	16	48
★	B-2	S-21	65.0	SILT, trace to some clay and fine-grained sand, dark gray	55	44	11	46

GRI

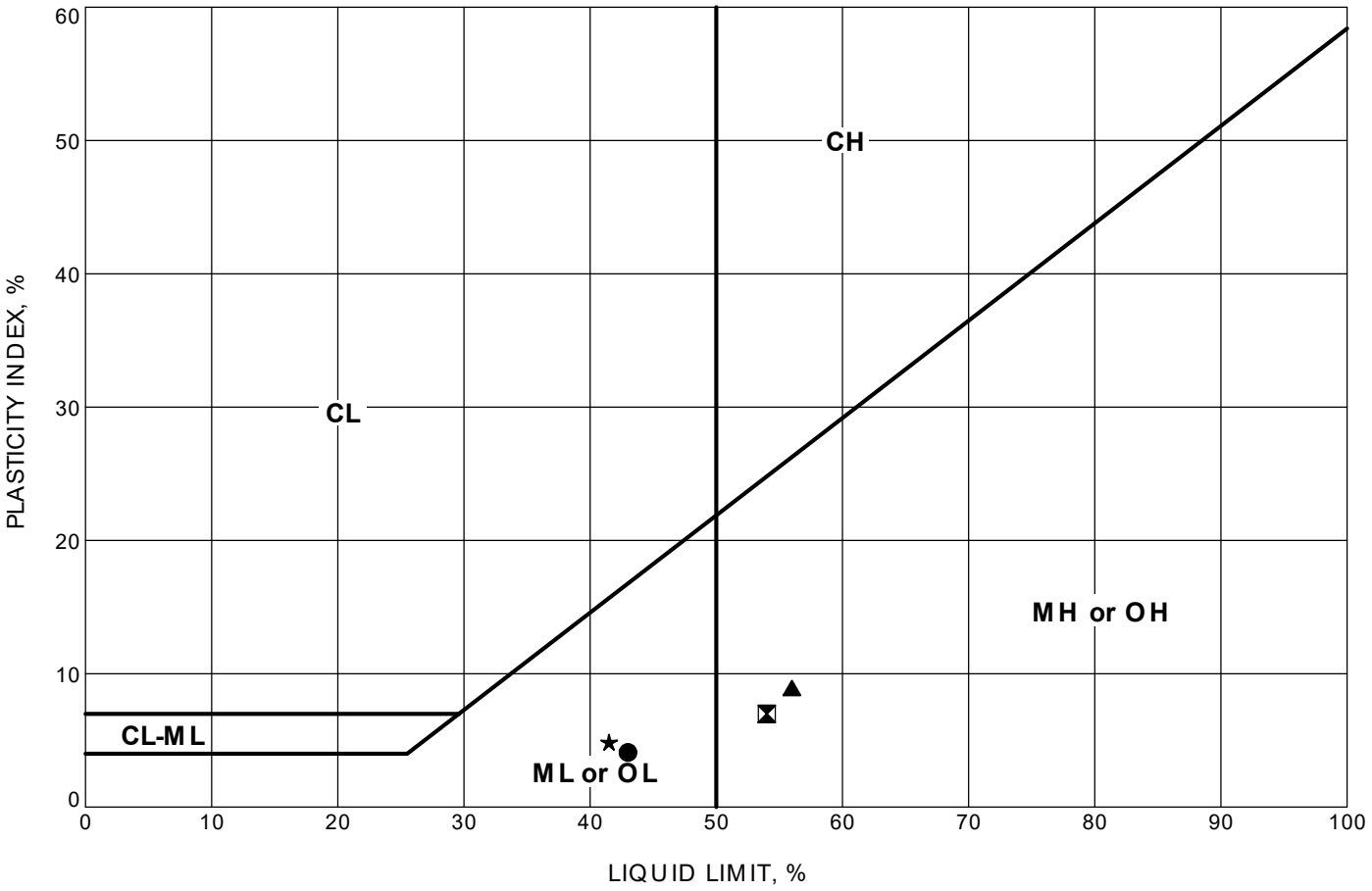
PLASTICITY CHART

SEP. 2023 JOB NO. 6771-A FIG. 16B

ATTERBERG-PLASTICITY 4 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILT
CH	INORGANIC CLAYS OF HIGH PLASTICITY



	Location	Sample	Depth, ft	Classification	LL	PL	PI	MC, %
●	B-2	S-23	75.0	SILT, trace to some clay and fine-grained sand, dark gray	43	39	4	41
⊠	B-2	S-26	90.0	SILT, trace to some clay and fine-grained sand, dark gray-brown	54	47	7	48
▲	B-2	S-28	100.0	SILT, trace to some clay, up to trace fine-grained sand, dark gray-brown	56	47	9	56
★	B-2	S-30	115.0	SILT, trace to some clay and fine-grained sand, dark gray	42	37	5	40

GRI

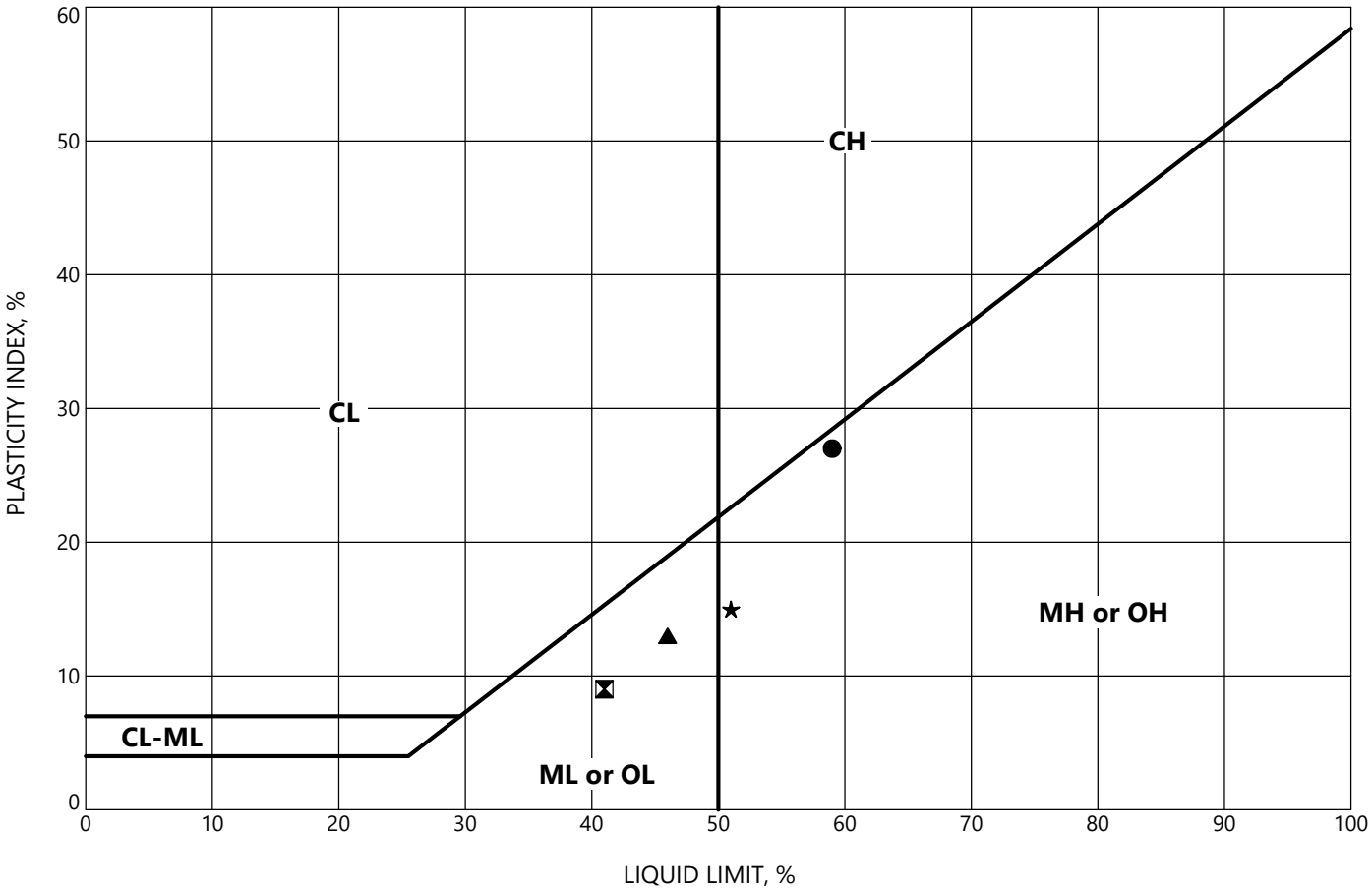
PLASTICITY CHART

SEP. 2023 JOB NO. 6771-A FIG. 17B

ATTERBERG-PLASTICITY 4 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILT
CH	INORGANIC CLAYS OF HIGH PLASTICITY



	Location	Sample	Depth, ft	Classification	LL	PL	PI	MC, %
●	B-3	S-6	27.0	Clayey SILT, some fine-grained sand, gray	59	32	27	55
⊠	B-3	S-9	37.0	SILT, some clay, trace fine-grained sand, gray	41	32	9	51
▲	B-3	S-12	47.0	SILT, some clay, trace fine-grained sand, gray	46	33	13	50
★	B-3	S-15	65.0	SILT, some clay to clayey, trace fine-grained sand, gray	51	36	15	63

GRI

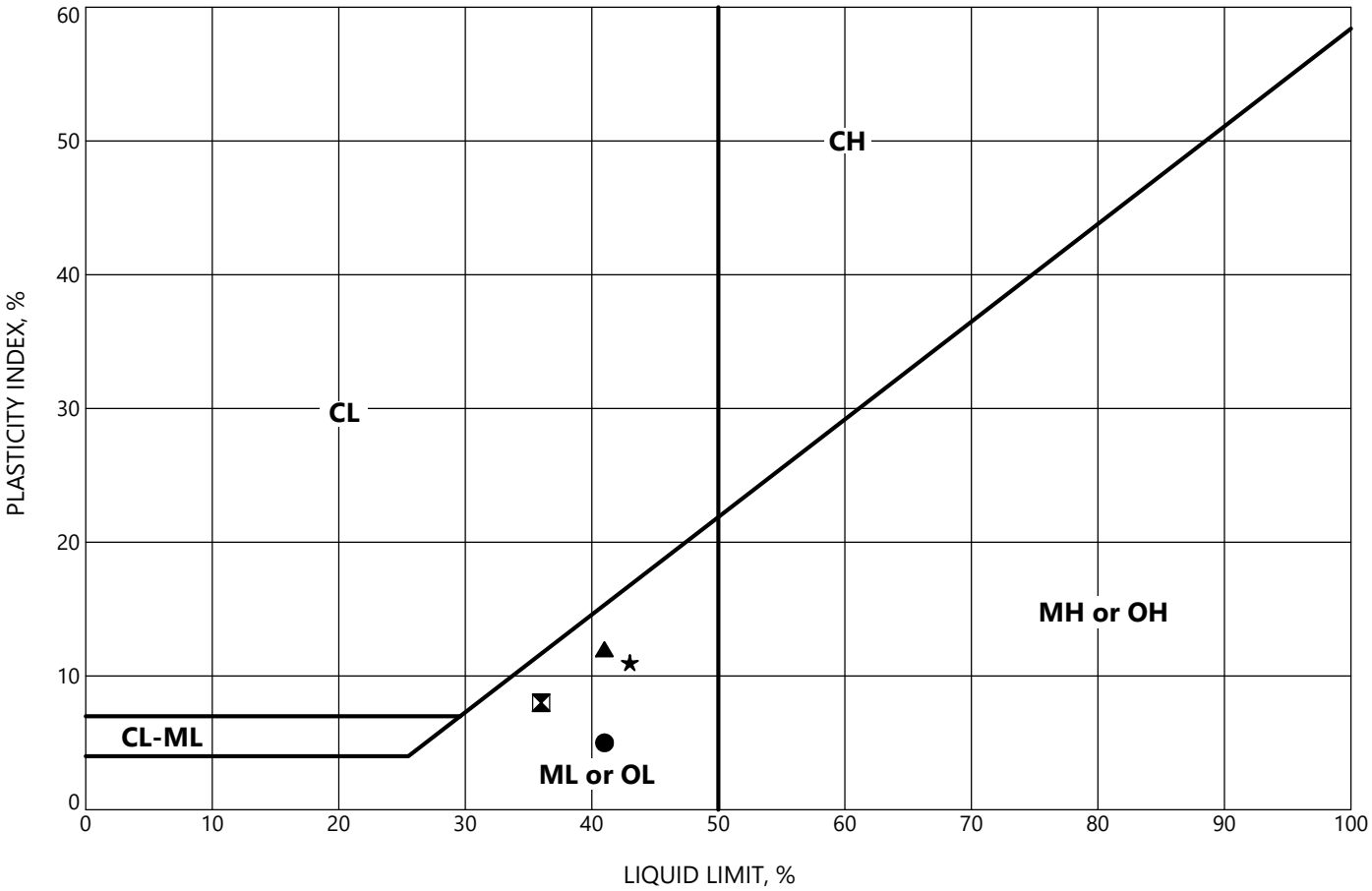
PLASTICITY CHART

SEP. 2023 JOB NO. 6771-A FIG. 18B

ATTERBERG-PLASTICITY 4 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILT
CH	INORGANIC CLAYS OF HIGH PLASTICITY



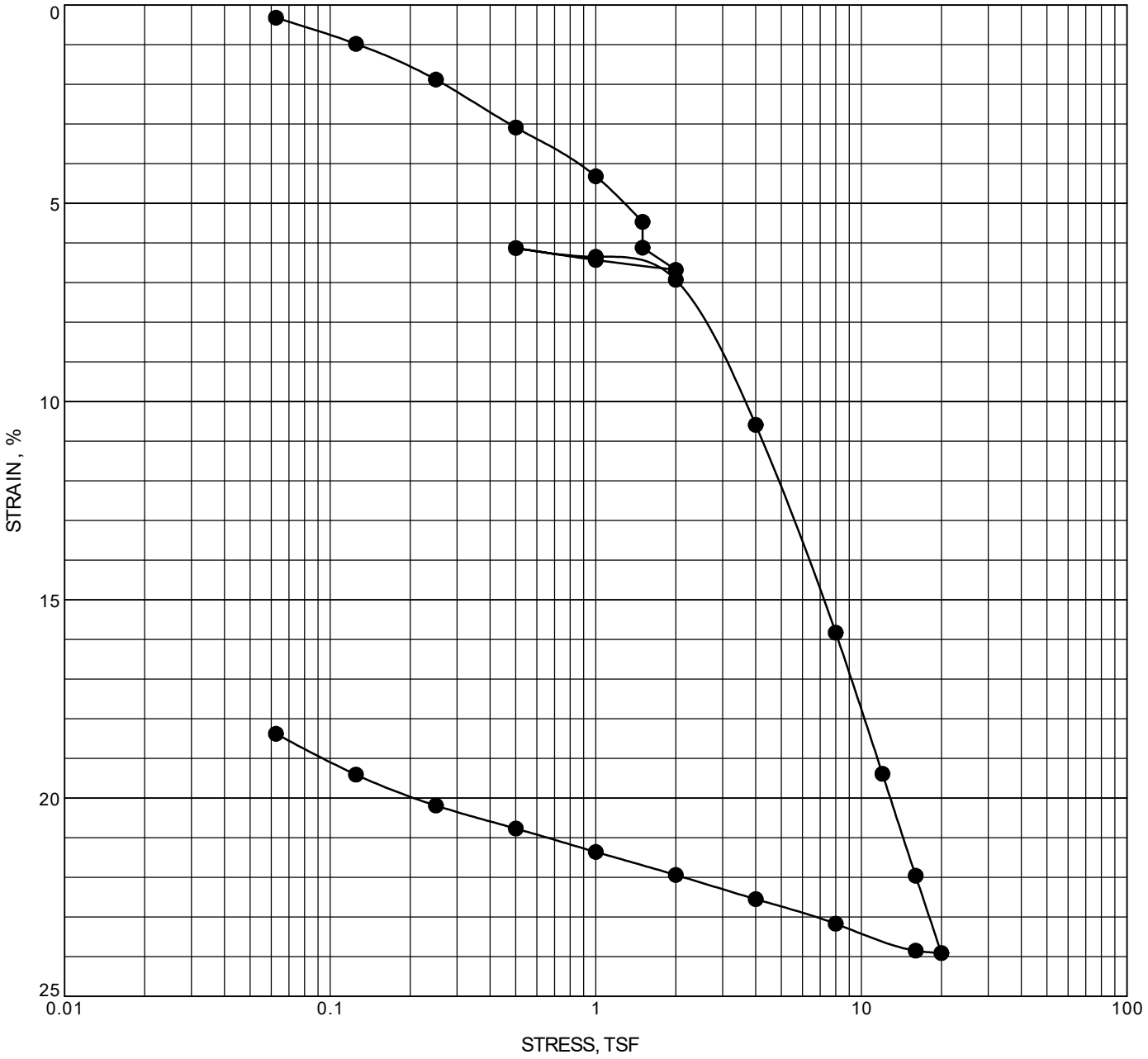
	Location	Sample	Depth, ft	Classification	LL	PL	PI	MC, %
●	B-3	S-19	85.0	SILT, some clay, up to trace fine-grained sand, gray	41	36	5	45
⊠	B-3	S-25	110.0	SILT, some clay, trace fine-grained sand, gray	36	28	8	42
▲	B-3	S-32	145.0	SILT, some clay to clayey, trace fine-grained sand, gray	41	29	12	45
★	B-3	S-39	175.0	SILT, some clay, trace fine-grained sand, gray	43	32	11	46

GRI

PLASTICITY CHART

SEP. 2023 JOB NO. 6771-A FIG. 19B

ATTERBERG-PLASTICITY 4 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23



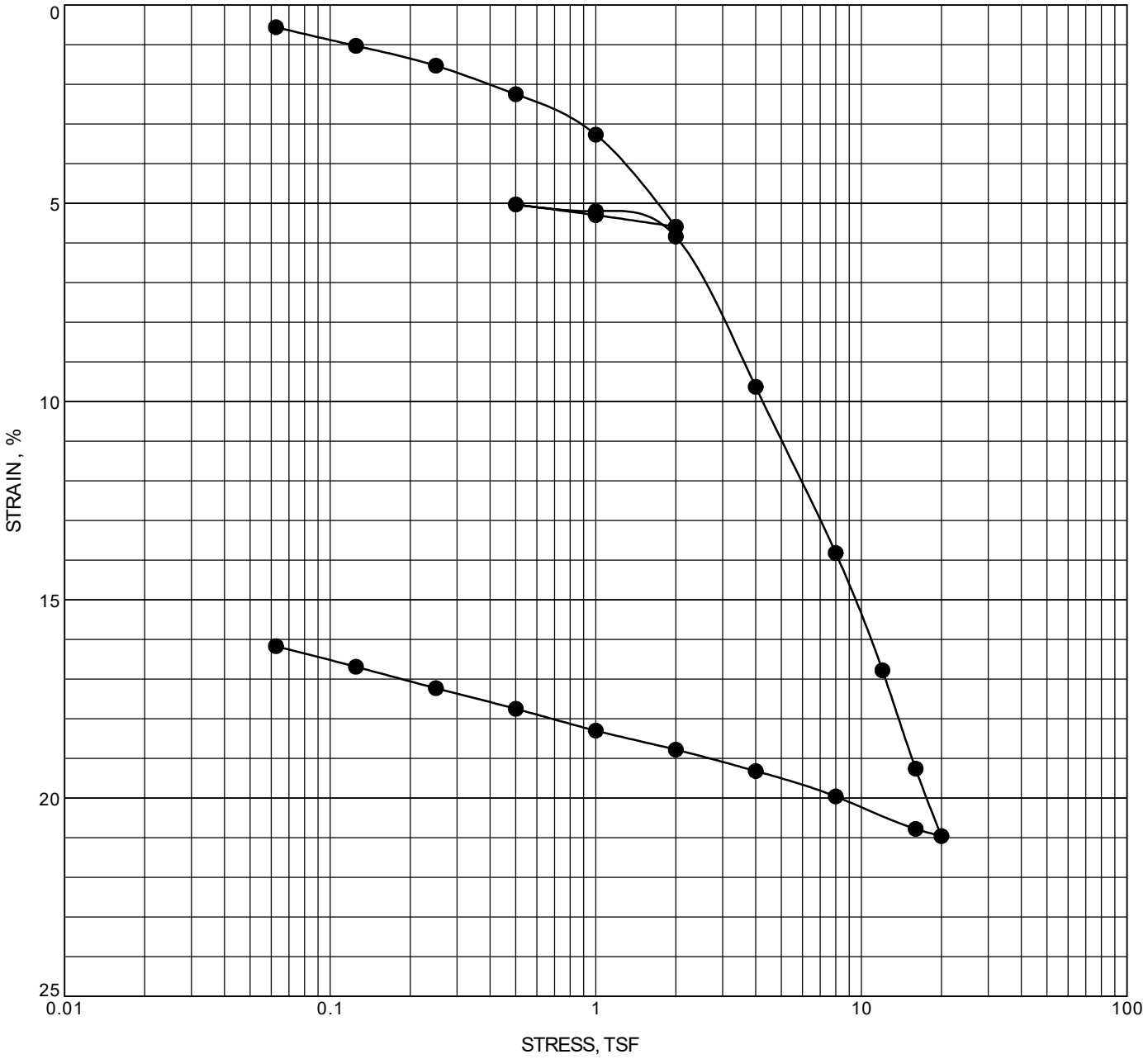
	Location	Sample	Depth, ft	Classification	Initial γ_d, pcf	Initial MC, %
●	B-1	S-10	29.8	SILT, some clay to clayey, up to trace fine-grained sand, gray, medium stiff	68	53

CONSOL STRAIN GRI-0 TO 25-1 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

GRI

CONSOLIDATION TEST

SEP. 2023 JOB NO. 6771-A FIG. 20B



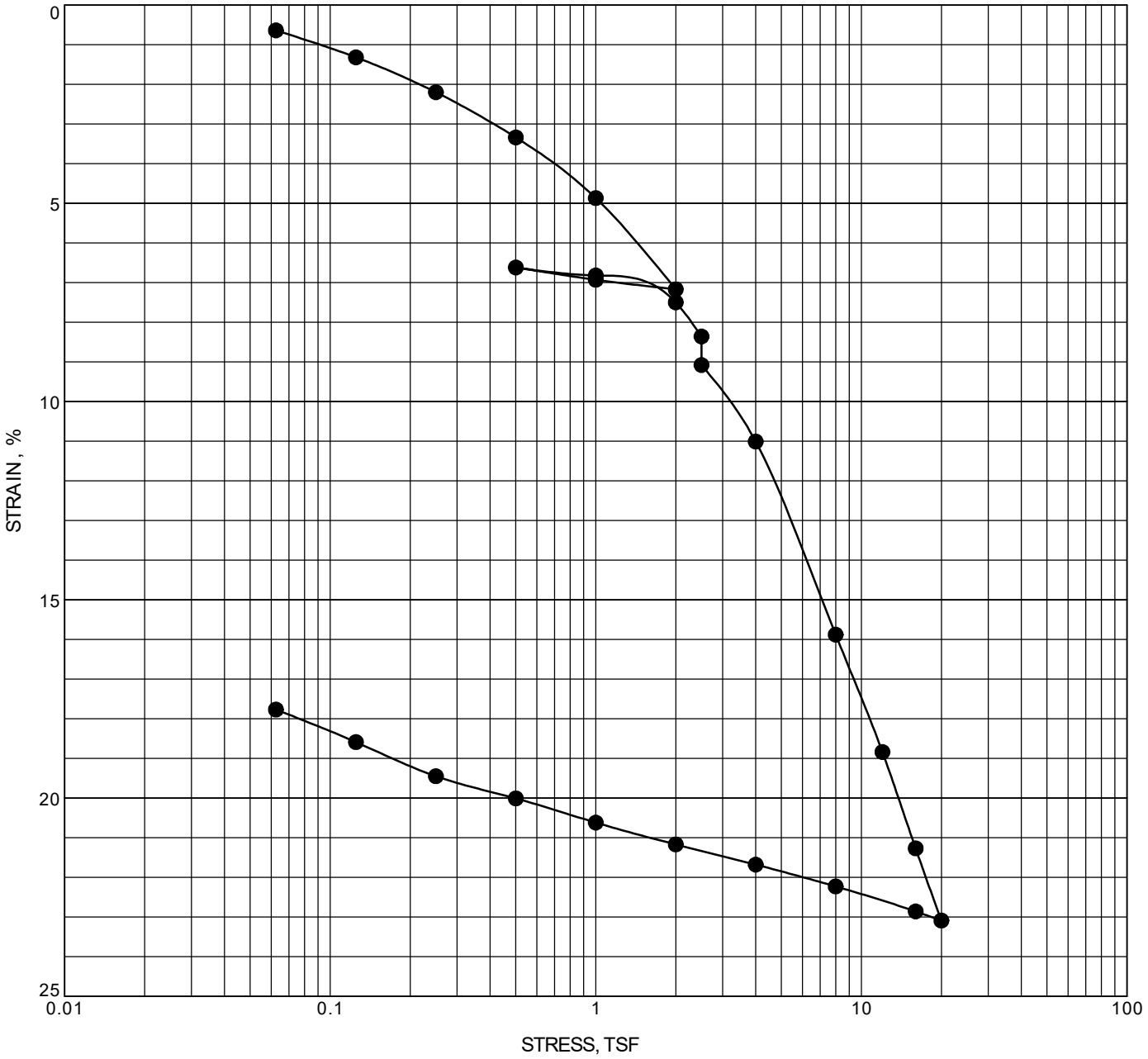
	Location	Sample	Depth, ft	Classification	Initial γ_d, pcf	Initial MC, %
●	B-1	S-13	38.8	SILT, some fine-grained sand, trace clay, gray, soft to medium stiff	75	46

CONSOL STRAIN GRI-0 TO 25-1 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

GRI

CONSOLIDATION TEST

SEP. 2023 JOB NO. 6771-A FIG. 21B



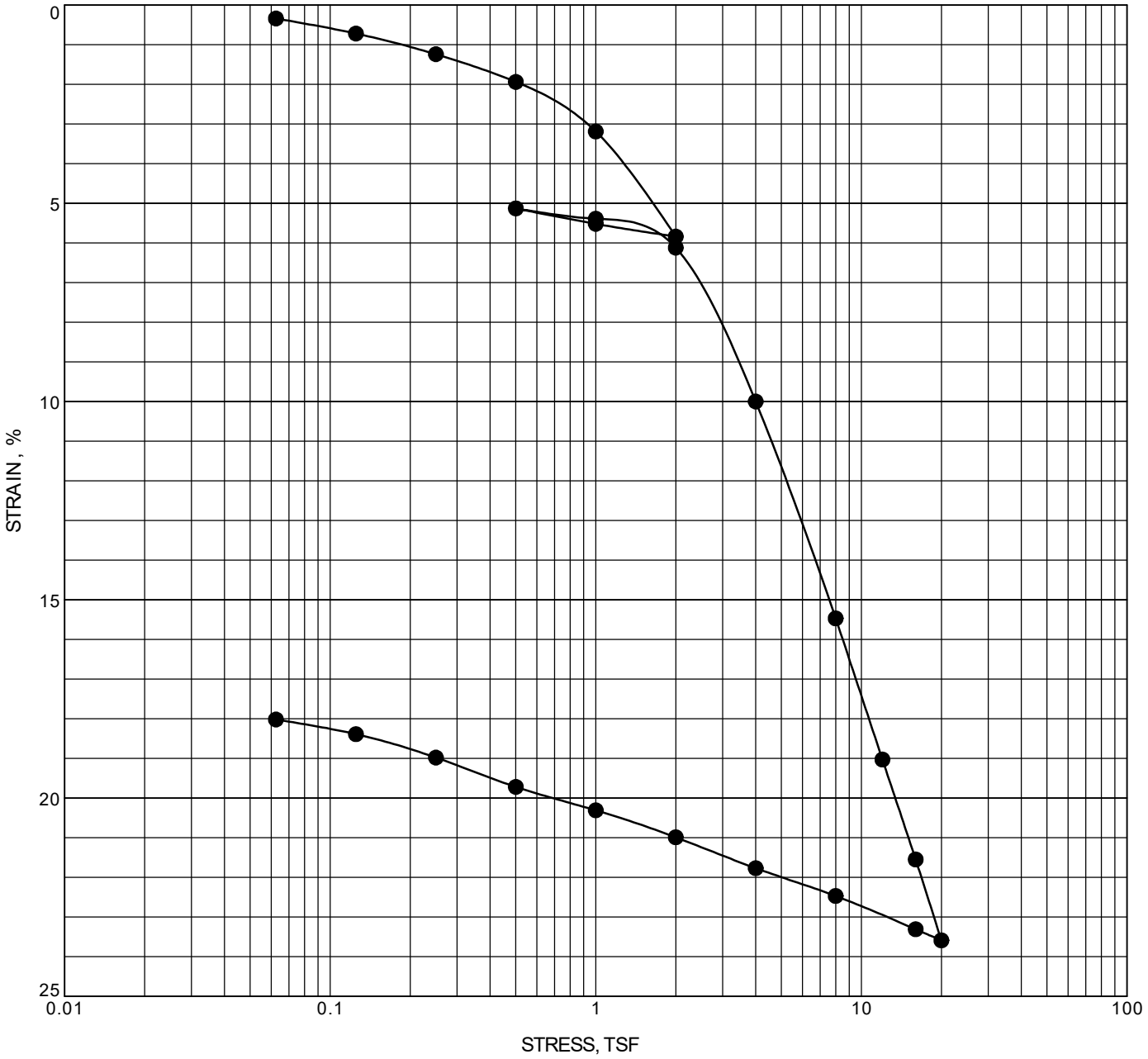
	Location	Sample	Depth, ft	Classification	Initial γ_d, pcf	Initial MC, %
●	B-1	S-16	49.8	SILT, some clay, trace to some fine- to medium-grained sand, dark gray to brown-gray, medium stiff	70	50

CONSOL STRAIN GRI-0 TO 25-1 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

GRI

CONSOLIDATION TEST

SEP. 2023 JOB NO. 6771-A FIG. 22B



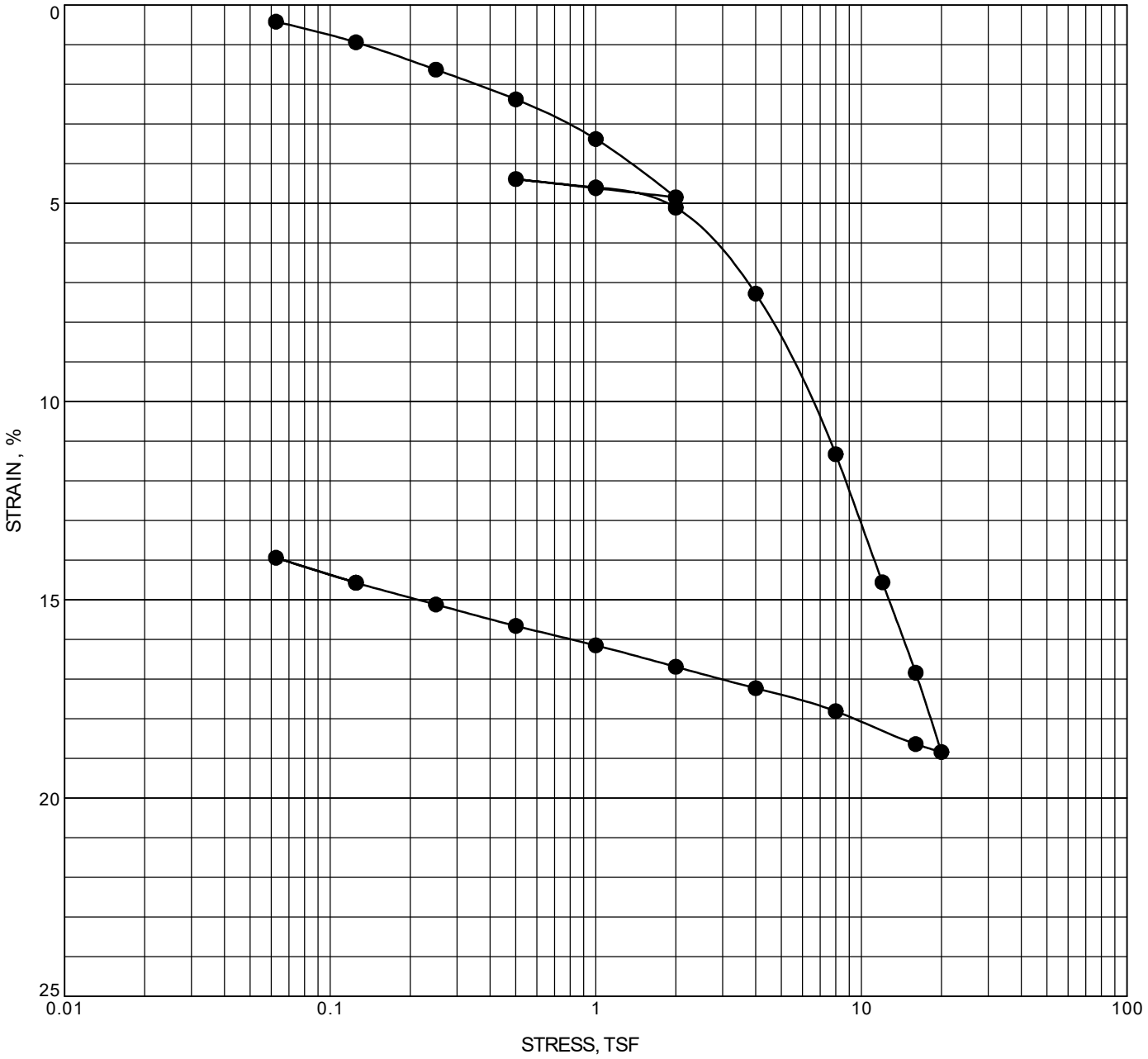
	Location	Sample	Depth, ft	Classification	Initial γ_d, pcf	Initial MC, %
●	B-2	S-5	14.8	Clayey SILT, up to trace fine-grained sand, gray, medium stiff	74	50

GRI

CONSOLIDATION TEST

SEP. 2023 JOB NO. 6771-A FIG. 23B

CONSOL STRAIN GRI-0 TO 25-1 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23



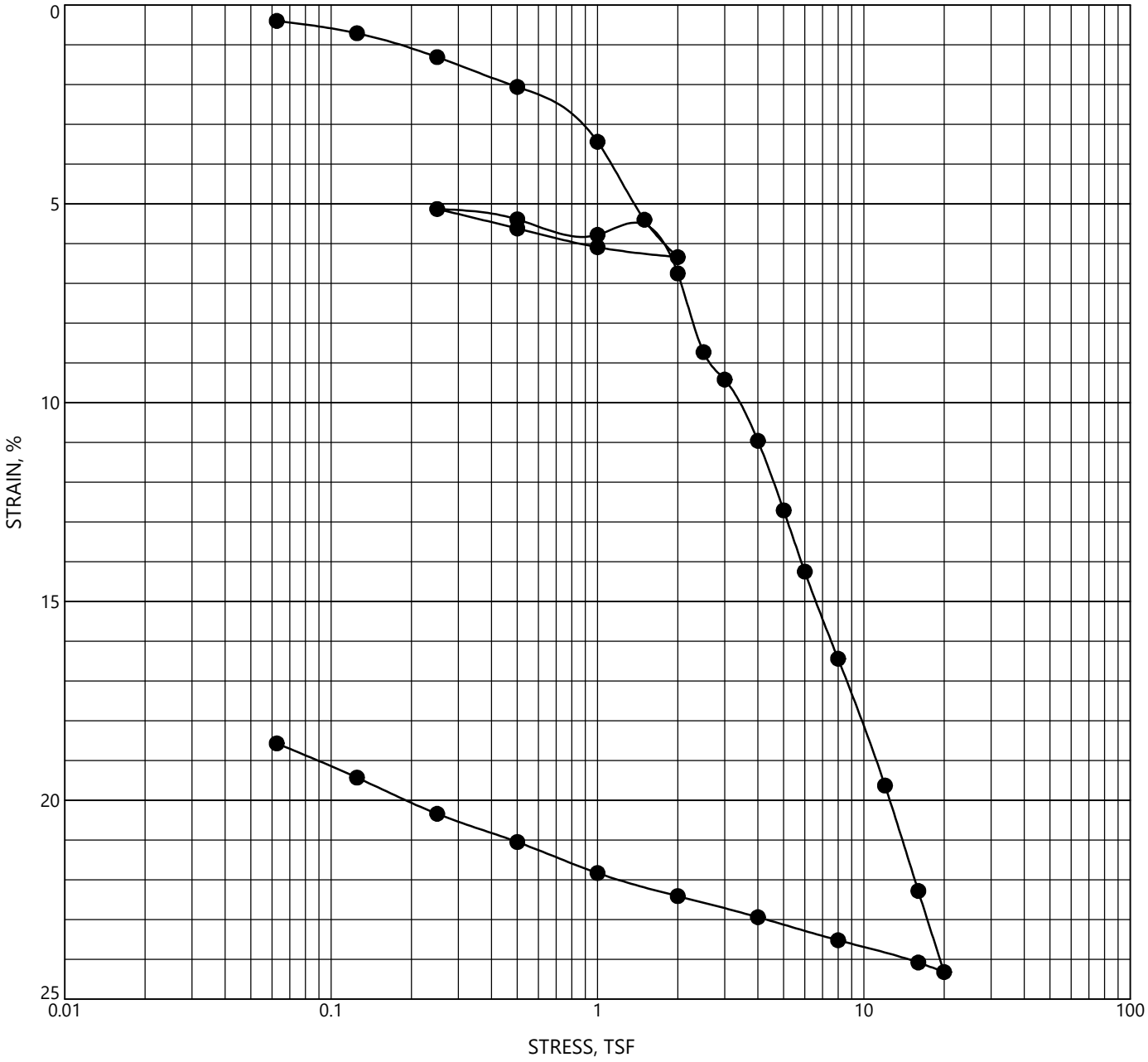
	Location	Sample	Depth, ft	Classification	Initial γ_d, pcf	Initial MC, %
●	B-2	S-20	63.5	SILT, some clay, trace to some fine-grained sand, gray, soft to medium stiff	78	47

GRI

CONSOLIDATION TEST

SEP. 2023 JOB NO. 6771-A FIG. 24B

CONSOL STRAIN GRI-0 TO 25-1 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

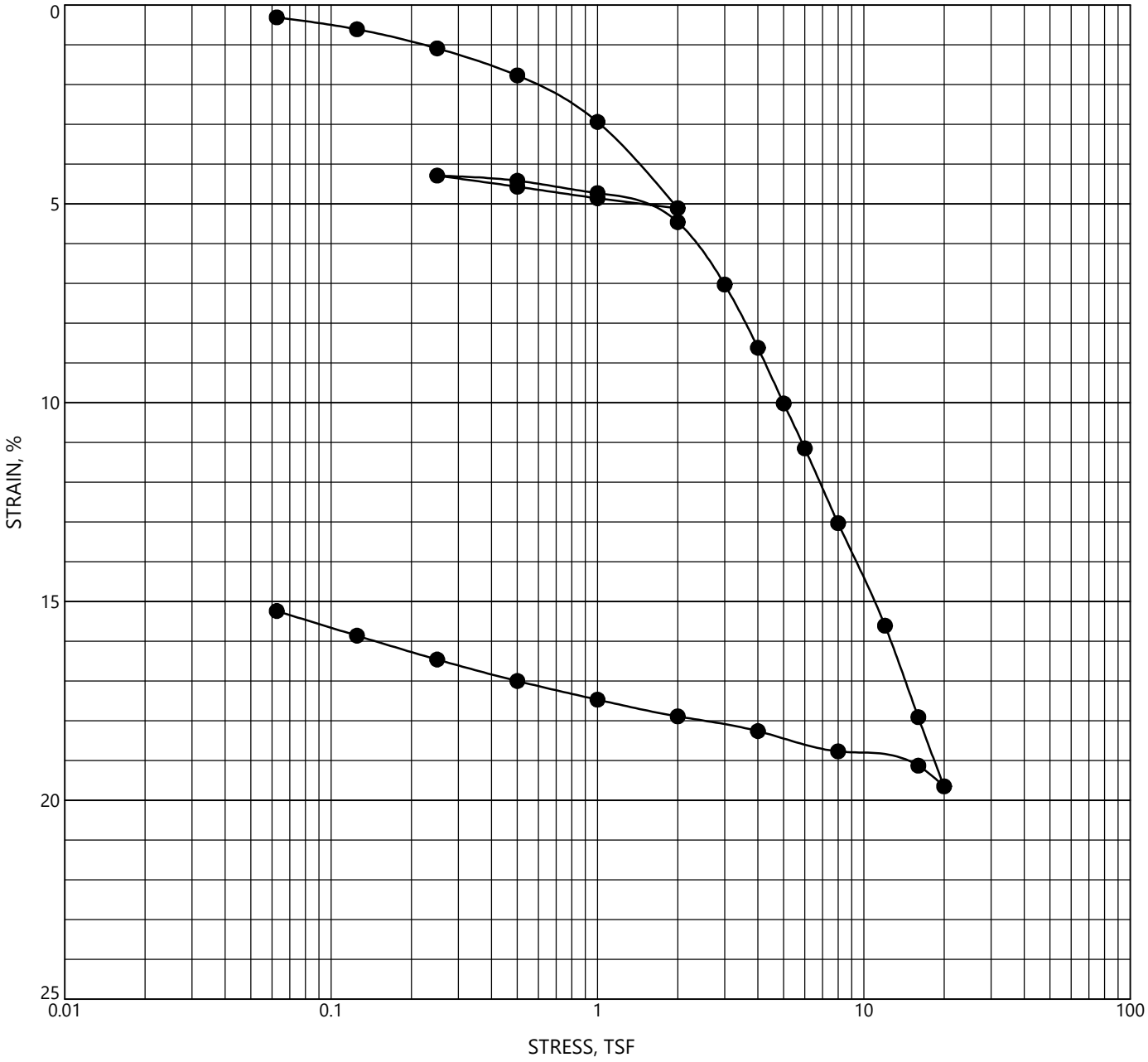


	Location	Sample	Depth, ft	Classification	Initial γ_d, pcf	Initial MC, %
●	B-3	S-5	25.5	Clayey SILT, some fine-grained sand, gray	67	56

CONSOLIDATION TEST

SEP. 2023 JOB NO. 6771-A FIG. 25B

CONSOL STRAIN GRI-0 TO 25-1 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

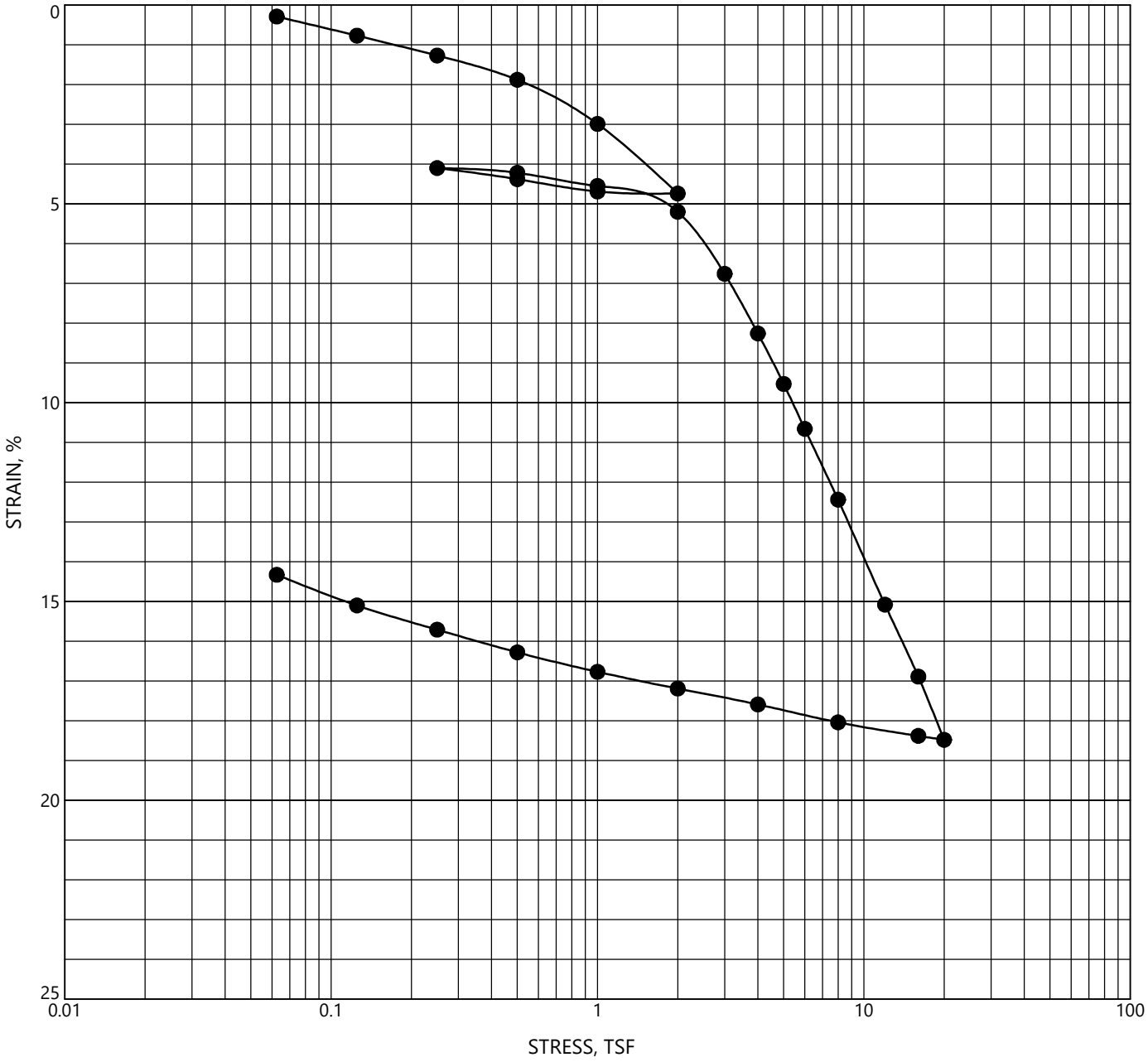


	Location	Sample	Depth, ft	Classification	Initial γ_d, pcf	Initial MC, %
●	B-3	S-8	35.3	SILT, some clay, trace fine-grained sand, gray	74	48

GRI

CONSOLIDATION TEST

SEP. 2023 JOB NO. 6771-A FIG. 26B

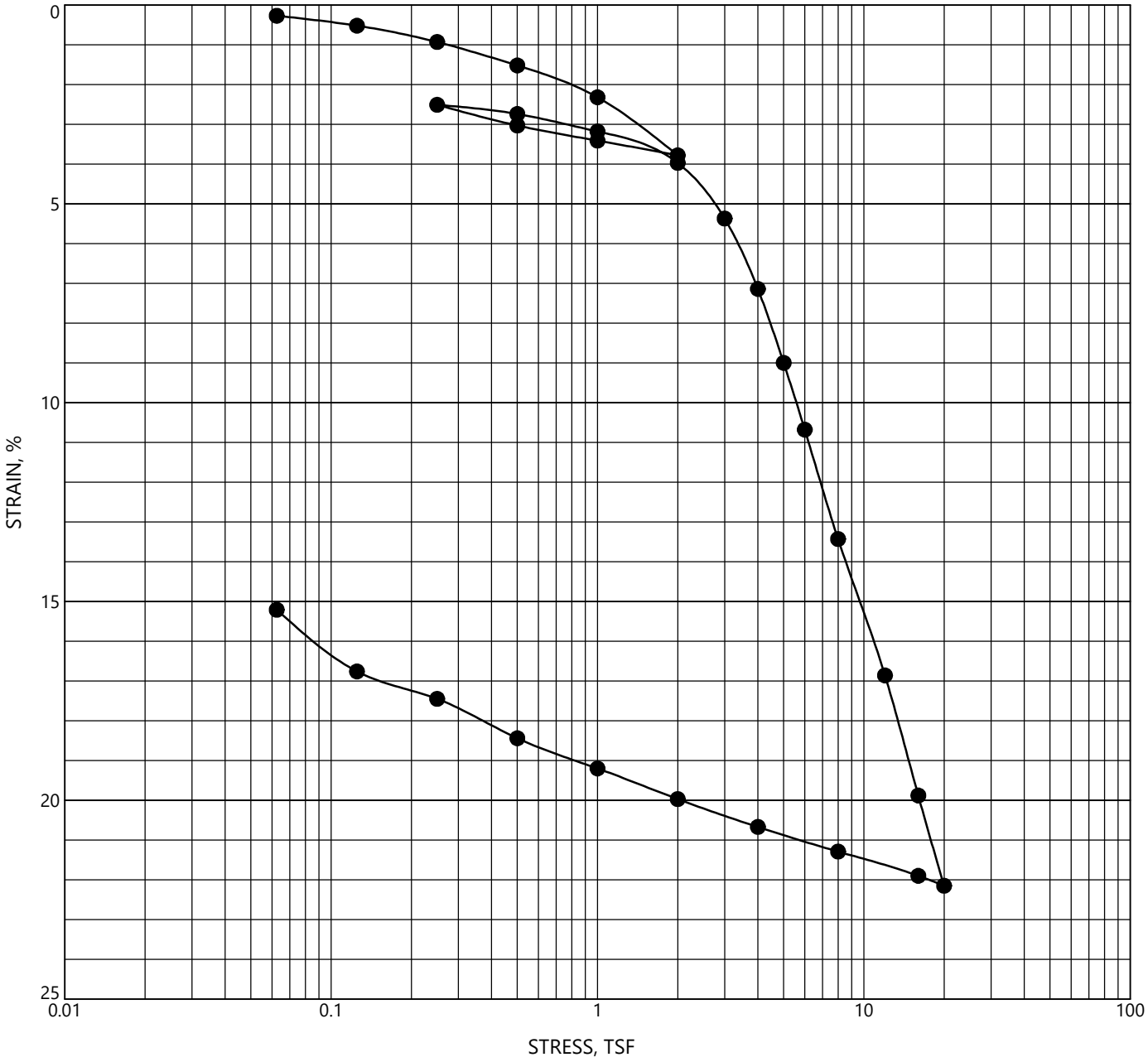


	Location	Sample	Depth, ft	Classification	Initial γ_d, pcf	Initial MC, %
●	B-3	S-11	46.0	SILT, some clay, trace fine-grained sand, gray	76	46

CONSOLIDATION TEST

SEP. 2023 JOB NO. 6771-A FIG. 27B

CONSOL STRAIN GRI-0 TO 25-1 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23



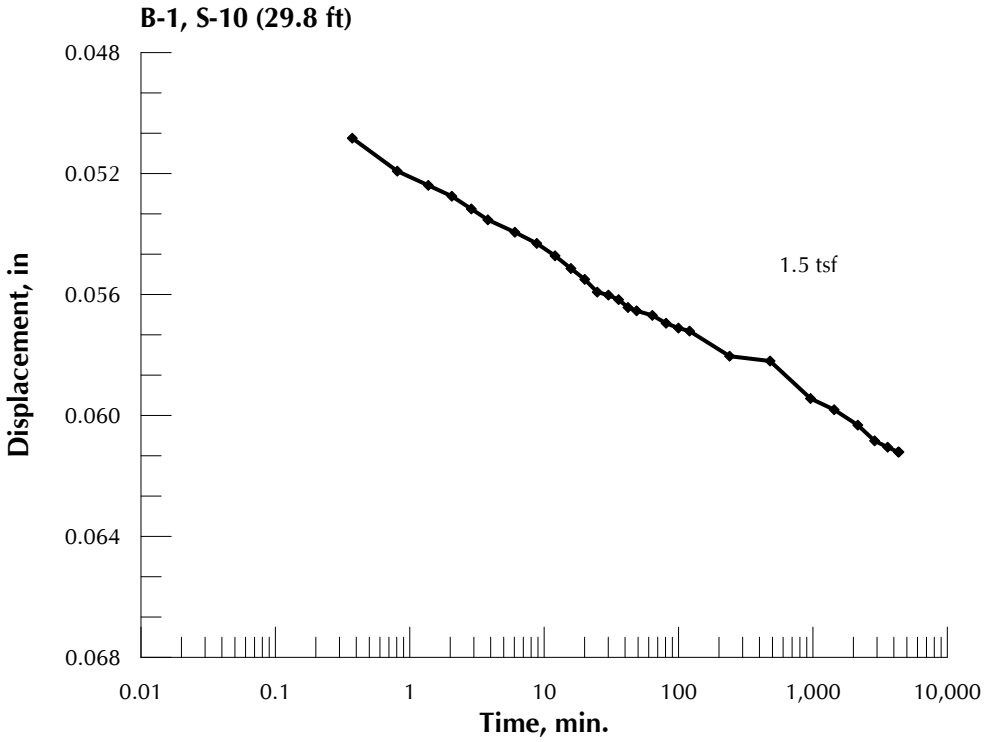
	Location	Sample	Depth, ft	Classification	Initial γ_d, pcf	Initial MC, %
●	B-3	S-14	60.5	SILT, some clay and fine-grained sand, gray	70	54

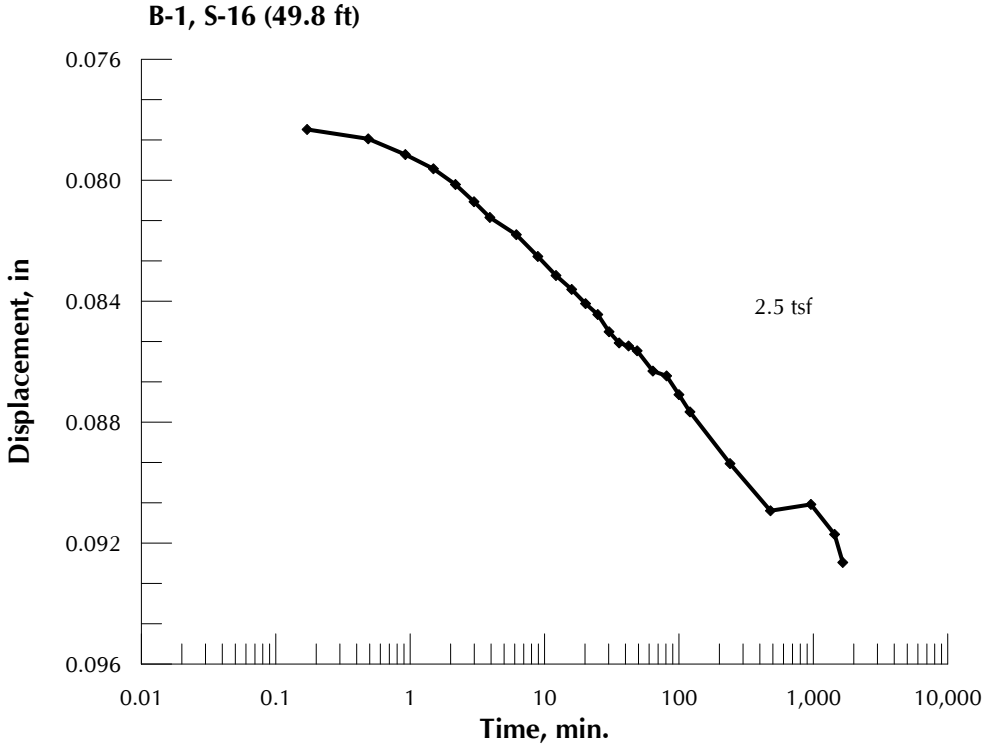
GRI

CONSOLIDATION TEST

SEP. 2023 JOB NO. 6771-A FIG. 28B

CONSOL STRAIN GRI-0 TO 25-1 PER PAGE GRI DATA TEMPLATE.GDT 9/15/23

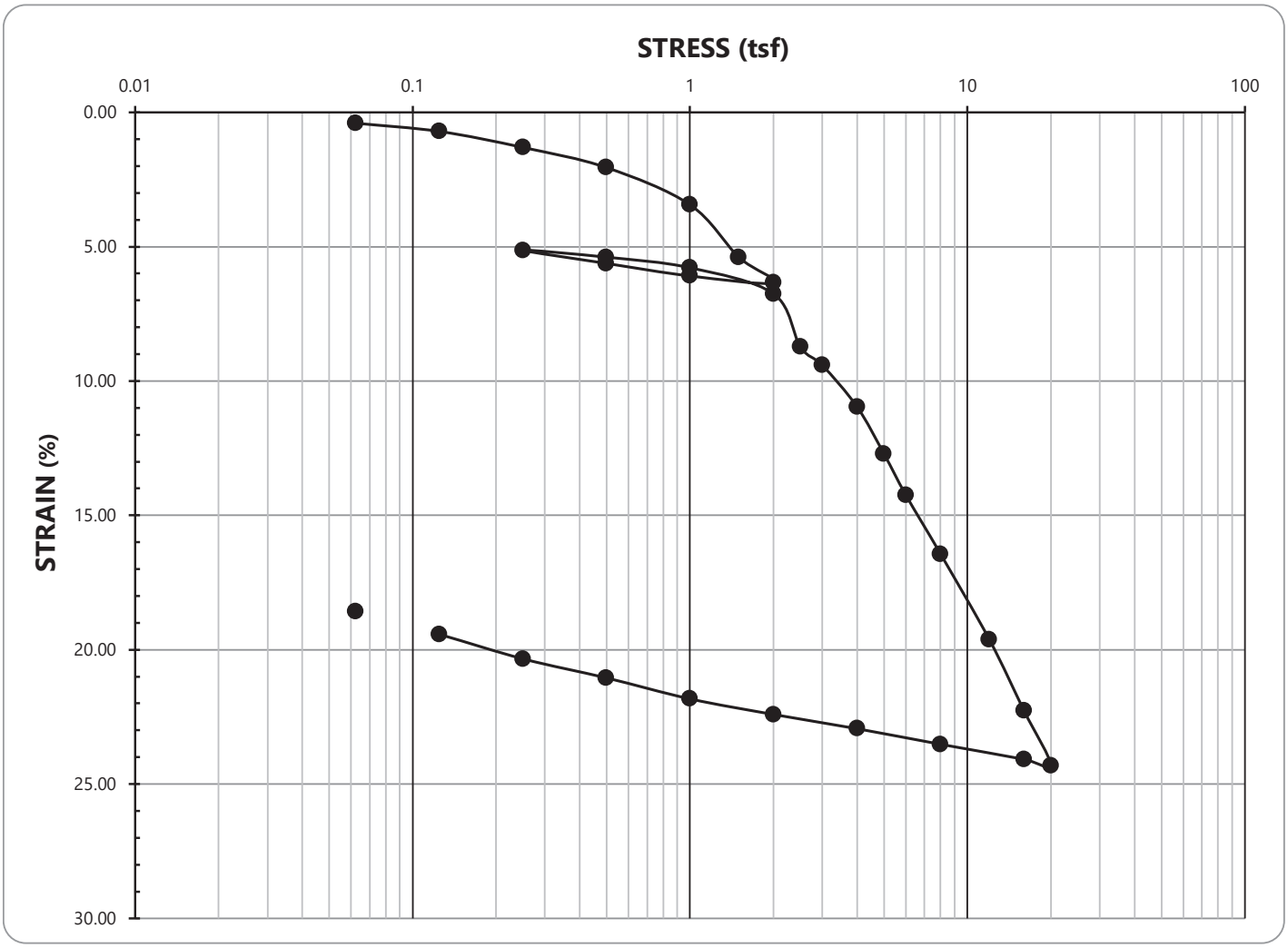




GRI

SECONDARY COMPRESSION

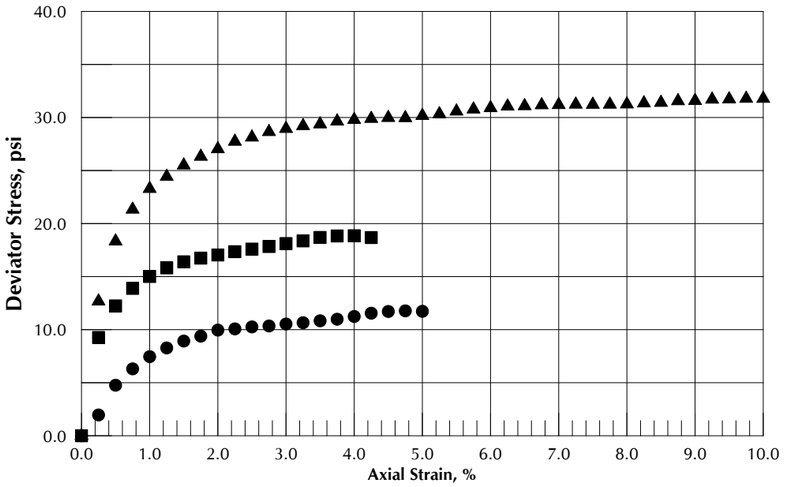
SEP. 2023 JOB NO. 6771-A FIG. 29B

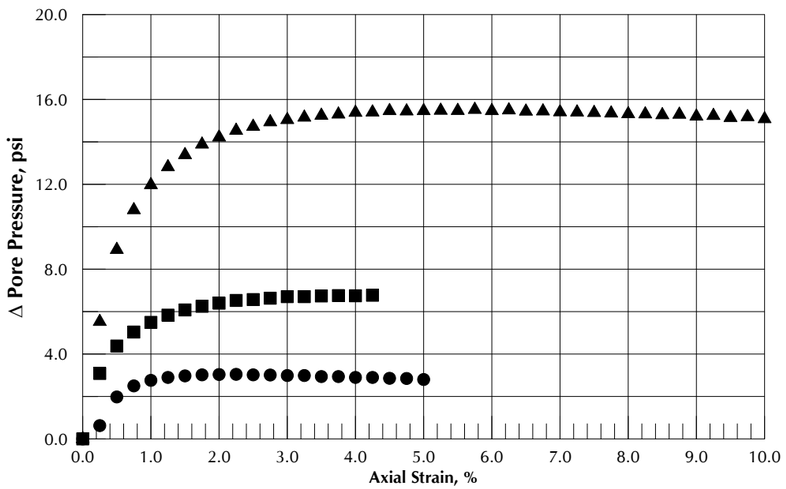


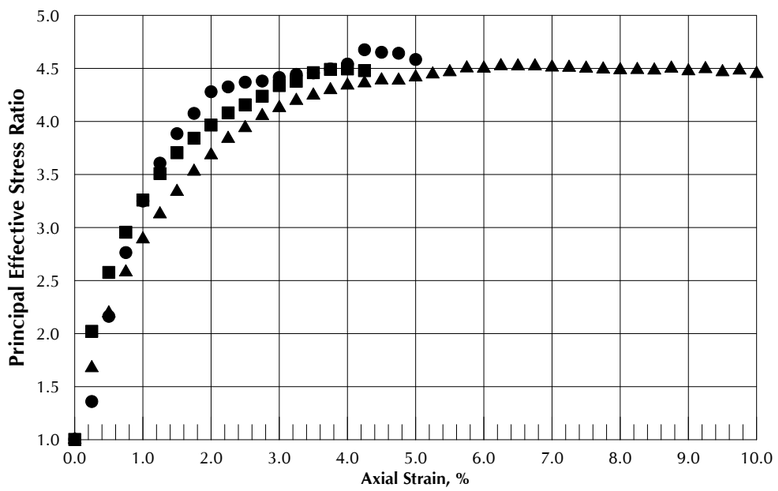
GRI

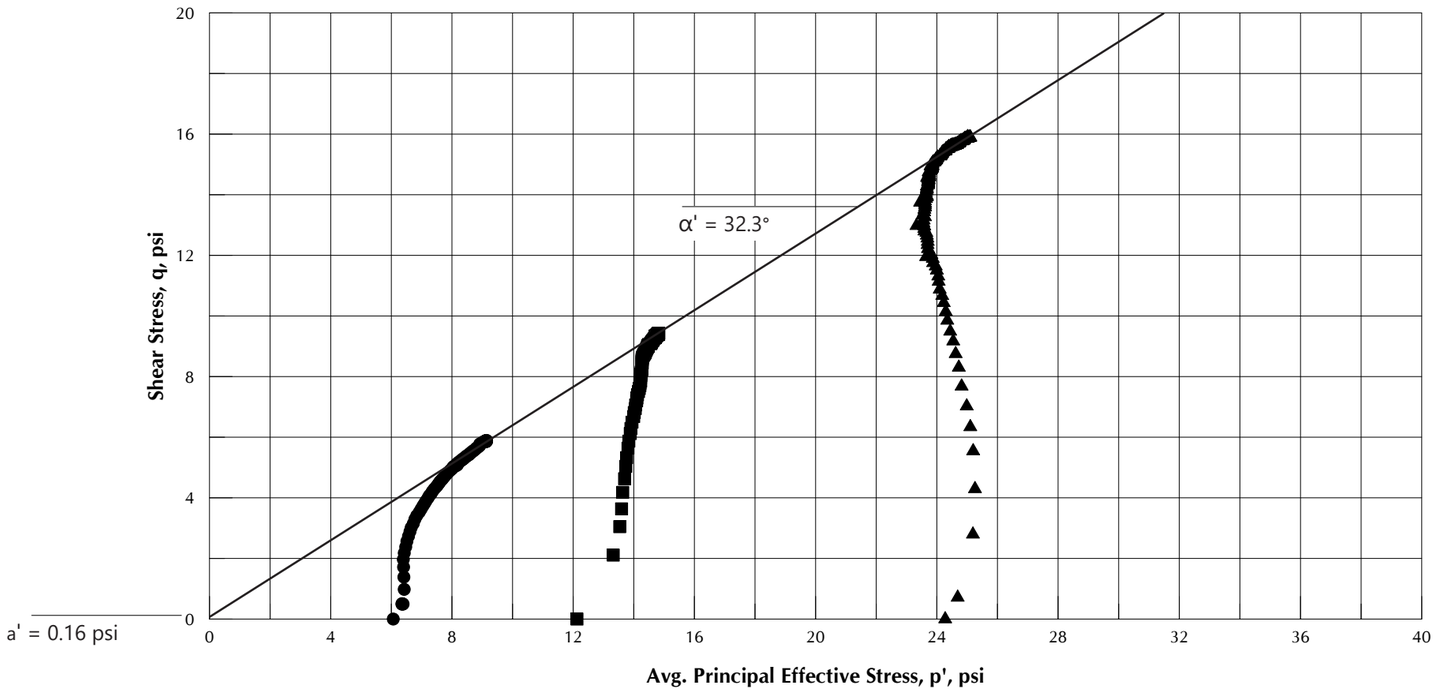
SECONDARY COMPRESSION

SEP. 2023 JOB NO. 6771-A FIG. 30B









	Stage 1	Stage 2	Stage 3
Test Symbol	●	■	▲
Boring No.	B-1	B-1	B-1
Sample No.	S-10	S-10	S-10
Depth, ft	29	29	29
Vertical Effective Consolidation Stress, psf	875	1,750	3,500
Sample Height, in.	6.0	5.7	5.5
Initial Sample Diameter, in.	2.85	--	--
Dry Unit Wt, pcf	68.3	--	--
W.C.% before test	55	--	--
W.C.% after test	--	--	41
Strain Rate, %/hr	1	1	1

Soil Classification: **SILT, some clay, gray, medium stiff**

TYPE OF TEST:

■ CU □ CD □ UU ■ UNDISTURBED □ REMOLDED

■ PRESATURATED ■ BACK PRESSURE

FAILURE CRITERIA: MAXIMUM DEVIATOR STRESS

REMARKS: TAN α' = SIN φ'

a' = c' COS φ' (psi)

α' = 32.3°

φ' = 34.3°

c' = 0.20 psi

a' = 0.16 psi

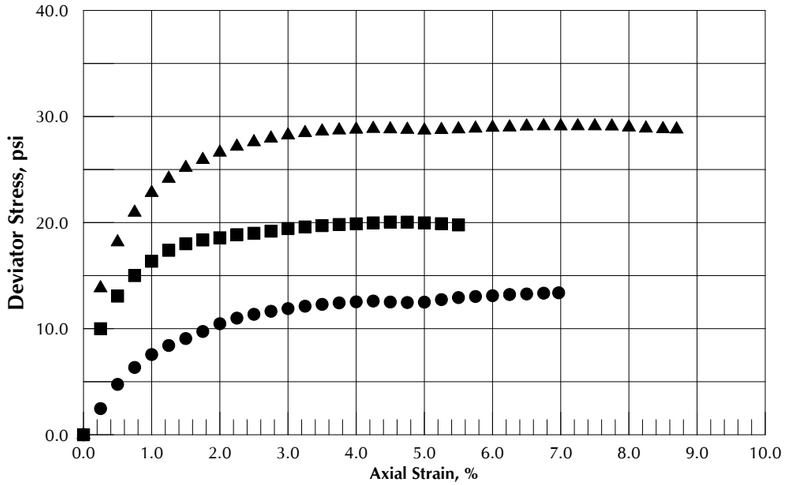
GRI

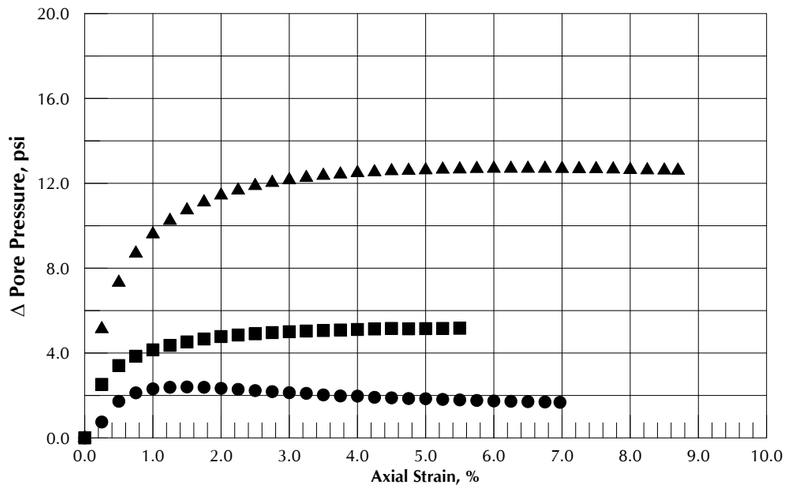
(CU MULTI-STAGE TEST)

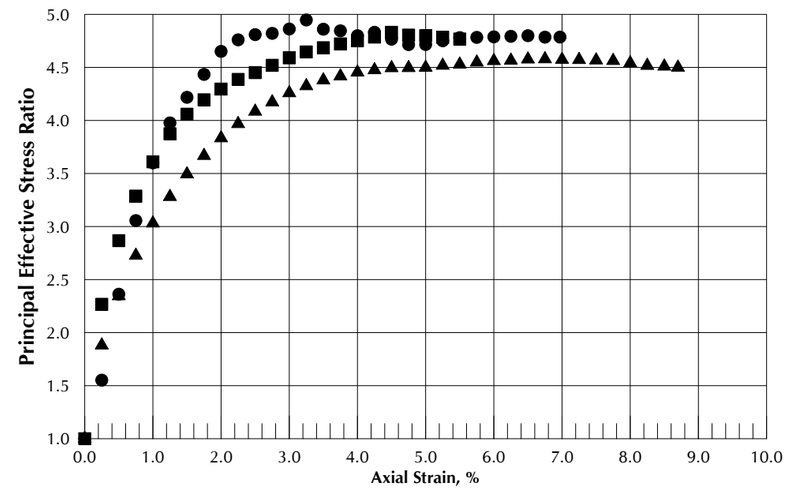
TRIAXIAL SHEAR STRENGTH TEST

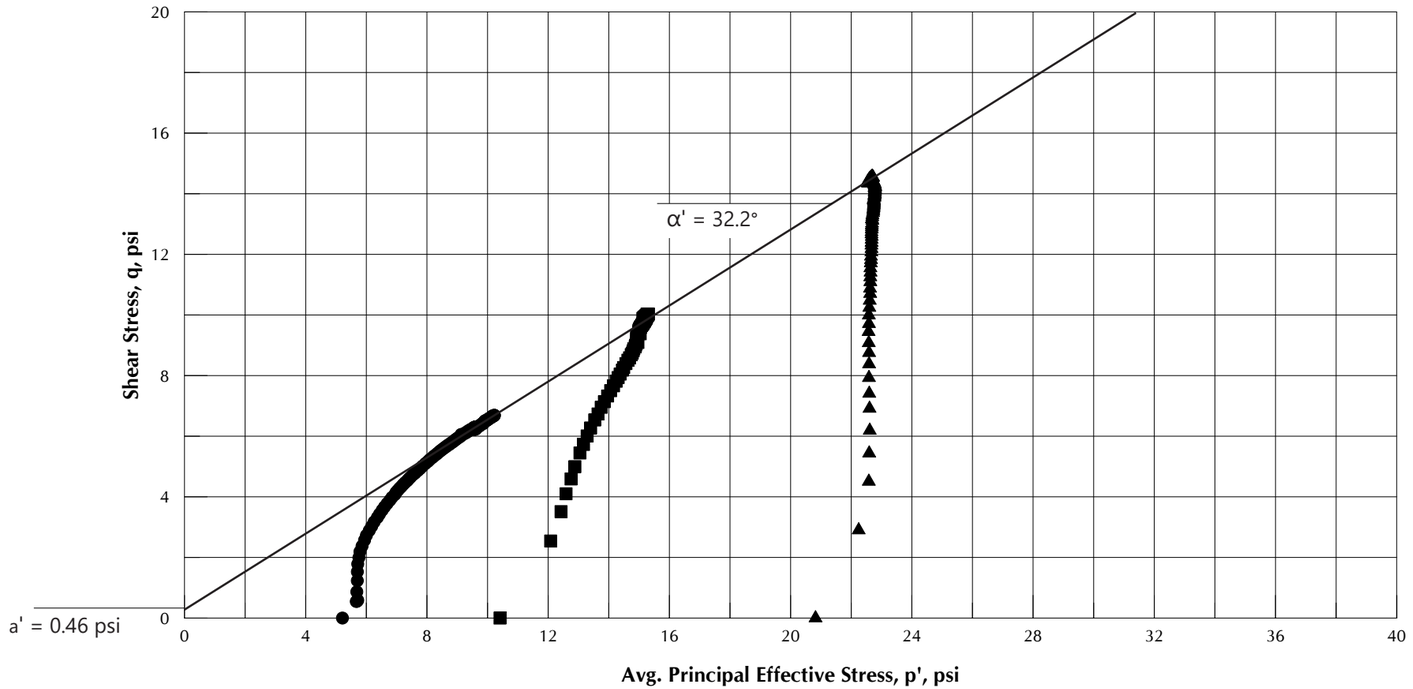
(BORING B-1, SAMPLE S-10)

SEP. 2023 JOB NO. 6771-A FIG. 31B









	Stage 1	Stage 2	Stage 3
Test Symbol	●	■	▲
Boring No.	B-2	B-2	B-2
Sample No.	S-8	S-8	S-8
Depth, ft	24.5	24.5	24.5
Vertical Effective Consolidation Stress, psf	750	1,500	3,000
Sample Height, in.	6.0	5.6	5.4
Initial Sample Diameter, in.	2.85	--	--
Dry Unit Wt, pcf	70.0	--	--
W.C.% before test	53	--	--
W.C.% after test	--	--	46
Strain Rate, %/hr	1	1	1

TYPE OF TEST:

■ CU □ CD □ UU ■ UNDISTURBED □ REMOLDED

■ PRESATURATED ■ BACK PRESSURE

FAILURE CRITERIA: MAXIMUM DEVIATOR STRESS

REMARKS: TAN α' = SIN φ'

a' = c' COS φ' (psi)

α' = 32.2°

φ' = 34.2°

c' = 0.60 psi

a' = 0.46 psi

Soil Classification: **SILT, trace to some clay, gray, medium stiff**

GRI

(CU MULTI-STAGE TEST)

TRIAXIAL SHEAR STRENGTH TEST

(BORING B-2, SAMPLE S-8)

SEP. 2023 JOB NO. 6771-A FIG. 32B

APPENDIX C

Site-Specific *Geologic Hazards*

APPENDIX C

SITE-SPECIFIC GEOLOGIC HAZARDS

C.1 GENERAL

GRI completed a geologic hazards study for the proposed Wastewater Lagoon Repurposing in St. Helens to identify potential geologic and seismic conditions at the project site. This geologic hazard assessment of the project is generally intended to provide an assessment of the presence of geologic hazards and potential for earthquake damage based on preliminary investigations of the regional and site geology, subsurface conditions, and the potential for seismic shaking. The report sections below present discussions on tectonic, geologic, and seismic settings and primary geologic hazards of concern at the site.

C.2 TECTONIC AND GEOLOGIC SETTING

On a regional scale, the site lies at the northern end of the Willamette Valley, a broad, gently deformed, north-south-trending topographic feature separating the Coast Range to the west from the Cascade Mountains to the east. The site lies approximately 90 kilometers inland from the down-dip edge of the seismogenic extent of the CSZ, an active convergent-plate boundary along which remnants of the Farallon Plate (the Gorda, Juan de Fuca, and Explorer plates) are being subducted beneath the western edge of the North American continent. The subduction zone is a broad, eastward-dipping zone of contact between the upper portion of the subducting slabs of the Gorda, Juan de Fuca, and Explorer plates and the overriding North American Plate, as shown on the Tectonic Setting Summary, Figure 1C.

On a local scale, the site lies within the Portland Basin, a large, well-defined, northwest-trending structure characterized as a right-lateral pull-apart basin in the forearc of the CSZ. The local surface geology in close proximity to the site is shown on the Local Geologic Map, Figure 2C. The site is generally mantled with a relatively thin layer of wind-deposited silt, referred to as Portland Hills Silt. These deposits consist of well-sorted silt and fine-grained sand that, on exposed surfaces, weather to clayey silt. These deposits are underlain by a thick sequence of basalt lava flows of the Columbia River Basalt Group. The boundary between the overlying sedimentary materials and underlying basalt is unconformable, indicating a considerable period of time elapsed between the solidification of the last of the basalt flows and the deposition of the overlying sedimentary materials. During this period, the upper portion of the basalt was subjected to surficial processes, including erosion, mass wasting, and chemical and physical degradation. These processes resulted in severe, non-uniform weathering of the upper portions of the basalt.

The Portland Basin is bounded by high-angle, northwest-trending, right-lateral strike-slip faults considered to be seismogenic; however, the relationship between specific earthquakes and individual faults in the area is not well understood since few of these faults are expressed clearly at the ground surface. A limited number of intrabasin faults have been mapped based on stratigraphic offsets and geophysical evidence, and the site is located within 25 km of the inferred traces of the Portland Hills Fault, the East Bank Fault east of the site and the Oatfield Fault south of the site (Personius et al., 2003). The distribution of nearby Quaternary faults is shown on the Local Fault Map, Figure 3C.

C.3 SEISMIC SETTING

C.3.1 General

Because of the proximity of the site to the CSZ and its location within the Portland Basin, three seismic sources contribute to the potential for damaging earthquake motions at the site. Two of these sources are associated with tectonic activity related to the CSZ, including the interface subduction-zone events related to sudden slip between the upper surface of the Juan de Fuca Plate and lower surface of the North American Plate and subcrustal (Benioff zone) events related to deformation and volume changes within the deeper portion of the subducted Juan de Fuca Plate. The third source is associated with movement on relatively shallow faults within and adjacent to the Portland Basin. Each of these sources is considered capable of producing damaging earthquakes in the Pacific Northwest; however, there are no historical records of significant subcrustal earthquakes (M_W >6.0) in northwest Oregon and southwest Washington. Wong (2005) hypothesizes that due to subduction-zone geometry, geophysical conditions, and local geology, southwest Washington and northwest Oregon may not be subject to subcrustal earthquakes of significant magnitude.

Based on review of historical records and evaluation of USGS national seismic-hazard maps (NSHMs), the two primary types of seismic sources at the site are the CSZ interface and local crustal faults.

C.3.2 Cascadia Subduction Zone

Coastal paleoseismic evidence, offshore geological studies, and historical tsunami accounts indicate the CSZ is capable of producing large-magnitude, megathrust earthquakes (M_W 8 to M_W 9) at the interface between the Juan de Fuca and North American plates (Atwater et al. 1995, Goldfinger et al. 2012). Geological studies indicate these megathrust earthquakes have occurred repeatedly in the past 10,000 years (Walton et al., 2021). A combination of paleoseismic and geologic studies (Kelsey et al., 2005), and geodetic studies (Savage et al., 2000) indicate rate of strain accumulation consistent with the assumption that the CSZ is locked beneath offshore northern California, Oregon, Washington, and southern British Columbia (Fluck et al., 1997; Wang et al., 2001).

Numerous geological and geophysical studies suggest the CSZ may be segmented (Hughes and Carr, 1980; Weaver and Michaelson, 1985; Guffanti and Weaver, 1988; Goldfinger, 1994; Kelsey and Bockheim, 1994; Mitchell et al., 1994; Personius, 1995; Nelson and Personius, 1996; Witter, 1999), but the most recent studies suggest that for the last great earthquake in 1700, most of the subduction zone ruptured in a single M_W 9.0 earthquake (Satake et al., 1996; Atwater and Hemphill-Haley, 1997; Clague et al., 2000). There is consensus within the scientific community that the most recent great earthquake occurred along the CSZ in January 1700 (Atwater et al., 2015), based on paleoseismic evidence and historical records of an orphan-tsunami in Japan. Tsunami modeling completed for the 1700 orphan-tsunami indicated the 1700 earthquake ruptured the whole length of the CSZ and had a moment magnitude of about M_W 9.0 (Satake et al. 2003).

The average recurrence interval for a CSZ megathrust event is estimated to be around 350 years to 600 years based on prehistoric geologic evidence (Atwater and Hemphill-Haley 1997, Kelsey et al., 2002; Witter et al., 2003). Tsunami inundation in buried marshes along the Washington and Oregon coast and stratigraphic evidence from the Cascadia margin support these recurrence intervals (Kelsey et al., 2005; Goldfinger et al., 2003). Goldfinger et al. (2003, 2012, 2016) evaluated turbidite evidence at the heads of Cascadia submarine canyons, results of which indicated the occurrence of more than 40 great earthquakes over the past 10,000 years with partial or entire length rupture of the CSZ. About 20 of the earthquake events are associated with partial ruptures concentrated in the southern part of the margin and have estimated recurrence intervals of about 220 years to 320 years. About 19 of the events are associated with a rupture of the full CSZ, characterized by a moment magnitude (M_W) of about 8.5 to 9.1 or greater earthquake. Considering a combination of recent paleoseismic, geodetic, and geologic research, the average recurrence interval for a full-rupture CSZ earthquake is estimated to be about 500 years to 540 years (Walton et. al 2021).

The USGS probabilistic analysis assumes four potential locations (three alternative down-dip edge options and one up-dip edge option) for the eastern edge of the earthquake rupture zone for the CSZ, as shown on Figure 4C. As discussed in Petersen et al. (2014), the 2014 USGS mapping effort represents the 2014 CSZ source model with the full-CSZ ruptures with moment magnitudes from M_W 8.6 to M_W 9.3, supplemented by partial ruptures with smaller magnitudes (M_W 8.0 to M_W 9.1). There is also a possibility of serial M_W 8 earthquakes that rupture the entire CSZ over a period of a few decades or less; however, this is not implemented in the current NSHMs. The partial ruptures were accounted for using a segmented model and an unsegmented model. The magnitude-frequency distribution showing the contributions to the earthquake rates from each of the models and how the estimated rates vary along the fault is presented on Figure 5C.

C.3.3 Local Crustal Event

Sudden crustal movements along relatively shallow, local faults in the project area, although rare, have been responsible for local crustal earthquakes. The precise relationship between specific earthquakes and individual faults is not well understood since few of the faults in the area are expressed at the ground surface and there is a limited history of crustal events in the region. The history of local seismic activity is commonly used as a basis for determining the size and frequency to be expected of local crustal events. Although the historical record of local earthquakes is relatively short (the earliest reported seismic event in the area occurred in 1920), it can serve as a guide for estimating the potential for seismic activity in the area.

The locations of and general information regarding Quaternary faults (i.e., those that have experienced movement during the last 1.6 million years and are considered potentially active) are available through the USGS Earthquake Hazards Program. The USGS Quaternary Fault and Fold Database shows the Portland Hills Fault as one of the closest shallow crustal faults located near the site. The Portland Hills Fault is a northwest-striking, reverse-oblique fault located about 18 kilometers south of the site that dips to the southwest beneath the eastern base of the Portland Hills. The length of the Portland Hills Fault is approximately 40 kilometers to 60 kilometers and has a characteristic earthquake magnitude of M_W 7.0.

C.4 GEOLOGIC HAZARDS

C.4.1 Ground Shaking Hazard

In general, the Pacific Northwest is a seismically active region where moderate to severe earthquakes are expected to cause strong ground shaking. As previously discussed, potential damaging earthquake motions at the site come from the Portland Hills Fault and the CSZ. In general, CSZ megathrust earthquakes typically result in ground shaking that lasts substantially longer than shallow crustal faults. The Seismic Design Guidance for Municipal Solid Waste Landfill facilities (RCRA Subtitle D) document generally specify the use of an earthquake event having a 10% probability of exceedance in 250 years (an average return period of 2,373 years) for seismic deign.

C.4.2 Fault Rupture Hazard

Identification of potentially active faults in the immediate vicinity of the project site is one of the key components of the geologic hazard study. There are about four faults (considered to have been active in the last 1.6 million years by the USGS) located within 30 kilometers of the site based on review of the USGS Quaternary Fault and Fold Database (i.e., Figure 3A shows the local faults in the vicinity of the site). However, there are no known or mapped potentially active faults within the specific project site. Therefore, the risk of fault surface rupture at the site is considered to be low. Several normal faults and fault splays are mapped south of the site.

C.4.3 Liquefaction, Cyclic Softening and Lateral Spread Hazards

Liquefaction is a process by which loose, saturated, granular materials, such as sand, and to a somewhat lesser extent, soft to medium-stiff, non-plastic and low-plasticity silts, temporarily lose strength during and immediately after a seismic event. Liquefaction occurs as seismic shear stresses propagate through a saturated soil and distort the soil structure, causing loosely packed groups of particles to contract or collapse. If drainage is impeded and cannot occur quickly, the collapsing soil structure increases the pore-water pressure between the soil grains. If the pore-water pressure increases to a level approaching the weight of the overlying soil, the soil temporarily behaves as a viscous liquid rather than a solid. Cyclic softening describes a relatively gradual and progressive increase in shear strain that occurs in normally consolidated to slightly overconsolidated, moderate-plasticity silts and clays as a result of seismic loading. Cyclic softening may result in elevated pore-water pressures and a reduction of shear strength of sensitive silts and clays. Due to the presence of loose to medium-dense sand and low-plasticity silt layers below the groundwater level identified in our recent explorations, it is our opinion there is a risk of liquefaction, cyclic softening and lateral spreading at the site. A detailed discussion on engineering analyses related to liquefaction and cyclic softening is included in the main text of the report.

C.4.4 Landslide Hazard

Landslides are defined as "the movement of a mass of rock, debris, or earth down a slope" (Cruden, 1991). Landslide hazard areas are defined as areas susceptible to strength failure of the underlying soil or rock and subsequent downhill movement of the debris. These areas are susceptible to landslides due to a combination of factors, including slope inclination, material type and strength characteristics, geologic structure, and presence of water. There are many different types of mass movement, including rockfalls, topples, slides, spreads, soil slumps, soil creep, and debris slides and flows. As the slope angle increases, the slope becomes more susceptible to landslides. Landslides can move very slowly in the case of soil creep or can move downhill extremely rapidly. Some of the most common causes of landslides are soils becoming saturated by water (e.g., rainfall, change in groundwater), earthquakes, or modification of existing slopes by construction activities. Modification of slopes or natural vegetation can lead to a reduction of slope stability both upslope and downslope of where the modifications take place.

The potential landslide hazard at the project site was evaluated by reviewing the SLIDO and lidar elevation published online by the Oregon Department of Geology and Mineral Industries (DOGAMI). SLIDO provides a statewide database of historical landslide records and information developed based on published geologic reports and geologic hazard studies by USGS, DOGAMI, and others. The landslide inventory map indicates a number of past landslides that occurred north of the site along Columbia River Highway. In general,

the landslide susceptibility map shows a potential of moderate to high landslides at the project site.

C.4.5 Volcanic Hazard

The Pacific Northwest region is home to a large number of active volcanoes along the Cascade Mountain Range. Mount St. Helens and Mount Hood are the two closest potentially active volcanos to the project site at approximate distances of 60 kilometers and 100 kilometers, respectively. The major explosive eruption of Mount St. Helens occurred on May 18, 1980, and killed 57 people. Mount Hood's last major eruption occurred about 200 years ago, while Mount St. Helens had two eruptive episodes in the past four decades: a sequence of explosive and dome-forming eruptions during 1980–1986, and a continuous dome-forming eruption during 2004–2008 (Dzurisin, 2018). The primary hazard from these volcanos to the project site is deposition of volcanic ash.

The project site is located within the Portland basin, which includes the Boring volcanic field. The Boring volcanic field constitutes more than 80 small volcanic vents and associated lava flows dispersed throughout the greater Portland-Vancouver metropolitan area (Evarts et al. 2009) which became active about 2.7 million years ago and last eruptions took place about 57,000 years ago. All existing Boring volcanic centers are considered to be extinct, and the probability of an eruption in the Portland/Vancouver metropolitan area is very low.

C.4.6 Other Hazards

Although detailed tsunami modeling of the Columbia and Willamette rivers in response to a CSZ earthquake has not been completed, the limited tsunami modeling by Allan et al. (2018) indicates the risk of damage by tsunami is low due to the distance from the Pacific Ocean.

C.5 REFERENCES

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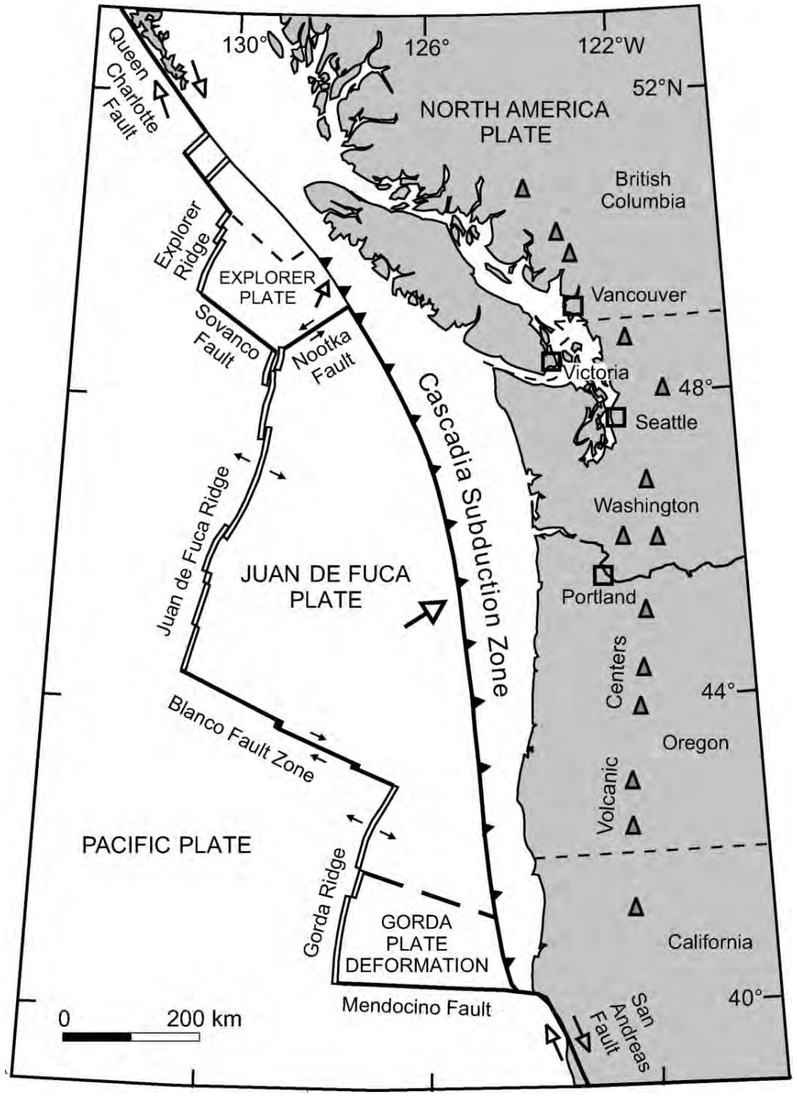
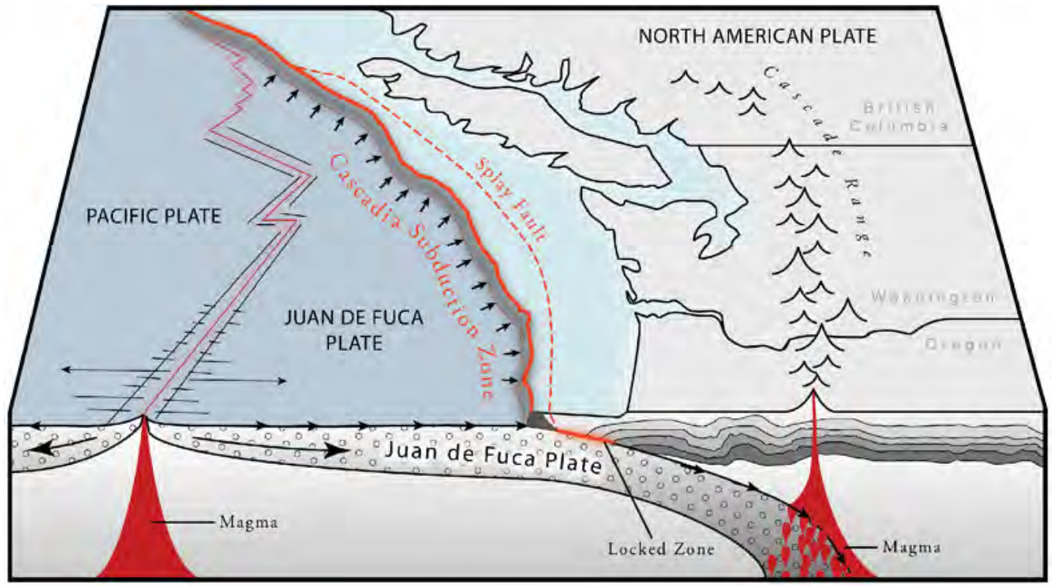


A) TECTONIC MAP OF PACIFIC NORTHWEST, SHOWING ORIENTATION AND EXTENT OF CASCADIA SUBDUCTION ZONE (MODIFIED FROM DRAGERT AND OTHERS, 1994)

Cascadia Subduction Zone Setting

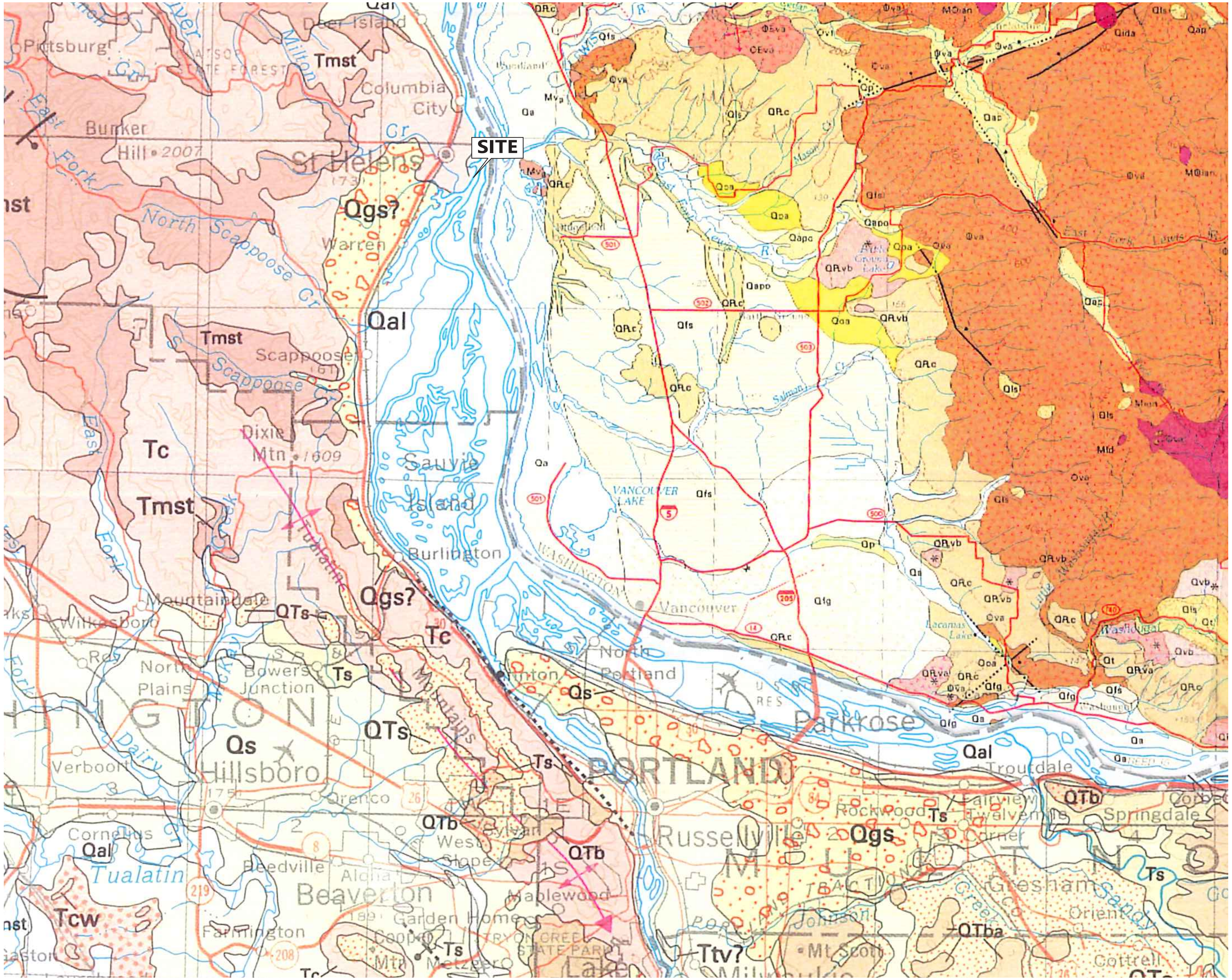


CASCADIA SUBDUCTION ZONE SETTING, TSUNAMI INUNDATION MAPS, OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRY, 2013

GRI

TECTONIC SETTING SUMMARY

SEP. 2023 JOB NO. 6771-A FIG. 1C



Contact — Approximately located

Fault — Dashed where inferred; dotted where concealed; queried where doubtful; ball and bar on downthrown side

Thrust fault — Dashed where inferred; dotted where concealed; queried where doubtful; sawteeth on upper plate

Strike and dip of bed

FROM:

WALSH, T.J., KOROSEC, M.A., PHILLIPS, W.M., LOGAN, R.L., AND SCHASSE, H.W., 1987, GEOLOGIC MAP OF WASHINGTON-SOUTHWEST QUADRANT; 1:250,000: WASHINGTON DIVISION OF GEOLOGY AND EARTH RESOURCES, 6M-34

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N

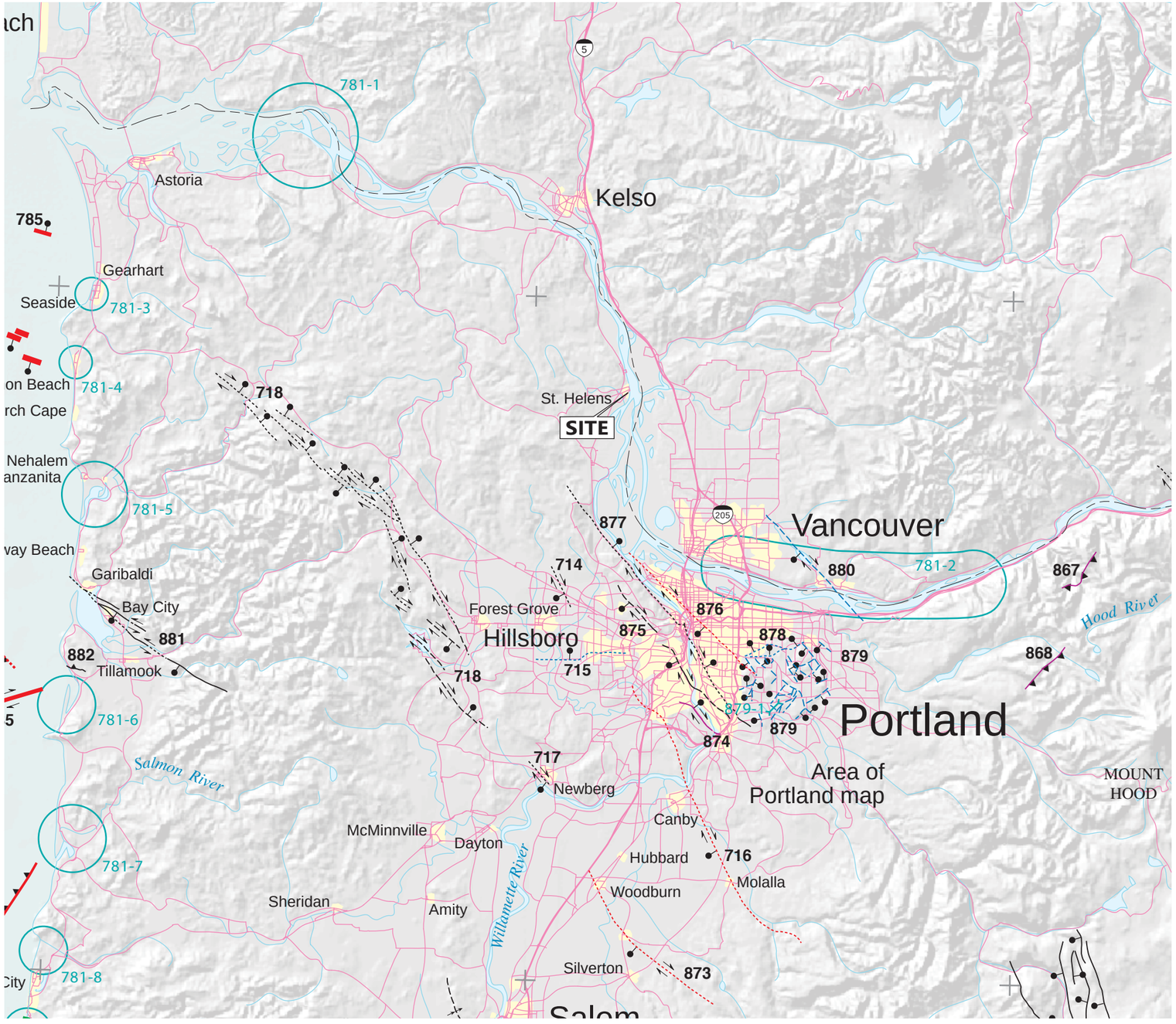
0 5 10 MILES

0 5 10 KILOMETERS

GRI

REGIONAL GEOLOGIC MAP

SEP. 2023 JOB NO. 6771-A FIG. 2C



TIME OF MOST RECENT SURFACE RUPTURE

- Holocene (<10,000 years) or post last glaciation (<15,000 years; 15 ka); no historic ruptures in Oregon to date
- Late Quaternary (<130,000; post penultimate glaciation)
- Late and middle Quaternary (<750,000 years; 750 ka)
- Quaternary, undifferentiated (<1,600,000 years; <1.6 Ma)
- Class B structure (age or origin uncertain)

SLIP RATE

- >5 mm/year
- 1.0-5.0 mm/year
- 0.2-1.0 mm/year
- <0.2 mm/year

TRACE

- Mostly continuous at map scale
- Mostly discontinuous at map scale
- Inferred or concealed

STRUCTURE TYPE AND RELATED FEATUR

- Normal or high-angle reverse fault
- Strike-slip fault
- Thrust fault
- Anticlinal fold
- Synclinal fold
- Monoclinal fold
- Plunge direction of fold
- Fault section marker

DETAILED STUDY SITES

- 731-2 Trench site
- 781-2 Subduction zone study site

CULTURAL AND GEOGRAPHIC FEATURES

- Divided highway
- Primary or secondary road
- Permanent river or stream
- Intermittent river or stream
- Permanent or intermittent lake

FAULT NUMBER	NAME OF STRUCTURE
714	HELVETIA FAULT
715	BEAVERTON FAULT
716	CANBY-MOLALLA FAULT
717	NEWBERG FAULT
718	GALES CREEK FAULT ZONE
719	SALEM-EOLA HILLS HOMOCLINE
864	CLACKAMAS RIVER FAULT ZONE
867	EAGLE CREEK THRUST FAULT
868	BULL RUN THRUST FAULT
872	WALDO HILLS FAULT
873	MOUNT ANGEL FAULT
874	BOLTON FAULT
875	OATFIELD FAULT
876	EAST BANK FAULT
877	PORTLAND HILLS FAULT
878	GRANT BUTTE FAULT
879	DAMASCUS-TICKLE CREEK FAULT ZONE
880	LACAMAS LAKE FAULT
881	TILLAMOOK BAY FAULT ZONE

NOTE: NOT ALL QUATERNARY FAULTS ARE SHOWN.

FROM: PERSONIUS, S.F., AND OTHERS, 2003, MAP OF QUATERNARY FAULTS AND FOLDS IN OREGON, USGS OPEN FILE REPORT OFR-03-095.

N

0 10 20 MILES

0 20 40 KILOMETERS

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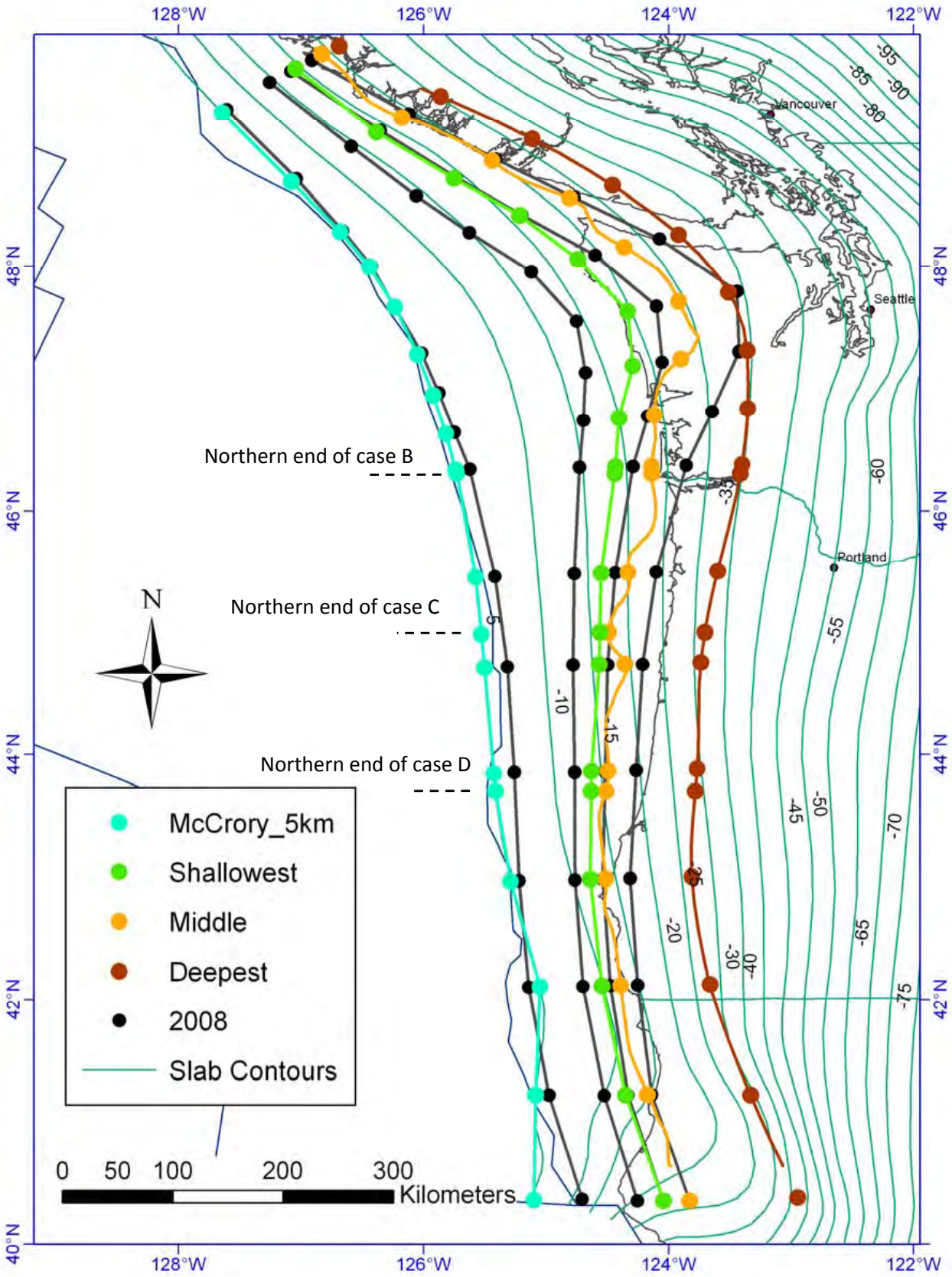
LOCAL FAULT MAP

SEP. 2023 JOB NO. 6771-A FIG. 3C



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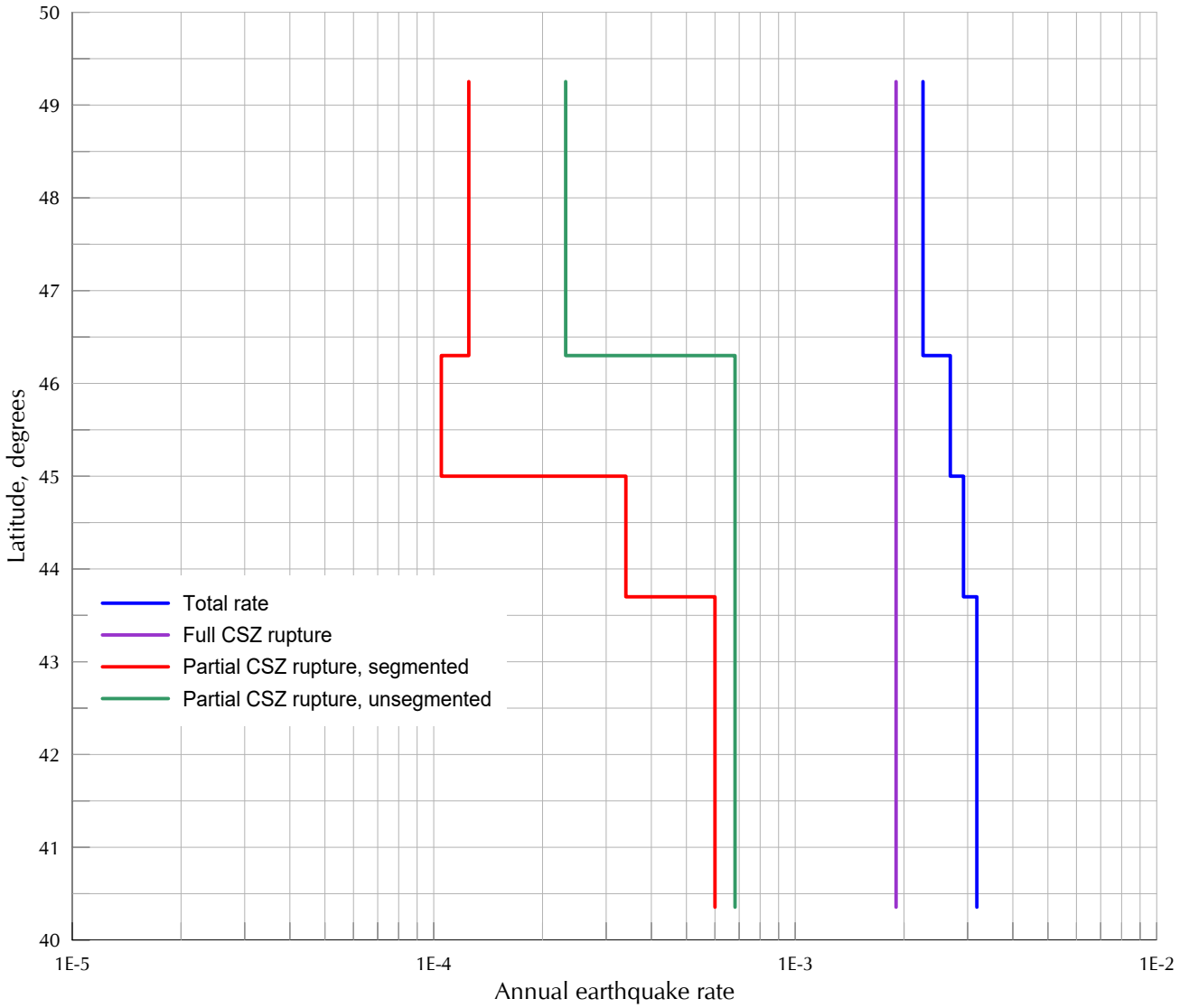
LOCATION OF SURFACE TRACES FOR UP-DIP EDGE & THREE DOWN-DIP EDGE OPTIONS USED IN 2014 NSHMS (CHEN ET. AL 2014)

SEP. 2023 JOB NO. 6771-A FIG. 4C



REFERENCE:
PETERSEN, M.D., MOSCHETTI, M.P., POWERS, P.M., MUELLER, C.S., HALLER, K.M., FRANKEL, A.D., ZENG, Y., REZAEIAN, S., HARMSEN, S.C., BOYD, O.S., FIELD, N., CHEN, R., RUKSTALES, K.S., NICO, L., WHEELER, R.L., WILLIAMS, R.A., AND OLSEN, A.H., 2014, DOCUMENTATION FOR THE 2014 UPDATE OF THE UNITED STATES NATIONAL SEISMIC HAZARD MAPS: U.S. GEOLOGICAL SURVEY OPEN-FILE REPORT 2014–1091, 243 P.

GRI

VARIATION OF EARTHQUAKE RATES CASCADIA SUBDUCTION ZONE (CSZ)

SEP. 2023 JOB NO. 6771-A FIG. 5C

APPENDIX D

Earth Dynamics LLC – Geophysical Exploration for St. Helens Water Treatment Plant

Report on

Geophysical Exploration for St. Helens Water Treatment Plant St. Helens, OR

Report Date: May 25, 2023

Prepared for:

GRI
16950 SW Upper Boones Fry
Tigard, OR 97224

Prepared by:

EARTH DYNAMICS LLC
2284 N.W. Thurman St.
Portland, OR 97210
(503) 227-7659
Project No. 23207

1.0 - Introduction

GRI engaged Earth Dynamics LLC to conduct geophysical explorations in the vicinity of the St. Helens Water Treatment Plant in St. Helens, Oregon. The purpose of the explorations is to determine the depth to basalt bedrock at the site. These data are needed for site development.

This work was requested and authorized by Mr. Brian Bayne of GRI. The geophysical field work was conducted on March 6, May 2 and May 3, 2023 under the supervision of Mr. Daniel Lauer of Earth Dynamics LLC. Seismic refraction data were acquired along one profile and electrical resistivity data were acquired along two profiles. This report describes the methodology and results of the geophysical investigation.

2.0 - Method

2.1 - Seismic Refraction

The seismic velocity of soil and rock is a function of the density and elastic properties of the material. Therefore, variations in subsurface materials can be inferred from analysis of the seismic velocity. Application of the method is limited to areas where seismic velocity increases or is constant with depth. Low velocity zones, which are common in basalt, cannot be resolved with seismic refraction.

A seismic refraction exploration consists of measuring the time required for a seismic wave to travel from a seismic source to a receiving transducer. A sledgehammer, large weight dropped, or explosive device is typically used for the seismic source and vertical geophones are used as receiving transducers. A seismograph records signals from the geophones. By analyzing the arrival time of the seismic wave as a function of distance from the seismic source, the seismic velocities of the underlying soil/rock units and the depth to geologic contacts can be determined. The seismic refraction method requires that seismic sources be placed at each end of the geophone array. Intermediate and off end sources are also often used to increase resolution and penetration. The depth of penetration is typically one-quarter to one-third of the geophone array length, and lateral resolution is typically one-half of the geophone spacing.

The seismic refraction survey for this study was conducted using two Seismic Source 24-channel DAQ Link IV seismographs equipped with forty-eight vertical geophones. One-half to two pounds of Kine-Pak explosive was used as the seismic source at five shot points for each array.

The seismic data are analyzed using SeisOpt@2D Ver. 6.0 by Optim Software. SeisOpt@2D uses a forward modeling global optimization technique. The technique consists of creating a finite element velocity model through which travel

times are computed. The computed times are compared with the observed data. Thousands of iterations are completed to find the velocity model with the minimum travel time error. Comparison of the computed travel times to the measured values provides an indication of the validity of the model. Several velocity models are run using different grid resolution and depth values to obtain the best result for each data set. SeisOpt generates xyz data files that are input to Surfer® 17 for contouring, scaling, and data presentation. The SeisOpt modeling technique is generally superior to discrete layer modeling because lateral, as well as vertical variations can be resolved, and gradual increases in seismic velocity with depth can be quantified.

For this study, data were acquired for two profiles using a 48-channel geophone array. The profiles are identified as S1A and S1B. Details of the profile setups are summarized in Table 2-1.

Table 2-1. Seismic Refraction Profile Detail Summary

Profile	Geophone Spacing (ft)	Number of 48 channel Arrays	Nominal Profile Length (ft)
S1A	30	1	1,410
S1B	20	1	940

2.2 – Electrical Resistivity

Electrical resistivity is an intrinsic property of all materials. The properties that affect the resistivity of soil or rock include porosity, water content, composition (clay mineral and metal content), salinity of the pore water, and grain size distribution. Therefore, the electrical resistivity method is ideally suited to provide information for ground water surveys, alluvial stratigraphy, bedrock topography and identification of basalt interflows and weathered zones.

A Dipole-Dipole array was used for this study to acquire data for determination of a two-dimensional electrical resistivity image. In a Dipole-Dipole array, two current electrodes form a dipole at one end of the line and two potential electrodes form a second dipole at the other end of the line. An electric current of up to 2,000 mA is applied to the ground by the current electrodes. This applied current causes a potential field. The voltage associated with the potential field is measured by the potential electrodes. The spacing between the electrodes and the distance between the dipoles is varied to obtain data as a function of depth along the line.

For this study, an Advanced Geosciences, Inc. (AGI) SuperSting R8 equipped with a Sting/Swift automatic multi-electrode system was used to acquire resistivity data. The SuperSting R8 is programmed to automatically select current and potential electrode pairs to provide the desired spacing and separation. The data are stored in the SuperSting R8 and subsequently downloaded to a computer for processing and analysis.

The penetration depth and resolution of the resistivity technique depends upon the electrode spacing and overall profile length. The penetration depth is typically twenty percent of the array length, and the resolution is typically one half of the minimum electrode spacing.

This study includes two electrical resistivity profiles. The profiles are designated R1 and R2. The data for each profile were acquired using fifty-six electrodes spaced nineteen feet apart. The "roll-along" method is used to extend the profile length to 2,109 feet. The details of the profiles are summarized in Table 2-2.

Table 2-2. Summary of Resistivity Profiles.

Profile Designation	Electrode Spacing (ft)	Number of electrodes	Nominal Profile Length (ft)
R1	19	112	2,109
R2	19	112	2,109

The resistivity data are analyzed using EarthImager software by AGI. EarthImager is a two-dimensional inversion program which was specifically designed for use with the AGI Sting/Swift system. Anomalous and unrealistic data points are removed prior to the inversion analysis. Anomalous data are typically due to low signal-to-noise ratio for the measured electric potential. The inversion program uses both finite-difference and finite-element forward modeling techniques. In the program, a non-linear least-squares optimization technique is used to automatically determine the best fit to the data.

The results of the inversion are presented as three contoured cross-sections. One cross-section shows the measured values of apparent resistivity. A second cross-section shows the computed apparent resistivity values which correspond to the computed model. The third cross-section is the computed model. Comparison of the measured to the computed apparent resistivity cross-sections provides an indication of the validity of the computed model. The computed model is then corrected for topography, and it is scaled for presentation.

2.2 - Location and Elevation Survey

Horizontal position data were obtained with a Trimble GEOXH 6000 GPS receiver equipped with a Tornado external antenna. The position data were post-processed to increase the accuracy of the GPS positions. Location data were recorded at the end points of each geophone array. Recorded GPS data are summarized in Table 2-3. The GPS data are displayed in degrees, decimal minutes Latitude and Longitude using the WGS 1984 datum. The elevations along each profile are extrapolated from GPS elevation data.

Table 2-3. GPS Position and Elevation Data for Profile Endpoints. (WGS 1984).

Profile Location	Latitude	Longitude
S1A – 0’	45° 51.3346’N	122° 47.8575’W
S1A – 1,410’	45° 51.1187’N	122° 47.9771’W
S1B – 1,200’	45° 51.1512’N	122° 47.9594’W
S1B – 2,140’	45° 51.0076’N	122° 48.0386’W
R1 – 0’	45° 51.3321’N	122° 47.8127’W
R1 – 2,109’	45° 51.0114’N	122° 47.9773’W
R2– 0’	45° 51.3440’N	122° 47.8363’W
R2 – 2,109’	45° 51.0167’N	122° 47.9947’W

3.0 - Results

The approximate locations of the geophysical profiles are shown in the Google Earth image in Figure 3-1. Computed seismic velocity models with interpreted geology for the seismic refraction profiles are contained in Appendix A. Computed electrical resistivity models are contained in Appendix B. Electrical resistivity model fit images are contained in Appendix C.

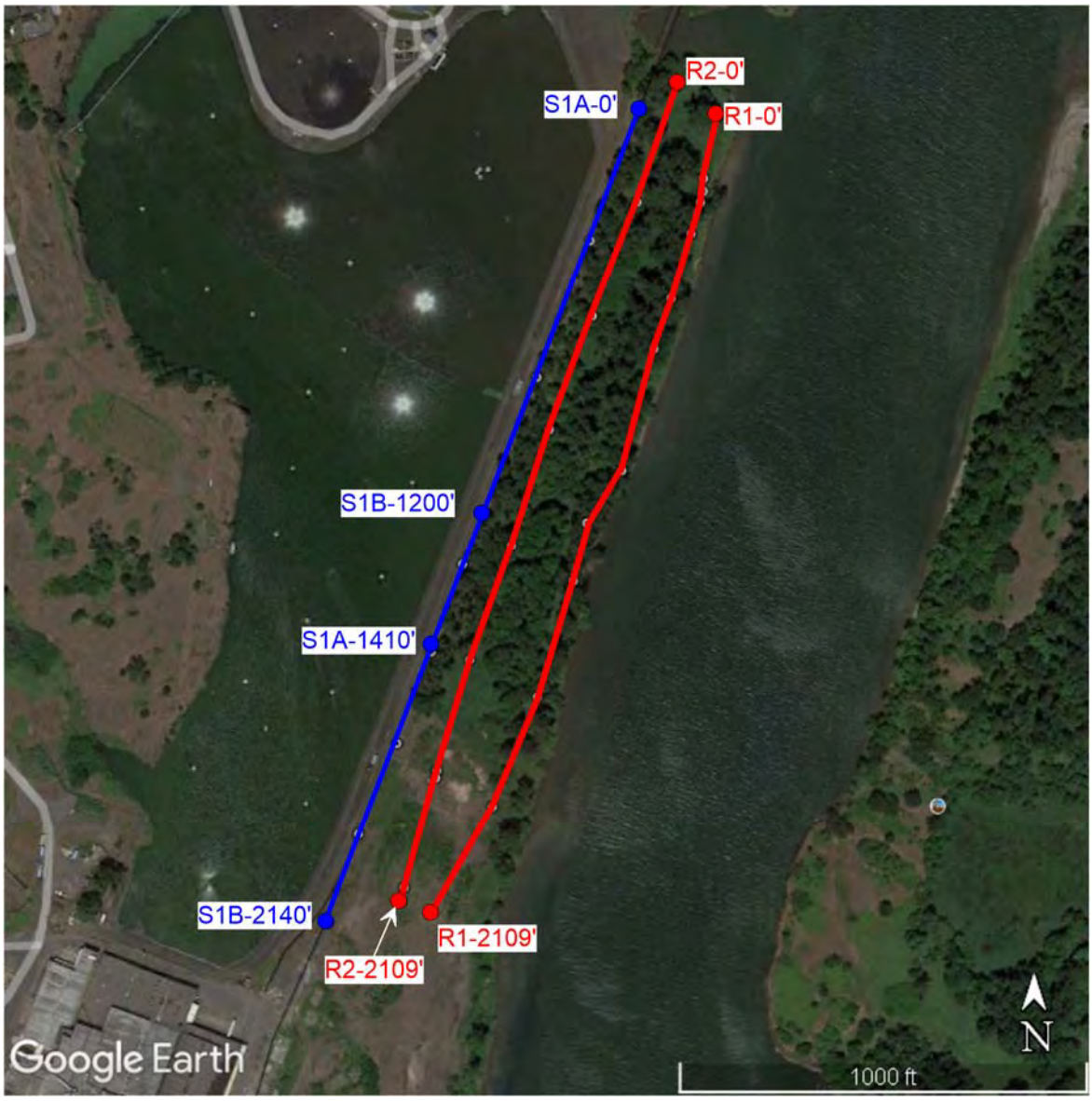


Figure 3-1. Site plan showing approximate locations of geophysical profiles.

4.0 - Discussion

4.1 - Seismic Refraction

The use of explosives as a seismic source provides sufficient energy to provide moderately good confidence in the first arrival picks along the long profiles and the seismic refraction data acquired in this study are generally of good quality.

Exploratory borings completed at the site by others indicate that there is good correlation between the seismic refraction models and the boring log data.

Earth Dynamics LLC has completed numerous seismic refraction studies in Portland and surrounding areas. In many cases it is observed that the minimum velocity of un-weathered and fractured basalt is greater than approximately 5,000 feet per second (ft/sec). Weathered, fractured and/or residual/decomposed basalt typically has a seismic velocity range of 3,000 to 5,000 ft/s. Soils and silts and other unconsolidated sediments typically have a seismic velocity less than 3,000 ft/s.

The interpreted geologic contacts are shown with dashed black lines on the seismic models in Appendix A. Question marks along the interpreted contact indicate that the contact in these areas is less certain. Material with a seismic velocity in the range of 1,000 – 5,000 ft/s is interpreted to be silty sand. Material with a seismic velocity greater than 5,000 ft/s is likely to be basalt bedrock.

The modeled elevation of the top of bedrock varies significantly along the length of Profile S1. From approximately S1-0' to S1-100' the model indicates that basalt may be at an elevation of -100 feet. The top of the basalt then dips steeply to the south. However, this area is near the edge of the model and the interpreted shallow elevation and the steep dip may be a modelling artifact. From S1-300' to S1-1000' the modelled basalt contact rises from an elevation of approximately -320' to -120'. From S1-1000' to S1-2140' the basalt contact rises more gradually from elevation -120 to -50 feet.

4.2 – Electrical Resistivity

The data quality for the electrical resistivity profiles acquired at this site is very good. Very few data points were removed during the inversion process due to negative and anomalous values. The RMS error between the data and model fit for the profiles is less than ten percent.

The two-dimensional models for the resistivity profiles are contained in Appendix B. The profiles are annotated with interpreted contacts and possible lithologic units. The contacts are based on steep gradients in the modelled resistivity profiles.

Both resistivity models suggest that basalt bedrock is present at an elevation of -100 to -150 feet in the southern portion of the profiles. The top of rock appears to be deeper than elevation -200 ft for the northern portion of each profile. The penetration depth of the electrical resistivity models is limited to approximately elevation -200 ft.

4.3 – Summary

The seismic refraction and electrical resistivity models both indicate that basalt may be present at elevation 100’ to 150’ at the southern portions of the profiles. The depth to the top of the basalt increases toward the north.

5.0 - Limitations

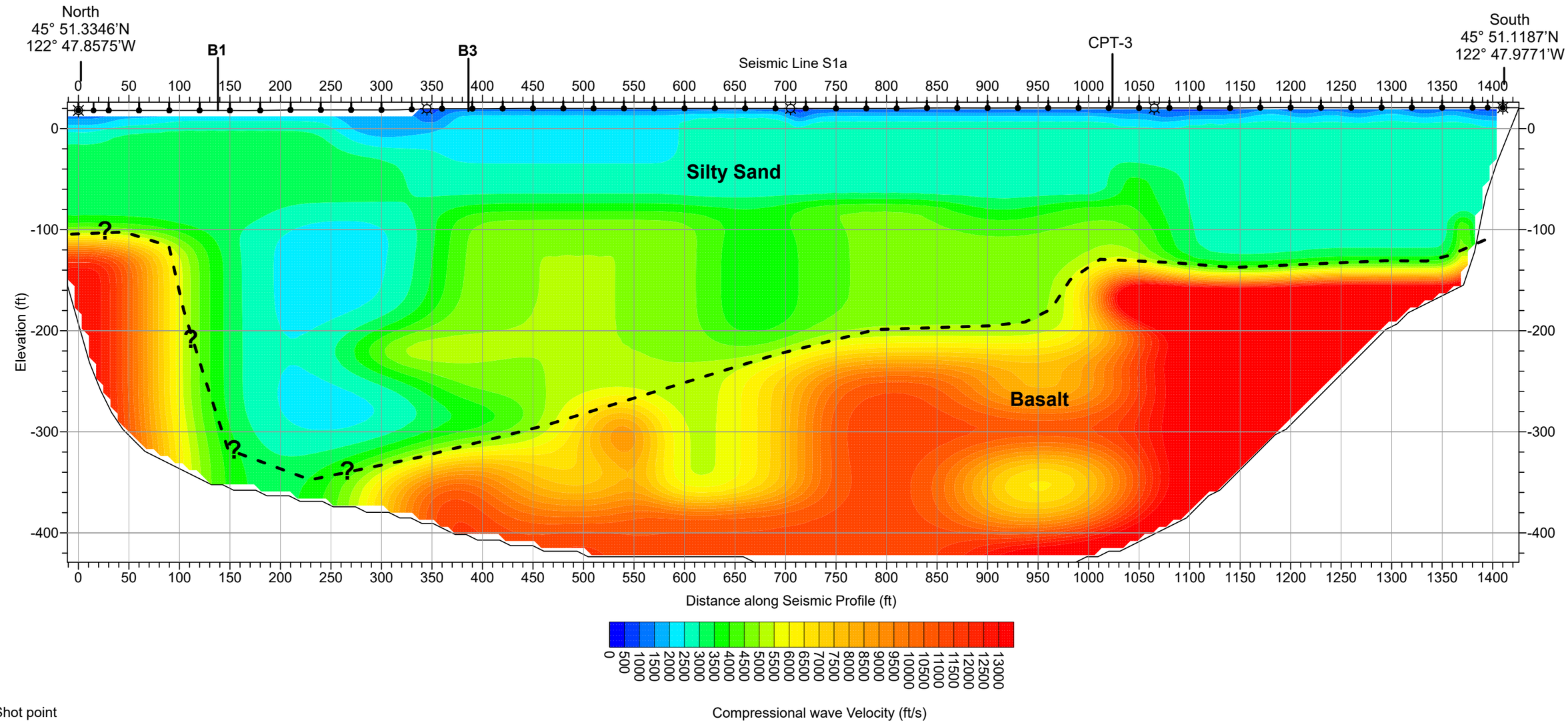
The inversion of seismic refraction and electrical resistivity data does not produce unique models. Theoretically, there are an infinite number of models that will fit the data as well as the models presented in this report. Further, many geologic materials have similar seismic velocity and electrical resistivity. We have presented models and interpretations which we believe to be the best fit given the geology and known conditions at the site. However, no warranty is made or intended by this report or by oral or written presentation of this work. Earth Dynamics LLC accepts no responsibility for damages because of decisions made or actions taken based upon this report.

RESPECTFULLY SUBMITTED
EARTH DYNAMICS LLC

Daniel Lauer, M.S.
Partner - Senior Geophysicist

APPENDIX A

Seismic Refraction Profile Models



Horizontal Scale: 1" = 100'
Vertical Scale: 1" =100'

Elevations surveyed with level and rod and tied to GPS elevation (S1-0' = 3,228.4') .
Horizontal Positions surveyed with Trimble GeoXH 6000 GPS Receiver (Differentially Corrected)

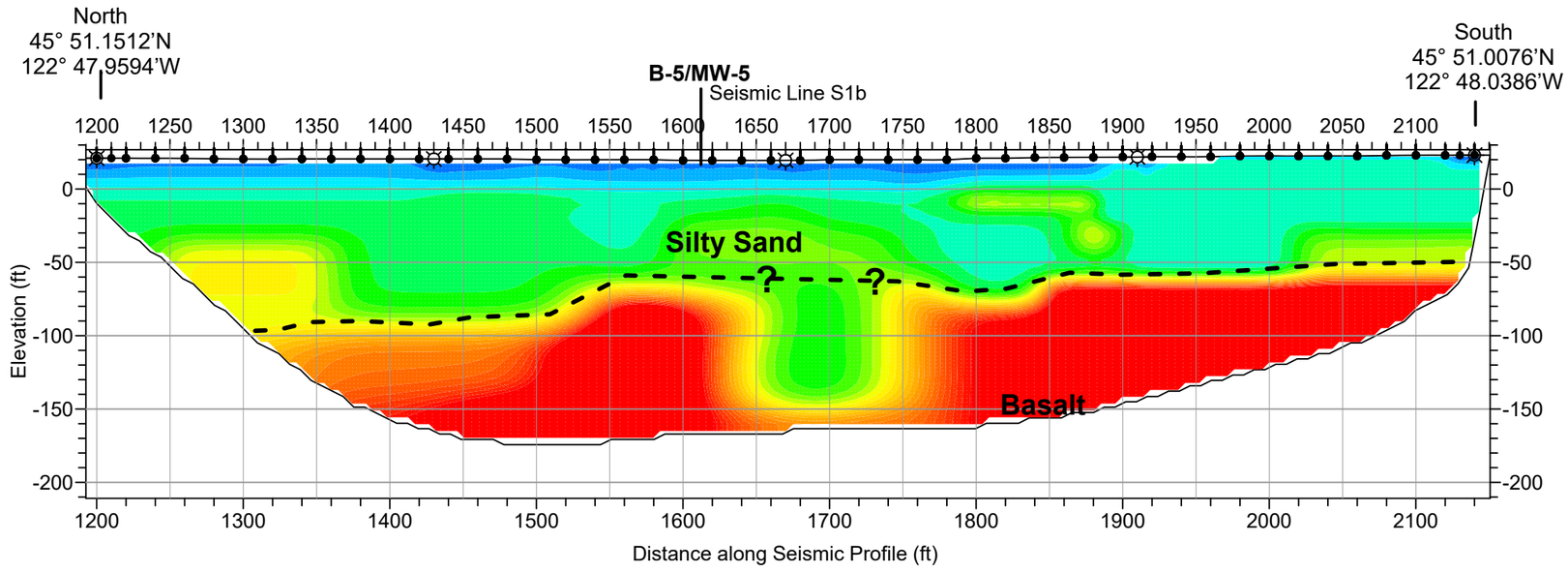
EARTH DYNAMICS LLC
2284 NW Thurman St.
Portland, OR 97210
(503) 227-7659
www.earthdyn.com

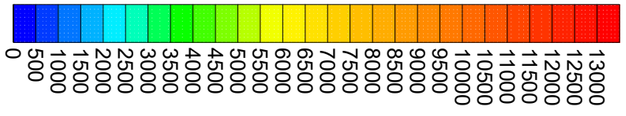
St. Helens Water Treatment Plant

St. Helens, Oregon

Seismic Refraction Profile S1a - SeisOpt2D Model

Job #:	Date:	Figure:
23207	May 2023	A1





Shot point

Geophone

Horizontal Scale: 1" = 100'
Vertical Scale: 1" =100'

Elevations surveyed with level and rod and tied to GPS elevation (S1-0' = 3,228.4') .
Horizontal Positions surveyed with Trimble GeoXH 6000 GPS Receiver (Differentially Corrected)

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2284 NW Thurman St.
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(503) 227-7659
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St. Helens Water Treatment Plant

St. Helens, Oregon

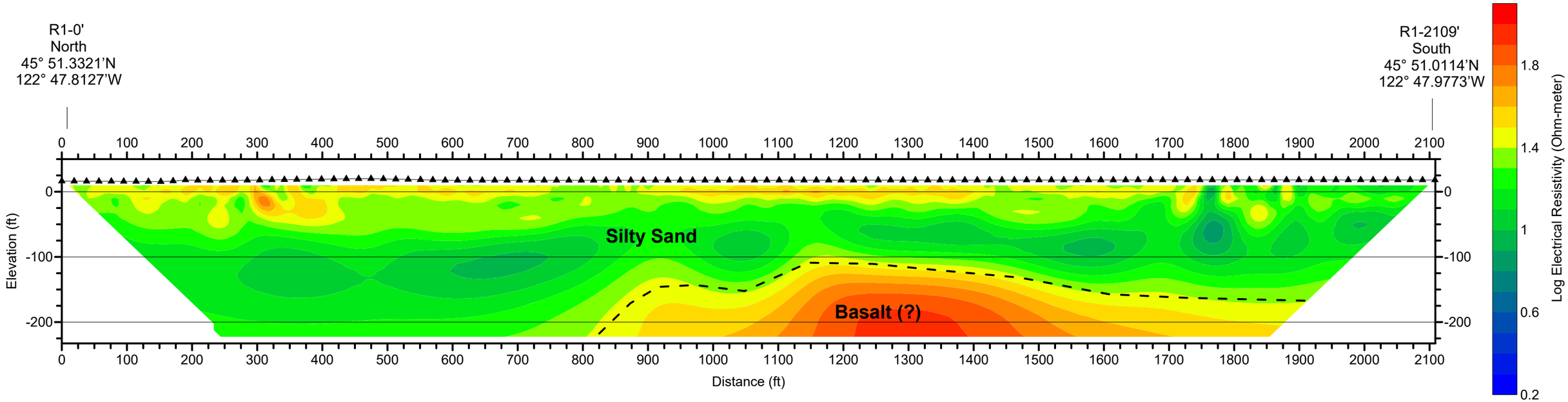
Seismic Refraction Profile S1b - SeisOpt2D Model

Job #:	Date:	Figure:
23207	May 2023	A1

APPENDIX B

Resistivity Profile Models

Profile R1



▲ Electrode Location

Scale 1" = 150'

Horizontal Positions determined with a tape measure. Relative Elevations surveyed with level and rod.
Profile endpoints surveyed with Trimble GeoXH 6000 GPS Receiver
Elevations surveyed with Rod and Level. Elevation tied to Reported GPS Elevation at R1-0' = 16.4'.

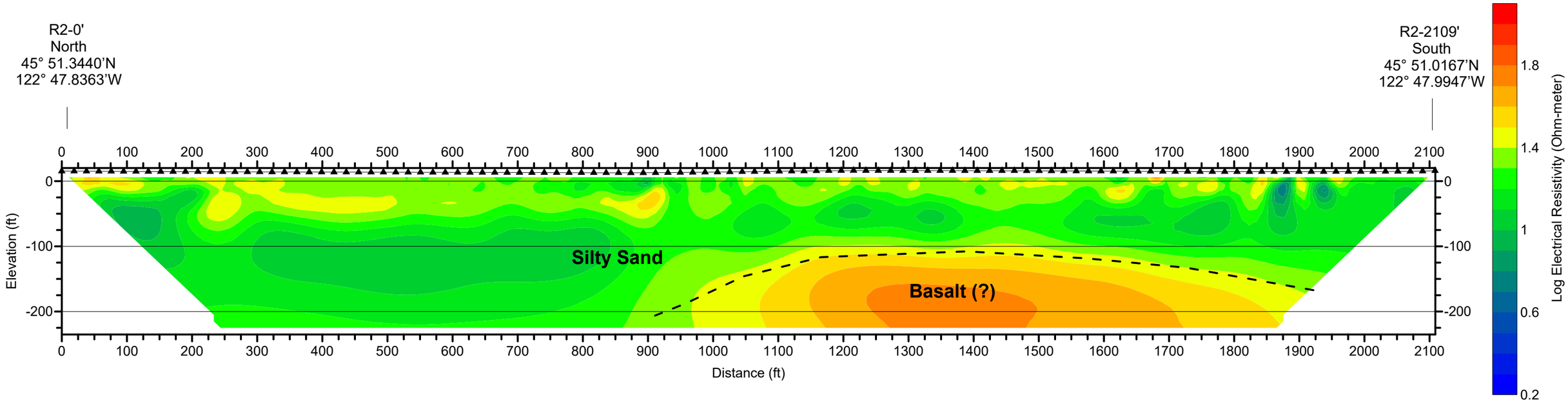
EARTH DYNAMICS LLC
2284 NW Thurman St.
Portland, OR 97210
(503) 227-7659
Email: DLauer@earthdyn.com

St. Helens Water Treatment Plant
St. Helens, Oregon

Resistivity Profile R1

Job #:	Date:	Figure:
23207	May, 2023	B-1

Profile R2



▲ Electrode Location

Scale 1" = 150'

Horizontal Positions determined with a tape measure. Relative Elevations surveyed with level and rod.
Profile endpoints surveyed with Trimble GeoXH 6000 GPS Receiver
Elevations surveyed with Rod and Level. Elevation tied to Reported GPS Elevation at R2-0' = 15.3'.

EARTH DYNAMICS LLC
2284 NW Thurman St.
Portland, OR 97210
(503) 227-7659
Email: DLauer@earthdyn.com

St. Helens Water Treatment Plant
St. Helens, Oregon

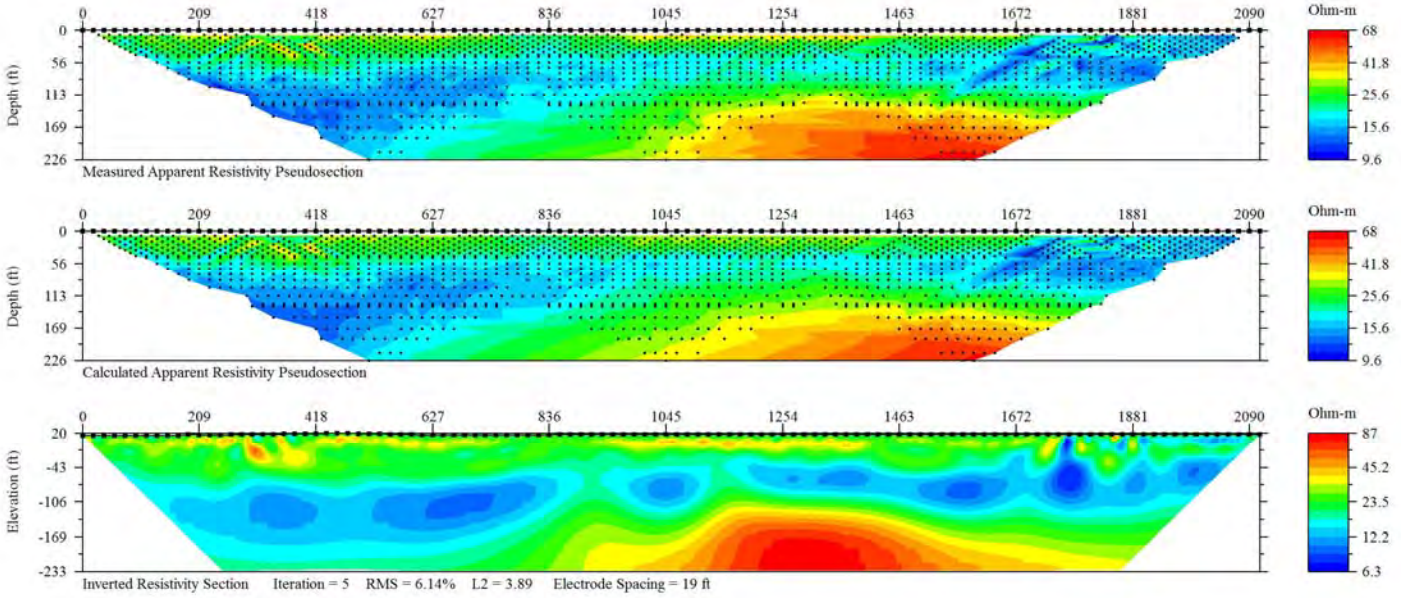
Resistivity Profile R2

Job #:	Date:	Figure:
23207	May, 2023	B-2

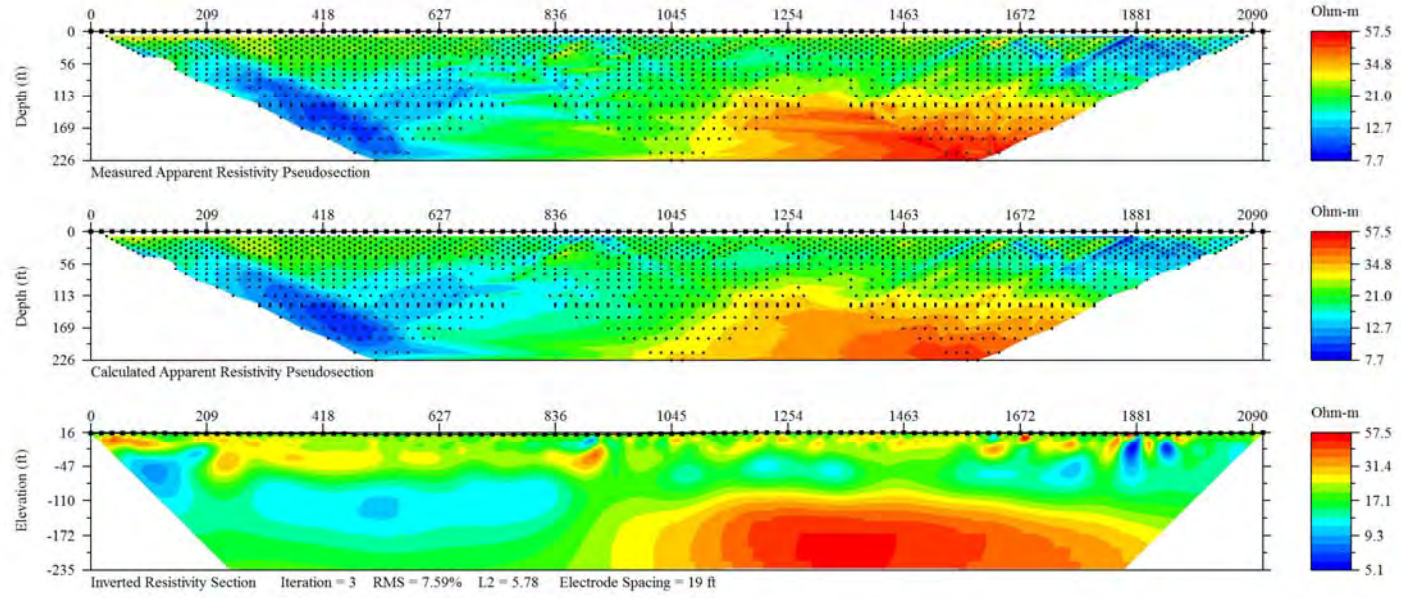
APPENDIX C

Resistivity Data and Model Fit Profiles

R1merged_trial1.stg



R2 merged_trial1.stg



APPENDIX E

Maul Foster & Alongi Boring Logs (2019 and 2023)

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-1**	**1 of 1**

Project Name	**St. Helens Lagoon**		
Project Location	**St. Helens, OR**	Surface Elevation (feet)	**Approx. 9.0**
Start/End Date	**01/30/2023 to 01/30/2023**	Northing	
Driller/Equipment	**Cascade Environmental/Geoprobe 7822 DT**	Easting	
Geologist/Engineer	**C. Schweitzer**	Total Depth of Borehole	**5.0 feet**
Sample Method	**Macro-core**	Outer Hole Diam	**2.25 inch**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
1			**MFA-B1-20230130-21.9**		0.0 to 1.0 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2		**100**			1.0 to 3.0 feet: GRAVEL WITH SAND (GW); dark gray to black; 5% fines; 15% sand, fine to coarse; 80% gravel, fine to coarse; compact; wet.
3					At 2.2 feet: Color change to dark gray to black with slight greenish tint.
4					3.0 to 5.0 feet: BEDROCK; weathered basalt with reddish brown mottles; refusal at 5.0 feet.
5					

Total Depth = 5.0 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 21.5 feet. 5. Top of sludge surface elevation of 9.0 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (21.5 feet). 6. ID = identification. 7. bgs = below ground surface.

Borehole Completion Details
0.0 to 5.0 feet below lagoon bottom: 2.25-inch borehole.

Borehole Abandonment Details
0.0 to 5.0 feet below lagoon bottom: Bentonite chips hydrated with potable water.

Geologic Borehole Log

MAUL FOSTER ALONG

Project Number	Boring Number	Sheet
M0830.03.006	MFA B-2	1 of 1

Project Name	St. Helens Lagoon		
Project Location	St. Helens, OR	Surface Elevation (feet)	Approx. 8.5
Start/End Date	01/31/2023 to 01/31/2023	Northing	
Driller/Equipment	Cascade Environmental/Geoprobe 7822 DT	Easting	
Geologist/Engineer	C. Schweitzer	Total Depth of Borehole	5.0 feet
Sample Method	Macro-core	Outer Hole Diam	2.25 inch

Depth (feet, bgs)	Water Levels	Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
1			MFA-B2-20230131-23.0		0.0 to 2.0 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2		100			2.0 to 4.8 feet: SILT (ML); dark gray to black; 100% fines, low plasticity; soft; moist. At 2.3 feet: Color change to gray with some iron oxide/orange mottling.
3					
4					
5					At 4.5 feet: Color change to dark gray. 4.8 to 5.0 feet: GRAVEL WITH SILT (GW-GM); dark gray; 15% fines; 85% gravel, fine to coarse, subangular; loose; refusal on vesicular basalt bedrock at 5.0 feet.

Total Depth = 5.0 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 22.0 feet. 5. Top of sludge surface elevation of 8.5 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (22.0 feet). 6. ID = identification. 7. bgs = below ground surface.

Borehole Completion Details
0.0 to 5.0 feet below lagoon bottom: 2.25-inch borehole.

Borehole Abandonment Details
0.0 to 5.0 feet below lagoon bottom: Bentonite chips hydrated with potable water.

Geologic Borehole Log

MAUL FOSTER ALONG

Project Number	Boring Number	Sheet
M0830.03.006	MFA B-3	1 of 6

Project Name	St. Helens Lagoon		
Project Location	St. Helens, OR	Surface Elevation (feet)	Approx. 0.5
Start/End Date	01/31/2023 to 02/01/2023	Northing	
Driller/Equipment	Cascade Environmental/Geoprobe 7822 DT	Easting	
Geologist/Engineer	C. Schweitzer	Total Depth of Borehole	110.0 feet
Sample Method	Macro-core	Outer Hole Diam	2.25 inch

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
1		100	MFA-B3-20230131-31.0		0.0 to 2.5 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2					
3					2.5 to 3.0 feet: SAND (SP); dark gray; 100% sand, fine to medium; loose; faint sheen; wet.
4		0			3.0 to 14.5 feet: No recovery.
5					
6					
7		0			
8					
9					
10					
11					
12		0			
13					
14					
15					14.5 to 17.5 feet: SILT (ML); gray; 100% fines, low plasticity; soft; trace organics, plant matter, and rootlets; moist.
16					
17		60			
18					17.5 to 19.5 feet: No recovery.
19					
20		80			19.5 to 23.5 feet: Same as above from 14.5 to 17.5 feet.

MFA BOREHOLE W/RECON SCREEN W:\GINT\GINTW\PROJECTS\M0830.03.006 ST. HELENS.GPJ 8/31/23

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3**	**2 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
21					
22		**80**			
23					
24					*23.5 to 24.5 feet: No recovery.*
25					*24.5 to 27.5 feet: Same as above from 14.5 to 17.5 feet.*
26					
27		**60**			
28					*27.5 to 29.5 feet: No recovery.*
29					
30					*29.5 to 39.0 feet: Same as above from 14.5 to 17.5 feet.*
31					
32		**100**			
33					
34					
35					
36					
37		**90**			
38					
39					*39.0 to 39.5 feet: No recovery.*
40					*39.5 to 54.0 feet: Same as above from 14.5 to 17.5 feet.*
41		**100**			
42					

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3**	**3 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
43					
44		**100**			
45					
46					
47		**100**			
48					
49					
50					
51					
52		**90**			
53					
54					*54.0 to 54.5 feet: No recovery.*
55					*54.5 to 68.5 feet: Same as above from 14.5 to 17.5 feet.*
56					
57		**100**			
58					
59					
60					
61					
62		**100**			
63					
64					

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3**	**4 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
65					
66					
67		100			
68					
69					68.5 to 68.7 feet: SAND (SP); dark gray; 100% sand, fine to medium; loose; moist. 68.7 to 74.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, fine; loose; trace organics and rootlets, trace medium gravels; moist to wet.
70					
71					
72		90			
73					
74					74.0 to 74.5 feet: No recovery.
75					74.5 to 77.5 feet: Same as above from 68.7 to 74.0 feet.
76					
77		100			
78					77.5 to 79.5 feet: Same as above from 14.5 to 17.5 feet with trace sand.
79					
80					79.5 to 94.5 feet: No recovery. Pushed drill point without collecting soil in order to speed up drilling process.
81					
82		0			
83					
84					
85		0			
86					

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3**	**5 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
87					
88		0			
89					
90					
91					
92		0			
93					
94					
95					94.5 to 95.0 feet: Same as above from 14.5 to 17.5 feet with trace sand.
					95.0 to 97.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, fine; loose; moist.
96					
97		90			97.0 to 98.5 feet: Same as above from 14.5 to 17.5 feet.
98					
99					98.5 to 108.5 feet: No recovery. Pushed drill point without collecting soil in order to speed up drilling process.
100					
101					
102		0			
103					
104					
105					
106		0			
107					
108					
		100			108.5 to 110.0 feet: Same as above from 14.5 to 17.5 feet.

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3**	**6 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
110		**100**			

Total Depth = 110.0 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 30.0 feet. 5. Top of sludge surface elevation of 0.5 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (30.0 feet). 6. ID = identification. 7. bgs = below ground surface.

Borehole Completion Details
0.0 to 110.0 feet below lagoon bottom: 2.25-inch borehole.

Borehole Abandonment Details
0.0 to 110.0 feet below lagoon bottom: Bentonite chips hydrated with potable water.

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3A**	**1 of 2**

Project Name	**St. Helens Lagoon**		
Project Location	**St. Helens, OR**	Surface Elevation (feet)	**Approx. 2.5**
Start/End Date	**02/06/2023 to 02/06/2023**	Northing	
Driller/Equipment	**Cascade Environmental/Geoprobe 7822 DT**	Easting	
Geologist/Engineer	**C. Schweitzer**	Total Depth of Borehole	**21.5 feet**
Sample Method	**Macro-core**	Outer Hole Diam	**2.25 inch**

Depth (feet, bgs)	Water Levels	Percent Recovery	Screen Int.	Sample Data: Sample ID	Lithologic Column	Soil Description
1						0.0 to 1.0 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2		100				1.0 to 3.3 feet: SILT (ML); gray; 100% fines, low plasticity; soft; moist.
3						
4						3.3 to 5.5 feet: SAND (SP); gray; 100% sand, fine to medium; loose; moist.
5		60				
6						5.5 to 6.5 feet: No recovery.
7						6.5 to 6.8 feet: SILT (ML); gray; 100% fines, low plasticity; trace organics and rootlets; soft; moist.
8						6.8 to 9.0 feet: SAND (SP); gray; 100% sand, fine to medium; loose; moist.
9		80		MFA-B3A-20230207-GW-36.0		
10						9.0 to 10.5 feet: SILT (ML); gray; 100% fines, low plasticity; trace organics and rootlets; soft; moist.
11						10.5 to 11.5 feet: No recovery.
12						11.5 to 15.0 feet: Same as above from 9.0 to 10.5 feet.
13						
14		70				
15						15.0 to 16.5 feet: No recovery.
16						
17						16.5 to 20.5 feet: Same as above from 9.0 to 10.5 feet.
18		80				
19						
20						

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-3A**	**2 of 2**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Screen Int.	Sample Data: Sample ID	Lithologic Column	Soil Description
21		**80**				20.5 to 21.5 feet: No recovery.

Total Depth = 21.5 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 28.0 feet. 5. Top of sludge surface elevation of 2.5 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (28.0 feet). 6. ID = identification. 7. bgs = below ground surface.

8. Water level measured inside casing with an electric water level meter after sitting overnight to equilibrate. Lagoon water level elevation (28 feet); Casing height above lagoon water (4.9 feet); Depth of water level below casing (17.60 feet); Groundwater elevation = lagoon level (28 feet) plus PVC casing height above lagoon water level (4.9 feet) minus depth to water from top of casing (17.60 feet) = 15.3 feet

Borehole Completion Details
0.0 to 21.5 feet below lagoon bottom: 2.25-inch borehole.

Reconnaissance Well Completion Details
Temporary polyvinyl chloride well screen set from 6.0 to 10.0 feet below lagoon bottom.

Borehole Abandonment Details
0.0 to 21.5 feet below lagoon bottom: Bentonite chips hydrated with potable water.

Geologic Borehole Log

MAUL FOSTER ALONG

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**1 of 6**

Project Name	**St. Helens Lagoon**		
Project Location	**St. Helens, OR**	Surface Elevation (feet)	**Approx. 6.0**
Start/End Date	**02/02/2023 to 02/03/2023**	Northing	
Driller/Equipment	**Cascade Environmental/Geoprobe 7822 DT**	Easting	
Geologist/Engineer	**C. Schweitzer**	Total Depth of Borehole	**110.0 feet**
Sample Method	**Macro-core**	Outer Hole Diam	**2.25 inch**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
1–2					0.0 to 2.0 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2–3		**80**	**MFA-B4-20230202-SL-26.5**		2.0 to 3.5 feet: SILT (ML); dark gray to black; 100% fines, low plasticity; soft; trace organics, plant matter and rootlets; wet.
3–4					3.5 to 4.5 feet: SAND (SP); dark gray; 100% sand, fine to mediuml; loose; wet.
4–5					4.0 to 5.0 feet: No recovery.
5–6					5.0 to 6.5 feet: Same as above from 3.5 to 4.5 feet.
6–7					6.5 to 10.0 feet: SILT (ML); gray; 100% fines, low plasticity; soft; trace organics, plant matter, and rootlets; moist.
7–8		**100**			
8–9					
9–10					
10–11					10.0 to 11.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, fine; loose; moist to wet.
11–12					11.0 to 18.5 feet: Same as above from 6.5 to 10.0 feet.
12–13		**100**			
13–14					
14–15					
15–16					
16–17					
17–18		**70**			
18–19					
19–20					18.5 to 20.0 feet: No recovery.

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Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**2 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
21					20.0 to 23.5 feet: Same as above from 6.5 to 10.0 feet.
22					
23		**70**			
24					23.5 to 25.0 feet: No recovery.
25					25.0 to 29.0 feet: Same as above from 6.5 to 10.0 feet.
26					
27					
28		**80**			
29					29.0 to 30.0 feet: No recovery.
30					30.0 to 34.5 feet: Same as above from 6.5 to 10.0 feet.
31					
32					
33		**90**			
34					
35					34.5 to 35.0 feet: No recovery.
36					35.0 to 39.5 feet: Same as above from 6.5 to 10.0 feet.
37					
38		**90**			
39					
40					39.5 to 40.0 feet: No recovery.
41					40.0 to 44.5 feet: Same as above from 6.5 to 10.0 feet.
42		**90**			

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**3 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
43					
44		**90**			
45					*44.5 to 45.0 feet: No recovery.*
					45.0 to 64.5 feet: Same as above from 6.5 to 10.0 feet.
46					
47					
48		**100**			
49					
50					
51					
52					
53		**100**			
54					
55					
56					
57					
58		**100**			
59					
60					
61					
62					
63		**90**			
64					

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**4 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
65		90			64.5 to 65.0 feet: No recovery.
					65.0 to 69.5 feet: Same as above from 6.5 to 10.0 feet.
66					
67					
68		90			
69					
70					69.5 to 70.0 feet: No recovery.
					70.0 to 74.5 feet: Same as above from 6.5 to 10.0 feet.
71					
72					
73		100			
74					At 73.5 to 74.5 feet: Multiple thin sand lenses.
75					74.5 to 75.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, fine to medium; loose; moist.
					75.0 to 76.5 feet: Same as above from 6.5 to 10.0 feet.
76					
					76.5 to 76.8 feet: Same as above from 74.5 to 75.0 feet.
77					76.8 to 83.5 feet: SILT (ML); gray; 100% fines, low plasticity; soft; moist.
78		100			
79					
80					
81					
82					
83		70			
84					83.5 to 100.0 feet: No recovery. Pushed drill point without collecting soil in order to speed up drilling process.
85					
86		0			

MFA BOREHOLE W/RECON SCREEN W:\GINT\GINTW\PROJECTS\M0830.03.006 ST. HELENS.GPJ 8/31/23

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**5 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
87					
88		0			
89					
90					
91		0			
92					
93					
94					
95		0			
96					
97					
98					
99					
100		90			100.0 to 104.0 feet: Same as above from 76.8 to 83.5 feet.
101					
102					
103					
104					
105					104.5 to 105.0 feet: No recovery. 105.0 to 109.5 feet: Same as above from 76.8 to 83.5 feet.
106					
107		90			
108					

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-4**	**6 of 6**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
110		**90**			109.5 to 110.0 feet: No recovery.

Total Depth = 110.0 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 24.5 feet. 5. Top of sludge surface elevation of 6.0 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (24.5 feet). 6. ID = identification. 7. bgs = below ground surface.

Borehole Completion Details
0.0 to 110.0 feet below lagoon bottom: 2.25-inch borehole.

Borehole Abandonment Details
0.0 to 110.0 feet below lagoon bottom: Bentonite chips hydrated with potable water.

Geologic Borehole Log

MAUL FOSTER ALONG

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-5**	**1 of 2**

Project Name	**St. Helens Lagoon**		
Project Location	**St. Helens, OR**	Surface Elevation (feet)	**Approx. 5.0**
Start/End Date	**02/03/2023 to 02/06/2023**	Northing	
Driller/Equipment	**Cascade Environmental/Geoprobe 7822 DT**	Easting	
Geologist/Engineer	**C. Schweitzer**	Total Depth of Borehole	**30.25 feet**
Sample Method	**Macro-core**	Outer Hole Diam	**2.25 inch**

Depth (feet, bgs)	Water Levels	Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
1					0.0 to 1.5 feet: LAGOON SLUDGE; dark gray to black; 100% fines; low plasticity; abundant decomposed organic material; very soft; wet.
2			**MFA-B5-20230203-SL-27.0**		1.5 to 12.0 feet: SILT (ML); dark gray to black; 100% fines, low plasticity; soft; moist.
3					At 2.5 feet: Color change to gray.
4					
5					
6					
7		**100**			
8					
9					
10					
11					At 11.0 feet: Color change to brownish gray.
12		**60**			12.0 to 14.0 feet: No recovery.
13					
14					14.0 to 20.5 feet: SILT (ML); brownish gray; 100% fines, low plasticity; soft; moist.
15					
16					
17		**100**			
18					
19					At 19.0 feet: Color change to gray.
20		**30**			

MFA BOREHOLE W/RECON SCREEN W:\GINT\GINTW\PROJECTS\M0830.03.006 ST. HELENS.GPJ 8/31/23

MAUL FOSTER ALONG

Geologic Borehole Log

Project Number	Boring Number	Sheet
M0830.03.006	**MFA B-5**	**2 of 2**

Depth (feet, bgs)	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Lithologic Column	Soil Description
21					20.5 to 24.0 feet: No recovery.
22		30			
23					
24					24.0 to 27.0 feet: SILT (ML); gray; 100% fines, low plasticity; soft; moist.
25					At 25.0 feet: Wood piece.
26		60			
27					27.0 to 29.0 feet: No recovery.
28					
29					29.0 to 29.75 feet: GRAVEL WITH SAND (GW); gray; 5% fines; 15% sand, coarse; 80% gravel, fine to coarse, angular; loose; moist.
30		90			29.75 to 30.0 feet: BEDROCK; refusal on vesicular basalt pieces.
					30.0 to 30.25 feet: No recovery.

Total Depth = 30.25 feet bgs

NOTES:

1. Depths are relative to feet below top of the sludge at the lagoon bottom. 2. Lagoon water level elevation at time of drilling: 28 feet 3. Barge deck height above the lagoon: 2.5 feet. 4. Depth below deck to top of sludge: 25.5 feet. 5. Top of sludge surface elevation of 5.0 feet calculated as lagoon water level elevation (28 feet) plus barge deck height above water (2.5 feet) minus depth to top of sludge (25.5 feet). 6. ID = identification. 7. bgs = below ground surface.

Borehole Completion Details
0.0 to 30.25 feet below lagoon bottom: 2.25-inch borehole.

Borehole Abandonment Details
0.0 to 30.25 feet below lagoon bottom: Bentonite chips hydrated with potable water.

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-1**	**1 of 5**

Project Name	**St. Helens Lagoon**	TOC Elevation (feet)	
Project Location	**St. Helens**	Surface Elevation (feet)	
Start/End Date	**7/10/19 to 7/11/19**	Northing	
Driller/Equipment	**Dan Rider/Terra Sonic Incorporated 150 CC**	Easting	
Geologist/Engineer	**C. Schweitzer**	Hole Depth	**100.0-feet**
Sample Method	**Core Barrel: Ten-foot intervals.**	Outer Hole Diam	**6" to 4"-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					*0.0 to 44.0 feet: Basalt with trace vesicles <5%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.*
2									
3									
4									
5									
6									
7									
8									
9									
10			**100**	**CB**					
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-1**	**2 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21			**100**	**CB**					
22									
23									
24									
25									
26									
27									
28									
29									
30			**100**	**CB**					
31									
32									
33									
34									
35									
36									
37									
38									
39									
40			**100**	**CB**					
41									
42									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-1**	**3 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
44									44.0 to 45.5 feet: SANDY CLAY WITH GRAVEL (CL); gray; 70% fines, medium plasticity; 20% sand, coarse to very course; 10% gravel, very fine to coarse; soft; trace weathered bedrock; some fresh, angular bedrock.
45									
46									45.5 to 50.0 feet: Basalt with trace vesicles <5%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.
47									
48									
49									
50			**0**	**CB**					50.0 to 60.0 feet: No recovery.
51									
52									
53									
54									
55									
56									
57									
58									
59									
60			**100**	**CB**					60.0 to 64.0 feet: Basalt with trace vesicles <5%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.
61									
62									
63									
64									64.0 to 71.0 feet: SANDY CLAY WITH GRAVEL (CL); gray with brown mottling; 70% fines, medium plasticity; 20% sand, medium to very course, angular; 10% gravel, very fine to coarse, angular; soft; highly weathered insitu basalt bedrock in a fine matrix of weathered material with weathering rinds, slight porosity, slight
65									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-1**	**4 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									*intact bedrock.*
67									
68									
69									
70			**100**	**CB**					
71									*71.0 to 75.0 feet: GRAVELLY CLAY WITH SAND (CL); dark gray when wet; 60% fines; 10% sand, very fine to coarse; 30% gravel, fine to very coarse, angular; soft; trace weathered bedrock; wet.*
72									
73									
74									
75									*75.0 to 80.0 feet: Highly vesicular basalt >20%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are open and filled with firm dark gray clay material that encapsulates the bedrock.*
76									
77									
78									
79									
80			**100**	**CB**					*80.0 to 90.0 feet: Highly vesicular basalt <20%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (high to low angle), joints are closed.*
81									
82									
83									
84									
85									
86									
87									
88									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-1**	**5 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					@ 90.0 feet: Becomes less vesicular <10%.
91									
92									
93									
94									
95									@ 95.0 feet: Becomes less vesicular <5%, and increase in jointing.
96									
97									
98									
99									
100									

Total Depth = 100.0 feet bgs.

Borehole Details:
0.0 to 80.0 feet bgs: 6-inch borehole.
80.0 to 100.0 feet bgs: 4-inch borehole.

Borehole Completion Details:
0.0 to 5.0 feet bgs: Concrete.
5.0 to 58.0 feet bgs: Bentonite chips hydrated with potable water.
58.0 to 81.5 feet bgs: 12/20 Silica Sand.
81.5 to 100.0 feet bgs: Bentonite chips hydrated with potable water.

Monitoring Well Completion
Well Tag Number: L133559
Flushmount monitoring well.
0.0 to 60.0 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
60.0 to 80.0 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
80.0 to 80.5 feet bgs: 2-inch-diameter end cap.

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-2**	**1 of 5**

Project Name	**St. Helens Lagoon**	TOC Elevation (feet)	
Project Location	**St. Helens**	Surface Elevation (feet)	
Start/End Date	**7/8/19 to 7/10/19**	Northing	
Driller/Equipment	**Dan Rider/Terra Sonic Incorporated 150 CC**	Easting	
Geologist/Engineer	**C. Schweitzer**	Hole Depth	**100.0-feet**
Sample Method	**Core Barrel: Ten-foot intervals.**	Outer Hole Diam	**6" to 4"-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1–20			**100**	**CB**					*0.0 to 62.0 feet: Basalt with trace vesicles <5%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.*
10			**100**	**CB**					

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-2**	**2 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21			**100**	**CB**					
22									
23									
24									
25									
26									
27									
28									
29									
30			**100**	**CB**					
31									
32									
33									
34									
35									
36									
37									
38									
39									
40			**100**	**CB**					
41									
42									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-2**	**3 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
44									
45									
46									
47									
48									
49									
50			**100**	**CB**					
51									
52									
53									
54									
55									
56									
57									
58									
59									
60			**100**	**CB**					
61									
62									
63									*62.0 to 68.0 feet: SANDY CLAY WITH GRAVEL (CL); gray with brown mottling; 70% fines; 20% sand, medium to very course; 10% gravel, very fine to medium, angular; soft; highly weathered insitu bedrock in a fine matrix, with slight porosity; some intact bedrock with weathering rinds.*
64									
65									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-2**	**4 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									@ 66.0 feet: Becomes gray with more intact rock only moderately weathered.
67									
68									68.0 to 100.0 feet: Highly vesicular basalt <20%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (high to low angle), fewer joints, joints are closed.
69									
70			**100**	**CB**					
71									
72									
73									
74									
75									
76									
77									
78									
79									
80			**100**	**CB**					@ 80.0 feet: Becomes less vesicular, <10%.
81									
82									
83									
84									
85									@ 85.0 feet: Becomes less vesicular, <5%, with an increase in joints.
86									
87									
88									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-2**	**5 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

Total Depth = 100.0 feet bgs.

Borehole Details:
0.0 to 70.0 feet bgs: 6-inch borehole.
70.0 to 100.0 feet bgs: 4-inch borehole.

Borehole Completion Details:
0.0 to 2.0 feet bgs: Concrete.
2.0 to 48.0 feet bgs: Bentonite chips hydrated with potable water.
48.0 to 71.0 feet bgs: 12/20 Silica Sand.
71.0 to 100.0 feet bgs: Bentonite chips hydrated with potable water.

Monitoring Well Completion
Well Tag Number: L133560
Flushmount monitoring well.
0.0 to 50.0 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
50.0 to 70.0 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
70.0 to 70.5 feet bgs: 2-inch-diameter end cap.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-3**	**1 of 5**

Project Name	**St. Helens Lagoon**	TOC Elevation (feet)	
Project Location	**St. Helens**	Surface Elevation (feet)	
Start/End Date	**7/17/19 to 7/17/19**	Northing	
Driller/Equipment	**Dan Rider/Terra Sonic Incorporated 150 CC**	Easting	
Geologist/Engineer	**C. Schweitzer**	Hole Depth	**100.0-feet**
Sample Method	**Core Barrel: Ten-foot intervals.**	Outer Hole Diam	**6" to 4"-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					0.0 to 1.0 feet: SANDY GRAVEL (GW); gray; 0% fines; 20% sand; 80% gravel, fine to coarse, angular; loose; no odor; no sheen; moist.
2									1.0 to 2.0 feet: GRAVELLY CLAY (CL); brown; 80% fines, medium plasticity; 0% sand; 20% gravel, very fine to medium, angular; stiff; no odor; no sheen; moist.
3									2.0 to 5.0 feet: SAND WITH GRAVEL (SW); gray; 0% fines; 90% sand, very fine to coarse; 10% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; moist.
4									
5									
6			**100**	**CB**					5.0 to 5.5 feet: GRAVELLY CLAY (CL); brown; 80% fines, medium plasticity; 0% sand; 20% gravel, very fine to medium, angular; stiff; no odor; no sheen; moist.
7									5.5 to 8.0 feet: SANDY CLAYEY GRAVEL (GW); gray; 20% fines, medium plasticity; 30% sand, medium to coarse; 50% gravel, fine to coarse, angular; loose; trace cobbles; no odor; no sheen; moist.
8									
9									8.0 to 10.0 feet: GRAVELLY SAND (SW); brown; 0% fines; 80% sand, fine to coarse; 20% gravel, fine to very coarse, angular; loose; trace silt clasts; no odor; no sheen; moist.
10									
11									10.0 to 15.0 feet: No recovery.
12									
13									
14									
15									
16			**100**	**CB SPT**			**21, 11, 15**		15.0 to 22.0 feet: SAND WITH GRAVEL (SW); gray; 0% fines; 90% sand, fine to medium; 10% gravel, fine to very coarse, angular; loose; trace silt clasts; no odor; no sheen; moist.
17									
18									
19									
20									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-3**	**2 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21									
22									22.0 to 48.0 feet: SAND (SP); dark gray; 0% fines; 100% sand, very fine to medium; 0% gravel; very loose; no odor; no sheen; wet.
23									
24									
25			**0**	**CB**					
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40			**100**	**CB**					
41									
42									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-3**	**3 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Sample Data: Percent Recovery	Sample Data: Collection Method	Sample Data: Number	Sample Data: Name (Type)	Sample Data: Blows/6"	Lithologic Column	Soil Description
44									
45									
46									
47									
48									48.0 to 75.0 feet; SILT (ML); gray; 100% fines, low plasticity; 0% sand; 0% gravel; soft; trace organics, plant matter, and rootlets; no odor; no sheen; moist to wet.
49									
50			**100**	**CB**					
51									
52									
53									
54									
55									
56									
57									
58									
59									
60			**100**	**CB**					
61									
62									
63									
64									
65									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-3**	**4 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									
67									
68									
69									
70			**100**	**CB**					
71									
72									
73									
74									
75									*75.0 to 80.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, very fine to fine; 0% gravel; loose; trace organics and wood fragments; no odor; no sheen; wet.*
76									
77									
78									
79									
80			**100**	**CB**					*Basalt with trace vesicles <5%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.*
81									
82									
83									
84									
85									
86									
87									
88									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-3**	**5 of 5**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

Total Depth = 100.0 feet bgs.

Borehole Details:
0.0 to 90.0 feet bgs: 6-inch borehole.
90.0 to 100.0 feet bgs: 4-inch borehole.

Borehole Completion Details:
0.0 to 3.0 feet bgs: Concrete.
3.0 to 5.0 feet bgs: 12/20 Silica Sand.
5.0 to 23.0 feet bgs: Bentonite chips hydrated with potable water.
23.0 to 46.5 feet bgs: 12/20 Silica Sand.
46.5.0 to 70.0 feet bgs: Bentonite chips hydrated with potable water.
70.0 to 100.0 feet bgs: Native soil heave/slough.

Monitoring Well Completion
Well Tag Number: L133572
Flushmount monitoring well.
0.0 to 25.0 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
25.0 to 45.0 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
45.0 to 45.5 feet bgs: 2-inch-diameter end cap.

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**1 of 6**

Project Name	**St. Helens Lagoon**	TOC Elevation (feet)	
Project Location	**St. Helens**	Surface Elevation (feet)	
Start/End Date	**7/15/19 to 7/15/19**	Northing	
Driller/Equipment	**Dan Rider/Terra Sonic Incorporated 150 CC**	Easting	
Geologist/Engineer	**C. Schweitzer**	Hole Depth	**120.0-feet**
Sample Method	**Core Barrel: Ten-foot intervals.**	Outer Hole Diam	**6" to 4"-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					*0.0 to 2.0 feet: SANDY GRAVEL (GW); gray; 0% fines; 20% sand; 80% gravel, fine to very coarse, angular; loose; no odor; no sheen; moist.*
2									*@ 1.5 feet: Becomes brown.*
3									*2.0 to 4.0 feet: GRAVELLY CLAY (CL); brown; 80% fines, medium plasticity; 0% sand; 20% gravel, very fine to medium, angular; stiff; no odor; no sheen; moist.*
4									
5									*4.0 to 8.5 feet: SAND WITH GRAVEL (SW); gray; 0% fines; 90% sand, very fine to coarse; 10% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; moist.*
6			**100**	**CB SH**		**Shelby tube at 5.0'**			*@ 4.1 feet: Piece of black plastic.*
7									
8									
9									*8.5 to 11.0 feet: GRAVELLY SAND (SW); gray; 0% fines; 70% sand, very fine to coarse; 30% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; moist.*
10									
11									
12									*11.0 to 12.0 feet: SANDY CLAYEY GRAVEL (GW); brown; 20% fines, medium plasticity; 30% sand, medium to coarse; 50% gravel, very fine to coarse, angular; loose; trace slightly weathered vesicular basalt cobbles; no odor; no sheen; moist.*
13									*12.0 to 13.0 feet: SANDY GRAVELLY CLAY (CL); brown fines with gray sand; 50% fines, medium plasticity; 30% sand, very fine to medium; 20% gravel, very fine to medium, angular; very soft; no odor; no sheen; wet.*
14									*13.0 to 16.0 feet: GRAVELLY SAND (SW); gray; 0% fines; 80% sand, fine to coarse; 20% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; wet.*
15			**100**	**CB SPT**			**25, 21, 16**		
16									*16.0 to 20.0 feet: SANDY GRAVEL WITH CLAY (GW); brown; 10% fines; 40% sand, fine to very coarse; 50% gravel, fine to very coarse, angular; loose; some cobbles; no odor; no sheen; wet.*
17									
18									
19									
20									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**2 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21									20.0 to 23.0 feet: SAND WITH GRAVEL (SW); brown; 0% fines; 90% sand, fine to very coarse; 10% gravel, fine to very coarse, angular; loose; no odor; no sheen; wet.
22									
23									23.0 to 65.0 feet: SAND (SP); dark gray; 0% fines; 100% sand, very fine to medium; 0% gravel; very loose; no odor; no sheen; wet.
24									
25			**0**	**CB**					
26									
27									
28									
29									
30									
31									
32									
33									
34									
35			**0**	**CB**					
36									
37									
38									
39									
40									
41									
42									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**3 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60			**100**	**CB**					
61									
62									
63									
64									
65									65.0 to 95.0 feet; SILT (ML); gray; 100% fines, low plasticity; 0% sand; 0% gravel; soft; trace organics, plant matter, and rootlets; no

NOTES: 1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**4 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									odor; no sheen; moist to wet.
67									
68									
69									
70			**100**	**CB**					
71									
72									
73									
74									
75									
76									
77									
78									
79									
80			**100**	**CB**					
81									
82									
83									
84									
85									
86									
87									
88									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**5 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					
91									
92									
93									
94									
95									
96									*95.0 to 105.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, very fine to fine; 0% gravel; loose; trace organics and rootlets; no odor; no sheen; wet.*
97									
98									
99									
100			**100**	**CB**					
101									
102									
103									
104									
105									*105.0 to 113.0 feet; SILT (ML); gray; 100% fines, low plasticity; 0% sand; 0% gravel; soft; trace organics, and rootlets; no odor; no sheen; moist.*
106									
107									
108									
109									
110			**100**	**CB**					
111									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-4**	**6 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
112									
113									
114									113.0 to 120.0 feet: SILTY SAND (SM); gray; 20% fines, low plasticity; 80% sand, very fine to fine; 0% gravel; loose; trace organics and rootlets; no odor; no sheen; moist.
115									
116									@ 116.0 feet: Becomes only 10% fines.
117									@ 117.0 feet: wood fragment.
118									
119									
120									

Total Depth = 120.0 feet bgs.

Borehole Details:
0.0 to 90.0 feet bgs: 6-inch borehole.
90.0 to 120.0 feet bgs: 4-inch borehole.

Borehole Completion Details:
0.0 to 2.0 feet bgs: Concrete.
2.0 to 27.0 feet bgs: Bentonite chips hydrated with potable water.
27.0 to 51.0 feet bgs: 12/20 Silica Sand.
51.0.0 to 75.0 feet bgs: Bentonite chips hydrated with potable water.
75.0 to 120.0 feet bgs: Native soil heave/slough.

Monitoring Well Completion
Well Tag Number: L133571
Flushmount monitoring well.
0.0 to 30.0 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
30.0 to 50.0 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
50.0 to 50.5 feet bgs: 2-inch-diameter end cap.

NOTES: 1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**1 of 6**

Project Name	**St. Helens Lagoon**	TOC Elevation (feet)	
Project Location	**St. Helens**	Surface Elevation (feet)	
Start/End Date	**7/16/19 to 7/16/19**	Northing	
Driller/Equipment	**Dan Rider/Terra Sonic Incorporated 150 CC**	Easting	
Geologist/Engineer	**C. Schweitzer**	Hole Depth	**120.0-feet**
Sample Method	**Core Barrel: Ten-foot intervals.**	Outer Hole Diam	**6" to 4"-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					0.0 to 2.0 feet: SANDY GRAVEL (GW); gray; 0% fines; 20% sand; 80% gravel, fine to coarse, angular; loose; no odor; no sheen; moist.
2									
3									2.0 to 3.0 feet: GRAVELLY CLAY (CL); brown; 80% fines, medium plasticity; 0% sand; 20% gravel, very fine to medium, angular; stiff; no odor; no sheen; moist.
4									3.0 to 6.0 feet: SAND WITH GRAVEL (SW); gray; 0% fines; 90% sand, very fine to coarse; 10% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; moist.
5									
6			**100**	**CB SPT**			**10, 11, 15**		@ 5.0 feet: Thin brown silt bed.
7									6.0 to 9.0 feet: SANDY CLAYEY GRAVEL (GW); gray; 20% fines, medium plasticity; 30% sand, medium to coarse; 50% gravel, very fine to coarse, angular; loose; no odor; no sheen; moist.
8									
9									
10									9.0 to 15.0 feet: GRAVELLY SAND (SW); gray; 0% fines; 80% sand, fine to coarse; 20% gravel, fine to very coarse, angular; loose; trace cobbles; no odor; no sheen; moist.
11									
12									
13									
14									
15									
16			**100**	**CB**					15.0 to 16.0 feet: SANDY GRAVELLY CLAY (CL); brown fines with gray sand and gravel; 50% fines, medium plasticity; 30% sand, very fine to medium; 20% gravel, fine to medium, angular; very soft; no odor; no sheen; wet.
17									16.0 to 23.0 feet: SAND WITH GRAVEL (SW); gray; 0% fines; 90% sand, fine to medium; 10% gravel, fine to very coarse, angular; loose; no odor; no sheen; wet.
18									
19									
20									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**2 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21									
22									
23									23.0 to 63.0 feet: SAND (SP); dark gray; 0% fines; 100% sand, very fine to medium; 0% gravel; very loose; no odor; no sheen; wet.
24									
25			**100**	**CB SPT**			**2, 3, 6**		
26									
27									
28									
29									
30									
31									
32									
33									
34									
35			**0**	**CB**					
36									
37									
38									
39									
40									
41									
42									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**3 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60			**100**	**CB**					
61									
62									
63									
64									63.0 to 103.0 feet; SILT (ML); gray; 100% fines, low plasticity; 0% sand; 0% gravel; soft; trace organics, plant matter, and rootlets; no odor; no sheen; moist to wet.
65									

NOTES: 1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**4 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									
67									
68									
69									
70			**100**	**CB**					
71									
72									
73									
74									
75									
76									
77									
78									
79									
80			**100**	**CB**					
81									
82									
83									
84									
85									
86									
87									
88									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**5 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					
91									
92									
93									
94									
95									
96									
97									
98									
99									
100			**100**	**CB**					
101									
102									
103									103.0 to 120.0 feet: Basalt with some vesicles <25%, dark gray when wet, fresh, hard, close non-systematically jointed, randomly oriented (low to high angle), joints are closed.
104									
105									
106									
107									
108									
109									
110			**100**	**CB**					@ 110.0 feet: Becomes less vesicular, <10%.
111									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-5**	**6 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
112									
113									
114									
115									@ 115.0 feet: Becomes less vesicular, <5%.
116									
117									
118									
119									
120									

Total Depth = 120.0 feet bgs.

Borehole Details:
0.0 to 90.0 feet bgs: 6-inch borehole.
90.0 to 120.0 feet bgs: 4-inch borehole.

Borehole Completion Details:
0.0 to 5.0 feet bgs: Concrete.
5.0 to 27.0 feet bgs: Bentonite chips hydrated with potable water.
27.0 to 51.0 feet bgs: 12/20 Silica Sand.
51.0.0 to 54.0 feet bgs: Bentonite chips hydrated with potable water.
54.0 to 120.0 feet bgs: Native soil heave/slough.

Monitoring Well Completion
Well Tag Number: L133553
Flushmount monitoring well.
0.0 to 30.0 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
30.0 to 50.0 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
50.0 to 50.5 feet bgs: 2-inch-diameter end cap.

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**1 of 6**

Project Name	**St. Helens Lagoon**	TOC Elevation (feet)	
Project Location	**St. Helens**	Surface Elevation (feet)	
Start/End Date	**7/11/19 to 7/12/19**	Northing	
Driller/Equipment	**Dan Rider/Terra Sonic Incorporated 150 CC**	Easting	
Geologist/Engineer	**C. Schweitzer**	Hole Depth	**120.0-feet**
Sample Method	**Core Barrel: Ten-foot intervals.**	Outer Hole Diam	**6" to 4"-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					0.0 to 4.0 feet: SANDY GRAVEL (GW); gray; 0% fines; 20% sand; 80% gravel, fine to very coarse, angular; loose; no odor; no sheen; moist.
2									
3									@ 2.5 feet: Becomes brown.
4									
5									4.0 to 5.0 feet: GRAVELLY CLAY (CL); brown; 60% fines, medium plasticity; 0% sand; 40% gravel, very fine to medium, angular; stiff; no odor; no sheen; moist.
6			**100**	**CB SPT**			**6, 4, 5**		5.0 to 6.0 feet: SANDY CLAYEY GRAVEL (GW); brown with dark gray sand and gravel; 20% fines, medium plasticity; 30% sand, medium to coarse; 50% gravel, very fine to coarse, angular; loose; fines in clumps; no odor; no sheen; moist.
7									6.0 to 10.0 feet: SAND WITH GRAVEL (SW); brown; 0% fines; 90% sand, very fine to coarse; 10% gravel, fine to very coarse, angular; loose; trace cobbles up to 2 inch; no odor; no sheen; moist.
8									
9									
10									
11									10.0 to 11.0 feet: SILTY GRAVELLY SAND (SM); dark gray; 30% fines, low plasticity; 50% sand, very fine to medium; 20% gravel, fine to medium, angular; loose; trace cobbles up to 3 inch; no odor; no sheen; moist.
12									11.0 to 20.0 feet: GRAVELLY SAND (SW); gray; 0% fines; 80% sand, fine to very coarse; 20% gravel, fine to very coarse, angular; loose; trace cobbles up to 2 inch; no odor; no sheen; moist.
13									@ 13.0 feet: Becomes brown, with a thin silt bed.
14									
15			**100**	**CB SH**		**Shelby Tube at 15.0'**			
16									@ 16.0 feet: Becomes gray, with a thin silt bed.
17									
18									@ 18.0 feet: Becomes brown.
19									
20									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**2 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21–42			**0**	**CB SPT**			**1, 2, 5**		*20.0 to 55.0 feet: SAND (SP); dark gray; 0% fines; 100% sand, very fine to medium; 0% gravel; very loose; no odor; no sheen; wet.*

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**3 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
44–65			**100**	**CB**					55.0 to 120.0 feet; SILT (ML); gray; 100% fines, low plasticity; 0% sand; 0% gravel; soft; trace organics, plant matter, and rootlets; trace light interbeded zones of light gray sand; no odor; no sheen; moist to wet.
			100	**CB**					

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**4 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66									
67									
68									
69									
70			**100**	**CB**					
71									
72									
73									
74									
75									
76									
77									
78									
79									
80			**100**	**CB**					
81									
82									
83									
84									
85									
86									
87									
88									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**5 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
89									
90			**100**	**CB**					
91									
92									
93									
94									
95									
96									
97									
98									
99									
100			**100**	**CB**					
101									
102									
103									
104									
105									
106									
107									
108									
109									
110			**100**	**CB**					
111									

NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0830.03.04-02	**MW-6**	**6 of 6**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
112									
113									
114									
115									
116									
117									
118									
119									
120									

Total Depth = 120.0 feet bgs.

Borehole Details:
0.0 to 120.0 feet bgs: 6-inch borehole.

Borehole Completion Details:
0.0 to 3.5 feet bgs: Concrete.
3.5 to 28.0 feet bgs: Bentonite chips hydrated with potable water.
28.0 to 51.0 feet bgs: 12/20 Silica Sand.
51.0 to 120.0 feet bgs: Native soil heave/slough.

Monitoring Well Completion
Well Tag Number: L133558
Flushmount monitoring well.
0.0 to 30.5 feet bgs: 2-inch-diameter, schedule 40, PVC blank riser pipe.
30.5 to 50.5 feet bgs: 2-inch-diameter, schedule 40, 0.010-inch machine slot, pre-pack well screen.
50.5 to 51.0 feet bgs: 2-inch-diameter end cap.

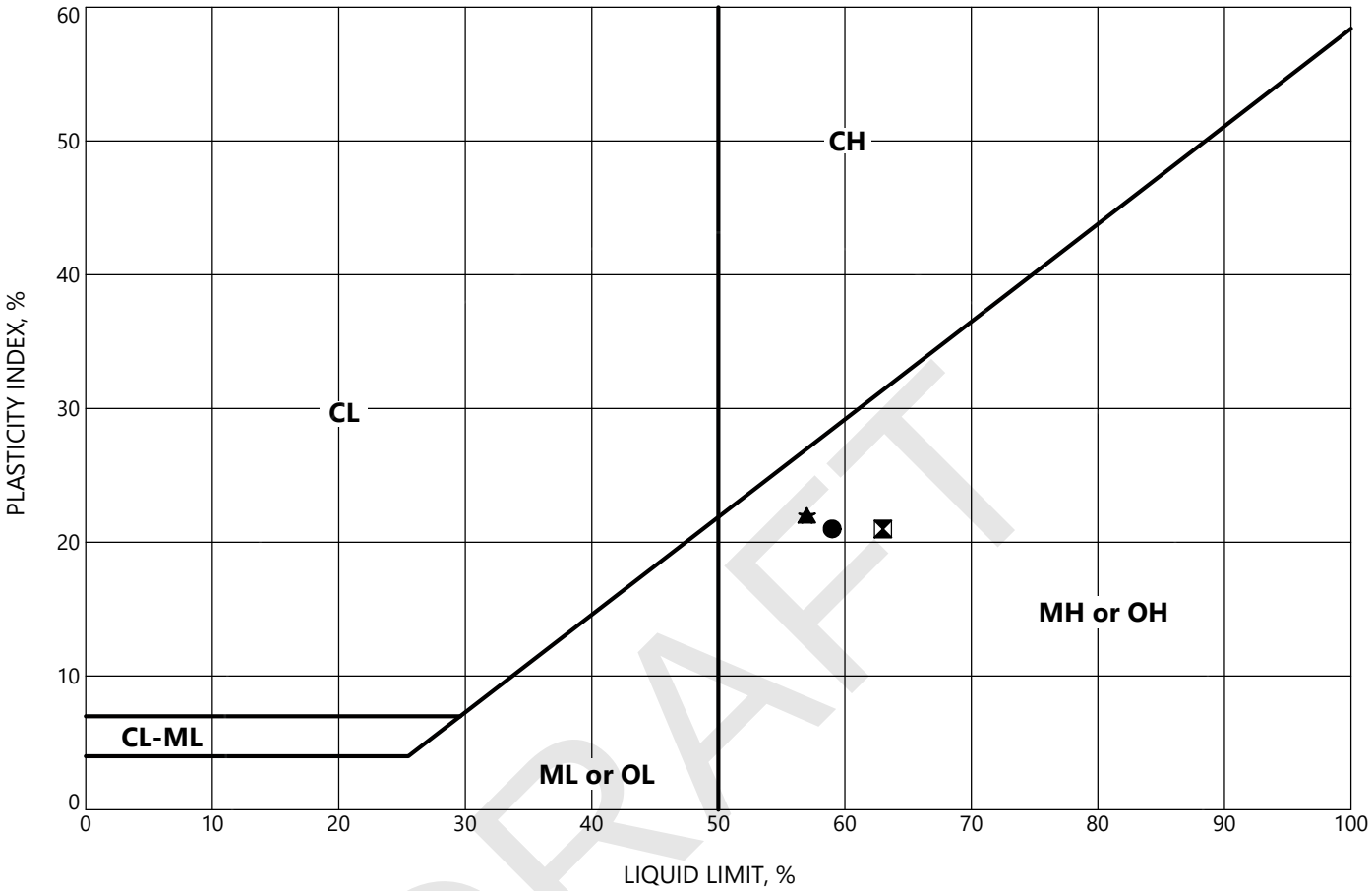
NOTES: *1. bgs = below ground surface. 2. PVC = polyvinyl chloride. 3. CB = Core Barrel. 4. SH = Shelby Tube. 5. SPT = Standard Penetration Test.*

APPENDIX F

Maul Foster & Alongi - Atterberg Limits Results (2023)

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILT
CH	INORGANIC CLAYS OF HIGH PLASTICITY



	Location	Sample	Depth, ft	Classification	LL	PL	PI	MC, %
●	MFA B-3A		13.0	MH	59	38	21	59
⊠	MFA B-3		26.5	MH	63	42	21	57
▲	MFA B-3		46.5	MH	57	35	22	54
★	MFA B-3		64.5	MH	57	35	22	52

GRI

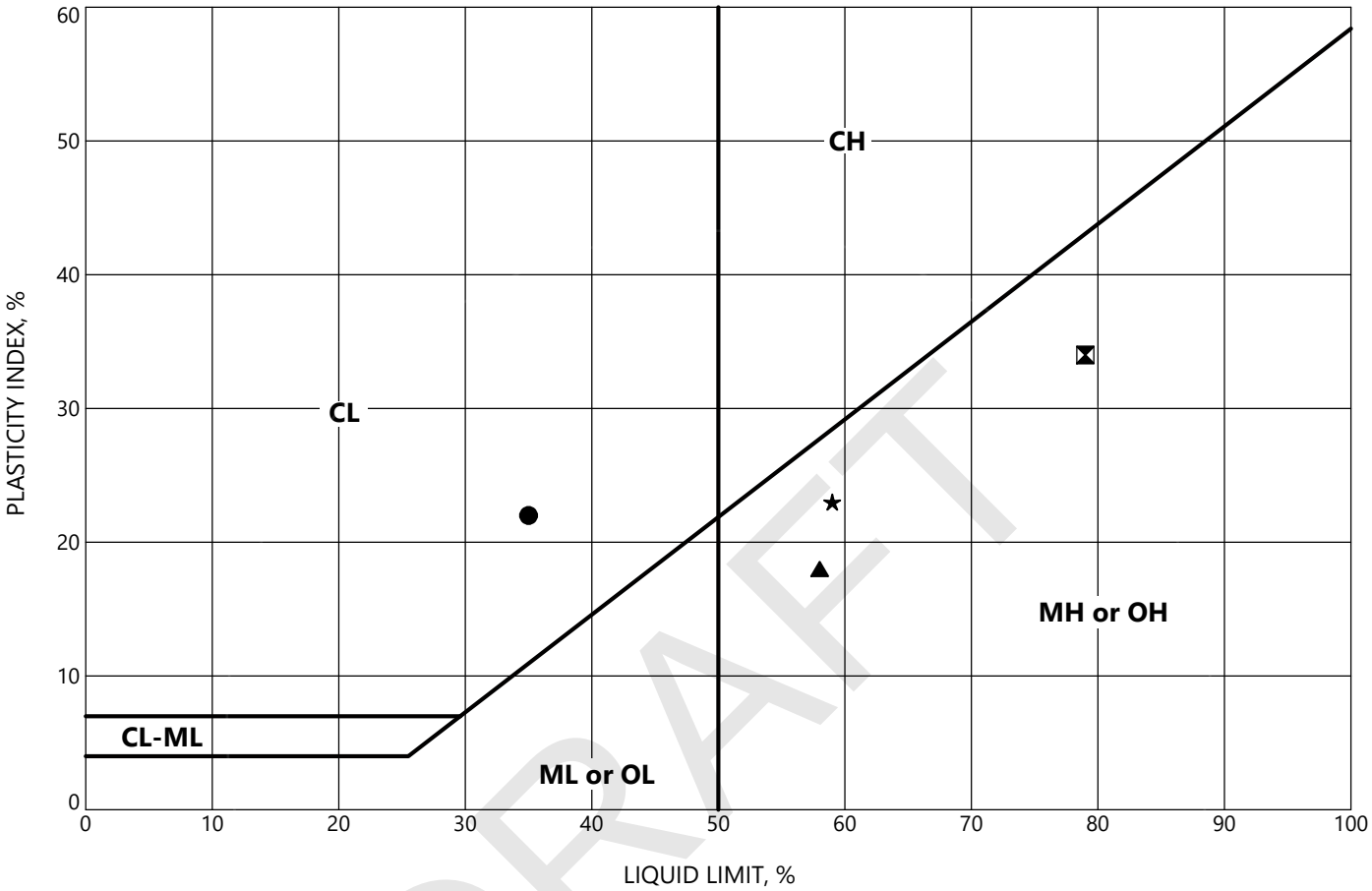
PLASTICITY CHART

JUNE 2023 JOB NO. 6771-A FIG. 1C

ATTERBERG-PLASTICITY 4 PER PAGE GRI DATA TEMPLATE.GDT 6/30/23

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILT
CH	INORGANIC CLAYS OF HIGH PLASTICITY



	Location	Sample	Depth, ft	Classification	LL	PL	PI	MC, %
●	MFA B-3		108.5	MH	35	13	22	45
⊠	MFA B-4		17.5	MH	79	45	34	78
▲	MFA B-4		37.5	MH	58	40	18	53
★	MFA B-4		51.0	MH	59	36	23	56

GRI

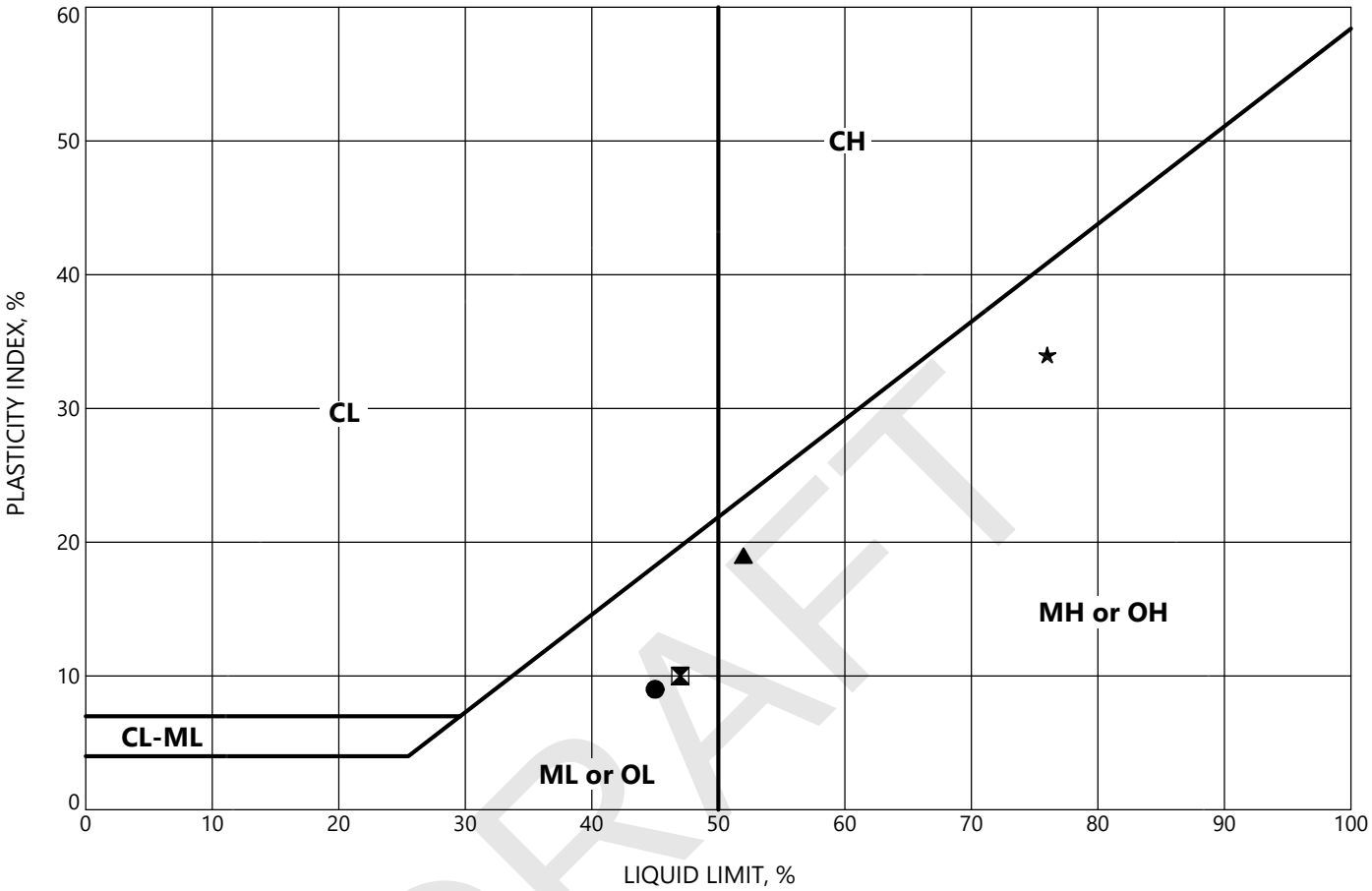
PLASTICITY CHART

JUNE 2023 JOB NO. 6771-A FIG. 2C

ATTERBERG-PLASTICITY 4 PER PAGE GRI DATA TEMPLATE.GDT 6/30/23

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE-GRAINED SOIL GROUPS
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILT
CH	INORGANIC CLAYS OF HIGH PLASTICITY



	Location	Sample	Depth, ft	Classification	LL	PL	PI	MC, %
●	MFA B-4		77.5	ML	45	36	9	44
⊠	MFA B-4		101.5	ML	47	37	10	46
▲	MFA B-5		9.5	MH	52	33	19	51
★	MFA B-5		22.5	MH	76	42	34	86

GRI

PLASTICITY CHART

JUNE 2023 JOB NO. 6771-A FIG. 3C

APPENDIX G

Shannon and Wilson Exploration Logs (1968 and 1969)

BORING NO. B-1

STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▲ Blows per foot

Surface Elevation: 19.8'

USC	SOIL DESCRIPTION	DEPTH, feet
SP	Loose, light brown to gray, clean, fine to medium SAND with occasional wood fragments (FILL)	7.5
ML-CL	Soft, light gray to gray, clayey to fine sandy SILT with partings of fine to medium sand and traces of shell fragments	15.0
GM	Very stiff, medium brown, iron stained, clayey SILT with [illegible] hard BASALT fragments. [illegible]	17.5
Bs	[illegible] (See fig. B-2)	27.5
	Bottom of Boring Completed 9/23/69	

FIG. B-1

HOLE NO. B-1

PROJECT	AERATION LAGOON, ST. HELENS, OREGON
JOB NO.	W-1702-01
SHEET	1 OF 1
CLIENT	J. H. Whiteley & Associates
DRILLING AGENCY	Soil Sampling Service
ELEVATION	19.8'
LOCATION (COORDINATES OR STATION)	See Fig. 1
DIRECTION AND INCLINATION OF HOLE	☒ VERTICAL
SOIL SAMPLING FOOTAGE	21.0'
CORING FOOTAGE	6.8'
TOTAL DEPTH OF HOLE	27.8'
SIZE & TYPE OF BIT	BX
MFR. DESIGNATION OF DRILL	Mobile
NUMBER OF SOIL SAMPLES	PENETRATION 7 TUBES 1
DEPTH TO WATER	7.2'
TOTAL CORE RECOVERY	6.5 FT 96 %
DATE HOLE	STARTED Sept. 23, 1969; COMPLETED Sept. 23, 1969
INSPECTOR (S)	John H. Hughes

CLASSIFICATION AND DESCRIPTION OF MATERIAL:

See Figure B-1 for sample description above core point

10/15/69

Top of bedrock Elev. 1.3 ft.

BASALT, hard, light gray, dense, highly fractured, trace of coarse vesicules to 1 inch, fractures with iron stain & [illegible] enrichment, fractures space 1½ to 6 inches apart, low to high angle — % core recovery 100%, 60%, 100%

Bottom of Boring Elevation -7.7' Depth 27.8'

REMARKS (BIT, CASING, DRILL MUD, WATER LOSS, DRILLING ACTION, ETC.):

Hole advanced from surface to 21.0' by driving Standard Penetration test & taking Shelby samples at bottom of hollow stem auger (4 inch I.D.) Using auger as casing at 21.0', hole advanced below 21.0' by BX coring

Fairdrill water return, cored uniformly

Fairdrill water return, cored uniformly

Fairdrill water return, cored uniformly

NOTE: No pressure test run in this boring

FIG. B-2

BORING NO. B-2

Surface Elevation: 35.5'

USC	SOIL DESCRIPTION	DEPTH, feet
GM	Medium dense to very dense FILL composed of hard, angular, dark gray BASALT fragments to 3 inches with voids filled with dark brown permeable silty fine to medium SAND	8.5
	Bottom of Boring Completed 9/23/69	

NOTE: Refusal to auger at depth of 8.5 ft.

Blows per foot: 54, 35

FIG. B-3

BORING NO. B-3

Surface Elevation: 18.8'

USC	SOIL DESCRIPTION	DEPTH, feet
GM	Loose to very dense FILL composed of hard, angular, dark gray BASALT fragments up to 2 foot size (crushed quarry rock) with voids filled with permeable, very silty, fine to coarse, basaltic SAND	10.0
GM	Dense to very dense TALUS or FILL composed of hard, dark gray, angular BASALT fragments to 1 foot, in matrix of soft, damp, red brown, sandy, clayey SILT	14.0
	Bottom of Boring Completed 9/24/69	

NOTE: Refusal to auger at depth of 8 ft., moved location; refusal to auger at depth of 13 ft. at new location.. Rough drilling throughout boring.

Blows per foot: 74/9", 41, 56

FIG. B-4

BORING NO. B-4

Surface Elevation: [illegible]

Bottom of Boring Completed 9/24/69

NOTES: 1. Refusal to auger at depth of 4 ft., moved location; refusal to auger at 5 ft. at new location

2. See Fig. B-6 for log of boring B-4A which extends below bottom of boring B-4

FIG. B-5

HOLE NO. B-4A

PROJECT: AERATION LAGOON, ST. HELENS, OREGON — JOB NO. W-1702-01 — SHEET 1 OF 1

CLIENT: J. H. Whiteley & Associates — DRILLING AGENCY: Soil Sampling Service

DEPTH TO WATER: Not determined — TOTAL CORE RECOVERY: 10.3 FT 100 %

INSPECTOR (S): John H. Hughes

Top of bedrock Elev. 11.0'

Bottom of Boring Elevation [illegible] Depth 19.0'

FIG. B-6

HOLE NO. B-5

PROJECT: AERATION LAGOON, ST. HELENS, OREGON — JOB NO. W-1702-01 — SHEET 1 OF 2

CLIENT: J. H. Whiteley & Associates — DRILLING AGENCY: Soil Sampling Service

DEPTH TO WATER: Not determined — TOTAL CORE RECOVERY: 37.0 FT 99 %

Pressure Test 1, Interval 11.2'-25.2' At 10 psi interval took 0 cfm At 25 psi interval took 0 cfm

Pressure Test 2, Interval 22.7'-36.2' At 18 psi interval took 0 cfm At 40 psi interval took 0 cfm

Sheet 1 of 2

FIG. B-7

HOLE NO. B-5

SHEET 2 OF 2 — JOB NO. W-1702-01

See Sheet 1

Bottom of Boring Elevation -4.0 ft.

Sheet 2 of 2

FIG. B-7

NOTE: SOILS INVESTIGATION CONDUCTED BY SHANNON & WILSON

LEGEND

- 2.0" O.D. split spoon sample
- 3.0" O.D. thin-wall sample
- Sample not recovered
- Atterberg limits: Liquid limit; Natural water content; Plastic limit
- Impervious seal
- Water level
- Piezometer tip
- P Sampler pushed
- USC Unified Soil Classification
- ● % Water content

CITY OF ST. HELENS, OREGON			REVISIONS
SECONDARY TREATMENT FACILITY			
LOG OF BORINGS & TEST PITS			
WHITELEY-JACOBSEN & ASSOCIATES CONSULTING ENGINEERS 1910 E. OLIVE WAY SEATTLE, 98122 EA 2-7677 WASHINGTON	DRAWN: R.C.	CHECKED: SH	SHEET NO. C-5
	APPROVED: J.H.W.	DATE: 9-26-70	

Stamp: REGISTERED PROFESSIONAL ENGINEER 6133 OREGON JACK H. WHITELEY

HOLE NO. B-6

PROJECT	JOB NO.	SHEET 1 OF 2
AERATION LAGOON, ST. HELENS, OREGON	W-1702-01	

CLIENT: J. B. Whitaker & Associates	DRILLING AGENCY: Soil Sampling Service
ELEVATION	LOCATION (COORDINATES OR STATION): See Fig. 1
DIRECTION AND INCLINATION OF HOLE: VERTICAL	SOIL SAMPLING FOOTAGE / CORING FOOTAGE / TOTAL DEPTH OF HOLE
SIZE & TYPE OF BIT / TYPE DESIGNATION OF DRILL: Mobile	NUMBER OF SOIL SAMPLES: PENETRATION / TUBES
DEPTH TO WATER: Not detected	TOTAL CORE RECOVERY / DATE HOLE / INSPECTOR(S)

[illegible]

FIG. B-5

HOLE NO. B-6

PROJECT	JOB NO.	SHEET 2 OF 2
AERATION LAGOON, ST. HELENS, OREGON	W-1702-01	

DEPTH FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (BIT, CASING, DRILL MUD, WATER LOSS, DRILLING ACTION, ETC.)
30	See Sheet 1	100%	Run 11 Box 3	Lost small volume of water at beginning of Run 11 (See Pressure Test 2). Fair, light grey water return from 30' to [illegible]
	BASALT, as above (29.0'–32.0') but with fractures filled with silt, dark brown, iron rich silt to ½ inch, interval pervious	100%	Run 12 Box 3	
35	BASALT, very hard, dense, highly fractured with fractures [illegible], irregular, intersecting, dip 10°–60°, spaced 2–6 inches apart with random chlorite on fracture planes, also numerous, low to high angle, irregular, intersecting tight healed fractures	100%	Run 13	
40		100%	Run 14 Box 4	Pressure Test 2, [illegible]
		100%		
	BASALT, as above [illegible] except moderately fractured with fractures spaced 6–22 inches apart; also few high angle, tight, healed, irregular fractures	98%		
	BASALT, as above [illegible], highly fractured with fractures [illegible]	100%		Poor drill water at [illegible]. Fair, light grey water return
	[illegible]	98%		
	Bottom of Boring Elevation [illegible]			

NOTE: [illegible]

FIG. B-6

BORING NO. B-7

USC	SOIL DESCRIPTION — Surface Elevation: 8.7'	DEPTH, feet	SAMPLES	GROUND WATER	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▲ Blows per foot (0, 10, 20)
SP	Very loose, gray-brown, fine to medium SAND (FILL)		1		
[illegible]	Very soft to soft, gray to gray-brown, [illegible] SILT with [illegible] and scattered wood fragments. Slightly organic. [illegible]		2–7		
[illegible]	[illegible]				
	Bottom of Boring [illegible]				

FIG. B-9

HOLE NO. B-8

PROJECT	JOB NO.	SHEET 1 OF 1
AERATION LAGOON, ST. HELENS, OREGON	W-1702-01	

CLIENT: J. B. Whitaker & Associates	DRILLING AGENCY: Soil Sampling Service
ELEVATION: [illegible]	LOCATION (COORDINATES OR STATION): See Fig. 1
DIRECTION AND INCLINATION OF HOLE: VERTICAL	SOIL SAMPLING FOOTAGE: [illegible] / CORING FOOTAGE: 8.7' / TOTAL DEPTH OF HOLE: 8.7'
SIZE & TYPE OF BIT: NX / TYPE DESIGNATION OF DRILL: Mobile	NUMBER OF SOIL SAMPLES: PENETRATION 0, TUBES 0
DEPTH TO WATER: Not detected	TOTAL CORE RECOVERY: [illegible] FT, 74 %
DATE HOLE: STARTED Oct. 2, 1969; COMPLETED Oct. 2, 1969	INSPECTOR(S): John H. Hughes

DEPTH FEET	CLASSIFICATION AND DESCRIPTION OF MATERIAL	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (BIT, CASING, DRILL MUD, WATER LOSS, DRILLING ACTION, ETC.)
	[illegible], dark gray, tight, dense [illegible] fractures with iron [illegible]	[illegible]	Run 1 Box 1	Hole advanced from surface by coring with NX diamond bit. Fair drill water return down to [illegible] at which point water was lost. Cored uniformly
	[illegible] Bottom of Boring Elevation [illegible]	[illegible]	Run 2 Box 1	No drill water return. Intermittent soft zones in Run 2. Attempted to drill 3 inch casing down with diamond casing bit but unable to get below 20 inches due to crushed hole. Hole requires casing. Abandoned hole. Pressure Test in open hole at 8.7' depth, pumped [illegible] gallons per minute into hole with pump [illegible] & hole did not fill up. No purpose in running packer test

FIG. B-10

HOLE NO. B-9A

[illegible]

CLIENT: J. B. Whitaker & Associates

DEPTH TO WATER: Not detected

[illegible]

FIG B-11

BORING NO. B-9

USC	SOIL DESCRIPTION — Surface Elevation: 8.7'	STANDARD PENETRATION RESISTANCE
OL	Soft, brown to gray-brown, [illegible] sandy to clayey SILT with irregular [illegible] of fine sand. Slightly organic	
OL	Soft, light gray SILT with carbonized wood fragments and plant material	
OL	Soft, gray, clayey to fine sandy SILT with [illegible] fragments to 2"	
[illegible]	Medium dense, light brown, clayey SILT [illegible] fragments. [illegible]	
[illegible]	Very dense, gray & tan-brown, highly weathered [illegible]	
	Bottom of Boring Completed 10/[illegible]	

NOTE: 1. Very rough drilling [illegible] ft. to [illegible] ft. 2. Piezometer installation [illegible] destroyed

FIG. B-12

HOLE NO. B-10

[illegible]

FIG. B-13

LEGEND

[illegible]

NOTE: SOILS INVESTIGATION CONDUCTED BY SHANNON & WILSON

CITY OF ST. HELENS, OREGON		
[illegible] TREATMENT FACILITY		
LOG OF BORINGS & TEST PITS		
[illegible]-JACOBSEN & ASSOCIATES CONSULTING ENGINEERS, 1610 [illegible] WAY, SEATTLE, 98122, WASHINGTON	DRAWN: R.C. / CHECKED: SH / APPROVED: J.H.W. / DATE: 3-16-70	SHEET NO. C-6

BORING NO.WB-6

USC	SOIL DESCRIPTION	DEPTH, feet	SAMPLES	GROUND WATER	DEPTH, feet	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▲ Blows per foot
	Surface Elevation: 8.5'			10/14/88		0 10 20
SP	Loose, gray, clean, fine to medium SAND (Dredge Spoil)	2.0	1		0	
OH-PT	Very soft, brown-gray and green-gray to gray, slightly clayey SILT with scattered wood fragments	18.0	2 3 4 5 6		5 10 15	
ML-OL	Very soft, gray, slightly fine, sandy SILT & SILT with plant & wood fragments throughout	28.0	7		20	
	Bottom of Boring Completed 10/14/88				25 30 35 40	
					0 50 100	

FIG.B-22

BORING NO. WB-7

USC	SOIL DESCRIPTION	DEPTH, feet	SAMPLES	GROUND WATER	DEPTH, feet	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▲ Blows per foot
	Surface Elevation: 8.5'			10/15/88		0 10 20
SP	Loose, gray, clean, fine SAND (Dredge Spoil)	2.5	1		0	
OH-PT	Very soft, gray to mottled green-gray and gray, clayey to slightly clayey SILT with wood fragments throughout	30.5	2 3 4		5 10 15	28.0'
ML	Loose to medium dense, gray, slightly fine sandy SILT to silty fine SAND		5			
PT	Broken BASALT in very soft, brown, organic SILT matrix	33.5	6		20	
	Bottom of Boring Completed 10/15/88				25 30 35 40	
					0 50 100	

FIG.B-23

BORING NO.WB-8

USC	SOIL DESCRIPTION	DEPTH, feet	SAMPLES	GROUND WATER	DEPTH, feet	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▲ Blows per foot
	Surface Elevation: 8.0'					0 10 20
ML-OL	Medium stiff, red-brown and brown variegated to gray, slightly clayey to slightly fine sandy SILT (Dredged Material)	12.0	1 2 3 4 5		0 5 10	
ML	Very soft to soft, gray, slightly fine sandy SILT with plant and wood fragments scattered throughout and with occasional lenses of very fine sand 13.0 to 18.0 ft.		6 7 8		15 20	
			9		25 30	
			10		35	
	Bottom of Boring at 48.0 ft. Completed 10/10/88	48.0	11 12		40 45	
					0 50 100	

FIG.B-24

BORING NO.WB-9

USC	SOIL DESCRIPTION	DEPTH, feet	SAMPLES	GROUND WATER	DEPTH, feet	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▲ Blows per foot
	Surface Elevation: 12.0' approx.			10/14/88		0 10 20
SM-SP	Medium dense, brown and red-brown to gray, fine sandy to slightly fine sandy SILT (Dredged Material)	5.0	1		0	
ML	Soft, red-brown to gray, slightly fine sandy SILT	7.0	2		5	
OH-PT	Very soft, gray, slightly clayey SILT	10.0	3 4 5		10 15	
ML	Soft, gray SILT and slightly fine sandy SILT with wood and plant fragments scattered throughout. Slightly organic.		6 7		20	
			8		25 30	
ML SM	Soft, gray SILT with scattered fine sand partings	35.0	9 10		35	
	Bottom of Boring Completed 10/10/88	38.5			40	
					0 50 100	

FIG.B-25

BORING NO.WB-10

USC	SOIL DESCRIPTION	DEPTH, feet	SAMPLES	GROUND WATER	DEPTH, feet	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▲ Blows per foot
	Surface Elevation: 7.0'					0 10 20
OL	Very soft, gray-brown SILT with roots	1.0	1		0	
SP	Loose, gray, slightly gravelly, fine to coarse SAND	1.5				
OH	Very soft, gray SILT with plant fragments scattered throughout. Slightly organic.	8.0	2		5	
OH-CL	Very soft, slightly clayey SILT with scattered plant fragments	8.0	3 4		10	
OH	Very soft, gray SILT with wood and plant fragments throughout		5 6 7 8 9		15 20 25 30	
ML-OH	Very soft, gray SILT with scattered fine sandy lenses and partings	30.0	10		35	
	Bottom of Boring Completed 10/17/88	36.5	11		40	
					0 50 100	

FIG.B-26

BORING NO. A-1

USC	SOIL DESCRIPTION	DEPTH, feet	SAMPLES	GROUND WATER	DEPTH, feet	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▲ Blows per foot
	Surface Elevation: 15.0'					0 5 10 15 20
SP	Loose, gray, fine to medium SAND (not to saturated)	0	1		0	
OH	Very soft to soft, gray, slightly clayey SILT; trace of organics	15.0	2 3 4 5 6	7/29/88	10 20 30 40 50 60 70	3.0
ML	Soft, gray, slightly sandy micaceous SILT; trace of organics	32.0	7 8 9 10			
ML	Medium, stiff, gray, very sandy SILT and loose, silty, very fine SAND	52.0	11			
ML	Hard, light gray SILT	65.0	12			
	Bottom of Boring Completed 2/29/88	68.0				
					0 20 40 60 80	

FIG.B-27

BORING NO. A-2

USC	SOIL DESCRIPTION	DEPTH, feet	SAMPLES	GROUND WATER	DEPTH, feet	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▲ Blows per foot
	Surface Elevation: 16.0'					0 5 10 15 20
SP	Very loose, gray, fine to medium SAND	0	1	3/1/88	0	
OH	Very soft, gray, clayey SILT; with organics	12.0	2		10	
ML	Very soft, gray, sandy micaceous SILT; with a trace of organics, becomes stiff below 25 feet	17.0	3 4		20 30 40	
Rock	Broken, black BASALT on bedrock and boulder	27.5	5			
	Bottom of Boring on bedrock or boulder Completed 3/1/88	31.5				
					0 20 40 60 80	

FIG.B-28

BORING NO. A-3

USC	SOIL DESCRIPTION	DEPTH, feet	SAMPLES	GROUND WATER	DEPTH, feet	STANDARD PENETRATION RESISTANCE (140 lb. weight, 30" drop) ▲ Blows per foot
	Surface Elevation: 22.5 feet					0 5 10 15 20
SP	Very loose to loose, gray, fine to medium SAND (damp at 8') (saturated at 12')	8.0	1		0	
OH	Very soft to soft, gray, clayey SILT	22.0	2 3 4 5 6	2/27/88	10 20 30 40 50	
ML	Very soft, gray, fine sandy, micaceous SILT; with a trace of organics	32.0	7 8			
OH	Very soft, gray, clayey SILT; with organics	40.0	9			
ML	Loose, gray, very fine SAND Bottom of Boring Completed 2/27/88	48.0 to 49.5				
					0 20 40 60 80	

FIG.B-29

NOTE: SOILS INVESTIGATION CONDUCTED BY SHANNON & WILSON

LEGEND

- 2.0" O.D. split spoon sample
- 3.0" O.D. thin-wall sample
- ✱ Sample not recovered
- Atterberg limits: LL Liquid limit; Natural water content; PL Plastic limit
- Impervious seal
- Water level
- Piezometer tip
- P Sampler pushed
- USC Unified Soil Classification
- % Water content

CITY OF ST. HELENS, OREGON

SECONDARY TREATMENT FACILITY

LOG OF BORINGS & TEST PITS

REGISTERED PROFESSIONAL ENGINEER 6133 OREGON JACK H. WHITNEY

REVISIONS

WHITNEY-JACOBSEN & ASSOCIATES CONSULTING ENGINEERS

1818 E. OLIVE WAY SEATTLE 98122 EA 2-7677 WASHINGTON

DRAWN: R.C. CHECKED: SH APPROVED: J.H.W. DATE: 3-16-70

SHEET NO. C-8

BORING NO. A-4

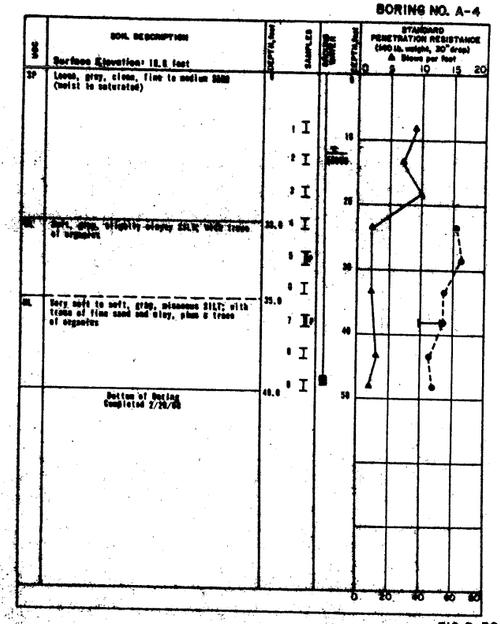


FIG. B-30

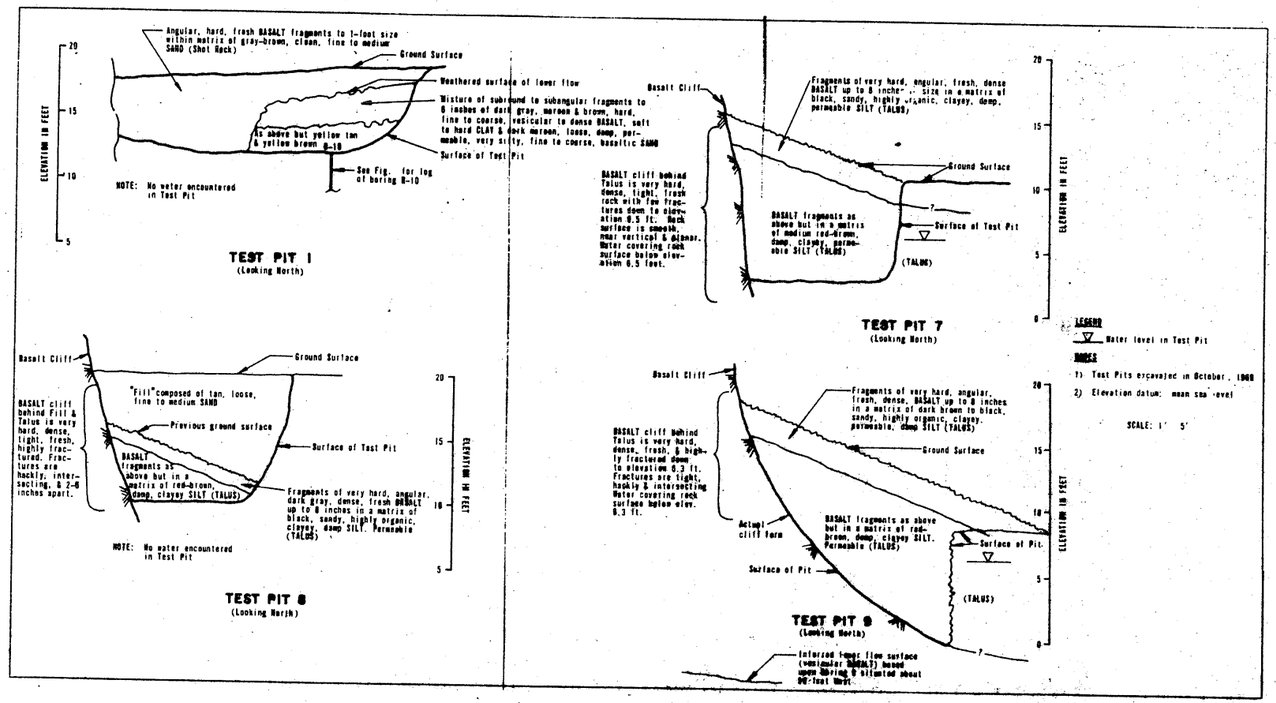


FIG. B-31

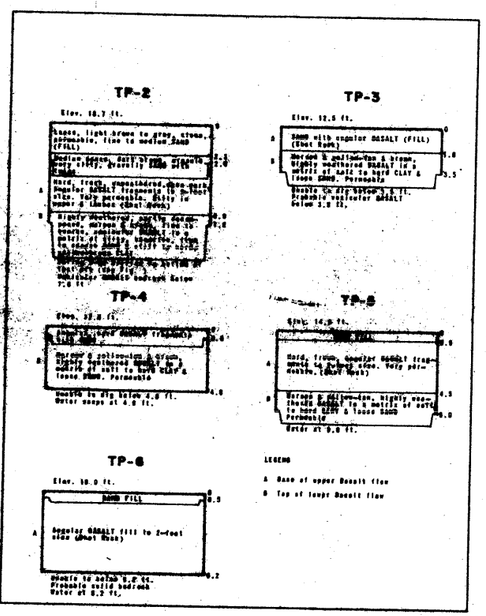
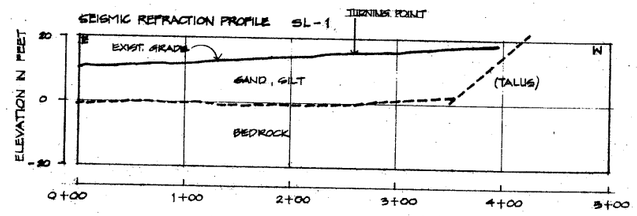
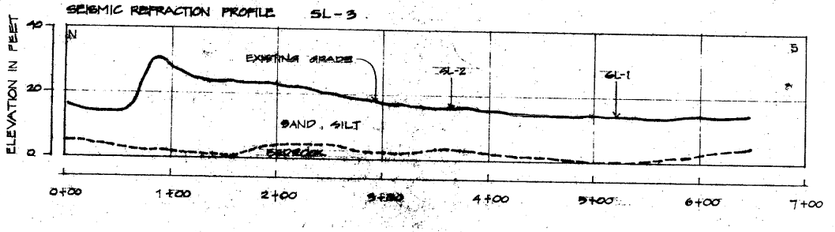
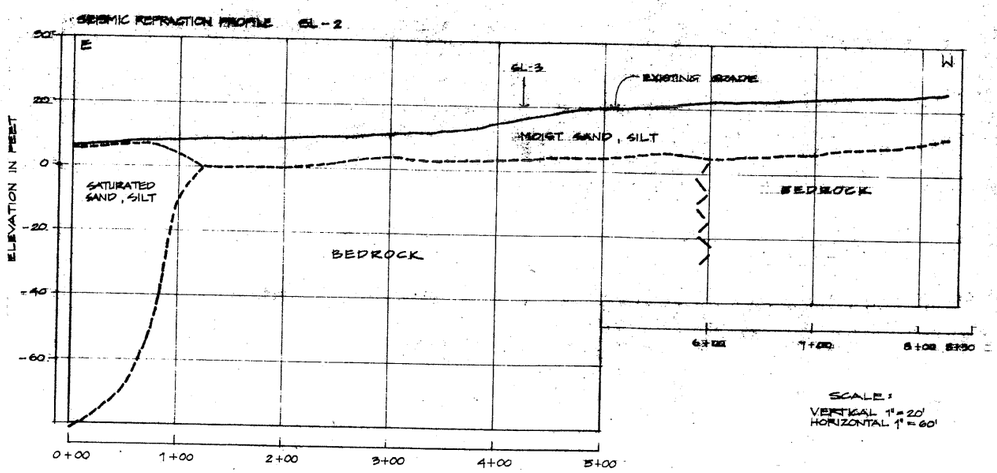


FIG. B-32

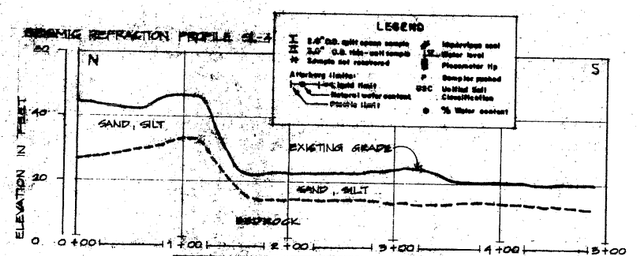
NOTE: SOILS INVESTIGATION CONDUCTED BY SHANNON & WILSON







SCALE:
VERTICAL 1" = 20'
HORIZONTAL 1" = 60'



CITY OF ST. HELENS, OREGON

SECONDARY TREATMENT FACILITY

LOG OF BORINGS & TEST PITS

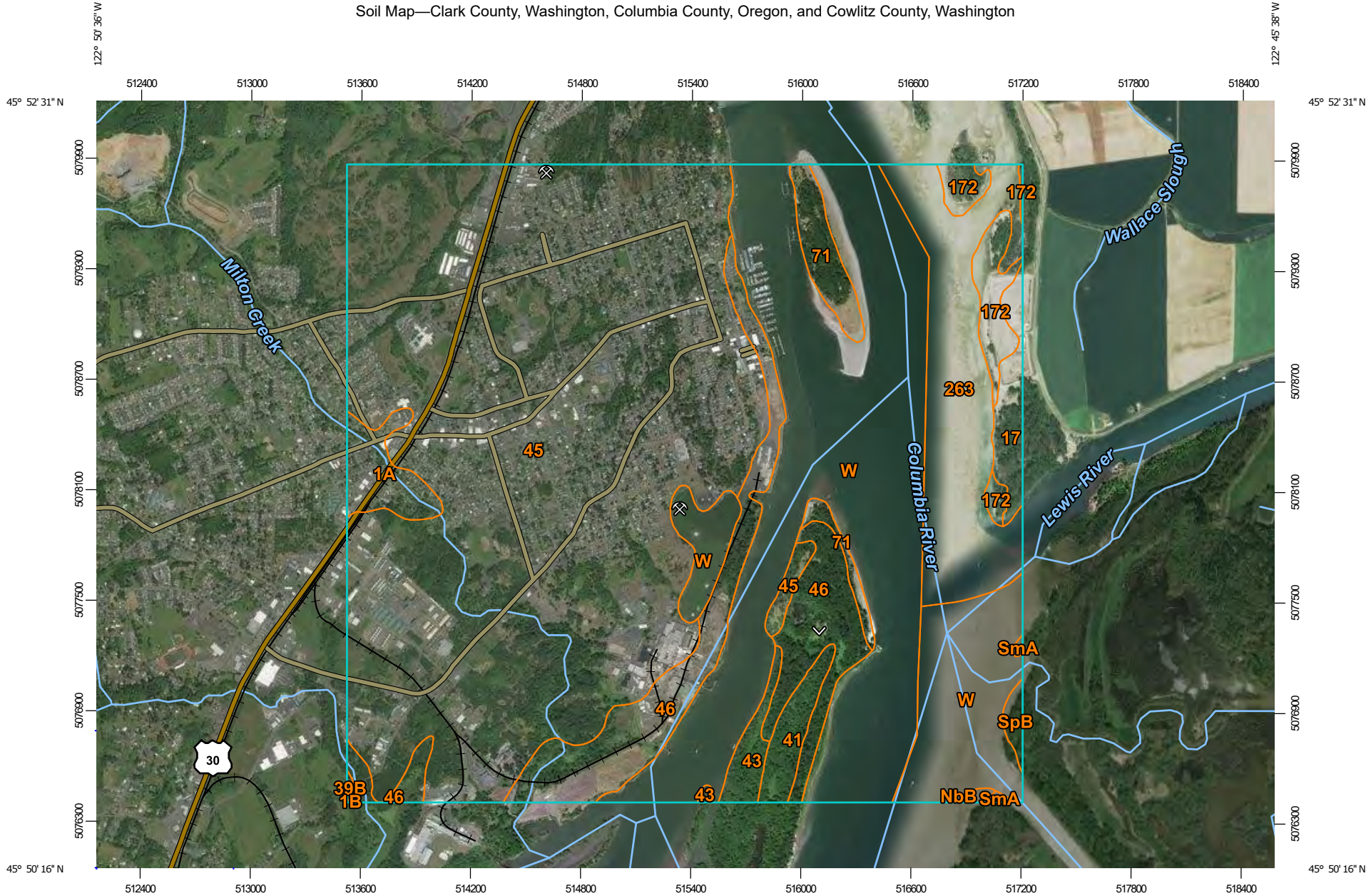
REVISIONS

WHITLEY-JACOBSEN & ASSOCIATES
CONSULTING ENGINEERS
1518 S. OLIVE WAY SEATTLE, 98122
EA 2-7677 WASHINGTON

DRAWN:	CHECKED:	SHEET NO.
R.C.	SH	C-9
APPROVED:	DATE:	
J.H.W.	5-26-70	

APPENDIX H

U.S. Department of Agriculture Soil Map


122° 50' 36" W
122° 45' 38" W
45° 52' 31" N
45° 50' 16" N
512400
513000
513600
514200
514800
515400
516000
516600
517200
517800
518400
5079900
5079300
5078700
5078100
5077500
5076900
5076300
Milton Creek
Columbia River
Lewis River
Wallace Slough
30
1A
45
W
71
172
263
17
46
41
43
SmA
SpB
NbB
39B
1B
Map Scale: 1:29,300 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 400 800 1600 2400
Feet
0 1000 2000 4000 6000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clark County, Washington
Survey Area Data: Version 17, Sep 16, 2019

Soil Survey Area: Columbia County, Oregon
Survey Area Data: Version 16, Sep 10, 2019

Soil Survey Area: Cowlitz County, Washington
Survey Area Data: Version 20, Sep 16, 2019

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 29, 2015—Jun 11, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
NbB	Newberg silt loam, 3 to 8 percent slopes	2.4	0.1%
SmA	Sauvie silt loam, 0 to 3 percent slopes	2.3	0.1%
SpB	Sauvie silty clay loam, 0 to 8 percent slopes	8.3	0.3%
W	Water	151.5	4.8%
Subtotals for Soil Survey Area		**164.6**	**5.2%**
Totals for Area of Interest		**3,165.1**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1A	Aloha silt loam, 0 to 3 percent slopes	45.5	1.4%
1B	Aloha silt loam, 3 to 8 percent slopes	0.1	0.0%
39B	Quafeno loam, 3 to 8 percent slopes	1.3	0.0%
41	Rafton silt loam	32.3	1.0%
43	Rafton-Sauvie-Moag complex	24.9	0.8%
45	Rock outcrop-Xerumbrepts complex, undulating	1,573.0	49.7%
46	Sauvie silt loam	247.9	7.8%
71	Xeropsamments, nearly level	50.3	1.6%
W	Water	702.2	22.2%
Subtotals for Soil Survey Area		**2,677.4**	**84.6%**
Totals for Area of Interest		**3,165.1**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
17	Caples silty clay loam, 0 to 3 percent slopes	37.8	1.2%
172	Riverwash	55.1	1.7%
263	Water	230.2	7.3%
Subtotals for Soil Survey Area		**323.1**	**10.2%**
Totals for Area of Interest		**3,165.1**	**100.0%**

APPENDIX I

Geoprofessional Business Association Guidance Document

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org