Technical Memorandum

To: Katie Daugherty, RG
Date: August 9, 2024

From: Phil Wiescher, PhD
Tim Browning, RG
Project No.: M8012.01.001

Re: Residential Yard May 2024 Supplemental Sampling
Permapost Products, Inc.
Hillsboro, Oregon ECSI #148

Maul Foster & Alongi, Inc. (MFA) and Permapost Products, Inc. (Permapost) have prepared this memorandum to summarize the results of the May 2024 supplemental soil sampling at Property 1 within the residential properties (Area of Interest [AOI]-5) associated with the Permapost site in Hillsboro, Oregon (the Site). This sampling was conducted to refine the excavation depths for the front and mid yards of Property 1.

Background

In October 2022 and May 2023, Permapost conducted soil sampling on Properties 1, 2, and 3 in AOI-5 (see Figure 1). Soil was sampled in the front and backyards of the residences and analyzed for chemicals of concern (COC) (dioxin/furans and arsenic) to assess contamination from potential historical stormwater runoff onto AOI-5. Analytical data were screened relative to a site-specific preliminary remediation goal for dioxins/furans and the natural background concentration for arsenic (MFA 2022, 2023 and Table).

Sampling Approach

At Property 1, additional data collection was proposed in the front and mid-yard area to refine the planned remediation depths.

- Front Yard—A decision unit (DU1-A) extended across the entire front yard of Property 1 contained a dioxin/furan toxicity equivalency (TEQ) concentration of 16 picograms per gram (pg/g) in shallow soil (0-0.5 feet below ground surface [bgs]). A discrete soil sample (HA-19) collected at 1-2 feet below ground surface (bgs) within DU1-A contained a dioxin/furan TEQ concentration of 5.11 pg/g. This lower concentration at depth is consistent with anticipated attenuation of concentrations. A three-point composite sample (HA-24-COMP), also collected within DU1-A, included a sample within the gravel driveway area along the eastern portion of the property and contained a dioxin/furan TEQ concentration of 23.6 pg/g at 1-2 feet bgs. This is inconsistent with the analytical results of the surface soil (DU1-A) and subsurface soil (HA-19) of 16 pg/g and 5.11 pg/g, respectively. To determine if the gravel driveway area was biasing the composite depth concentrations, an additional 3-point composite sample (HA-31-COMP) was proposed within the front yard at 1-2 feet (without the gravel driveway area, decision subunit A [DSU-A]) (see Figure 2).

- Mid Yard—A decision unit (DU1-B) extended across the entire mid yard of Property 1, including a portion of the driveway area. A three-point composite sample (HA-23-COMP) collected within the mid yard analyzed soil from 1-2 feet and 2-3 feet bgs. Analytical results identified concentrations increasing dioxin/furan TEQ concentrations with depth (15.7 pg/g at 1-2 feet bgs and 17.0 pg/g at 2-3 feet bgs). This is inconsistent with other site data identifying attenuation of dioxin/furan concentrations with depth. To determine if the gravel driveway area was biasing these deeper composite concentrations, an additional 3-point composite sample (HA-30-COMP) was proposed within the mid yard at 1-2 feet (without the gravel driveway area, decision subunit B [DSU-B]) (see Figure).

This additional sampling approach was approved by DEQ (DEQ, 2024).

Results

The supplemental sampling at Property 1 was completed on May 31, 2024 (see Figure 2), consistent with previously conducted sampling procedures.

- Front Yard— One three-point composite soil sample (HA-31-COMP [sample HA-31-1.5-COMP]) was collected from soil at 1-2 feet bgs and analyzed for dioxin/furans.
- Mid Yard—Two three-point composite soil samples (HA-30-COMP [samples HA-30-1.5-COMP and HA-30-2.5-COMP]) were collected from soil at 1-2 feet bgs and 2-3 fee bgs and analyzed for dioxin/furans.

The analytical laboratory report is provided in Attachment A. Based on the data quality assurance/quality control review provided in Attachment B, the data, with the appropriate final data qualifiers assigned, are considered acceptable for their intended use. Analytical data were screened relative to a site-specific preliminary remediation goal (PRG) for dioxins/furans of 11.8 pg/g (see Table).

- Front Yard— The dioxin/furan TEQ concentration was 2.58 pg/g (HA-31-1.5-COMP) from soil collected at 1-2 feet bgs, well below the site-specific PRG of 11.8 pg/g.
- Mid Yard— The dioxin/furan TEQ concentration was 13.9 pg/g and 179 pg/g (HA-30-1.5-COMP and HA-30-2.5-COMP, respectively) from soil collected at 1-2 feet bgs and 2-3 feet bgs, respectively, above the site-specific PRG of 11.8 pg/g.

Recommendations

Based on the analytical results, it appears that the gravel driveway area is biasing the concentrations of dioxin/furans in the front yard of Property 1. Therefore, the remediation depth for the front yard without the gravel driveway area is proposed to 1-foot bgs. A separate remediation depth for the front yard with the gravel driveway area is proposed to 2-feet bgs.

No revisions to the remediation depth for the mid yard of 3-feet bgs are proposed.

Attachments

References

Limitations

Figures

Table

A—Analytical Laboratory Report

B—Data Validation Memorandum

References

DEQ. 2024. Katie Daughtery, RG, Oregon Department of Environmental Quality. *RE: Proposed Additional Sampling, Residential Property DU-1.* Email to Tim Browning, Permapost Products, Inc. May 17.

MFA. 2022. *Supplemental Investigation Report, Permapost Products, Inc. Hillsboro, Oregon, ECSI #148*. Prepared for Permapost Products, Inc. Maul Foster & Alongi, Inc., Portland, Oregon. March 22.

MFA. 2023. Phil Wiescher, PhD, Maul Foster & Alongi, Inc., Tim Browning, RG, Permapost Products, Inc. *Topsoil Source Evaluation and Proposed Residential Preliminary Remediation Goal for Dioxins/Furans*. Memorandum to Katie Daugherty, RG, Oregon Department of Environmental Quality. October 6.

Limitations

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

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

Figures

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Figure 1
AOI-5 Sample Locations

Permapost Products, Inc.
Hillsboro, OR

Legend

- 3-Point Composite Sample
- Hand Auger
- Decision Unit A
- Decision Unit B
- Discrete Composite Sampling Area
- Previous Decision Unit
- Historical Encroachment Until 1990
- Existing Berm
- Former Retail Yard Driving Lane
- Study Area
- Permapost Property
- Tax Lot

Notes
AOI = area of interest.
Permapost = Permapost Products, Inc.

0 40
Feet

Data Sources
Aerial photograph obtained from the City of Portland (2022); tax lot data obtained from Oregon Metro (2024).

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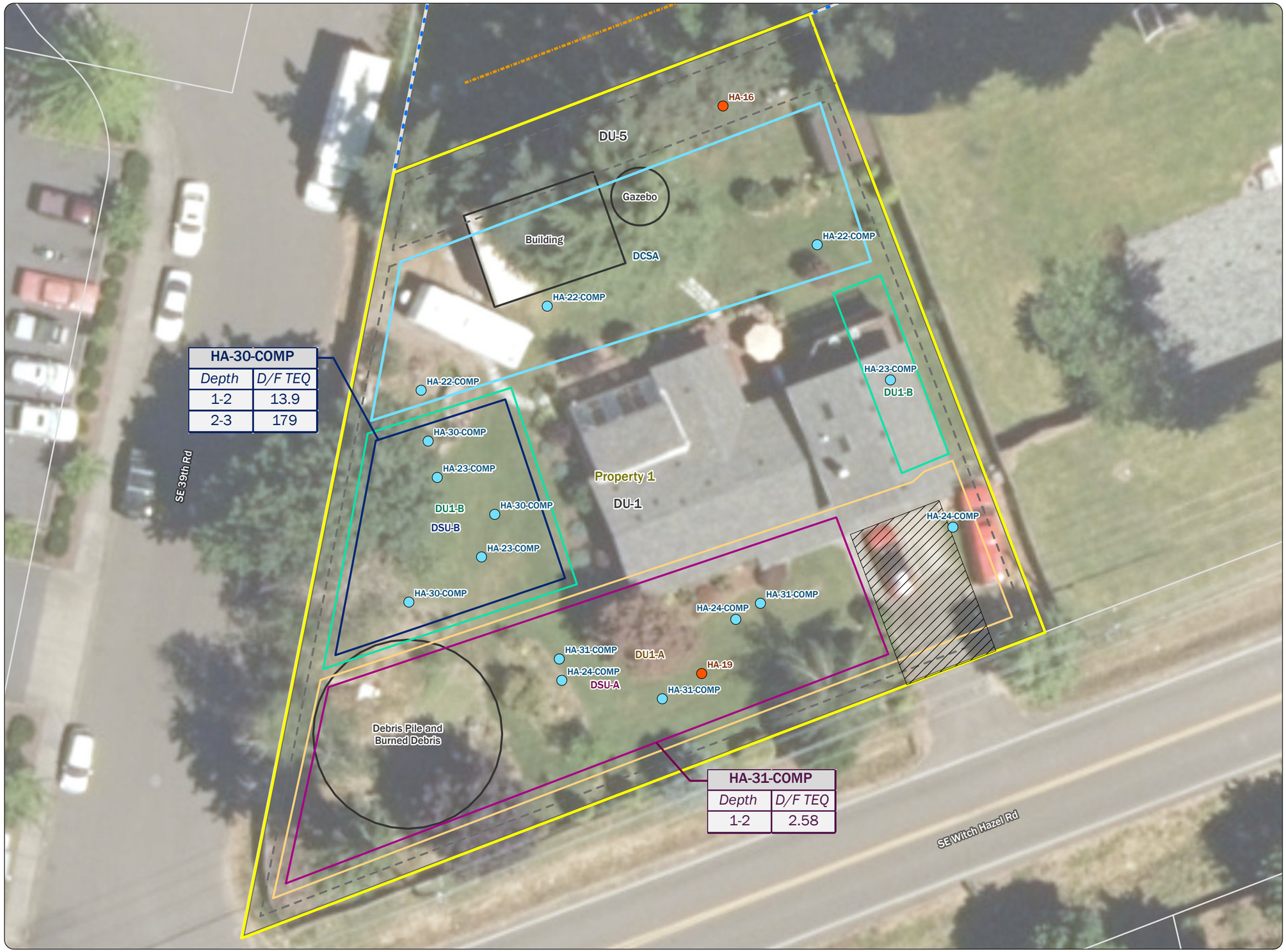
Print Date: 8/15/2024
Reviewed By: cwise
Produced By: jroberts
Project: M8012.01.001

Figure 2
Property 1 Supplemental Soil Sampling Results

Permapost Products, Inc.
Hillsboro, OR



Legend

- 3-Point Composite Sample
- Hand Auger
- Decision Subunit A
- Decision Subunit B
- Decision Unit A
- Decision Unit B
- Discrete Composite Sampling Area
- Previous Decision Unit
- Hardscape/Pavement
- Site Feature/Building
- Existing Berm
- Property 1 Tax Lot
- Permapost Property
- Tax Lot

Notes
All depths are in feet below ground surface.
All D/F TEQ results are in picograms per gram.
D/F TEQ = dioxin/furan toxic equivalency.
DCSA = discrete composite sampling area.
DU = decision unit.
DSU = decision subunit.
Permapost = Permapost Products, Inc.

0 20
Feet

Data Sources
Aerial photograph obtained from the City of Portland (2022); tax lot data obtained from Oregon Metro (2024).

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Print Date: 8/9/2024
Reviewed By: cwise
Produced By: jroberts
Project: M8012.01.001

Table

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Table
Summary of Soil Analytical Results
Permapost Products, Inc., Hillsboro, Oregon

Decision Unit:	Screening Criteria	DU-01								
Sample Name:		DU01-S-0.5	HA19-S-2.0	DU1-A	DU1-B	HA-22-Comp-1-2	HA-22-COMP-2-3	HA-23-COMP-1-2	HA-23-COMP-2-3	HA-24-COMP-1-2
Sample Date:		10/05/2022	10/05/2022	05/09/2023	05/09/2023	05/11/2023	05/11/2023	05/11/2023	05/11/2023	05/11/2023
Sample Depth (ft bgs):		0-0.5	1.0-2.0	0-0.5	0-0.5	1.0-2.0	2.0-3.0	1.0-2.0	2.0-3.0	1.0-2.0
Total Metals (mg/kg)										
Arsenic	8.8[a][1]	10.0	5.58	6.21	7.75	9.25	12.2	--	--	--
Dioxins and Furans (pg/g)										
Dioxin and Furan TEQ[b][2]	11.8[c][3]	45.7 J	5.11 J	16.0 J	27.5 J	21.4 J	28.9 J	15.7 J	17.0 J	23.6 J

Table
Summary of Soil Analytical Results
Permapost Products, Inc., Hillsboro, Oregon

Decision Unit:	Screening Criteria	DU-01 (cont.)				DU-02				
Sample Name:		HA-24-COMP-2-3	HA-30-1.5-COMP	HA-30-2.5-COMP	HA-31-1.5-COMP	DU02-S-0.5	HA20-S-2.0	DU2-A	DU2-B	HA-25-Comp-1-2
Sample Date:		05/11/2023	05/31/2024	05/31/2024	05/31/2024	10/05/2022	10/05/2022	05/09/2023	05/09/2023	05/11/2023
Sample Depth (ft bgs):		2.0-3.0	1.0-2.0	2.0-3.0	1.0-2.0	0-0.5	1.0-2.0	0-0.5	0-0.5	1.0-2.0
Total Metals (mg/kg)										
Arsenic	8.8[a][1]	--	--	--	--	7.99	--	--	--	--
Dioxins and Furans (pg/g)										
Dioxin and Furan TEQ[b][2]	11.8[c][3]	2.90 J	13.9	179	2.58	28.6 J	9.8 J	71.7 J	80.2 J	7.60 J

Table
Summary of Soil Analytical Results
Permapost Products, Inc., Hillsboro, Oregon

Decision Unit:	Screening Criteria	DU-02 (cont.)					DU-03			
Sample Name:		HA-25-COMP 2-3	HA-26-COMP 1-2	HA-26-COMP 2-3	HA-27-COMP 1-2	HA-27-COMP 2-3	DU03A-S-0.5	DU03B-S-0.5	DU03C-S-0.5	HA21-S-2.0
Sample Date:		05/11/2023	05/11/2023	05/11/2023	05/11/2023	05/11/2023	10/05/2022	10/05/2022	10/05/2022	10/05/2022
Sample Depth (ft bgs):		2.0-3.0	1.0-2.0	2.0-3.0	1.0-2.0	2.0-3.0	0-0.5	0-0.5	0-0.5	1.0-2.0
Total Metals (mg/kg)										
Arsenic	8.8[a][1]	--	--	--	--	--	38.2	38.4	40.3	9.60
Dioxins and Furans (pg/g)										
Dioxin and Furan TEQ[b][2]	11.8[c][3]	3.96 J	6.30 J	18.4 J	26.7 J	7.90 J	395 J	359 J	370	26.1 J

Table
Summary of Soil Analytical Results
Permapost Products, Inc., Hillsboro, Oregon

Decision Unit:	Screening Criteria	DU-03 (cont.)			DU-05					
Sample Name:		HA21-S-3.0	HA-28-Comp-2-3	HA-29-Comp-2-3	DU05-S-0.5	HA16-S-2.0	HA16-S-3.0	HA17-S-2.0	HA18-S-2.0	HA18-S-3.0
Sample Date:		10/05/2022	05/11/2023	05/11/2023	10/05/2022	10/05/2022	10/05/2022	10/05/2022	10/05/2022	10/05/2022
Sample Depth (ft bgs):		2.0-3.0	2.0-3.0	2.0-3.0	0-0.5	1.0-2.0	2.0-3.0	1.0-2.0	1.0-2.0	2.0-3.0
Total Metals (mg/kg)										
Arsenic	8.8[a][1]	13.2	16.4	9.96	13.3	41.8	10.2	6.08	53.2	32.2
Dioxins and Furans (pg/g)										
Dioxin and Furan TEQ[b][2]	11.8[c][3]	73.3 J	53.1 J	29.2 J	68.2 J	74.1 J	18.3 J	6.60 J	506 J	91.3 J

Table
Summary of Soil Analytical Results
Permapost Products, Inc., Hillsboro, Oregon

Notes

Shading indicates values that exceed screening criteria; non-detect results (U, UJ, UJK) were not compared with screening criteria.

-- = not analyzed.

ft bgs = feet below ground surface.

J = result is estimated.

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

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

mg/kg = milligrams per kilogram.

NV = no value.

pg/g = picograms per gram.

TEQ = toxicity equivalency.

U = result is non-detect at the estimated detection limit, method detection limit, or method reporting limit.

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

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

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

[a]Oregon background concentration, Portland Basin.

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

[c]Preliminary remediation goal.

References

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

[2]Van den Berg et al. 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.

[3]MFA. 2023. Phil Wiescher, PhD, Maul Foster & Alongi, Inc., Tim Browning, RG, Permapost Products, Inc. *Topsoil Source Evaluation and Proposed Residential Preliminary Remediation Goal for Dioxins/Furans* . Memorandum to Katie Daugherty, RG, Oregon Department of Environmental Quality. October 6.

Attachment A

Analytical Laboratory Report

MAUL FOSTER ALONGI

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

ANALYTICAL REPORT

Thursday, July 25, 2024

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

RE: A4E1783 - Permapost Supplemental RI - M8012.01.001

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 A4E1783, which was received by the laboratory on 5/31/2024 at 3:24:00PM.

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
Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.
(See Cooler Receipt Form for details)
Default Cooler 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, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.

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

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **Permapost Supplemental RI**	
3140 NE Broadway Street	Project Number: **M8012.01.001**	**Report ID:**
Portland, OR 97232	Project Manager: **Phil Wiescher**	**A4E1783 - 07 25 24 1524**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
HA-30-1.5-Comp	A4E1783-01	Soil	05/31/24 11:15	05/31/24 15:24
HA-30-2.5-Comp	A4E1783-02	Soil	05/31/24 11:45	05/31/24 15:24
HA-31-1.5-Comp	A4E1783-03	Soil	05/31/24 12:30	05/31/24 15:24

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Portland, OR 97232	Project Manager: Phil Wiescher	A4E1783 - 07 25 24 1524

QUALIFIER DEFINITIONS

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

There are No Qualifiers on Sample or QC Data for this report

Apex Laboratories

Philip Nerenberg, Lab Director

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3140 NE Broadway Street	Project Number: **M8012.01.001**	**Report ID:**
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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

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

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

NR Result Not Reported

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

Detection Limits: Limit of Detection (LOD)

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

Reporting Limits: Limit of Quantitation (LOQ)

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

Reporting Conventions:

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

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

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

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

Results for Volatiles analyses on soils and sediments that are reported on a “dry weight” basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an “As Received” basis do not have the WMS correction applied, as dry weight was not performed.

QC Source:

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

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

Miscellaneous Notes:

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

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

Apex Laboratories

Philip Nerenberg, Lab Director

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REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to one half of the Reporting Limit (RL).
Blank results for gravimetric analyses are evaluated to the Reporting Level, not to half of the Reporting Level.
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.
-Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.
'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Benzofluoranthene Isomer Reporting:

Due to coelutions present on the analytical column, the results reported for Benzo(b+j)fluoranthene(s) represent the concentraton of both the Benzo(b)fluoranthene and Benzo(j)fluoranthene isomers. Calibration, validation and accreditation are based on the Benzo(b)fluoranthene isomer.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.

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6700 S.W. Sandburg Street
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ANALYTICAL REPORT

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3140 NE Broadway Street	Project Number: M8012.01.001	Report ID:
Portland, OR 97232	Project Manager: Phil Wiescher	A4E1783 - 07 25 24 1524

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

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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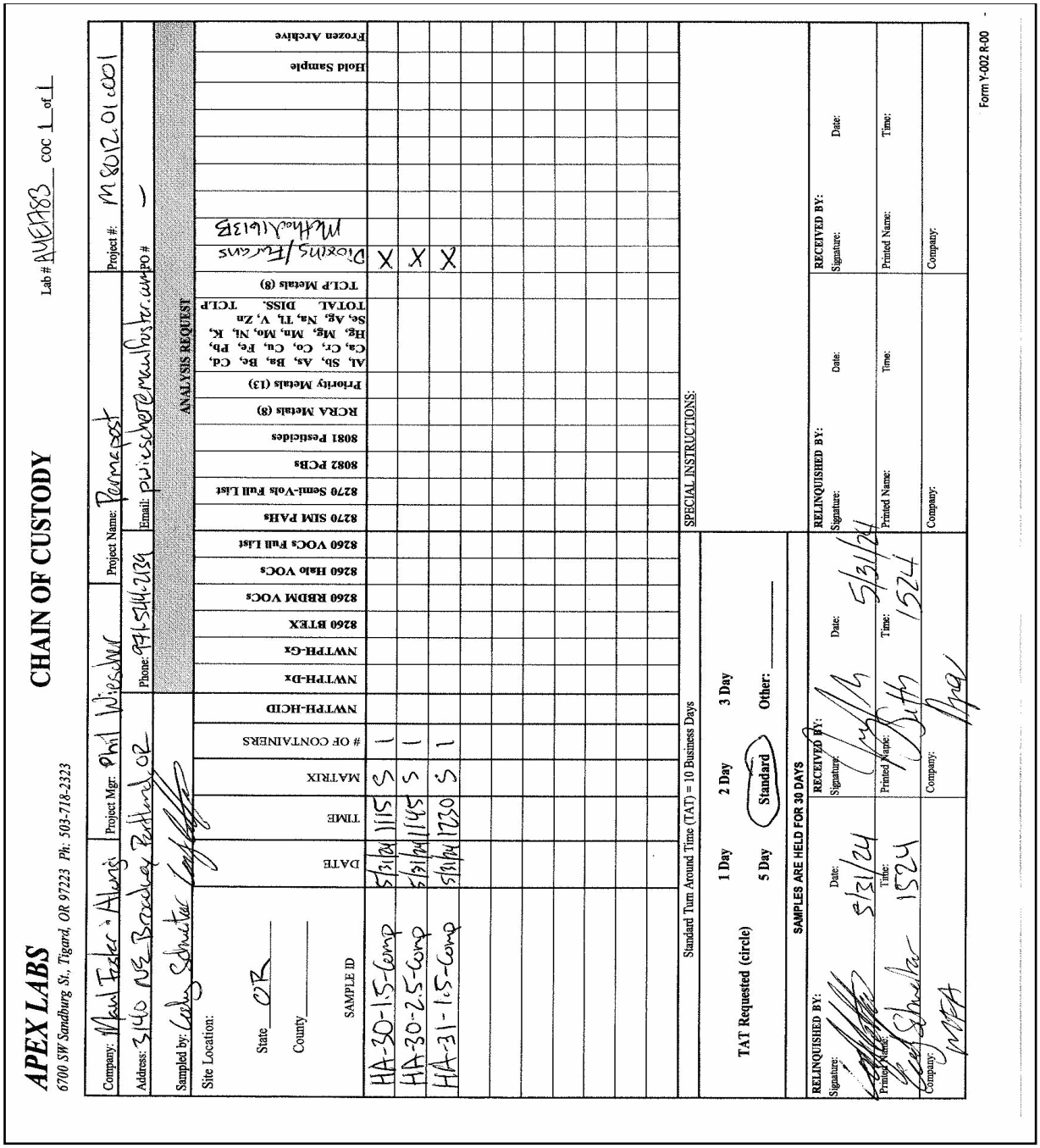
3140 NE Broadway Street	Project Number: **M8012.01.001**	**Report ID:**
Portland, OR 97232	Project Manager: **Phil Wiescher**	**A4E1783 - 07 25 24 1524**



APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A4E1783 COC 1 of 1

Company: Maul Foster & Alongi | Project Mgr: Phil Wiescher | Project Name: Permapost | Project #: M8012.01.001
Address: 3140 NE Broadway Portland, OR | Phone: 971-544-2139 | Email: pwiescher@maulfoster.com | PO #: —
Sampled by: Cory Schreiber

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pesticides	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS.	TCLP	TCLP Metals (8)	Dioxins/Furans	Hold Sample	Frozen Archive
HA-30-15-Comp	5/31/24	1115	S	1																X		
HA-30-25-Comp	5/31/24	1145	S	1																X		
HA-31-15-Comp	5/31/24	1230	S	1																X		

Site Location: State OR County
Standard Turn Around Time (TAT) = 10 Business Days
TAT Requested (circle): 1 Day 2 Day 3 Day 5 Day Standard Other: ____
SPECIAL INSTRUCTIONS:

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Signature: Date: 5/31/24 Time: 1524 Printed Name: Cory Schreiber Company: MFA
RECEIVED BY: Signature: Date: 5/31/24 Time: 1524 Printed Name: Cory Schreiber Company: MFA
RELINQUISHED BY: Signature: Date: 5/31/24 Time: 1524 Printed Name: Company:
RECEIVED BY: Signature: Date: Time: Printed Name: Company:
RELINQUISHED BY: Signature: Date: Time: Printed Name: Company:
RECEIVED BY: Signature: Date: Time: Printed Name: Company:

Form Y-002 R-00

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.

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

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **Permapost Supplemental RI**	
3140 NE Broadway Street	Project Number: **M8012.01.001**	**Report ID:**
Portland, OR 97232	Project Manager: **Phil Wiescher**	**A4E1783 - 07 25 24 1524**

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster & Alongi Element WO#: A4E1783

Project/Project #: Permapost M8012.01.001

Delivery Info:

Date/time received: 5/31/24 @ 1524 By: JS

Delivered by: Apex__Client_X_ESS__FedEx__UPS__Radio__Morgan__SDS__Evergreen__Other__

From USDA Regulated Origin? Yes____ No_X_

Cooler Inspection Date/time inspected: 5/31/24 @ 1524 By: JS

Chain of Custody included? Yes_X_ No____

Signed/dated by client? Yes_X_ No____

Contains USDA Reg. Soils? Yes____ No_X_ Unsure (email RegSoils) ____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	5.4						
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: 5/31/24 @ 1539 By: ADW

All samples intact? Yes_X_ No___ Comments: ____

Bottle labels/COCs agree? Yes_X_ No___ Comments: ____

COC/container discrepancies form initiated? Yes___ No_X_

Containers/volumes received appropriate for analysis? Yes_X_ No___ Comments: ____

Do VOA vials have visible headspace? Yes___ No___ NA_X_

Comments ____

Water samples: pH checked: Yes___No___NA_X_ pH appropriate? Yes___No___NA_X_ pH ID:____

Comments: ____

Labeled by: ADW Witness: WAB Cooler Inspected by: ADW

Form Y-003 R-02

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.

July 17, 2024

Enthalpy Analytical - El Dorado Hills
Work Order No. 2406043

Mr. Philip Nerenberg
Apex Laboratories
6700 S.W. Sandburg Street
Tigard, OR 97223

Dear Mr. Nerenberg,

Enclosed are the results for the sample set received at Enthalpy Analytical - EDH on June 06, 2024 under your Project Name 'A4E1783'.

Enthalpy Analytical - EDH is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at kathy.zipp@enthalpy.com.

Thank you for choosing Enthalpy Analytical - EDH as part of your analytical support team.

Sincerely,

Kathy Zipp
Project Manager

Enthalpy Analytical - EDH Work Order No. 2406043
Case Narrative

Sample Condition on Receipt:

Three soil samples were received and stored securely in accordance with Enthalpy Analytical - EDH standard operating procedures and EPA methodology. The samples were received in good condition and within the method temperature requirements.

Analytical Notes:

EPA Method 1613B

The samples were extracted and analyzed for tetra-through-octa chlorinated dioxins and furans by EPA Method 1613B using a ZB-DIOXIN GC column.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected above the sample quantitation limit in the Method Blank. The OPR recoveries were within the method acceptance criteria.

Labeled standard recoveries for all QC and field samples were within method acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2406043-01	HA-30-1.5-Comp	31-May-24 11:15	06-Jun-24 09:10	Clear Glass Jar, 120mL
2406043-02	HA-30-2.5-Comp	31-May-24 11:45	06-Jun-24 09:10	Clear Glass Jar, 120mL
2406043-03	HA-31-1.5-Comp	31-May-24 12:30	06-Jun-24 09:10	Clear Glass Jar, 120mL

ANALYTICAL RESULTS

Sample ID: Method Blank **EPA Method 1613B**

Client Data
Name: Apex Laboratories
Project: A4E1783
Matrix: Solid

Laboratory Data
Lab Sample: B24G066-BLK1
QC Batch: B24G066 Date Extracted: 10-Jul-24
Sample Size: 10.0 g Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.130	0.190			15-Jul-24 13:23	1
1,2,3,7,8-PeCDD	ND	0.192	0.784			15-Jul-24 13:23	1
1,2,3,4,7,8-HxCDD	ND	0.234	0.633			15-Jul-24 13:23	1
1,2,3,6,7,8-HxCDD	ND	0.224	0.640			15-Jul-24 13:23	1
1,2,3,7,8,9-HxCDD	ND	0.257	0.717			15-Jul-24 13:23	1
1,2,3,4,6,7,8-HpCDD	ND	0.334	0.706			15-Jul-24 13:23	1
OCDD	ND	0.539	1.62			15-Jul-24 13:23	1
2,3,7,8-TCDF	ND	0.112	0.183			15-Jul-24 13:23	1
1,2,3,7,8-PeCDF	ND	0.0908	0.576			15-Jul-24 13:23	1
2,3,4,7,8-PeCDF	ND	0.0825	0.686			15-Jul-24 13:23	1
1,2,3,4,7,8-HxCDF	ND	0.121	0.659			15-Jul-24 13:23	1
1,2,3,6,7,8-HxCDF	ND	0.128	0.621			15-Jul-24 13:23	1
2,3,4,6,7,8-HxCDF	ND	0.147	0.661			15-Jul-24 13:23	1
1,2,3,7,8,9-HxCDF	ND	0.237	0.716			15-Jul-24 13:23	1
1,2,3,4,6,7,8-HpCDF	ND	0.186	0.649			15-Jul-24 13:23	1
1,2,3,4,7,8,9-HpCDF	ND	0.308	0.818			15-Jul-24 13:23	1
OCDF	ND	0.452	3.84			15-Jul-24 13:23	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	0.00						
Totals							
Total TCDD	ND	0.130					
Total PeCDD	ND	0.192					
Total HxCDD	ND	0.257					
Total HpCDD	ND	0.334					
Total TCDF	ND	0.112					
Total PeCDF	ND	0.0908					
Total HxCDF	ND	0.237					
Total HpCDF	ND	0.308					

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	66.8	25 - 164		15-Jul-24 13:23	1
13C-1,2,3,7,8-PeCDD	IS	66.9	25 - 181		15-Jul-24 13:23	1
13C-1,2,3,4,7,8-HxCDD	IS	66.3	32 - 141		15-Jul-24 13:23	1
13C-1,2,3,6,7,8-HxCDD	IS	74.7	28 - 130		15-Jul-24 13:23	1
13C-1,2,3,7,8,9-HxCDD	IS	66.6	32 - 141		15-Jul-24 13:23	1
13C-1,2,3,4,6,7,8-HpCDD	IS	60.9	23 - 140		15-Jul-24 13:23	1
13C-OCDD	IS	53.0	17 - 157		15-Jul-24 13:23	1
13C-2,3,7,8-TCDF	IS	68.5	24 - 169		15-Jul-24 13:23	1
13C-1,2,3,7,8-PeCDF	IS	62.7	24 - 185		15-Jul-24 13:23	1
13C-2,3,4,7,8-PeCDF	IS	62.8	21 - 178		15-Jul-24 13:23	1
13C-1,2,3,4,7,8-HxCDF	IS	68.1	26 - 152		15-Jul-24 13:23	1
13C-1,2,3,6,7,8-HxCDF	IS	70.2	26 - 123		15-Jul-24 13:23	1
13C-2,3,4,6,7,8-HxCDF	IS	68.5	28 - 136		15-Jul-24 13:23	1
13C-1,2,3,7,8,9-HxCDF	IS	62.4	29 - 147		15-Jul-24 13:23	1
13C-1,2,3,4,6,7,8-HpCDF	IS	63.4	28 - 143		15-Jul-24 13:23	1
13C-1,2,3,4,7,8,9-HpCDF	IS	55.6	26 - 138		15-Jul-24 13:23	1
13C-OCDF	IS	52.6	17 - 157		15-Jul-24 13:23	1
37Cl-2,3,7,8-TCDD	CRS	70.1	35 - 197		15-Jul-24 13:23	1

EDL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration
MDL - Method Detection Limit

The results are reported in dry weight.
The sample size is reported in wet weight.

Sample ID: OPR **EPA Method 1613B**

Client Data
Name: Apex Laboratories
Project: A4E1783
Matrix: Solid

Laboratory Data
Lab Sample: B24G066-BS1
QC Batch: B24G066 Date Extracted: 10-Jul-24 08:09
Sample Size: 10.0 g Column: ZB-DIOXIN

Analyte	Amt Found (pg/g)	Spike Amt	% Recovery	Limits	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	20.2	20.0	101	67-158		15-Jul-24 11:51	1
1,2,3,7,8-PeCDD	100	100	100	70-142		15-Jul-24 11:51	1
1,2,3,4,7,8-HxCDD	98.5	100	98.5	70-164		15-Jul-24 11:51	1
1,2,3,6,7,8-HxCDD	94.8	100	94.8	76-134		15-Jul-24 11:51	1
1,2,3,7,8,9-HxCDD	98.6	100	98.6	64-162		15-Jul-24 11:51	1
1,2,3,4,6,7,8-HpCDD	96.3	100	96.3	70-140		15-Jul-24 11:51	1
OCDD	189	200	94.5	78-144		15-Jul-24 11:51	1
2,3,7,8-TCDF	18.2	20.0	91.2	75-158		15-Jul-24 11:51	1
1,2,3,7,8-PeCDF	96.1	100	96.1	80-134		15-Jul-24 11:51	1
2,3,4,7,8-PeCDF	95.8	100	95.8	68-160		15-Jul-24 11:51	1
1,2,3,4,7,8-HxCDF	98.3	100	98.3	72-134		15-Jul-24 11:51	1
1,2,3,6,7,8-HxCDF	105	100	105	84-130		15-Jul-24 11:51	1
2,3,4,6,7,8-HxCDF	99.9	100	99.9	70-156		15-Jul-24 11:51	1
1,2,3,7,8,9-HxCDF	101	100	101	78-130		15-Jul-24 11:51	1
1,2,3,4,6,7,8-HpCDF	95.1	100	95.1	82-122		15-Jul-24 11:51	1
1,2,3,4,7,8,9-HpCDF	96.1	100	96.1	78-138		15-Jul-24 11:51	1
OCDF	199	200	99.6	63-170		15-Jul-24 11:51	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	74.4	20-175		15-Jul-24 11:51	1
13C-1,2,3,7,8-PeCDD	IS	77.2	21-227		15-Jul-24 11:51	1
13C-1,2,3,4,7,8-HxCDD	IS	75.5	21-193		15-Jul-24 11:51	1
13C-1,2,3,6,7,8-HxCDD	IS	85.8	25-163		15-Jul-24 11:51	1
13C-1,2,3,7,8,9-HxCDD	IS	77.3	21-193		15-Jul-24 11:51	1
13C-1,2,3,4,6,7,8-HpCDD	IS	74.0	26-166		15-Jul-24 11:51	1
13C-OCDD	IS	67.2	13-199		15-Jul-24 11:51	1
13C-2,3,7,8-TCDF	IS	79.0	22-152		15-Jul-24 11:51	1
13C-1,2,3,7,8-PeCDF	IS	72.2	21-192		15-Jul-24 11:51	1
13C-2,3,4,7,8-PeCDF	IS	73.7	13-328		15-Jul-24 11:51	1
13C-1,2,3,4,7,8-HxCDF	IS	77.8	19-202		15-Jul-24 11:51	1
13C-1,2,3,6,7,8-HxCDF	IS	77.0	21-159		15-Jul-24 11:51	1
13C-2,3,4,6,7,8-HxCDF	IS	77.9	22-176		15-Jul-24 11:51	1
13C-1,2,3,7,8,9-HxCDF	IS	72.4	17-205		15-Jul-24 11:51	1
13C-1,2,3,4,6,7,8-HpCDF	IS	74.6	21-158		15-Jul-24 11:51	1
13C-1,2,3,4,7,8,9-HpCDF	IS	66.2	20-186		15-Jul-24 11:51	1
13C-OCDF	IS	63.5	13-199		15-Jul-24 11:51	1
37Cl-2,3,7,8-TCDD	CRS	81.2	31-191		15-Jul-24 11:51	1

Sample ID: HA-30-1.5-Comp **EPA Method 1613B**

Client Data
Name: Apex Laboratories
Project: A4E1783
Matrix: Soil
Date Collected: 31-May-24 11:15

Laboratory Data
Lab Sample: 2406043-01
QC Batch: B24G066
Sample Size: 12.0 g
% Solids: 83.5
Date Received: 06-Jun-24 09:10
Date Extracted: 10-Jul-24
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.190	0.119		14-Jul-24 16:07	1
1,2,3,7,8-PeCDD	1.70		0.782		J	14-Jul-24 16:07	1
1,2,3,4,7,8-HxCDD	4.49		0.632			14-Jul-24 16:07	1
1,2,3,6,7,8-HxCDD	22.5		0.639			14-Jul-24 16:07	1
1,2,3,7,8,9-HxCDD	9.16		0.715			14-Jul-24 16:07	1
1,2,3,4,6,7,8-HpCDD	468		0.704			14-Jul-24 16:07	1
OCDD	2880		1.62			14-Jul-24 16:07	1
2,3,7,8-TCDF	ND		0.183	0.230		14-Jul-24 16:07	1
1,2,3,7,8-PeCDF	1.04		0.575		J	14-Jul-24 16:07	1
2,3,4,7,8-PeCDF	1.99		0.684		J	14-Jul-24 16:07	1
1,2,3,4,7,8-HxCDF	4.81		0.658			14-Jul-24 16:07	1
1,2,3,6,7,8-HxCDF	5.34		0.620			14-Jul-24 16:07	1
2,3,4,6,7,8-HxCDF	3.93		0.660			14-Jul-24 16:07	1
1,2,3,7,8,9-HxCDF	ND		0.714	0.473		14-Jul-24 16:07	1
1,2,3,4,6,7,8-HpCDF	77.8		0.648			14-Jul-24 16:07	1
1,2,3,4,7,8,9-HpCDF	6.05		0.816			14-Jul-24 16:07	1
OCDF	176		3.83			14-Jul-24 16:07	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	13.8						
Totals							
Total TCDD	0.0867			0.205	J		
Total PeCDD	3.86			4.88			
Total HxCDD	89.5						
Total HpCDD	762						
Total TCDF	0.826			1.98			
Total PeCDF	37.4			38.4			
Total HxCDF	154						
Total HpCDF	209			211			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	78.3	25 - 164		14-Jul-24 16:07	1
13C-1,2,3,7,8-PeCDD	IS	71.6	25 - 181		14-Jul-24 16:07	1
13C-1,2,3,4,7,8-HxCDD	IS	78.2	32 - 141		14-Jul-24 16:07	1
13C-1,2,3,6,7,8-HxCDD	IS	84.3	28 - 130		14-Jul-24 16:07	1
13C-1,2,3,7,8,9-HxCDD	IS	82.5	32 - 141		14-Jul-24 16:07	1
13C-1,2,3,4,6,7,8-HpCDD	IS	64.9	23 - 140		14-Jul-24 16:07	1
13C-OCDD	IS	55.5	17 - 157		14-Jul-24 16:07	1
13C-2,3,7,8-TCDF	IS	83.0	24 - 169		14-Jul-24 16:07	1
13C-1,2,3,7,8-PeCDF	IS	70.3	24 - 185		14-Jul-24 16:07	1
13C-2,3,4,7,8-PeCDF	IS	65.0	21 - 178		14-Jul-24 16:07	1
13C-1,2,3,4,7,8-HxCDF	IS	78.4	26 - 152		14-Jul-24 16:07	1
13C-1,2,3,6,7,8-HxCDF	IS	80.4	26 - 123		14-Jul-24 16:07	1
13C-2,3,4,6,7,8-HxCDF	IS	66.6	28 - 136		14-Jul-24 16:07	1
13C-1,2,3,7,8,9-HxCDF	IS	67.1	29 - 147		14-Jul-24 16:07	1
13C-1,2,3,4,6,7,8-HpCDF	IS	68.4	28 - 143		14-Jul-24 16:07	1
13C-1,2,3,4,7,8,9-HpCDF	IS	46.0	26 - 138		14-Jul-24 16:07	1
13C-OCDF	IS	36.7	17 - 157		14-Jul-24 16:07	1
37Cl-2,3,7,8-TCDD	CRS	85.6	35 - 197		14-Jul-24 16:07	1

EDL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration
MDL - Method Detection Limit

The results are reported in dry weight.
The sample size is reported in wet weight.

Sample ID: HA-30-2.5-Comp **EPA Method 1613B**

Client Data
Name: Apex Laboratories
Project: A4E1783
Matrix: Soil
Date Collected: 31-May-24 11:45

Laboratory Data
Lab Sample: 2406043-02
QC Batch: B24G066
Sample Size: 39.4 g
% Solids: 26.1
Date Received: 06-Jun-24 09:10
Date Extracted: 10-Jul-24
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.185	0.609		14-Jul-24 16:54	1
1,2,3,7,8-PeCDD	21.0		0.763			14-Jul-24 16:54	1
1,2,3,4,7,8-HxCDD	52.1		0.616			14-Jul-24 16:54	1
1,2,3,6,7,8-HxCDD	276		0.623			14-Jul-24 16:54	1
1,2,3,7,8,9-HxCDD	112		0.698			14-Jul-24 16:54	1
1,2,3,4,6,7,8-HpCDD	6930		6.87		D	15-Jul-24 17:16	10
OCDD	39700		15.8		D	15-Jul-24 17:16	10
2,3,7,8-TCDF	2.53		0.178			14-Jul-24 16:54	1
1,2,3,7,8-PeCDF	10.8		0.560			14-Jul-24 16:54	1
2,3,4,7,8-PeCDF	22.2		0.668			14-Jul-24 16:54	1
1,2,3,4,7,8-HxCDF	51.4		0.641			14-Jul-24 16:54	1
1,2,3,6,7,8-HxCDF	54.7		0.604			14-Jul-24 16:54	1
2,3,4,6,7,8-HxCDF	23.3		0.643			14-Jul-24 16:54	1
1,2,3,7,8,9-HxCDF	6.90		0.697			14-Jul-24 16:54	1
1,2,3,4,6,7,8-HpCDF	1010		0.632			14-Jul-24 16:54	1
1,2,3,4,7,8,9-HpCDF	73.7		0.796			14-Jul-24 16:54	1
OCDF	2410		3.74			14-Jul-24 16:54	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	179						
Totals							
Total TCDD	1.76			2.90			
Total PeCDD	58.5			61.0			
Total HxCDD	1070						
Total HpCDD	9610						
Total TCDF	19.7			24.7			
Total PeCDF	410						
Total HxCDF	1600						
Total HpCDF	3130						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	80.1	25 - 164		14-Jul-24 16:54	1
13C-1,2,3,7,8-PeCDD	IS	72.7	25 - 181		14-Jul-24 16:54	1
13C-1,2,3,4,7,8-HxCDD	IS	85.6	32 - 141		14-Jul-24 16:54	1
13C-1,2,3,6,7,8-HxCDD	IS	94.7	28 - 130		14-Jul-24 16:54	1
13C-1,2,3,7,8,9-HxCDD	IS	89.0	32 - 141		14-Jul-24 16:54	1
13C-1,2,3,4,6,7,8-HpCDD	IS	74.4	23 - 140	D	15-Jul-24 17:16	10
13C-OCDD	IS	72.4	17 - 157	D	15-Jul-24 17:16	10
13C-2,3,7,8-TCDF	IS	85.2	24 - 169		14-Jul-24 16:54	1
13C-1,2,3,7,8-PeCDF	IS	72.5	24 - 185		14-Jul-24 16:54	1
13C-2,3,4,7,8-PeCDF	IS	71.1	21 - 178		14-Jul-24 16:54	1
13C-1,2,3,4,7,8-HxCDF	IS	82.7	26 - 152		14-Jul-24 16:54	1
13C-1,2,3,6,7,8-HxCDF	IS	82.1	26 - 123		14-Jul-24 16:54	1
13C-2,3,4,6,7,8-HxCDF	IS	80.9	28 - 136		14-Jul-24 16:54	1
13C-1,2,3,7,8,9-HxCDF	IS	79.9	29 - 147		14-Jul-24 16:54	1
13C-1,2,3,4,6,7,8-HpCDF	IS	73.5	28 - 143		14-Jul-24 16:54	1
13C-1,2,3,4,7,8,9-HpCDF	IS	69.7	26 - 138		14-Jul-24 16:54	1
13C-OCDF	IS	76.8	17 - 157		14-Jul-24 16:54	1
37Cl-2,3,7,8-TCDD	CRS	85.2	35 - 197		14-Jul-24 16:54	1

EDL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration
MDL - Method Detection Limit

The results are reported in dry weight.
The sample size is reported in wet weight.

ENTHALPY ANALYTICAL

Sample ID: HA-31-1.5-Comp

EPA Method 1613B

Client Data

Name: Apex Laboratories
Project: A4E1783
Matrix: Soil
Date Collected: 31-May-24 12:30

Laboratory Data

Lab Sample: 2406043-03
QC Batch: B24G066
Sample Size: 14.1 g
% Solids: 74.3
Date Received: 06-Jun-24 09:10
Date Extracted: 10-Jul-24
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.181	0.0689		14-Jul-24 17:41	1
1,2,3,7,8-PeCDD	ND		0.748	0.228		14-Jul-24 17:41	1
1,2,3,4,7,8-HxCDD	ND		0.604	0.895		14-Jul-24 17:41	1
1,2,3,6,7,8-HxCDD	4.68		0.610			14-Jul-24 17:41	1
1,2,3,7,8,9-HxCDD	1.91		0.684		J	14-Jul-24 17:41	1
1,2,3,4,6,7,8-HpCDD	101		0.673			14-Jul-24 17:41	1
OCDD	627		1.54			14-Jul-24 17:41	1
2,3,7,8-TCDF	ND	0.0612	0.174			14-Jul-24 17:41	1
1,2,3,7,8-PeCDF	0.218		0.549		J	14-Jul-24 17:41	1
2,3,4,7,8-PeCDF	0.317		0.654		J	14-Jul-24 17:41	1
1,2,3,4,7,8-HxCDF	0.849		0.628		J	14-Jul-24 17:41	1
1,2,3,6,7,8-HxCDF	0.895		0.592		J	14-Jul-24 17:41	1
2,3,4,6,7,8-HxCDF	0.558		0.630		J	14-Jul-24 17:41	1
1,2,3,7,8,9-HxCDF	0.252		0.683		J	14-Jul-24 17:41	1
1,2,3,4,6,7,8-HpCDF	14.5		0.619			14-Jul-24 17:41	1
1,2,3,4,7,8,9-HpCDF	1.17		0.780		J	14-Jul-24 17:41	1
OCDF	31.1		3.66			14-Jul-24 17:41	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	2.38						
Totals							
Total TCDD	ND			0.0689			
Total PeCDD	ND			0.412			
Total HxCDD	16.4			17.3			
Total HpCDD	161						
Total TCDF	0.131				J		
Total PeCDF	5.22			5.36			
Total HxCDF	23.3						
Total HpCDF	44.0						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	89.4	25 - 164		14-Jul-24 17:41	1
13C-1,2,3,7,8-PeCDD	IS	85.4	25 - 181		14-Jul-24 17:41	1
13C-1,2,3,4,7,8-HxCDD	IS	100	32 - 141		14-Jul-24 17:41	1
13C-1,2,3,6,7,8-HxCDD	IS	111	28 - 130		14-Jul-24 17:41	1
13C-1,2,3,7,8,9-HxCDD	IS	102	32 - 141		14-Jul-24 17:41	1
13C-1,2,3,4,6,7,8-HpCDD	IS	90.8	23 - 140		14-Jul-24 17:41	1
13C-OCDD	IS	85.0	17 - 157		14-Jul-24 17:41	1
13C-2,3,7,8-TCDF	IS	97.3	24 - 169		14-Jul-24 17:41	1
13C-1,2,3,7,8-PeCDF	IS	83.2	24 - 185		14-Jul-24 17:41	1
13C-2,3,4,7,8-PeCDF	IS	83.0	21 - 178		14-Jul-24 17:41	1
13C-1,2,3,4,7,8-HxCDF	IS	97.4	26 - 152		14-Jul-24 17:41	1
13C-1,2,3,6,7,8-HxCDF	IS	98.5	26 - 123		14-Jul-24 17:41	1
13C-2,3,4,6,7,8-HxCDF	IS	96.2	28 - 136		14-Jul-24 17:41	1
13C-1,2,3,7,8,9-HxCDF	IS	93.3	29 - 147		14-Jul-24 17:41	1
13C-1,2,3,4,6,7,8-HpCDF	IS	83.3	28 - 143		14-Jul-24 17:41	1
13C-1,2,3,4,7,8,9-HpCDF	IS	78.5	26 - 138		14-Jul-24 17:41	1
13C-OCDF	IS	77.5	17 - 157		14-Jul-24 17:41	1
37Cl-2,3,7,8-TCDD	CRS	94.8	35 - 197		14-Jul-24 17:41	1

EDL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration
MDL - Method Detection Limit

The results are reported in dry weight.
The sample size is reported in wet weight.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection Limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
MDL	Method Detection Limit
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
RL	For 537.1, the reported RLs are the MRLs.
TEQ	Toxic Equivalency, sum of the toxic equivalency factors (TEF) multiplied by the sample concentrations.
TEQMax	TEQ calculation that uses the detection limit as the concentration for non-detects
TEQMin	TEQ calculation that uses zero as the concentration for non-detects
TEQRisk	TEQ calculation that uses ½ the detection limit as the concentration for non-detects
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Enthalpy Analytical - EDH Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	21-023-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2020018
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	2211390
Nevada Division of Environmental Protection	CA00413
New Hampshire Environmental Accreditation Program	207721
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Ohio Environmental Protection Agency	87778
Oregon Laboratory Accreditation Program	4042-021
Texas Commission on Environmental Quality	T104704189-22-13
Vermont Department of Health	VT-4042
Virginia Department of General Services	11276
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters can be found at Enthalpy.com/Resources/Accreditations.

EST 2406043 1.3°C

SUBCONTRACT ORDER

Apex Laboratories

Accel 5/24

A4E1783

SENDING LABORATORY:

Apex Laboratories
6700 S.W. Sandburg Street
Tigard, OR 97223
Phone: (503) 718-2323
Fax: (503) 336-0745
Project Manager: Philip Nerenberg

RECEIVING LABORATORY:

Enthalpy Analytical- CA
1104 Windfield Way
El Dorado Hills, CA 95762
Phone :(916) 673-1520
Fax: -

Sample Name: HA-30-1.5-Comp **Soil** **Sampled: 05/31/24 11:15** (A4E1783-01)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	06/13/24 17:00	05/31/25 11:15	
Containers Supplied: (A)4 oz Glass Jar			

Sample Name: HA-30-2.5-Comp **Soil** **Sampled: 05/31/24 11:45** (A4E1783-02)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	06/13/24 17:00	05/31/25 11:45	
Containers Supplied: (A)4 oz Glass Jar			

Sample Name: HA-31-1.5-Comp **Soil** **Sampled: 05/31/24 12:30** (A4E1783-03)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	06/13/24 17:00	05/31/25 12:30	
Containers Supplied: (A)4 oz Glass Jar			

Standard TAT

Released By	Date	Received By	Date
	6/5/24	Fed Ex (Shipper)	
Fed Ex (Shipper)			
Released By	Date	Received By	Date
			06/06/24 0910

Sample Log-In Checklist

ENTHALPY ANALYTICAL

Work Order #: 240 0443 **TAT** Std

Samples Arrival:	**Date/Time** 06/06/24 0910		**Initials:** WWS		**Location:** WR-1 **Shelf/Rack:** N/A		
Delivered By:	FedEx	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	Ice		Blue Ice		Techni Ice	Dry Ice	None
Temp °C: 1.3 (uncorrected)	**Probe used:** Y / N		**Thermometer ID:** IR-4				
Temp °C: 1.3 (corrected)							

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?			✓
Airbill — Trk # 7767 2205 5688	✓		
Shipping Documentation Present?	✓		
Shipping Container: Enthalpy / Client / Retain / Return / Dispose			
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 06/07/24 1335	**Initials:** JT	**Location:** WR-2 **Shelf/Rack:** D-4	
COC Anomaly/Sample Acceptance Form completed?				✓

Comments:

CoC/Label Reconciliation Report WO# 2406043

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2406043-01	A HA-30-1.5-Comp	☑	(A4E1783-01)	31-May-24 11:15	☑	Clear Glass Jar, 120mL	Solid	
2406043-02	A HA-30-2.5-Comp	☑	(A4E1783-02)	31-May-24 11:45	☑	Clear Glass Jar, 120mL	Solid	
2406043-03	A HA-31-1.5-Comp	☑	(A4E1783-03)	31-May-24 12:30	☑	Clear Glass Jar, 120mL	Solid	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓(A)		

Comments: (A) Samples received in clear glass wrapped in foil.

Preservation Documented: Na2S2O3 Trizma NH4CH3CO2 None Other

Verifed by/Date: JT 06/07/24
MMS 06/07/24