Technical Memorandum

To: Katie Daugherty, RG
Date: June 9, 2025

From: Carolyn Wise, RG
Tim Browning, RG
Project No.: M8012.01.001

Re: Residential Yard March 2025 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 March 2025 supplemental soil sampling at Properties 1, 2, 3, and 4 within the residential properties (Area of Interest [AOI]-5) associated with the Permapost site in Hillsboro, Oregon (the Site). This sampling was conducted to inform the extent of dioxin/furan (D/F) and arsenic concentrations for Properties 2 and 4 of AOI-5.

In addition, all data collected to date at residential properties are provided in the attached Table and data validation memoranda.

Background and Purpose

AOI-5 is located to the south of the Permapost property located at 4205 SE Witch Hazel Road in Hillsboro, Oregon (the Permapost Property). AOI-5 includes properties immediately adjacent to the Permapost Property with residential zoning in residential use (Washington County tax parcels 1S209BD00800, 1S209BD00700, 1S209BD00600, 1S209BD00500, properties 1 through 4, respectively; see Figure).

In October 2022, concentrations of dioxins/furans and arsenic were identified in shallow soil in the residentials yards (AOI-5) (see Table) (MFA 2022). Additional data have been collected from the residential yards to support characterization of D/F and arsenic concentrations in soil, consistent with the sampling approach described in an email correspondence *Proposed Additional Sampling, Residential Property DU-2* approved by DEQ on October 23, 2024, and the Property 4, Yard Investigation Work Plan (MFA 2025; Permapost 2024).

Sampling Approach

Property 2

Three additional incremental sampling methodology (ISM) samples and three additional composite samples were collected to refine the excavation depth with DU-2 of Property 2.

Back Yard

One ISM surface sample (DU-2c at 0-0.5 feet below ground surface [bgs]) was collected from the back yard in an area set back from Property 3 (DU-3) and where historical flooding may have impacted prior results of DU-2 on Property 2.

Mid Yard

One ISM surface sample (DU-2d at 0-0.5 feet bgs) was collected from the western portion of the mid yard in an area set back from Property 3 (DU-3).

Two additional 3-point composite samples were collected from 2-3 feet bgs from 1) the western portion of the mid yard (HA-33-COMP) and 2) the eastern portion of the mid yard (HA-34-COMP) to further evaluate the vertical extent of D/F concentrations relative to their proximity to Property 3 (DU-3).

Front Yard

One ISM surface sample (DU-2e at 0-0.5 feet bgs) was collected from the western portion of the front yard in an area set back from Property 3 (DU-3).

One additional 3-point composite samples were collected from 1-2 feet bgs from 1) the western portion of the front yard (HA-32-COMP) to evaluate the vertical extent of D/F concentrations relative to their proximity to Property 3 (DU-3).

Property 4

Property 4 was divided into four decision units (DU-4-A, DU-4-B, DU-4-C, and DU-4-D, see Figure).

- DU-4-A represented soil conditions along the western portion of Property 4 and immediately east of Property 3.[1]
- DU-4-B represents the central portion of Property 4.
- DU-4-C represents soil conditions along the northern portion of Property 4, immediately south of the Permapost Property.
- DU-4-D represents soil conditions along the eastern portions of Property 4, immediately west of the vehicle maintenance shop and yard on the adjacent property.

In addition, four (4) three-point composite samples were collected from 1.5 to 2 feet bgs and 2.5 to 3 feet bgs from each decision unit to evaluate the vertical extent of D/F and arsenic concentrations in soil (HA-35-COMP, HA-36-COMP, HA-37-COMP, HA-38-COMP).

Results

Laboratory analytical reports are provided as Attachment A. Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they met project-specific data quality objectives. This review was performed consistent with EPA procedures for evaluating laboratory analytical data (EPA, 2020a,b) and appropriate laboratory and method-specific guidelines (Apex, 2023; Enthalpy, 2023). A data validation memorandum summarizing data evaluation procedures, data usability, and deviations from specific field and/or laboratory methods is included as Attachment B. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned. Analytical results are provided in the Table. Analytical data were

[1] Property 3 contains the highest concentrations of dioxin/furans and arsenic of the other properties within AOI-5.

screened relative to a site-specific preliminary remediation goal (PRG) for dioxins/furans of 11.8 picograms per gram (pg/g) (MFA 2023) and regional background for arsenic of 8.8 milligrams per kilogram (mg/kg) (see Table).

Attachments

References

Limitations

Figure

Table

A—Analytical Laboratory Reports

B—Data Validation Memoranda

References

Apex. 2023. Quality Systems Manual. Rev. 11. Apex Laboratories, LLC: Tigard, OR. June 20.

Enthalpy. 2023. Quality Manual. Rev. 33. Enthalpy Analytical LLC: El Dorado Hills, CA. February 20.

EPA. 2020a. 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.

EPA. 2020b. 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.

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.

MFA. 2025. Phil Wiescher, PhD, & Carolyn Wise, RG, Maul Foster & Alongi, Inc., Property 4, Yard Investigation Work Plan, Permapost Products, Inc., Hillsboro, Oregon, ECSI #148. Memorandum to Katie Daugherty, RG, Oregon Department of Environmental Quality. January 15.

Permapost. 2024. Tim Browning, RG, Permapost Products, Inc. Proposed Additional Sampling, Residential Property DU-2. Email to Katie Daugherty, RG, Oregon Department of Environmental Quality. October 23.

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.

Figure

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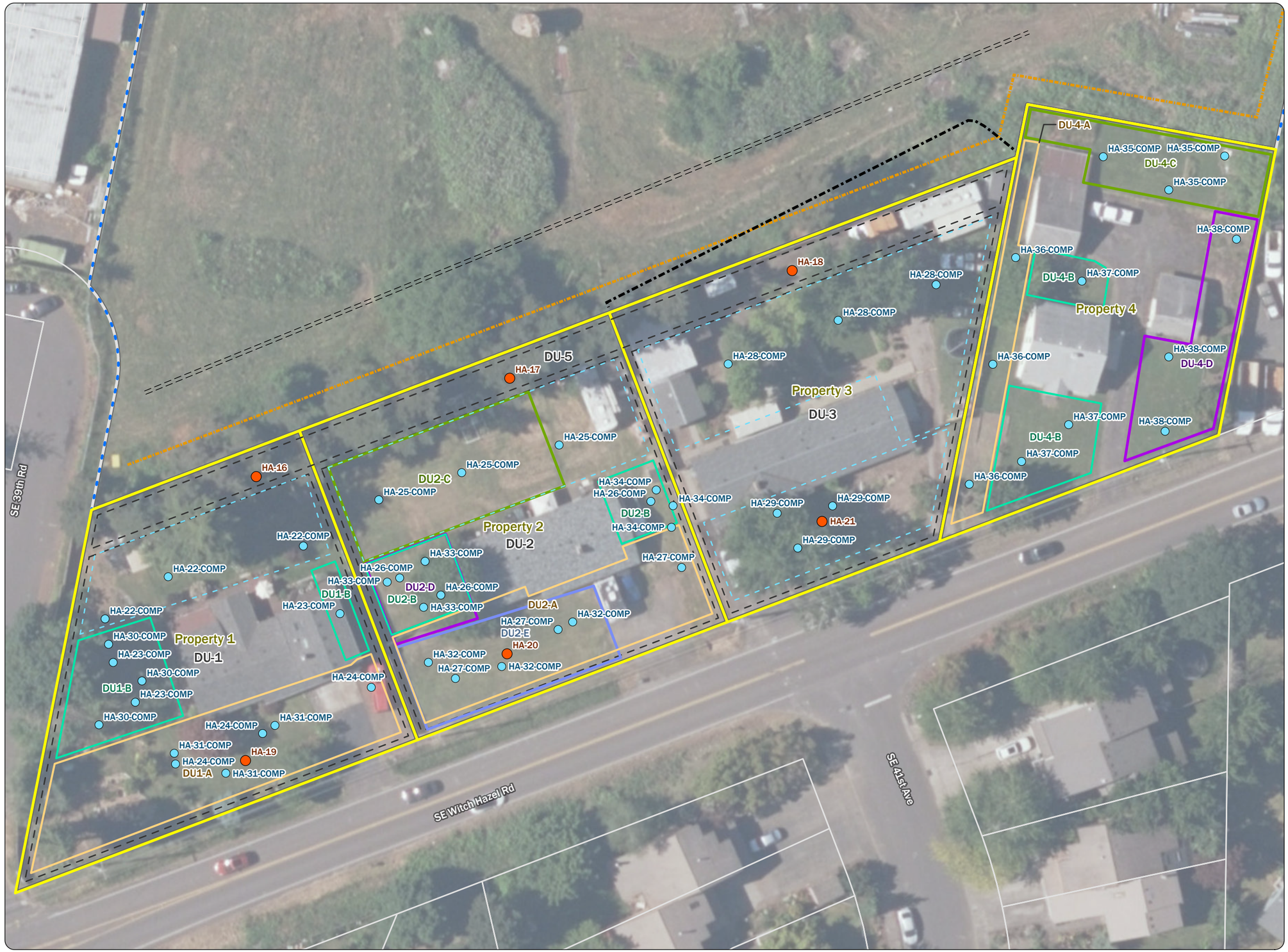
Figure
AOI-5 Sample Locations

Permapost Products, Inc.
Hillsboro, OR



Legend

- Composite Sample
- Discrete
- Decision Unit A
- Decision Unit B
- Decision Unit C
- Decision Unit D
- Decision Unit E
- 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 30
Feet

Data Sources
Aerial photograph obtained from the City of Portland (2024); tax lot data obtained from Oregon Metro (2025).

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

Path: X:\8012.01\Projects\Permapost_YardSampling\WP\Pro\M8012_01_001_Interim_Action.aprx\Fig 1 AOI-5 Sample Locs 202505
Print Date: 5/20/2025
Reviewed By: cwise
Produced By: jroberts
Project: M8012.01.001

Table

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Table
Summary of Soil Analytical Results
Yard Pre-Design Investigation Work Plan
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	HA-24-COMP-2-3
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	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	2.0-3.0
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	2.90 J

Table
Summary of Soil Analytical Results
Yard Pre-Design Investigation Work Plan
Permapost Products, Inc., Hillsboro, Oregon

Decision Unit:	Screening Criteria	DU-01 (cont.)			DU-02						
Sample Name:		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	HA-25-COMP-2-3	HA-26-COMP-1-2
Sample Date:		05/31/2024	05/31/2024	05/31/2024	10/05/2022	10/05/2022	05/09/2023	05/09/2023	05/11/2023	05/11/2023	05/11/2023
Sample Depth (ft bgs):		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	2.0-3.0	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]	13.9	179	2.58	28.6 J	9.8 J	71.7 J	80.2 J	7.60 J	3.96 J	6.30 J

Table
Summary of Soil Analytical Results
Yard Pre-Design Investigation Work Plan
Permapost Products, Inc., Hillsboro, Oregon

Decision Unit:	Screening Criteria	DU-02 (cont.)								
Sample Name:		HA-26-COMP-2-3	HA-27-COMP-1-2	HA-27-COMP-2-3	HA-32-COMP-S-1-	HA-33-COMP-S-2-	HA-34-COMP-S-2-	DU-2c-S-0.5	DU-2d-S-0.5	DU-2e-S-0.5
Sample Date:		05/11/2023	05/11/2023	05/11/2023	03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Sample Depth (ft bgs):		2.0-3.0	1.0-2.0	2.0-3.0	1.0-2.0	2.0-3.0	2.0-3.0	0.5	0.5	0.5
Total Metals (mg/kg)										
Arsenic	8.8[a][1]	--	--	--	--	5.39	--	6.76	8.93	7.05
Dioxins and Furans (pg/g)										
Dioxin and Furan TEQ[b][2]	11.8[c][3]	18.4 J	26.7 J	7.90 J	4.18 J	4.57 J	15.8 J	21.9 J	49.6 J	35.8 J

Table
Summary of Soil Analytical Results
Yard Pre-Design Investigation Work Plan
Permapost Products, Inc., Hillsboro, Oregon

Decision Unit:	Screening Criteria	DU-03						
Sample Name:		DU03A-S-0.5	DU03B-S-0.5	DU03C-S-0.5	HA21-S-2.0	HA21-S-3.0	HA-28-Comp-2-3	HA-29-Comp-2-3
Sample Date:		10/05/2022	10/05/2022	10/05/2022	10/05/2022	10/05/2022	05/11/2023	05/11/2023
Sample Depth (ft bgs):		0-0.5	0-0.5	0-0.5	1.0-2.0	2.0-3.0	2.0-3.0	2.0-3.0
Total Metals (mg/kg)								
Arsenic	8.8[a][1]	38.2	38.4	40.3	9.60	13.2	16.4	9.96
Dioxins and Furans (pg/g)								
Dioxin and Furan TEQ[b][2]	11.8[c][3]	395 J	359 J	370	26.1 J	73.3 J	53.1 J	29.2 J

Table
Summary of Soil Analytical Results
Yard Pre-Design Investigation Work Plan
Permapost Products, Inc., Hillsboro, Oregon

Decision Unit:	Screening Criteria	DU-04					
Sample Name:		HA-35-COMP-S-2.5-3.0	HA-36-COMP-S-2.5-3.0	DU4-A-S-0.5	DU4-B-S-0.5	DU4-C-S-0.5	DU4-D-S-0.5
Sample Date:		03/11/2025	03/11/2025	03/11/2025	03/11/2025	03/11/2025	03/11/2025
Sample Depth (ft bgs):		2.5-3.0	2.5-3.0	0.5	0.5	0.5	0.5
Total Metals (mg/kg)							
Arsenic	8.8[(a)(1)]	6.32	5.20	17.8	5.85	47.2	6.18
Dioxins and Furans (pg/g)							
Dioxin and Furan TEQ[(b)(2)]	11.8[(c)(3)]	14.3 J	12.3 J	106	12.7 J	479	14.1 J

Table
Summary of Soil Analytical Results
Yard Pre-Design Investigation Work Plan
Permapost Products, Inc., Hillsboro, Oregon

Decision Unit:	Screening Criteria	DU-05					
Sample Name:		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	10/05/2022	10/05/2022	10/05/2022	10/05/2022	10/05/2022
Sample Depth (ft bgs):		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)]	13.3	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)]	68.2 J	74.1 J	18.3 J	6.60 J	506 J	91.3 J

Attachment A

Analytical Laboratory Reports

MAUL FOSTER ALONGI

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

ANALYTICAL REPORT

Wednesday, April 2, 2025

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

RE: A5C1334 - 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 A5C1334, which was received by the laboratory on 3/12/2025 at 5:05:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, 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)					
Cooler #1	3.3	degC	Cooler #2	5.6	degC
Cooler #3	5.6	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	A5C1334 - 04 02 25 1828

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DU4-A-S-0.5	A5C1334-01	Soil	03/11/25 11:00	03/12/25 17:05
DU4-A-S-0.5	A5C1334-02	Soil	03/11/25 11:00	03/12/25 17:05
DU4-B-S-0.5	A5C1334-03	Soil	03/11/25 10:30	03/12/25 17:05
DU4-B-S-0.5	A5C1334-04	Soil	03/11/25 10:30	03/12/25 17:05
DU4-C-S-0.5	A5C1334-05	Soil	03/11/25 12:15	03/12/25 17:05
DU4-C-S-0.5	A5C1334-06	Soil	03/11/25 12:15	03/12/25 17:05
DU4-D-S-0.5	A5C1334-07	Soil	03/11/25 09:45	03/12/25 17:05
DU4-D-S-0.5	A5C1334-08	Soil	03/11/25 09:45	03/12/25 17:05
DU-2c-S-0.5	A5C1334-17	Soil	03/12/25 10:30	03/12/25 17:05
DU-2c-S-0.5	A5C1334-18	Soil	03/12/25 10:30	03/12/25 17:05
DU-2d-S-0.5	A5C1334-19	Soil	03/12/25 11:15	03/12/25 17:05
DU-2d-S-0.5	A5C1334-20	Soil	03/12/25 11:15	03/12/25 17:05
DU-2e-S-0.5	A5C1334-21	Soil	03/12/25 12:00	03/12/25 17:05
DU-2e-S-0.5	A5C1334-22	Soil	03/12/25 12:00	03/12/25 17:05

Apex Laboratories

Philip Nerenberg, Lab Director

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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	A5C1334 - 04 02 25 1828

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU4-A-S-0.5 (A5C1334-02)				**Matrix: Soil**				
Batch: 25C1019								
Arsenic	**17.8**	---	1.02	mg/kg dry	10	03/26/25 22:49	EPA 6020B	**PRO**
DU4-B-S-0.5 (A5C1334-04)				**Matrix: Soil**				
Batch: 25C1019								
Arsenic	**5.85**	---	1.09	mg/kg dry	10	03/26/25 22:54	EPA 6020B	**PRO**
DU4-C-S-0.5 (A5C1334-06)				**Matrix: Soil**				
Batch: 25C1019								
Arsenic	**47.2**	---	1.03	mg/kg dry	10	03/26/25 22:59	EPA 6020B	**PRO**
DU4-D-S-0.5 (A5C1334-08)				**Matrix: Soil**				
Batch: 25C1019								
Arsenic	**6.18**	---	1.09	mg/kg dry	10	03/26/25 23:05	EPA 6020B	**PRO**
DU-2c-S-0.5 (A5C1334-18)				**Matrix: Soil**				
Batch: 25C1019								
Arsenic	**6.76**	---	1.05	mg/kg dry	10	03/26/25 23:21	EPA 6020B	**PRO**
DU-2d-S-0.5 (A5C1334-20)				**Matrix: Soil**				
Batch: 25C1019								
Arsenic	**8.93**	---	1.08	mg/kg dry	10	03/26/25 23:27	EPA 6020B	**PRO**
DU-2e-S-0.5 (A5C1334-22)				**Matrix: Soil**				
Batch: 25C1019								
Arsenic	**7.05**	---	1.08	mg/kg dry	10	03/26/25 23:32	EPA 6020B	**PRO**

Apex Laboratories

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
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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	A5C1334 - 04 02 25 1828

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
DU4-A-S-0.5 (A5C1334-02)				**Matrix: Soil**		**Batch: 25C0703**		**PRO**
% Solids	**98.4**	---	1.00	%	1	03/19/25 04:57	EPA 8000D	
DU4-B-S-0.5 (A5C1334-04)				**Matrix: Soil**		**Batch: 25C0703**		**PRO**
% Solids	**98.4**	---	1.00	%	1	03/19/25 04:57	EPA 8000D	
DU4-C-S-0.5 (A5C1334-06)				**Matrix: Soil**		**Batch: 25C0703**		**PRO**
% Solids	**98.3**	---	1.00	%	1	03/19/25 04:57	EPA 8000D	
DU4-D-S-0.5 (A5C1334-08)				**Matrix: Soil**		**Batch: 25C0703**		**PRO**
% Solids	**98.2**	---	1.00	%	1	03/19/25 04:57	EPA 8000D	
DU-2c-S-0.5 (A5C1334-18)				**Matrix: Soil**		**Batch: 25C0703**		**PRO**
% Solids	**98.1**	---	1.00	%	1	03/19/25 04:57	EPA 8000D	
DU-2d-S-0.5 (A5C1334-20)				**Matrix: Soil**		**Batch: 25C0703**		**PRO**
% Solids	**98.2**	---	1.00	%	1	03/19/25 04:57	EPA 8000D	
DU-2e-S-0.5 (A5C1334-22)				**Matrix: Soil**		**Batch: 25C0703**		**PRO**
% Solids	**98.2**	---	1.00	%	1	03/19/25 04:57	EPA 8000D	

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

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	A5C1334 - 04 02 25 1828

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 25C1019 - EPA 3051A							Soil					
Blank (25C1019-BLK1)			Prepared: 03/26/25 08:30 Analyzed: 03/26/25 21:16									
EPA 6020B												
Arsenic	ND	---	1.00	mg/kg wet	10	---	---	---	---	---	---	
LCS (25C1019-BS1)			Prepared: 03/26/25 08:30 Analyzed: 03/26/25 21:38									
EPA 6020B												
Arsenic	51.1	---	1.00	mg/kg wet	10	50.0	---	102	80-120%	---	---	
Duplicate (25C1019-DUP1)			Prepared: 03/26/25 08:30 Analyzed: 03/26/25 21:54									
QC Source Sample: Non-SDG (A5C1231-01)												
Arsenic	**3.54**	---	1.24	mg/kg dry	10	---	4.17	---	---	16	20%	
Matrix Spike (25C1019-MS1)			Prepared: 03/26/25 08:30 Analyzed: 03/26/25 22:00									
QC Source Sample: Non-SDG (A5C1231-01)												
EPA 6020B												
Arsenic	66.3	---	1.26	mg/kg dry	10	63.2	4.17	98	75-125%	---	---	

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

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	A5C1334 - 04 02 25 1828

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 25C0703 - Dry Weight Prep (EPA 8000D)							Soil					
Duplicate (25C0703-DUP1)			Prepared: 03/18/25 10:13		Analyzed: 03/19/25 04:57							PRO
QC Source Sample: DU4-A-S-0.5 (A5C1334-02)												
EPA 8000D												
% Solids	**98.4**	---	1.00	%	1	---	98.4	---	---	0.06	10%	
Duplicate (25C0703-DUP2)			Prepared: 03/18/25 10:13		Analyzed: 03/19/25 04:57							
QC Source Sample: Non-SDG (A5C1512-01)												
% Solids	**72.1**	---	1.00	%	1	---	74.7	---	---	4	10%	
Duplicate (25C0703-DUP3)			Prepared: 03/18/25 18:27		Analyzed: 03/19/25 04:57							
QC Source Sample: Non-SDG (A5C1575-01)												
% Solids	**75.4**	---	1.00	%	1	---	75.7	---	---	0.4	10%	
Duplicate (25C0703-DUP4)			Prepared: 03/18/25 18:27		Analyzed: 03/19/25 04:57							
QC Source Sample: Non-SDG (A5C1576-02)												
% Solids	**74.2**	---	1.00	%	1	---	74.0	---	---	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

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: 25C1019							
A5C1334-02	Soil	EPA 6020B	03/11/25 11:00	03/26/25 08:30	0.496g/50mL	0.5g/50mL	1.01
A5C1334-04	Soil	EPA 6020B	03/11/25 10:30	03/26/25 08:30	0.467g/50mL	0.5g/50mL	1.07
A5C1334-06	Soil	EPA 6020B	03/11/25 12:15	03/26/25 08:30	0.496g/50mL	0.5g/50mL	1.01
A5C1334-08	Soil	EPA 6020B	03/11/25 09:45	03/26/25 08:30	0.467g/50mL	0.5g/50mL	1.07
A5C1334-18	Soil	EPA 6020B	03/12/25 10:30	03/26/25 08:30	0.486g/50mL	0.5g/50mL	1.03
A5C1334-20	Soil	EPA 6020B	03/12/25 11:15	03/26/25 08:30	0.471g/50mL	0.5g/50mL	1.06
A5C1334-22	Soil	EPA 6020B	03/12/25 12:00	03/26/25 08:30	0.472g/50mL	0.5g/50mL	1.06

Percent Dry Weight

Prep: Dry Weight Prep (EPA 8000D)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 25C0703							
A5C1334-02	Soil	EPA 8000D	03/11/25 11:00	03/18/25 10:13	1g	1g	1.00
A5C1334-04	Soil	EPA 8000D	03/11/25 10:30	03/18/25 10:13	1g	1g	1.00
A5C1334-06	Soil	EPA 8000D	03/11/25 12:15	03/18/25 10:13	1g	1g	1.00
A5C1334-08	Soil	EPA 8000D	03/11/25 09:45	03/18/25 10:13	1g	1g	1.00
A5C1334-18	Soil	EPA 8000D	03/12/25 10:30	03/18/25 10:13	1g	1g	1.00
A5C1334-20	Soil	EPA 8000D	03/12/25 11:15	03/18/25 10:13	1g	1g	1.00
A5C1334-22	Soil	EPA 8000D	03/12/25 12:00	03/18/25 10:13	1g	1g	1.00

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**	**A5C1334 - 04 02 25 1828**

QUALIFIER DEFINITIONS

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

Apex Laboratories

PRO Sample has undergone sample processing prior to extraction and analysis.

Apex Laboratories

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)

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

Reporting Limits: Limit of Quantitation (LOQ)

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

Reporting Conventions:

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

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

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

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

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

QC Source:

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

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

Miscellaneous Notes:

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

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

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REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 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.

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Decanted Samples:

Soils/Sediments:
Unless TCLP analysis is required or there is notification otherwise for a specific project, all Soil and Sediments containing excess water are decanted prior to analysis in order to provide the most representative sample for analysis.

Water Samples:
Water samples containing solids and sediment may need to be decanted in order to eliminate these particulates from the water extractions. In the case of organics extractions, a solvent rinse of the container will not be performed.

Volatiles Soils (5035s)
Samples that are field preserved by 5035 for volatiles are dry weight corrected using the same dry weight corretion as for normal analyses. In the case of decanted samples, the dry weight may be performed on a decanted sample, while the aliquot for 5035 may not have been treated the same way. If this is a concern, please submit separate containers for dry weight analysis for volatiles can be provided.

All samples decanted in the laboratory are noted in this report with the DCNT qualifier indicating the sample was decanted.

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LABORATORY ACCREDITATION INFORMATION

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

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

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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Portland, OR 97232	Project Manager:	**Phil Wiescher**

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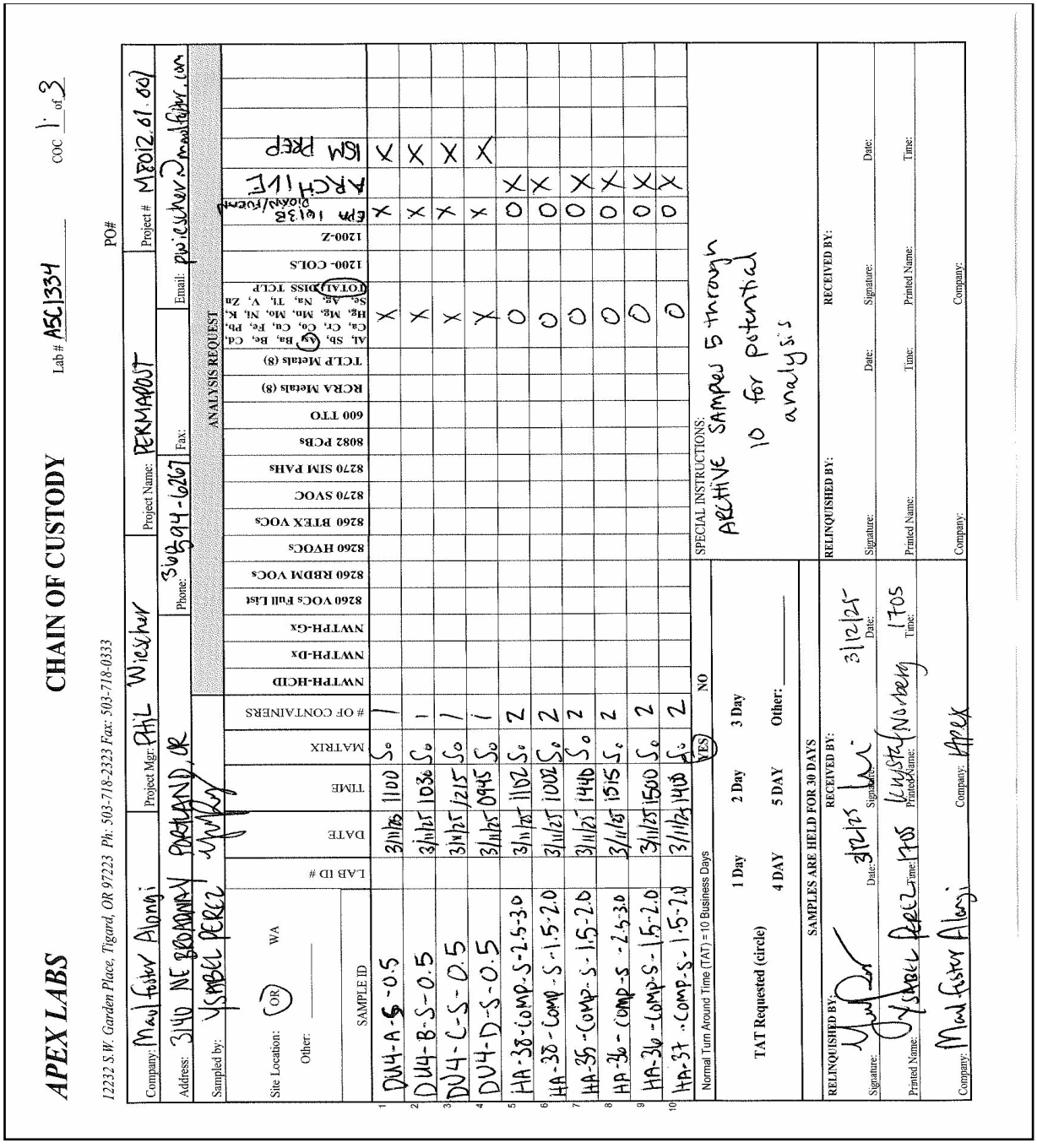
A5C1334 - 04 02 25 1828



APEX LABS

CHAIN OF CUSTODY

Lab # A5C1334

COC 1 of 3

PO#

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

Company: Maul Foster Alongi | Project Mgr: PHIL Wiescher | Project Name: PERMAPOST | Project # M8012.01.001

Address: 3140 NE BROADWAY PORTLAND, OR | Phone: 360 694-6267 | Fax: | Email: pwiescher@maulfoster.com

Sampled by: YSABEL PEREZ

Site Location: (OR) WA

Other: _____

ANALYSIS REQUEST

	SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 VOCs Full List	8260 RBDM VOCs	8260 HVOCs	8260 BTEX VOCs	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCRA Metals (8)	TCLP Metals (8)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn (TOTAL) DISS TCLP	1200-COLS	1200-Z	EPH 1613B Diokane/Dioxane	ARCHIVE	ISM PREP
1	DU4-A-S-0.5		3/11/25	1100	S	1													X			X		X
2	DU4-B-S-0.5		3/11/25	1036	S	1													X			X		X
3	DU4-C-S-0.5		3/11/25	1215	S	1													X			X		X
4	DU4-D-S-0.5		3/11/25	0945	S	1													X			X		X
5	HA-38-COMP-S-2.5-3.0		3/11/25	1102	S	2													O			O	X	
6	HA-38-COMP-S-1.5-2.0		3/11/25	1002	S	2													O			O	X	
7	HA-35-COMP-S-1.5-2.0		3/11/25	1446	S	2													O			O	X	
8	HA-36-COMP-S-2.5-3.0		3/11/25	1515	S	2													O			O	X	
9	HA-36-COMP-S-1.5-2.0		3/11/25	1500	S	2													O			O	X	
10	HA-37-COMP-S-1.5-2.0		3/11/25	1418	S	2													O			O	X	

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: _____

SAMPLES ARE HELD FOR 30 DAYS

SPECIAL INSTRUCTIONS: ARCHIVE SAMPLES THROUGH 10 FOR POTENTIAL ANALYSIS

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

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

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

RELINQUISHED BY: Signature: _____ Date: 3/12/25 Time: 1705 Printed Name: YSABEL PEREZ Company: MAUL FOSTER ALONGI

RECEIVED BY: Signature: _____ Date: 3/12/25 Time: 1705 Printed Name: Nerenberg Company: APEX

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

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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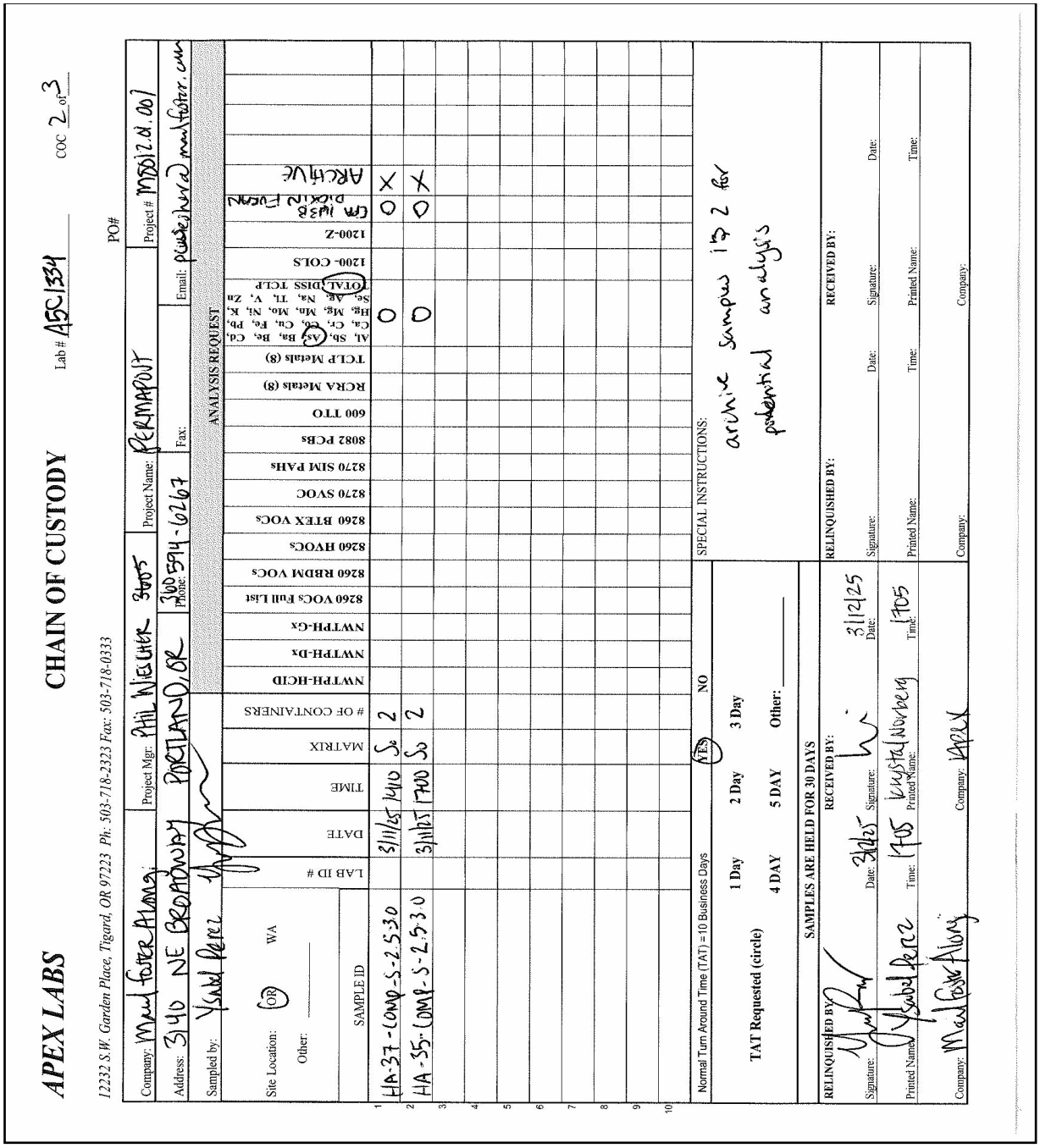
3140 NE Broadway Street	Project Number: **M8012.01.001**	**Report ID:**
Portland, OR 97232	Project Manager: **Phil Wiescher**	**A5C1334 - 04 02 25 1828**



Apex Laboratories

Philip Nerenberg

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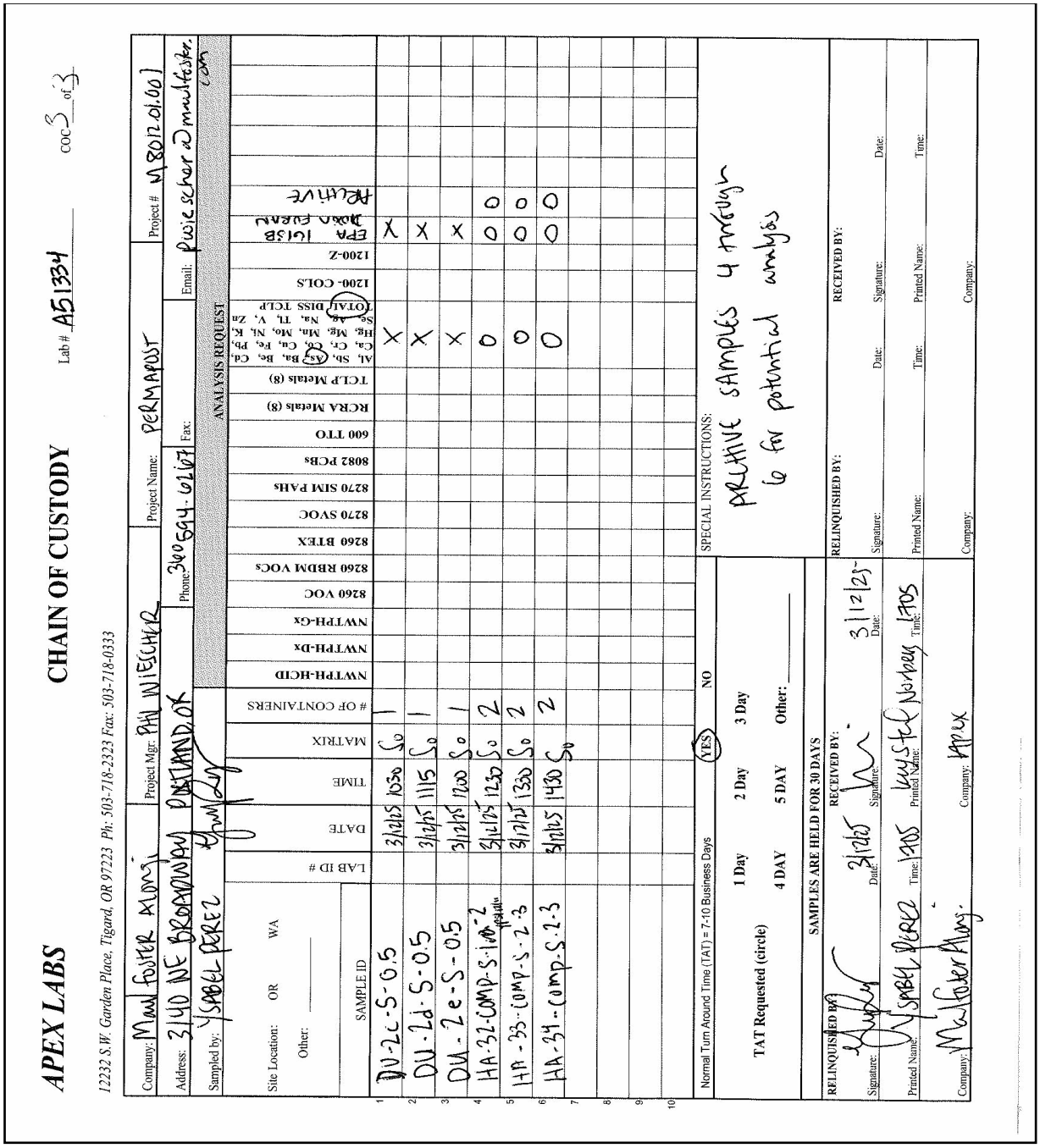

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APEX LABS COOLER RECEIPT FORM

Client: Maul Foster & Alongi Element WO#: A5C1334

Project/Project #: PermaPost / M8012.01.001

Delivery Info:

Date/time received: 3/12/25 @ 1705 By: KN

Delivered by: Apex__Client X ESS__FedEx__UPS__Radio__Morgan__SDS__Evergreen__Other__

From USDA Regulated Origin? Yes _____ No √

Cooler Inspection Date/time inspected: 3/12/25 @ 1705 By: KN

Chain of Custody included? Yes √ No _____

Signed/dated by client? Yes √ No _____

Contains USDA Reg. Soils? Yes _____ No √ Unsure (email RegSoils) _____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	3.3	5.6	5.6				
Custody seals? (Y/N)	N	N	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: 3/12/25 @ 17:51 By: KAM

All samples intact? Yes X No ___ Comments: _____

Bottle labels/COCs agree? Yes X No X Comments: Time on cans for HA-3B-Comp-S-1.5-2.0 reads 1001. KAM 3/12/25

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: KAM Witness: KN Cooler Inspected by: KAM

Form Y-003 R-02

Apex Laboratories

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Thursday, May 1, 2025

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

RE: A5C1334 - 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 A5C1334, which was received by the laboratory on 3/12/2025 at 5:05:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, 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)					
Cooler #1	3.3	degC	Cooler #2	5.6	degC
Cooler #3	5.6	degC			

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

Apex Laboratories

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Portland, OR 97232	Project Manager: **Phil Wiescher**	**A5C1334 - 05 01 25 1345**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
HA-36-COMP-S-2.5-3.0	A5C1334-12	Soil	03/11/25 15:15	03/12/25 17:05
HA-35-COMP-S-2.5-3.0	A5C1334-16	Soil	03/11/25 17:00	03/12/25 17:05
HA-33-COMP-S-2-3	A5C1334-24	Soil	03/12/25 13:30	03/12/25 17:05

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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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**	**A5C1334 - 05 01 25 1345**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
HA-36-COMP-S-2.5-3.0 (A5C1334-12)				**Matrix: Soil**				
Batch: 25D1141								
Arsenic	**5.20**	---	1.44	mg/kg dry	10	04/29/25 18:16	EPA 6020B	
HA-35-COMP-S-2.5-3.0 (A5C1334-16)				**Matrix: Soil**				
Batch: 25D1141								
Arsenic	**6.32**	---	1.39	mg/kg dry	10	04/29/25 18:21	EPA 6020B	**CONT**
HA-33-COMP-S-2-3 (A5C1334-24)				**Matrix: Soil**				
Batch: 25D1141								
Arsenic	**5.39**	---	1.27	mg/kg dry	10	04/29/25 18:26	EPA 6020B	**CONT**

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

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**	**A5C1334 - 05 01 25 1345**

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
HA-36-COMP-S-2.5-3.0 (A5C1334-12)				**Matrix: Soil**		**Batch: 25D0840**		**H-01**
% Solids	**75.5**	---	1.00	%	1	04/22/25 05:14	EPA 8000D	
HA-35-COMP-S-2.5-3.0 (A5C1334-16)				**Matrix: Soil**		**Batch: 25D0840**		**CONT, H-01**
% Solids	**75.9**	---	1.00	%	1	04/22/25 05:14	EPA 8000D	
HA-33-COMP-S-2-3 (A5C1334-24)				**Matrix: Soil**		**Batch: 25D0840**		**CONT, H-01**
% Solids	**77.4**	---	1.00	%	1	04/22/25 05:14	EPA 8000D	

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Portland, OR 97232	Project Manager: **Phil Wiescher**	**A5C1334 - 05 01 25 1345**

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 25D1141 - EPA 3051A							**Soil**					
Blank (25D1141-BLK1)			Prepared: 04/29/25 08:29		Analyzed: 04/29/25 18:05							
EPA 6020B												
Arsenic	ND	---	1.00	mg/kg wet	10	---	---	---	---	---	---	
LCS (25D1141-BS1)			Prepared: 04/29/25 08:29		Analyzed: 04/29/25 18:10							
EPA 6020B												
Arsenic	49.9	---	1.00	mg/kg wet	10	50.0	---	100	80-120%	---	---	
Duplicate (25D1141-DUP1)			Prepared: 04/29/25 08:29		Analyzed: 04/29/25 20:23							
QC Source Sample: Non-SDG (A5D1679-01)												
Arsenic	**3.03**	---	1.22	mg/kg dry	10	---	1.26	---	---	**82**	**20%**	CONT,Q-05
Matrix Spike (25D1141-MS1)			Prepared: 04/29/25 08:29		Analyzed: 04/29/25 20:28							
QC Source Sample: Non-SDG (A5D1679-01)												
EPA 6020B												
Arsenic	59.3	---	1.17	mg/kg dry	10	58.7	1.26	99	75-125%	---	---	CONT

Apex Laboratories

Philip Nerenberg, Lab Director

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Portland, OR 97232	Project Manager: **Phil Wiescher**	**A5C1334 - 05 01 25 1345**

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 25D0840 - Dry Weight Prep (EPA 8000D)							**Soil**					
Duplicate (25D0840-DUP1)			Prepared: 04/21/25 14:19		Analyzed: 04/22/25 05:14							
QC Source Sample: HA-36-COMP-S-2.5-3.0 (A5C1334-12)												
EPA 8000D												
% Solids	**76.7**	---	1.00	%	1	---	75.5	---	---	1	10%	
Duplicate (25D0840-DUP2)			Prepared: 04/21/25 14:19		Analyzed: 04/22/25 05:14							
QC Source Sample: Non-SDG (A5D1534-12)												
% Solids	**74.8**	---	1.00	%	1	---	74.8	---	---	0.006	10%	
Duplicate (25D0840-DUP3)			Prepared: 04/21/25 14:19		Analyzed: 04/22/25 05:14							**CONT**
QC Source Sample: Non-SDG (A5D1562-05)												
% Solids	**82.9**	---	1.00	%	1	---	82.8	---	---	0.1	10%	
Duplicate (25D0840-DUP4)			Prepared: 04/21/25 14:19		Analyzed: 04/22/25 05:14							
QC Source Sample: Non-SDG (A5D1601-09)												
% Solids	**78.7**	---	1.00	%	1	---	78.2	---	---	0.6	10%	
Duplicate (25D0840-DUP5)			Prepared: 04/21/25 18:51		Analyzed: 04/22/25 05:14							
QC Source Sample: Non-SDG (A5D1649-02)												
% Solids	**82.4**	---	1.00	%	1	---	82.6	---	---	0.3	10%	

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

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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	A5C1334 - 05 01 25 1345

SAMPLE PREPARATION INFORMATION

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: 25D1141							
A5C1334-12	Soil	EPA 6020B	03/11/25 15:15	04/29/25 08:29	0.46g/50mL	0.5g/50mL	1.09
A5C1334-16	Soil	EPA 6020B	03/11/25 17:00	04/29/25 08:29	0.475g/50mL	0.5g/50mL	1.05
A5C1334-24	Soil	EPA 6020B	03/12/25 13:30	04/29/25 08:29	0.508g/50mL	0.5g/50mL	0.98

Percent Dry Weight

Prep: Dry Weight Prep (EPA 8000D)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 25D0840							
A5C1334-12	Soil	EPA 8000D	03/11/25 15:15	04/21/25 14:19	1g	1g	1.00
A5C1334-16	Soil	EPA 8000D	03/11/25 17:00	04/21/25 14:19	1g	1g	1.00
A5C1334-24	Soil	EPA 8000D	03/12/25 13:30	04/21/25 14:19	1g	1g	1.00

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Philip Nerenberg, Lab Director

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QUALIFIER DEFINITIONS

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

Apex Laboratories

CONT	The Sample Container provided for this analysis was not provided by Apex Laboratories, and has not been verified as part of the Apex Quality System.
H-01	Analyzed outside the recommended holding time.
Q-05	Analyses are not controlled on RPD values from sample and duplicate concentrations that are below 5 times the reporting level.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

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

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

NR Result Not Reported

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

Detection Limits: Limit of Detection (LOD)

Validated 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 and Detection Limits: Default Limits

Default Reporting and Detection Limits are based on 100% dry weight with the minimum dilution for the analysis. Reporting and Detection Limits are raised due to moisture content, additional dilutions required for analysis, matrix interferences and in other cases, as necessary.

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.

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**	**A5C1334 - 05 01 25 1345**

Decanted Samples:

Soils/Sediments:
Unless TCLP analysis is required or there is notification otherwise for a specific project, all Soil and Sediments containing excess water are decanted prior to analysis in order to provide the most representative sample for analysis.

Water Samples:
Water samples containing solids and sediment may need to be decanted in order to eliminate these particulates from the water extractions. In the case of organics extractions, a solvent rinse of the container will not be performed.

Volatiles Soils (5035s)
Samples that are field preserved by 5035 for volatiles are dry weight corrected using the same dry weight corretion as for normal analyses. In the case of decanted samples, the dry weight may be performed on a decanted sample, while the aliquot for 5035 may not have been treated the same way. If this is a concern, please submit separate containers for dry weight analysis for volatiles can be provided.

All samples decanted in the laboratory are noted in this report with the DCNT qualifier indicating the sample was decanted.

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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LABORATORY ACCREDITATION INFORMATION

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

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

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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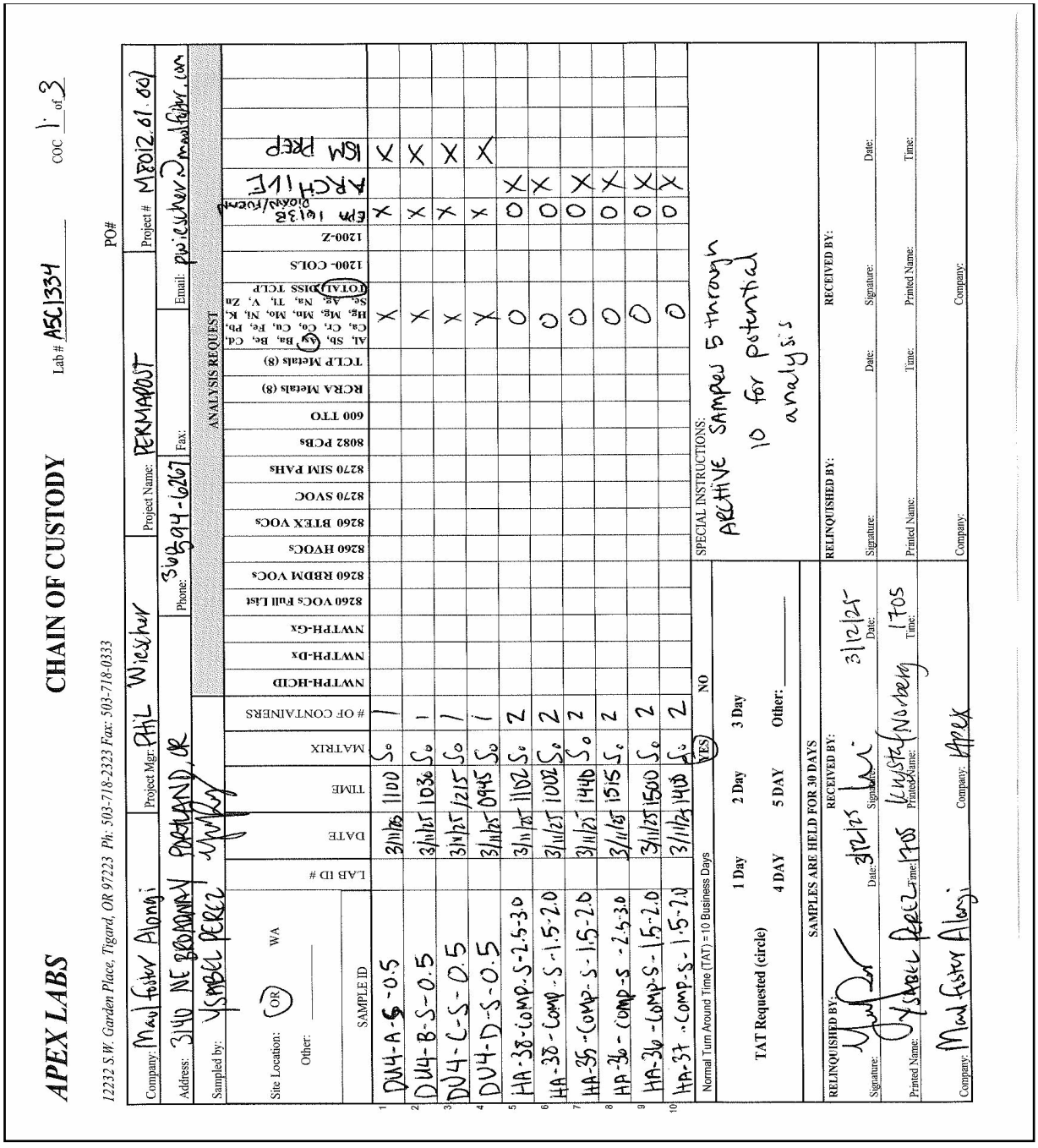

APEX LABS

CHAIN OF CUSTODY

Lab # A5C1334

COC 1 of 3

PO#

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

Company: Maul Foster Alongi | Project Mgr: Phil Wiescher | Project Name: PERMAPOST | Project # M8012.01.001

Address: 3140 NE BROADWAY PORTLAND, OR | Phone: 360-694-6267 | Fax: | Email: pwiescher@maulfoster.com

Sampled by: Ysabel Perez

Site Location: (OR) WA

Other: _____

ANALYSIS REQUEST

	SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 VOCs Full List	8260 RBDM VOCs	8260 HVOCs	8260 BTEX VOCs	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCRA Metals (8)	TCLP Metals (8)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn (TOTAL) DISS TCLP	1200-COLS	1200-Z	EPH 1613B Dioxin/Furan	ARCHIVE	ISM PREP
1	DU4-A-S-0.5		3/11/25	1100	So	1													X			X	X	X
2	DU4-B-S-0.5		3/11/25	1036	So	1													X			X	X	X
3	DU4-C-S-0.5		3/11/25	1215	So	1													X			X	X	X
4	DU4-D-S-0.5		3/11/25	0945	So	1													X			X	X	X
5	HA-38-Comp-S-2.5-3.0		3/11/25	1102	So	2													O			O	X	
6	HA-38-Comp-S-1.5-2.0		3/11/25	1002	So	2													O			O	X	
7	HA-35-Comp-S-1.5-2.0		3/11/25	1446	So	2													O			O	X	
8	HA-36-Comp-S-2.5-3.0		3/11/25	1515	So	2													O			O	X	
9	HA-36-Comp-S-1.5-2.0		3/11/25	1500	So	2													O			O	X	
10	HA-37-Comp-S-1.5-2.0		3/11/25	1418	So	2													O			O	X	

Normal Turn Around Time (TAT) = 10 Business Days (YES) NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: _____

SPECIAL INSTRUCTIONS: ARCHIVE SAMPLES THROUGH 10 FOR POTENTIAL ANALYSIS

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Signature: Date: 3/12/25 Printed Name: Ysabel Perez Time: 1705 Company: Maul Foster Alongi

RECEIVED BY: Signature: Date: 3/12/25 Printed Name: Ysabel Perez Time: 1705 Company: Apex

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

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

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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APEX LABORATORIES

ANALYTICAL REPORT

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3140 NE Broadway Street	Project Number: **M8012.01.001**	**Report ID:**
Portland, OR 97232	Project Manager: **Phil Wiescher**	**A5C1334 - 05 01 25 1345**

APEX LABS — CHAIN OF CUSTODY

Lab # A5C1334 COC 2 of 3

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

PO#

Company: Maul Foster Alongi | Project Mgr: PHIL WIESCHER ~~3605~~ | Project Name: PERMAPOST | Project # M8012.01.001

Address: 3140 NE BROADWAY PORTLAND, OR | Phone: 360 594-6267 | Fax: | Email: pwiescher@maulfoster.com

Sampled by: Ysabel Perez

Site Location: (OR) WA Other: ______

ANALYSIS REQUEST

	SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 VOCs Full List	8260 RBDM VOCs	8260 HVOCs	8260 BTEX VOCs	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCRA Metals (8)	TCLP Metals (8)	Al, Sb, (As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn (TOTAL) DISS TCLP	1200- COLS	1200-Z	EPA 1613B Dioxin Furan	ARCHIVE
1	HA-37-COMP-S-2.5-3.0		3/11/25	1410	So	2														O			O	X
2	HA-35-COMP-S-2.5-3.0		3/11/25	1700	So	2														O			O	X
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								

Normal Turn Around Time (TAT) = 10 Business Days (YES) NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ______

SPECIAL INSTRUCTIONS: archive samples 1 & 2 for potential analysis

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature] Date: 3/12/25	Signature: [signature] Date: 3/12/25	Signature: Date:	Signature: Date:
Printed Name: Ysabel Perez Time: 1705	Printed Name: Krystal Norberg Time: 1705	Printed Name: Time:	Printed Name: Time:
Company: Maul Foster Alongi	Company: Apex	Company:	Company:

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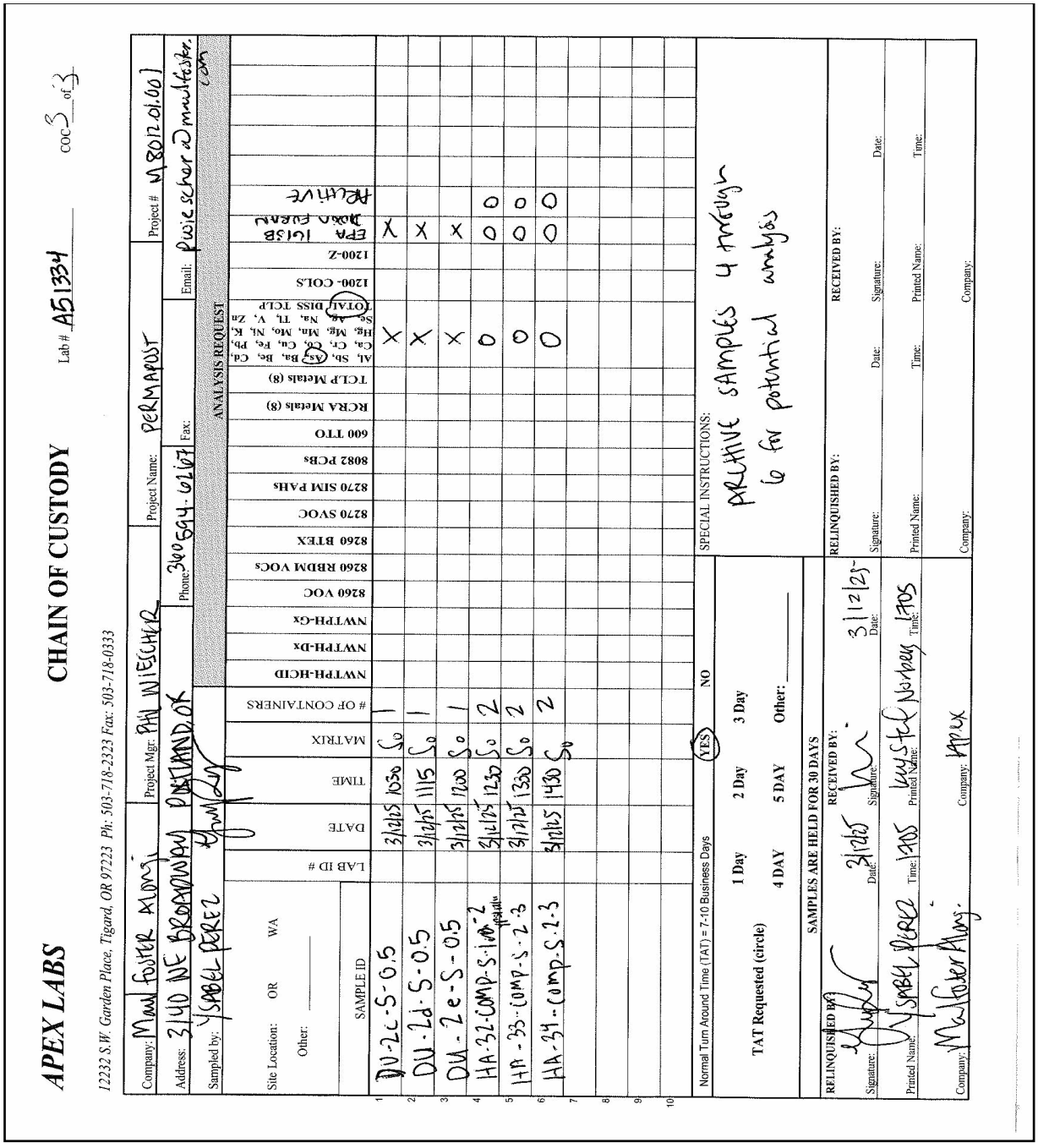
3140 NE Broadway Street	Project Number: **M8012.01.001**	**Report ID:**
Portland, OR 97232	Project Manager: **Phil Wiescher**	**A5C1334 - 05 01 25 1345**



APEX LABS — CHAIN OF CUSTODY — Lab # A51334 — COC 3 of 3

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

Company: Maul Foster Along — Project Mgr: PHIL WIESCHER — Project Name: PERMAPOST — Project # M8012.01.001

Address: 3140 NE BROADWAY PORTLAND OR — Phone: 360 694-6271 Fax: — Email: pwiescher@maulfoster.com

Sampled by: ISABEL PEREZ

Site Location: OR WA — Other: ____

ANALYSIS REQUEST

	SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 VOC	8260 RBDM VOCs	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCRA Metals (8)	TCLP Metals (8)	Al, Sb, As, Ba, Be, Ca, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn (TOTAL / DISS TCLP)	1200- COLS	1200-Z	EPA 1613B Dioxin/Furan	Archive
1	DU-2c-S-0.5		3/12/25	1050	So	1													X			
2	DU-2d-S-0.5		3/12/25	1115	So	1													X			
3	DU-2e-S-0.5		3/12/25	1200	So	1													X			
4	HA-32-COMP-S-1-2		3/12/25	1230	So	2													O		O	O
5	HA-33-COMP-S-2-3		3/12/25	1330	So	2													O		O	O
6	HA-34-COMP-S-2-3		3/12/25	1430	So	2													O		O	O
7																						
8																						
9																						
10																						

Normal Turn Around Time (TAT) = 7-10 Business Days — (YES) NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ____

SPECIAL INSTRUCTIONS: ARCHIVE SAMPLES 4 months & for potential analysis

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Signature: Isabel Perez Printed Name: Isabel Perez Company: Maul Foster Along. Date: 3/12/25 Time: 1905

RECEIVED BY: Signature: Printed Name: kyle stahl Company: NWTPH Date: 3/12/25 Time: 1705

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

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

Apex Laboratories

Philip Nerenberg

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

Philip Nerenberg, Lab Director

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**	**A5C1334 - 05 01 25 1345**

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster & Alongi Element WO#: A5C1334

Project/Project #: PermaPost / M8012.01.001

Delivery Info:

Date/time received: 3/12/25 @ 1705 By: KN

Delivered by: Apex__Client X ESS__FedEx__UPS__Radio__Morgan__SDS__Evergreen__Other__

From USDA Regulated Origin? Yes _____ No √

Cooler Inspection Date/time inspected: 3/12/25 @ 1705 By: KN

Chain of Custody included? Yes √ No _____

Signed/dated by client? Yes √ No _____

Contains USDA Reg. Soils? Yes _____ No √ Unsure (email RegSoils) _____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	3.3	5.6	5.6				
Custody seals? (Y/N)	N	N	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: 3/12/25 @ 17:51 By: KAM

All samples intact? Yes X No ___ Comments: _____

Bottle labels/COCs agree? Yes X No X Comments: Time on cans for HA-3B-Comp-S-1.5-2.0 reads 1001. KAM 3/12/25

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: KAM Witness: KN Cooler Inspected by: KAM

Form Y-003 R-02

Apex Laboratories

Philip Nerenberg

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

Philip Nerenberg, Lab Director

April 29, 2025

Enthalpy Analytical - El Dorado Hills
Work Order No. 2503187

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

Dear Mr. Nerenberg,

Enclosed are the amended results for the sample set received at Enthalpy Analytical - EDH on March 19, 2025 under your Project Name 'A5C1334'.

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 certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Enthalpy Analytical - EDH..

Enthalpy Analytical - EDH Work Order No. 2503187
Case Narrative

Sample Condition on Receipt:

Seven 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. As directed, this report was amended to include the reporting limit (RL) on the PDF and report to the MDL instead of zero.

Analytical Notes:

EPA Method 8290A

The sample was extracted and analyzed for tetra-through-octa chlorinated dioxins and furans by EPA Method 8290A using a ZB-DIOXIN GC column.

Holding Times

The method holding time criteria was met for this sample.

Quality Control

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

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

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

TABLE OF CONTENTS

Sample Inventory Report

Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2503187-01	DU4-A-S-0.5	11-Mar-25 11:00	19-Mar-25 09:38	Clear Glass Jar, 120mL
2503187-02	DU4-B-S-0.5	11-Mar-25 10:30	19-Mar-25 09:38	Clear Glass Jar, 120mL
2503187-03	DU4-C-S-0.5	11-Mar-25 12:15	19-Mar-25 09:38	Clear Glass Jar, 120mL
2503187-04	DU4-D-S-0.5	11-Mar-25 09:45	19-Mar-25 09:38	Clear Glass Jar, 120mL
2503187-05	DU-2c-S-0.5	12-Mar-25 10:30	19-Mar-25 09:38	Clear Glass Jar, 120mL
2503187-06	DU-2d-S-0.5	12-Mar-25 11:15	19-Mar-25 09:38	Clear Glass Jar, 120mL
2503187-07	DU-2e-S-0.5	12-Mar-25 12:00	19-Mar-25 09:38	Clear Glass Jar, 120mL

ANALYTICAL RESULTS

Sample ID: Method Blank

EPA Method 8290A

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Solid

Laboratory Data
Lab Sample: B25C292-BLK1
QC Batch: B25C292
Sample Size: 10.0 g
Date Extracted: 24-Mar-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.0656	0.190		0.500		25-Mar-25 23:49	1
1,2,3,7,8-PeCDD	ND	0.116	0.784		2.50		25-Mar-25 23:49	1
1,2,3,4,7,8-HxCDD	ND	0.140	0.633		2.50		25-Mar-25 23:49	1
1,2,3,6,7,8-HxCDD	ND	0.127	0.640		2.50		25-Mar-25 23:49	1
1,2,3,7,8,9-HxCDD	ND	0.134	0.717		2.50		25-Mar-25 23:49	1
1,2,3,4,6,7,8-HpCDD	ND	0.210	0.706		2.50		25-Mar-25 23:49	1
OCDD	ND	0.242	1.62		5.00		25-Mar-25 23:49	1
2,3,7,8-TCDF	ND	0.0667	0.183		0.500		25-Mar-25 23:49	1
1,2,3,7,8-PeCDF	ND	0.0704	0.576		2.50		25-Mar-25 23:49	1
2,3,4,7,8-PeCDF	ND	0.0626	0.686		2.50		25-Mar-25 23:49	1
1,2,3,4,7,8-HxCDF	ND	0.0798	0.659		2.50		25-Mar-25 23:49	1
1,2,3,6,7,8-HxCDF	ND	0.0804	0.621		2.50		25-Mar-25 23:49	1
2,3,4,6,7,8-HxCDF	ND	0.0877	0.661		2.50		25-Mar-25 23:49	1
1,2,3,7,8,9-HxCDF	ND	0.120	0.716		2.50		25-Mar-25 23:49	1
1,2,3,4,6,7,8-HpCDF	ND	0.104	0.649		2.50		25-Mar-25 23:49	1
1,2,3,4,7,8,9-HpCDF	ND	0.145	0.818		2.50		25-Mar-25 23:49	1
OCDF	ND	0.201	3.84		5.00		25-Mar-25 23:49	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	0.00							
Totals								
Total TCDD	ND	0.0656			0.500			
Total PeCDD	ND	0.116			2.50			
Total HxCDD	ND	0.140			2.50			
Total HpCDD	ND	0.210			2.50			
Total TCDF	ND	0.0667			0.500			
Total PeCDF	ND	0.0704			2.50			
Total HxCDF	ND	0.120			2.50			
Total HpCDF	ND	0.145			2.50			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	80.2	40 - 135		25-Mar-25 23:49	1
13C-1,2,3,7,8-PeCDD	IS	75.5	40 - 135		25-Mar-25 23:49	1
13C-1,2,3,4,7,8-HxCDD	IS	80.7	40 - 135		25-Mar-25 23:49	1
13C-1,2,3,6,7,8-HxCDD	IS	88.4	40 - 135		25-Mar-25 23:49	1
13C-1,2,3,7,8,9-HxCDD	IS	91.6	40 - 135		25-Mar-25 23:49	1
13C-1,2,3,4,6,7,8-HpCDD	IS	86.2	40 - 135		25-Mar-25 23:49	1
13C-OCDD	IS	78.8	40 - 135		25-Mar-25 23:49	1
13C-2,3,7,8-TCDF	IS	82.1	40 - 135		25-Mar-25 23:49	1
13C-1,2,3,7,8-PeCDF	IS	73.5	40 - 135		25-Mar-25 23:49	1
13C-2,3,4,7,8-PeCDF	IS	75.2	40 - 135		25-Mar-25 23:49	1
13C-1,2,3,4,7,8-HxCDF	IS	81.9	40 - 135		25-Mar-25 23:49	1
13C-1,2,3,6,7,8-HxCDF	IS	82.7	40 - 135		25-Mar-25 23:49	1
13C-2,3,4,6,7,8-HxCDF	IS	74.8	40 - 135		25-Mar-25 23:49	1
13C-1,2,3,7,8,9-HxCDF	IS	84.0	40 - 135		25-Mar-25 23:49	1
13C-1,2,3,4,6,7,8-HpCDF	IS	79.1	40 - 135		25-Mar-25 23:49	1
13C-1,2,3,4,7,8,9-HpCDF	IS	75.4	40 - 135		25-Mar-25 23:49	1
13C-OCDF	IS	76.0	40 - 135		25-Mar-25 23:49	1
37Cl-2,3,7,8-TCDD	CRS	98.6	40 - 135		25-Mar-25 23:49	1

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

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

Sample ID: OPR **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Solid

Laboratory Data
Lab Sample: B25C292-BS1
QC Batch: B25C292 Date Extracted: 24-Mar-25 11:03
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	17.6	20.0	88.1	70-130		25-Mar-25 21:31	1
1,2,3,7,8-PeCDD	99.0	100	99.0	70-130		25-Mar-25 21:31	1
1,2,3,4,7,8-HxCDD	96.4	100	96.4	70-130		25-Mar-25 21:31	1
1,2,3,6,7,8-HxCDD	90.5	100	90.5	70-130		25-Mar-25 21:31	1
1,2,3,7,8,9-HxCDD	93.1	100	93.1	70-130		25-Mar-25 21:31	1
1,2,3,4,6,7,8-HpCDD	92.2	100	92.2	70-130		25-Mar-25 21:31	1
OCDD	196	200	98.2	70-130		25-Mar-25 21:31	1
2,3,7,8-TCDF	19.1	20.0	95.6	70-130		25-Mar-25 21:31	1
1,2,3,7,8-PeCDF	106	100	106	70-130		25-Mar-25 21:31	1
2,3,4,7,8-PeCDF	106	100	106	70-130		25-Mar-25 21:31	1
1,2,3,4,7,8-HxCDF	99.9	100	99.9	70-130		25-Mar-25 21:31	1
1,2,3,6,7,8-HxCDF	99.4	100	99.4	70-130		25-Mar-25 21:31	1
2,3,4,6,7,8-HxCDF	95.5	100	95.5	70-130		25-Mar-25 21:31	1
1,2,3,7,8,9-HxCDF	103	100	103	70-130		25-Mar-25 21:31	1
1,2,3,4,6,7,8-HpCDF	96.3	100	96.3	70-130		25-Mar-25 21:31	1
1,2,3,4,7,8,9-HpCDF	92.3	100	92.3	70-130		25-Mar-25 21:31	1
OCDF	197	200	98.6	70-130		25-Mar-25 21:31	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	79.8	40-135		25-Mar-25 21:31	1
13C-1,2,3,7,8-PeCDD	IS	74.1	40-135		25-Mar-25 21:31	1
13C-1,2,3,4,7,8-HxCDD	IS	70.7	40-135		25-Mar-25 21:31	1
13C-1,2,3,6,7,8-HxCDD	IS	63.8	40-135		25-Mar-25 21:31	1
13C-1,2,3,7,8,9-HxCDD	IS	81.9	40-135		25-Mar-25 21:31	1
13C-1,2,3,4,6,7,8-HpCDD	IS	71.7	40-135		25-Mar-25 21:31	1
13C-OCDD	IS	68.0	40-135		25-Mar-25 21:31	1
13C-2,3,7,8-TCDF	IS	75.8	40-135		25-Mar-25 21:31	1
13C-1,2,3,7,8-PeCDF	IS	71.2	40-135		25-Mar-25 21:31	1
13C-2,3,4,7,8-PeCDF	IS	72.8	40-135		25-Mar-25 21:31	1
13C-1,2,3,4,7,8-HxCDF	IS	76.3	40-135		25-Mar-25 21:31	1
13C-1,2,3,6,7,8-HxCDF	IS	76.7	40-135		25-Mar-25 21:31	1
13C-2,3,4,6,7,8-HxCDF	IS	68.2	40-135		25-Mar-25 21:31	1
13C-1,2,3,7,8,9-HxCDF	IS	75.0	40-135		25-Mar-25 21:31	1
13C-1,2,3,4,6,7,8-HpCDF	IS	67.6	40-135		25-Mar-25 21:31	1
13C-1,2,3,4,7,8,9-HpCDF	IS	62.9	40-135		25-Mar-25 21:31	1
13C-OCDF	IS	46.0	40-135		25-Mar-25 21:31	1
37Cl-2,3,7,8-TCDD	CRS	106	40-135		25-Mar-25 21:31	1

Sample ID: Method Blank **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Solid

Laboratory Data
Lab Sample: B25C335-BLK1
QC Batch: B25C335 Date Extracted: 26-Mar-25
Sample Size: 10.0 g Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.115	0.190		0.500		28-Mar-25 11:36	1
1,2,3,7,8-PeCDD	ND	0.155	0.784		2.50		28-Mar-25 11:36	1
1,2,3,4,7,8-HxCDD	ND	0.183	0.633		2.50		28-Mar-25 11:36	1
1,2,3,6,7,8-HxCDD	ND	0.183	0.640		2.50		28-Mar-25 11:36	1
1,2,3,7,8,9-HxCDD	ND	0.209	0.717		2.50		28-Mar-25 11:36	1
1,2,3,4,6,7,8-HpCDD	ND	0.231	0.706		2.50		28-Mar-25 11:36	1
OCDD	ND		1.62	0.282	5.00		28-Mar-25 11:36	1
2,3,7,8-TCDF	ND	0.0957	0.183		0.500		28-Mar-25 11:36	1
1,2,3,7,8-PeCDF	ND	0.148	0.576		2.50		28-Mar-25 11:36	1
2,3,4,7,8-PeCDF	ND	0.140	0.686		2.50		28-Mar-25 11:36	1
1,2,3,4,7,8-HxCDF	ND	0.125	0.659		2.50		28-Mar-25 11:36	1
1,2,3,6,7,8-HxCDF	ND	0.128	0.621		2.50		28-Mar-25 11:36	1
2,3,4,6,7,8-HxCDF	ND	0.139	0.661		2.50		28-Mar-25 11:36	1
1,2,3,7,8,9-HxCDF	ND	0.214	0.716		2.50		28-Mar-25 11:36	1
1,2,3,4,6,7,8-HpCDF	ND	0.147	0.649		2.50		28-Mar-25 11:36	1
1,2,3,4,7,8,9-HpCDF	ND	0.248	0.818		2.50		28-Mar-25 11:36	1
OCDF	ND	0.487	3.84		5.00		28-Mar-25 11:36	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	0.00							
Totals								
Total TCDD	ND	0.115			0.500			
Total PeCDD	ND	0.155			2.50			
Total HxCDD	ND	0.209			2.50			
Total HpCDD	ND	0.231			2.50			
Total TCDF	ND	0.0957			0.500			
Total PeCDF	ND	0.148			2.50			
Total HxCDF	ND	0.214			2.50			
Total HpCDF	ND	0.248			2.50			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	73.9	40 - 135		28-Mar-25 11:36	1
13C-1,2,3,7,8-PeCDD	IS	70.3	40 - 135		28-Mar-25 11:36	1
13C-1,2,3,4,7,8-HxCDD	IS	70.5	40 - 135		28-Mar-25 11:36	1
13C-1,2,3,6,7,8-HxCDD	IS	78.4	40 - 135		28-Mar-25 11:36	1
13C-1,2,3,7,8,9-HxCDD	IS	71.7	40 - 135		28-Mar-25 11:36	1
13C-1,2,3,4,6,7,8-HpCDD	IS	60.7	40 - 135		28-Mar-25 11:36	1
13C-OCDD	IS	47.8	40 - 135		28-Mar-25 11:36	1
13C-2,3,7,8-TCDF	IS	76.3	40 - 135		28-Mar-25 11:36	1
13C-1,2,3,7,8-PeCDF	IS	69.1	40 - 135		28-Mar-25 11:36	1
13C-2,3,4,7,8-PeCDF	IS	69.9	40 - 135		28-Mar-25 11:36	1
13C-1,2,3,4,7,8-HxCDF	IS	74.7	40 - 135		28-Mar-25 11:36	1
13C-1,2,3,6,7,8-HxCDF	IS	76.3	40 - 135		28-Mar-25 11:36	1
13C-2,3,4,6,7,8-HxCDF	IS	72.4	40 - 135		28-Mar-25 11:36	1
13C-1,2,3,7,8,9-HxCDF	IS	68.4	40 - 135		28-Mar-25 11:36	1
13C-1,2,3,4,6,7,8-HpCDF	IS	65.9	40 - 135		28-Mar-25 11:36	1
13C-1,2,3,4,7,8,9-HpCDF	IS	62.0	40 - 135		28-Mar-25 11:36	1
13C-OCDF	IS	50.4	40 - 135		28-Mar-25 11:36	1
37Cl-2,3,7,8-TCDD	CRS	93.6	40 - 135		28-Mar-25 11:36	1

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

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

Sample ID: OPR **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Solid

Laboratory Data
Lab Sample: B25C335-BS1
QC Batch: B25C335 Date Extracted: 26-Mar-25 16:57
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	19.2	20.0	96.2	70-130		28-Mar-25 10:05	1
1,2,3,7,8-PeCDD	100	100	100	70-130		28-Mar-25 10:05	1
1,2,3,4,7,8-HxCDD	99.8	100	99.8	70-130		28-Mar-25 10:05	1
1,2,3,6,7,8-HxCDD	101	100	101	70-130		28-Mar-25 10:05	1
1,2,3,7,8,9-HxCDD	99.8	100	99.8	70-130		28-Mar-25 10:05	1
1,2,3,4,6,7,8-HpCDD	94.4	100	94.4	70-130		28-Mar-25 10:05	1
OCDD	198	200	99.1	70-130		28-Mar-25 10:05	1
2,3,7,8-TCDF	20.4	20.0	102	70-130		28-Mar-25 10:05	1
1,2,3,7,8-PeCDF	115	100	115	70-130		28-Mar-25 10:05	1
2,3,4,7,8-PeCDF	106	100	106	70-130		28-Mar-25 10:05	1
1,2,3,4,7,8-HxCDF	99.2	100	99.2	70-130		28-Mar-25 10:05	1
1,2,3,6,7,8-HxCDF	103	100	103	70-130		28-Mar-25 10:05	1
2,3,4,6,7,8-HxCDF	102	100	102	70-130		28-Mar-25 10:05	1
1,2,3,7,8,9-HxCDF	99.9	100	99.9	70-130		28-Mar-25 10:05	1
1,2,3,4,6,7,8-HpCDF	98.1	100	98.1	70-130		28-Mar-25 10:05	1
1,2,3,4,7,8,9-HpCDF	91.1	100	91.1	70-130		28-Mar-25 10:05	1
OCDF	199	200	99.3	70-130		28-Mar-25 10:05	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	80.2	40-135		28-Mar-25 10:05	1
13C-1,2,3,7,8-PeCDD	IS	76.1	40-135		28-Mar-25 10:05	1
13C-1,2,3,4,7,8-HxCDD	IS	72.0	40-135		28-Mar-25 10:05	1
13C-1,2,3,6,7,8-HxCDD	IS	84.1	40-135		28-Mar-25 10:05	1
13C-1,2,3,7,8,9-HxCDD	IS	79.4	40-135		28-Mar-25 10:05	1
13C-1,2,3,4,6,7,8-HpCDD	IS	69.6	40-135		28-Mar-25 10:05	1
13C-OCDD	IS	54.2	40-135		28-Mar-25 10:05	1
13C-2,3,7,8-TCDF	IS	78.4	40-135		28-Mar-25 10:05	1
13C-1,2,3,7,8-PeCDF	IS	69.3	40-135		28-Mar-25 10:05	1
13C-2,3,4,7,8-PeCDF	IS	72.1	40-135		28-Mar-25 10:05	1
13C-1,2,3,4,7,8-HxCDF	IS	78.4	40-135		28-Mar-25 10:05	1
13C-1,2,3,6,7,8-HxCDF	IS	81.2	40-135		28-Mar-25 10:05	1
13C-2,3,4,6,7,8-HxCDF	IS	73.4	40-135		28-Mar-25 10:05	1
13C-1,2,3,7,8,9-HxCDF	IS	73.4	40-135		28-Mar-25 10:05	1
13C-1,2,3,4,6,7,8-HpCDF	IS	70.5	40-135		28-Mar-25 10:05	1
13C-1,2,3,4,7,8,9-HpCDF	IS	68.4	40-135		28-Mar-25 10:05	1
13C-OCDF	IS	56.9	40-135		28-Mar-25 10:05	1
37Cl-2,3,7,8-TCDD	CRS	95.9	40-135		28-Mar-25 10:05	1

Sample ID: DU4-A-S-0.5 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 11-Mar-25 11:00

Laboratory Data
Lab Sample: 2503187-01
QC Batch: B25C292
Sample Size: 10.2 g
% Solids: 98.6
Date Received: 19-Mar-25 09:38
Date Extracted: 24-Mar-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	0.514		0.189		0.497		26-Mar-25 05:57	1
1,2,3,7,8-PeCDD	9.24		0.779		2.49		26-Mar-25 05:57	1
1,2,3,4,7,8-HxCDD	28.4		0.629		2.49		26-Mar-25 05:57	1
1,2,3,6,7,8-HxCDD	142		0.636		2.49		26-Mar-25 05:57	1
1,2,3,7,8,9-HxCDD	64.8		0.713		2.49		26-Mar-25 05:57	1
1,2,3,4,6,7,8-HpCDD	4310		7.02		24.9		27-Mar-25 17:12	10
OCDD	39400		16.1		49.7		27-Mar-25 17:12	10
2,3,7,8-TCDF	ND		0.182	0.819	0.497		26-Mar-25 05:57	1
1,2,3,7,8-PeCDF	4.73		0.573		2.49		26-Mar-25 05:57	1
2,3,4,7,8-PeCDF	7.84		0.682		2.49		26-Mar-25 05:57	1
1,2,3,4,7,8-HxCDF	25.3		0.655		2.49		26-Mar-25 05:57	1
1,2,3,6,7,8-HxCDF	25.5		0.617		2.49		26-Mar-25 05:57	1
2,3,4,6,7,8-HxCDF	17.8		0.657		2.49		26-Mar-25 05:57	1
1,2,3,7,8,9-HxCDF	5.97		0.712		2.49		26-Mar-25 05:57	1
1,2,3,4,6,7,8-HpCDF	657		0.645		2.49		26-Mar-25 05:57	1
1,2,3,4,7,8,9-HpCDF	35.4		0.813		2.49		26-Mar-25 05:57	1
OCDF	1420		3.82		4.97		26-Mar-25 05:57	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	105							
Totals								
Total TCDD	3.15			3.37	0.497			
Total PeCDD	40.5			40.9	2.49			
Total HxCDD	609				2.49			
Total HpCDD	6290				2.49			
Total TCDF	13.5			14.4	0.497			
Total PeCDF	202			203	2.49			
Total HxCDF	751			756	2.49			
Total HpCDF	1820			1830	2.49			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	85.8	40 - 135		26-Mar-25 05:57	1
13C-1,2,3,7,8-PeCDD	IS	72.6	40 - 135		26-Mar-25 05:57	1
13C-1,2,3,4,7,8-HxCDD	IS	103	40 - 135		26-Mar-25 05:57	1
13C-1,2,3,6,7,8-HxCDD	IS	103	40 - 135		26-Mar-25 05:57	1
13C-1,2,3,7,8,9-HxCDD	IS	96.8	40 - 135		26-Mar-25 05:57	1
13C-1,2,3,4,6,7,8-HpCDD	IS	91.9	40 - 135		27-Mar-25 17:12	10
13C-OCDD	IS	81.0	40 - 135		27-Mar-25 17:12	10
13C-2,3,7,8-TCDF	IS	85.8	40 - 135		26-Mar-25 05:57	1
13C-1,2,3,7,8-PeCDF	IS	70.7	40 - 135		26-Mar-25 05:57	1
13C-2,3,4,7,8-PeCDF	IS	70.2	40 - 135		26-Mar-25 05:57	1
13C-1,2,3,4,7,8-HxCDF	IS	88.4	40 - 135		26-Mar-25 05:57	1
13C-1,2,3,6,7,8-HxCDF	IS	87.9	40 - 135		26-Mar-25 05:57	1
13C-2,3,4,6,7,8-HxCDF	IS	87.6	40 - 135		26-Mar-25 05:57	1
13C-1,2,3,7,8,9-HxCDF	IS	88.2	40 - 135		26-Mar-25 05:57	1
13C-1,2,3,4,6,7,8-HpCDF	IS	74.4	40 - 135		26-Mar-25 05:57	1
13C-1,2,3,4,7,8,9-HpCDF	IS	73.4	40 - 135		26-Mar-25 05:57	1
13C-OCDF	IS	68.7	40 - 135		26-Mar-25 05:57	1
37Cl-2,3,7,8-TCDD	CRS	102	40 - 135		26-Mar-25 05:57	1

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

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

Sample ID: DU4-B-S-0.5 **EPA Method 8290A**

Client Data

Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 11-Mar-25 10:30

Laboratory Data

Lab Sample: 2503187-02
QC Batch: B25C335
Sample Size: 10.2 g
% Solids: 98.5
Date Received: 19-Mar-25 09:38
Date Extracted: 26-Mar-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.189	0.384	0.497		28-Mar-25 15:25	1
1,2,3,7,8-PeCDD	1.62		0.779		2.48	J	28-Mar-25 15:25	1
1,2,3,4,7,8-HxCDD	4.10		0.629		2.48		28-Mar-25 15:25	1
1,2,3,6,7,8-HxCDD	18.9		0.636		2.48		28-Mar-25 15:25	1
1,2,3,7,8,9-HxCDD	9.68		0.713		2.48		28-Mar-25 15:25	1
1,2,3,4,6,7,8-HpCDD	511		0.702		2.48		28-Mar-25 15:25	1
OCDD	3750		1.61		4.97		28-Mar-25 15:25	1
2,3,7,8-TCDF	ND		0.182	0.183	0.497		28-Mar-25 15:25	1
1,2,3,7,8-PeCDF	ND		0.572	0.725	2.48		28-Mar-25 15:25	1
2,3,4,7,8-PeCDF	ND		0.682	0.743	2.48		28-Mar-25 15:25	1
1,2,3,4,7,8-HxCDF	ND		0.655	2.47	2.48		28-Mar-25 15:25	1
1,2,3,6,7,8-HxCDF	2.94		0.617		2.48		28-Mar-25 15:25	1
2,3,4,6,7,8-HxCDF	ND		0.657	1.07	2.48		28-Mar-25 15:25	1
1,2,3,7,8,9-HxCDF	ND		0.712		2.48		28-Mar-25 15:25	1
1,2,3,4,6,7,8-HpCDF	67.3		0.645		2.48		28-Mar-25 15:25	1
1,2,3,4,7,8,9-HpCDF	3.86		0.813		2.48		28-Mar-25 15:25	1
OCDF	159		3.82		4.97		28-Mar-25 15:25	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	12.2							
Totals								
Total TCDD	1.02			1.40	0.497			
Total PeCDD	7.31			9.15	2.48			
Total HxCDD	99.4			101	2.48			
Total HpCDD	804				2.48			
Total TCDF	2.19			3.40	0.497			
Total PeCDF	19.5			22.9	2.48			
Total HxCDF	66.6			70.1	2.48			
Total HpCDF	168				2.48			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	77.9	40 - 135		28-Mar-25 15:25	1
13C-1,2,3,7,8-PeCDD	IS	73.2	40 - 135		28-Mar-25 15:25	1
13C-1,2,3,4,7,8-HxCDD	IS	74.3	40 - 135		28-Mar-25 15:25	1
13C-1,2,3,6,7,8-HxCDD	IS	78.9	40 - 135		28-Mar-25 15:25	1
13C-1,2,3,7,8,9-HxCDD	IS	71.3	40 - 135		28-Mar-25 15:25	1
13C-1,2,3,4,6,7,8-HpCDD	IS	70.9	40 - 135		28-Mar-25 15:25	1
13C-OCDD	IS	59.0	40 - 135		28-Mar-25 15:25	1
13C-2,3,7,8-TCDF	IS	81.7	40 - 135		28-Mar-25 15:25	1
13C-1,2,3,7,8-PeCDF	IS	63.8	40 - 135		28-Mar-25 15:25	1
13C-2,3,4,7,8-PeCDF	IS	65.9	40 - 135		28-Mar-25 15:25	1
13C-1,2,3,4,7,8-HxCDF	IS	78.5	40 - 135		28-Mar-25 15:25	1
13C-1,2,3,6,7,8-HxCDF	IS	79.3	40 - 135		28-Mar-25 15:25	1
13C-2,3,4,6,7,8-HxCDF	IS	77.4	40 - 135		28-Mar-25 15:25	1
13C-1,2,3,7,8,9-HxCDF	IS	73.6	40 - 135		28-Mar-25 15:25	1
13C-1,2,3,4,6,7,8-HpCDF	IS	70.7	40 - 135		28-Mar-25 15:25	1
13C-1,2,3,4,7,8,9-HpCDF	IS	69.3	40 - 135		28-Mar-25 15:25	1
13C-OCDF	IS	66.9	40 - 135		28-Mar-25 15:25	1
37Cl-2,3,7,8-TCDD	CRS	94.9	40 - 135		28-Mar-25 15:25	1

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

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

Sample ID: DU4-C-S-0.5 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 11-Mar-25 12:15

Laboratory Data
Lab Sample: 2503187-03
QC Batch: B25C292
Sample Size: 10.2 g
% Solids: 98.6
Date Received: 19-Mar-25 09:38
Date Extracted: 24-Mar-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.189	1.65	0.498		26-Mar-25 07:29	1
1,2,3,7,8-PeCDD	63.3		0.781		2.49		26-Mar-25 07:29	1
1,2,3,4,7,8-HxCDD	138		0.631		2.49		26-Mar-25 07:29	1
1,2,3,6,7,8-HxCDD	785		0.638		2.49		26-Mar-25 07:29	1
1,2,3,7,8,9-HxCDD	341		0.714		2.49		26-Mar-25 07:29	1
1,2,3,4,6,7,8-HpCDD	16300		14.1		49.8		27-Mar-25 18:44	20
OCDD	115000		32.3		99.6		27-Mar-25 18:44	20
2,3,7,8-TCDF	5.88		0.182		0.498		26-Mar-25 07:29	1
1,2,3,7,8-PeCDF	31.8		0.574		2.49		26-Mar-25 07:29	1
2,3,4,7,8-PeCDF	61.4		0.684		2.49		26-Mar-25 07:29	1
1,2,3,4,7,8-HxCDF	117		0.657		2.49		26-Mar-25 07:29	1
1,2,3,6,7,8-HxCDF	150		0.619		2.49		26-Mar-25 07:29	1
2,3,4,6,7,8-HxCDF	139		0.659		2.49		26-Mar-25 07:29	1
1,2,3,7,8,9-HxCDF	33.6		0.713		2.49		26-Mar-25 07:29	1
1,2,3,4,6,7,8-HpCDF	2460		0.647		2.49		26-Mar-25 07:29	1
1,2,3,4,7,8,9-HpCDF	130		0.815		2.49		26-Mar-25 07:29	1
OCDF	4160		3.83		4.98		26-Mar-25 07:29	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	478							
Totals								
Total TCDD	12.7			17.3	0.498			
Total PeCDD	217				2.49			
Total HxCDD	3270				2.49			
Total HpCDD	21900				2.49			
Total TCDF	99.2			102	0.498			
Total PeCDF	1340			1350	2.49			
Total HxCDF	3900				2.49			
Total HpCDF	6210				2.49			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	82.2	40 - 135		26-Mar-25 07:29	1
13C-1,2,3,7,8-PeCDD	IS	70.6	40 - 135		26-Mar-25 07:29	1
13C-1,2,3,4,7,8-HxCDD	IS	87.7	40 - 135		26-Mar-25 07:29	1
13C-1,2,3,6,7,8-HxCDD	IS	86.6	40 - 135		26-Mar-25 07:29	1
13C-1,2,3,7,8,9-HxCDD	IS	88.6	40 - 135		26-Mar-25 07:29	1
13C-1,2,3,4,6,7,8-HpCDD	IS	84.3	40 - 135		27-Mar-25 18:44	20
13C-OCDD	IS	83.7	40 - 135		27-Mar-25 18:44	20
13C-2,3,7,8-TCDF	IS	82.2	40 - 135		26-Mar-25 07:29	1
13C-1,2,3,7,8-PeCDF	IS	70.6	40 - 135		26-Mar-25 07:29	1
13C-2,3,4,7,8-PeCDF	IS	68.3	40 - 135		26-Mar-25 07:29	1
13C-1,2,3,4,7,8-HxCDF	IS	84.7	40 - 135		26-Mar-25 07:29	1
13C-1,2,3,6,7,8-HxCDF	IS	84.6	40 - 135		26-Mar-25 07:29	1
13C-2,3,4,6,7,8-HxCDF	IS	78.0	40 - 135		26-Mar-25 07:29	1
13C-1,2,3,7,8,9-HxCDF	IS	81.6	40 - 135		26-Mar-25 07:29	1
13C-1,2,3,4,6,7,8-HpCDF	IS	72.1	40 - 135		26-Mar-25 07:29	1
13C-1,2,3,4,7,8,9-HpCDF	IS	70.7	40 - 135		26-Mar-25 07:29	1
13C-OCDF	IS	65.6	40 - 135		26-Mar-25 07:29	1
37Cl-2,3,7,8-TCDD	CRS	106	40 - 135		26-Mar-25 07:29	1

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

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

Sample ID: DU4-D-S-0.5 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 11-Mar-25 09:45

Laboratory Data
Lab Sample: 2503187-04
QC Batch: B25C292
Sample Size: 10.2 g
% Solids: 98.2
Date Received: 19-Mar-25 09:38
Date Extracted: 24-Mar-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.190	0.289	0.500		27-Mar-25 13:22	1
1,2,3,7,8-PeCDD	1.39		0.784		2.50	J	27-Mar-25 13:22	1
1,2,3,4,7,8-HxCDD	4.21		0.633		2.50		27-Mar-25 13:22	1
1,2,3,6,7,8-HxCDD	17.0		0.640		2.50		27-Mar-25 13:22	1
1,2,3,7,8,9-HxCDD	9.77		0.717		2.50		27-Mar-25 13:22	1
1,2,3,4,6,7,8-HpCDD	625		0.706		2.50		27-Mar-25 13:22	1
OCDD	4730		1.62		5.00		27-Mar-25 13:22	1
2,3,7,8-TCDF	0.186		0.183		0.500	J	27-Mar-25 13:22	1
1,2,3,7,8-PeCDF	ND		0.576		2.50		27-Mar-25 13:22	1
2,3,4,7,8-PeCDF	0.829		0.686		2.50	J	27-Mar-25 13:22	1
1,2,3,4,7,8-HxCDF	2.41		0.659		2.50	J	27-Mar-25 13:22	1
1,2,3,6,7,8-HxCDF	2.33		0.621		2.50	J	27-Mar-25 13:22	1
2,3,4,6,7,8-HxCDF	2.31		0.661		2.50	J	27-Mar-25 13:22	1
1,2,3,7,8,9-HxCDF	ND		0.716	0.306	2.50		27-Mar-25 13:22	1
1,2,3,4,6,7,8-HpCDF	73.6		0.649		2.50		27-Mar-25 13:22	1
1,2,3,4,7,8,9-HpCDF	3.47		0.818		2.50		27-Mar-25 13:22	1
OCDF	180		3.84		5.00		27-Mar-25 13:22	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	14.0							
Totals								
Total TCDD	0.952			1.82	0.500			
Total PeCDD	8.67			9.97	2.50			
Total HxCDD	98.0			100	2.50			
Total HpCDD	967				2.50			
Total TCDF	2.36			2.76	0.500			
Total PeCDF	14.9			15.5	2.50			
Total HxCDF	61.6			63.2	2.50			
Total HpCDF	179				2.50			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	86.0	40 - 135		27-Mar-25 13:22	1
13C-1,2,3,7,8-PeCDD	IS	81.2	40 - 135		27-Mar-25 13:22	1
13C-1,2,3,4,7,8-HxCDD	IS	82.9	40 - 135		27-Mar-25 13:22	1
13C-1,2,3,6,7,8-HxCDD	IS	92.4	40 - 135		27-Mar-25 13:22	1
13C-1,2,3,7,8,9-HxCDD	IS	83.6	40 - 135		27-Mar-25 13:22	1
13C-1,2,3,4,6,7,8-HpCDD	IS	79.3	40 - 135		27-Mar-25 13:22	1
13C-OCDD	IS	75.7	40 - 135		27-Mar-25 13:22	1
13C-2,3,7,8-TCDF	IS	85.3	40 - 135		27-Mar-25 13:22	1
13C-1,2,3,7,8-PeCDF	IS	83.8	40 - 135		27-Mar-25 13:22	1
13C-2,3,4,7,8-PeCDF	IS	84.4	40 - 135		27-Mar-25 13:22	1
13C-1,2,3,4,7,8-HxCDF	IS	82.6	40 - 135		27-Mar-25 13:22	1
13C-1,2,3,6,7,8-HxCDF	IS	87.7	40 - 135		27-Mar-25 13:22	1
13C-2,3,4,6,7,8-HxCDF	IS	82.1	40 - 135		27-Mar-25 13:22	1
13C-1,2,3,7,8,9-HxCDF	IS	76.3	40 - 135		27-Mar-25 13:22	1
13C-1,2,3,4,6,7,8-HpCDF	IS	77.1	40 - 135		27-Mar-25 13:22	1
13C-1,2,3,4,7,8,9-HpCDF	IS	73.2	40 - 135		27-Mar-25 13:22	1
13C-OCDF	IS	71.7	40 - 135		27-Mar-25 13:22	1
37Cl-2,3,7,8-TCDD	CRS	107	40 - 135		27-Mar-25 13:22	1

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

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

Sample ID: DU-2c-S-0.5 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 12-Mar-25 10:30

Laboratory Data
Lab Sample: 2503187-05
QC Batch: B25C292
Sample Size: 10.2 g
% Solids: 98.2
Date Received: 19-Mar-25 09:38
Date Extracted: 24-Mar-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	1.38		0.190		0.500		27-Mar-25 14:08	1
1,2,3,7,8-PeCDD	2.25		0.784		2.50	J	27-Mar-25 14:08	1
1,2,3,4,7,8-HxCDD	5.78		0.633		2.50		27-Mar-25 14:08	1
1,2,3,6,7,8-HxCDD	27.7		0.640		2.50		27-Mar-25 14:08	1
1,2,3,7,8,9-HxCDD	14.0		0.717		2.50		27-Mar-25 14:08	1
1,2,3,4,6,7,8-HpCDD	831		0.706		2.50		27-Mar-25 14:08	1
OCDD	5490		1.62		5.00		27-Mar-25 14:08	1
2,3,7,8-TCDF	0.909		0.183		0.500		27-Mar-25 14:08	1
1,2,3,7,8-PeCDF	1.49		0.576		2.50	J	27-Mar-25 14:08	1
2,3,4,7,8-PeCDF	1.85		0.686		2.50	J	27-Mar-25 14:08	1
1,2,3,4,7,8-HxCDF	5.49		0.659		2.50		27-Mar-25 14:08	1
1,2,3,6,7,8-HxCDF	5.16		0.621		2.50		27-Mar-25 14:08	1
2,3,4,6,7,8-HxCDF	6.73		0.661		2.50		27-Mar-25 14:08	1
1,2,3,7,8,9-HxCDF	ND		0.716	0.602	2.50		27-Mar-25 14:08	1
1,2,3,4,6,7,8-HpCDF	100		0.649		2.50		27-Mar-25 14:08	1
1,2,3,4,7,8,9-HpCDF	5.43		0.818		2.50		27-Mar-25 14:08	1
OCDF	219		3.84		5.00		27-Mar-25 14:08	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	21.9							
Totals								
Total TCDD	6.12			6.94	0.500			
Total PeCDD	13.4			17.3	2.50			
Total HxCDD	141				2.50			
Total HpCDD	1320				2.50			
Total TCDF	22.5			26.6	0.500			
Total PeCDF	81.5			83.8	2.50			
Total HxCDF	135			136	2.50			
Total HpCDF	286			288	2.50			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	86.3	40 - 135		27-Mar-25 14:08	1
13C-1,2,3,7,8-PeCDD	IS	85.4	40 - 135		27-Mar-25 14:08	1
13C-1,2,3,4,7,8-HxCDD	IS	91.6	40 - 135		27-Mar-25 14:08	1
13C-1,2,3,6,7,8-HxCDD	IS	96.5	40 - 135		27-Mar-25 14:08	1
13C-1,2,3,7,8,9-HxCDD	IS	94.0	40 - 135		27-Mar-25 14:08	1
13C-1,2,3,4,6,7,8-HpCDD	IS	76.8	40 - 135		27-Mar-25 14:08	1
13C-OCDD	IS	79.8	40 - 135		27-Mar-25 14:08	1
13C-2,3,7,8-TCDF	IS	89.1	40 - 135		27-Mar-25 14:08	1
13C-1,2,3,7,8-PeCDF	IS	83.9	40 - 135		27-Mar-25 14:08	1
13C-2,3,4,7,8-PeCDF	IS	88.1	40 - 135		27-Mar-25 14:08	1
13C-1,2,3,4,7,8-HxCDF	IS	86.4	40 - 135		27-Mar-25 14:08	1
13C-1,2,3,6,7,8-HxCDF	IS	93.0	40 - 135		27-Mar-25 14:08	1
13C-2,3,4,6,7,8-HxCDF	IS	89.3	40 - 135		27-Mar-25 14:08	1
13C-1,2,3,7,8,9-HxCDF	IS	90.7	40 - 135		27-Mar-25 14:08	1
13C-1,2,3,4,6,7,8-HpCDF	IS	79.8	40 - 135		27-Mar-25 14:08	1
13C-1,2,3,4,7,8,9-HpCDF	IS	74.1	40 - 135		27-Mar-25 14:08	1
13C-OCDF	IS	70.8	40 - 135		27-Mar-25 14:08	1
37Cl-2,3,7,8-TCDD	CRS	105	40 - 135		27-Mar-25 14:08	1

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

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

Sample ID: DU-2d-S-0.5 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 12-Mar-25 11:15

Laboratory Data
Lab Sample: 2503187-06
QC Batch: B25C335
Sample Size: 10.2 g
% Solids: 98.2
Date Received: 19-Mar-25 09:38
Date Extracted: 26-Mar-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	2.35		0.189		0.497		28-Mar-25 16:11	1
1,2,3,7,8-PeCDD	3.66		0.779		2.48		28-Mar-25 16:11	1
1,2,3,4,7,8-HxCDD	12.8		0.629		2.48		28-Mar-25 16:11	1
1,2,3,6,7,8-HxCDD	63.8		0.636		2.48		28-Mar-25 16:11	1
1,2,3,7,8,9-HxCDD	29.7		0.713		2.48		28-Mar-25 16:11	1
1,2,3,4,6,7,8-HpCDD	1990		0.702		2.48		28-Mar-25 16:11	1
OCDD	14500		8.05		24.8		31-Mar-25 20:30	5
2,3,7,8-TCDF	1.54		0.182		0.497		28-Mar-25 16:11	1
1,2,3,7,8-PeCDF	3.78		0.573		2.48		28-Mar-25 16:11	1
2,3,4,7,8-PeCDF	6.59		0.682		2.48		28-Mar-25 16:11	1
1,2,3,4,7,8-HxCDF	13.2		0.655		2.48		28-Mar-25 16:11	1
1,2,3,6,7,8-HxCDF	12.4		0.617		2.48		28-Mar-25 16:11	1
2,3,4,6,7,8-HxCDF	6.54		0.657		2.48		28-Mar-25 16:11	1
1,2,3,7,8,9-HxCDF	2.33		0.712		2.48	J	28-Mar-25 16:11	1
1,2,3,4,6,7,8-HpCDF	266		0.645		2.48		28-Mar-25 16:11	1
1,2,3,4,7,8,9-HpCDF	16.0		0.813		2.48		28-Mar-25 16:11	1
OCDF	632		3.82		4.97		28-Mar-25 16:11	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	49.6							
Totals								
Total TCDD	6.70			8.47	0.497			
Total PeCDD	24.5				2.48			
Total HxCDD	280				2.48			
Total HpCDD	3130				2.48			
Total TCDF	44.0				0.497			
Total PeCDF	138				2.48			
Total HxCDF	346			352	2.48			
Total HpCDF	791				2.48			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	75.0	40 - 135		28-Mar-25 16:11	1
13C-1,2,3,7,8-PeCDD	IS	71.0	40 - 135		28-Mar-25 16:11	1
13C-1,2,3,4,7,8-HxCDD	IS	69.8	40 - 135		28-Mar-25 16:11	1
13C-1,2,3,6,7,8-HxCDD	IS	78.1	40 - 135		28-Mar-25 16:11	1
13C-1,2,3,7,8,9-HxCDD	IS	68.8	40 - 135		28-Mar-25 16:11	1
13C-1,2,3,4,6,7,8-HpCDD	IS	66.3	40 - 135		28-Mar-25 16:11	1
13C-OCDD	IS	60.5	40 - 135		31-Mar-25 20:30	5
13C-2,3,7,8-TCDF	IS	79.2	40 - 135		28-Mar-25 16:11	1
13C-1,2,3,7,8-PeCDF	IS	65.9	40 - 135		28-Mar-25 16:11	1
13C-2,3,4,7,8-PeCDF	IS	67.2	40 - 135		28-Mar-25 16:11	1
13C-1,2,3,4,7,8-HxCDF	IS	72.7	40 - 135		28-Mar-25 16:11	1
13C-1,2,3,6,7,8-HxCDF	IS	73.2	40 - 135		28-Mar-25 16:11	1
13C-2,3,4,6,7,8-HxCDF	IS	68.8	40 - 135		28-Mar-25 16:11	1
13C-1,2,3,7,8,9-HxCDF	IS	69.9	40 - 135		28-Mar-25 16:11	1
13C-1,2,3,4,6,7,8-HpCDF	IS	64.2	40 - 135		28-Mar-25 16:11	1
13C-1,2,3,4,7,8,9-HpCDF	IS	65.3	40 - 135		28-Mar-25 16:11	1
13C-OCDF	IS	61.3	40 - 135		28-Mar-25 16:11	1
37Cl-2,3,7,8-TCDD	CRS	97.3	40 - 135		28-Mar-25 16:11	1

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

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

Sample ID: DU-2e-S-0.5 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 12-Mar-25 12:00

Laboratory Data
Lab Sample: 2503187-07
QC Batch: B25C292
Sample Size: 10.2 g
% Solids: 98.5
Date Received: 19-Mar-25 09:38
Date Extracted: 24-Mar-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.190	0.446	0.500		27-Mar-25 15:40	1
1,2,3,7,8-PeCDD	2.88		0.784		2.50		27-Mar-25 15:40	1
1,2,3,4,7,8-HxCDD	9.00		0.633		2.50		27-Mar-25 15:40	1
1,2,3,6,7,8-HxCDD	48.1		0.640		2.50		27-Mar-25 15:40	1
1,2,3,7,8,9-HxCDD	22.6		0.717		2.50		27-Mar-25 15:40	1
1,2,3,4,6,7,8-HpCDD	1580		0.706		2.50		27-Mar-25 15:40	1
OCDD	10300		8.10		25.0		27-Mar-25 20:16	5
2,3,7,8-TCDF	0.527		0.183		0.500		27-Mar-25 15:40	1
1,2,3,7,8-PeCDF	1.60		0.576		2.50	J	27-Mar-25 15:40	1
2,3,4,7,8-PeCDF	4.76		0.686		2.50		27-Mar-25 15:40	1
1,2,3,4,7,8-HxCDF	9.90		0.659		2.50		27-Mar-25 15:40	1
1,2,3,6,7,8-HxCDF	7.35		0.621		2.50		27-Mar-25 15:40	1
2,3,4,6,7,8-HxCDF	4.81		0.661		2.50		27-Mar-25 15:40	1
1,2,3,7,8,9-HxCDF	ND		0.716	2.33	2.50		27-Mar-25 15:40	1
1,2,3,4,6,7,8-HpCDF	174		0.649		2.50		27-Mar-25 15:40	1
1,2,3,4,7,8,9-HpCDF	10.2		0.818		2.50		27-Mar-25 15:40	1
OCDF	393		3.84		5.00		27-Mar-25 15:40	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	35.4							
Totals								
Total TCDD	0.863			1.83	0.500			
Total PeCDD	12.5			15.1	2.50			
Total HxCDD	212				2.50			
Total HpCDD	2470				2.50			
Total TCDF	13.0			13.7	0.500			
Total PeCDF	85.0				2.50			
Total HxCDF	236			238	2.50			
Total HpCDF	511				2.50			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	83.8	40 - 135		27-Mar-25 15:40	1
13C-1,2,3,7,8-PeCDD	IS	80.9	40 - 135		27-Mar-25 15:40	1
13C-1,2,3,4,7,8-HxCDD	IS	89.1	40 - 135		27-Mar-25 15:40	1
13C-1,2,3,6,7,8-HxCDD	IS	92.3	40 - 135		27-Mar-25 15:40	1
13C-1,2,3,7,8,9-HxCDD	IS	87.9	40 - 135		27-Mar-25 15:40	1
13C-1,2,3,4,6,7,8-HpCDD	IS	82.3	40 - 135		27-Mar-25 15:40	1
13C-OCDD	IS	74.9	40 - 135		27-Mar-25 20:16	5
13C-2,3,7,8-TCDF	IS	86.8	40 - 135		27-Mar-25 15:40	1
13C-1,2,3,7,8-PeCDF	IS	80.5	40 - 135		27-Mar-25 15:40	1
13C-2,3,4,7,8-PeCDF	IS	84.2	40 - 135		27-Mar-25 15:40	1
13C-1,2,3,4,7,8-HxCDF	IS	83.7	40 - 135		27-Mar-25 15:40	1
13C-1,2,3,6,7,8-HxCDF	IS	84.4	40 - 135		27-Mar-25 15:40	1
13C-2,3,4,6,7,8-HxCDF	IS	82.8	40 - 135		27-Mar-25 15:40	1
13C-1,2,3,7,8,9-HxCDF	IS	82.8	40 - 135		27-Mar-25 15:40	1
13C-1,2,3,4,6,7,8-HpCDF	IS	76.5	40 - 135		27-Mar-25 15:40	1
13C-1,2,3,4,7,8,9-HpCDF	IS	76.5	40 - 135		27-Mar-25 15:40	1
13C-OCDF	IS	71.4	40 - 135		27-Mar-25 15:40	1
37Cl-2,3,7,8-TCDD	CRS	109	40 - 135		27-Mar-25 15:40	1

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

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

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
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
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
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.

SUBCONTRACT ORDER

Apex Laboratories

A5C1334

HHE 3/13/25

2503187 1.7°C

SENDING LABORATORY:

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

RECEIVING LABORATORY:

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

After processing

Sample Name: DU4-A-S-0.5 **Soil** **Sampled: 03/11/25 11:00** (A5C1334-02)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	03/25/25 17:00	04/10/25 11:00	
Containers Supplied:			
(B)4 oz Glass Jar			

After processing

Sample Name: DU4-B-S-0.5 **Soil** **Sampled: 03/11/25 10:30** (A5C1334-04)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	03/25/25 17:00	04/10/25 10:30	
Containers Supplied:			
(B)4 oz Glass Jar			

After processing

Sample Name: DU4-C-S-0.5 **Soil** **Sampled: 03/11/25 12:15** (A5C1334-06)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	03/25/25 17:00	04/10/25 12:15	
Containers Supplied:			
(B)4 oz Glass Jar			

After processing

Sample Name: DU4-D-S-0.5 **Soil** **Sampled: 03/11/25 09:45** (A5C1334-08)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	03/25/25 17:00	04/10/25 09:45	
Containers Supplied:			
(B)4 oz Glass Jar			

Standard TAT

Released By	Date	Received By	Date
	3/18/25	Fed Ex (Shipper)	
Fed Ex (Shipper)			
Released By	Date	Received By	Date
		03/19/25	09:38

SUBCONTRACT ORDER

Apex Laboratories

A5C1334

2503187

Sample Name: DU-2c-S-0.5 | **Soil** | **After processing** **Sampled: 03/12/25 10:30** | (A5C1334-18)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	03/25/25 17:00	04/11/25 10:30	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: DU-2d-S-0.5 | **Soil** | **After processing** **Sampled: 03/12/25 11:15** | (A5C1334-20)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	03/25/25 17:00	04/11/25 11:15	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: DU-2e-S-0.5 | **Soil** | **After processing** **Sampled: 03/12/25 12:00** | (A5C1334-22)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	03/25/25 17:00	04/11/25 12:00	
Containers Supplied:			
(B)4 oz Glass Jar			

Standard TAT

Released By 3/18/25 Date | Fed Ex (Shipper) | Received By Date

Fed Ex (Shipper) | Released By Date | Received By 03/19/25 09:38 Date

CoC/Label Reconciliation Report WO# 2503187

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2503187-01	A DU4-A-S-0.5	☑	(A5C1334-02)	11-Mar-25 11:00	☑	Clear Glass Jar, 120mL	Solid	
2503187-02	A DU4-B-S-0.5	☑	(A5C1334-04)	11-Mar-25 10:30	☑	Clear Glass Jar, 120mL	Solid	
2503187-03	A DU4-C-S-0.5	☑	(A5C1334-06)	11-Mar-25 12:15	☑	Clear Glass Jar, 120mL	Solid	
2503187-04	A DU4-D-S-0.5	☑	(A5C1334-08)	11-Mar-25 09:45	☑	Clear Glass Jar, 120mL	Solid	
2503187-05	A DU-2c-S-0.5	☑	(A5C1334-18)	12-Mar-25 10:30	☑	Clear Glass Jar, 120mL	Solid	
2503187-06	A DU-2d-S-0.5	☑	(A5C1334-20)	12-Mar-25 11:15	☑	Clear Glass Jar, 120mL	Solid	
2503187-07	A DU-2e-S-0.5	☑	(A5C1334-22)	12-Mar-25 12:00	☑	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.

CONDITION	Yes	No	NA
Sample Container Intact?	✓		
Sample Container(s) Custody Seals Intact?			✓
Custody Seals On Cooler Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)?	✓		

Comments:

Preservation Documented: Na2S2O3 Trizma NH4CH3CO2 (None) Other

Verifed by/Date: MMS 04/24/25 (originally labeled/reconciled by MS on 03/20/25)

April 29, 2025

Enthalpy Analytical - El Dorado Hills
Work Order No. 2504171

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 April 22, 2025 under your Project Name 'A5C1334'.

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 certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Enthalpy Analytical -EDH .

Enthalpy Analytical - EDH Work Order No. 2504171
Case Narrative

Sample Condition on Receipt:

Five 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
2504171-01	HA-36-COMP-S-2.5-3.0	11-Mar-25 15:15	22-Apr-25 09:39	Clear Glass Jar, 120mL
2504171-02	HA-35-COMP-S-2.5-3.0	11-Mar-25 17:00	22-Apr-25 09:39	Amber Glass, 120 mL
2504171-03	HA-32-COMP-S-1-2	12-Mar-25 12:30	22-Apr-25 09:39	Amber Glass, 120 mL
2504171-04	HA-33-COMP-S-2-3	12-Mar-25 13:30	22-Apr-25 09:39	Amber Glass, 120 mL
2504171-05	HA-34-COMP-S-2-3	12-Mar-25 14:30	22-Apr-25 09:39	Amber Glass, 120 mL

ANALYTICAL RESULTS

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

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Solid

Laboratory Data
Lab Sample: B25D266-BLK1
QC Batch: B25D266 Date Extracted: 23-Apr-25
Sample Size: 10.0 g Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.0634	0.190		0.500		25-Apr-25 17:11	1
1,2,3,7,8-PeCDD	ND	0.121	0.784		2.50		25-Apr-25 17:11	1
1,2,3,4,7,8-HxCDD	ND	0.209	0.633		2.50		25-Apr-25 17:11	1
1,2,3,6,7,8-HxCDD	ND	0.211	0.640		2.50		25-Apr-25 17:11	1
1,2,3,7,8,9-HxCDD	ND	0.200	0.717		2.50		25-Apr-25 17:11	1
1,2,3,4,6,7,8-HpCDD	ND		0.706		2.50		25-Apr-25 17:11	1
OCDD	ND		1.62		5.00		25-Apr-25 17:11	1
2,3,7,8-TCDF	ND	0.0749	0.183		0.500		25-Apr-25 17:11	1
1,2,3,7,8-PeCDF	ND	0.0868	0.576		2.50		25-Apr-25 17:11	1
2,3,4,7,8-PeCDF	ND	0.0816	0.686		2.50		25-Apr-25 17:11	1
1,2,3,4,7,8-HxCDF	ND	0.131	0.659		2.50		25-Apr-25 17:11	1
1,2,3,6,7,8-HxCDF	ND	0.133	0.621		2.50		25-Apr-25 17:11	1
2,3,4,6,7,8-HxCDF	ND	0.162	0.661		2.50		25-Apr-25 17:11	1
1,2,3,7,8,9-HxCDF	ND	0.154	0.716		2.50		25-Apr-25 17:11	1
1,2,3,4,6,7,8-HpCDF	ND	0.134	0.649		2.50		25-Apr-25 17:11	1
1,2,3,4,7,8,9-HpCDF	ND	0.182	0.818		2.50		25-Apr-25 17:11	1
OCDF	ND	0.281	3.84		5.00		25-Apr-25 17:11	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	0.00							
Totals								
Total TCDD	ND	0.0634			0.500			
Total PeCDD	ND			2.71	2.50			
Total HxCDD	ND	0.211			2.50			
Total HpCDD	0.192				2.50	J		
Total TCDF	ND			0.230	0.500			
Total PeCDF	ND			0.379	2.50			
Total HxCDF	ND	0.162			2.50			
Total HpCDF	ND	0.182			2.50			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	86.9	25 - 164		25-Apr-25 17:11	1
13C-1,2,3,7,8-PeCDD	IS	78.1	25 - 181		25-Apr-25 17:11	1
13C-1,2,3,4,7,8-HxCDD	IS	67.9	32 - 141		25-Apr-25 17:11	1
13C-1,2,3,6,7,8-HxCDD	IS	68.3	28 - 130		25-Apr-25 17:11	1
13C-1,2,3,7,8,9-HxCDD	IS	68.4	32 - 141		25-Apr-25 17:11	1
13C-1,2,3,4,6,7,8-HpCDD	IS	62.1	23 - 140		25-Apr-25 17:11	1
13C-OCDD	IS	52.4	17 - 157		25-Apr-25 17:11	1
13C-2,3,7,8-TCDF	IS	68.0	24 - 169		25-Apr-25 17:11	1
13C-1,2,3,7,8-PeCDF	IS	64.4	24 - 185		25-Apr-25 17:11	1
13C-2,3,4,7,8-PeCDF	IS	65.3	21 - 178		25-Apr-25 17:11	1
13C-1,2,3,4,7,8-HxCDF	IS	67.4	26 - 152		25-Apr-25 17:11	1
13C-1,2,3,6,7,8-HxCDF	IS	66.1	26 - 123		25-Apr-25 17:11	1
13C-2,3,4,6,7,8-HxCDF	IS	64.6	28 - 136		25-Apr-25 17:11	1
13C-1,2,3,7,8,9-HxCDF	IS	66.0	29 - 147		25-Apr-25 17:11	1
13C-1,2,3,4,6,7,8-HpCDF	IS	59.8	28 - 143		25-Apr-25 17:11	1
13C-1,2,3,4,7,8,9-HpCDF	IS	61.1	26 - 138		25-Apr-25 17:11	1
13C-OCDF	IS	51.0	17 - 157		25-Apr-25 17:11	1
37Cl-2,3,7,8-TCDD	CRS	117	35 - 197		25-Apr-25 17:11	1

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

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

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

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Solid

Laboratory Data
Lab Sample: B25D266-BS1
QC Batch: B25D266 Date Extracted: 23-Apr-25 14:20
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	21.1	20.0	106	67-158		25-Apr-25 15:38	1
1,2,3,7,8-PeCDD	113	100	113	70-142		25-Apr-25 15:38	1
1,2,3,4,7,8-HxCDD	108	100	108	70-164		25-Apr-25 15:38	1
1,2,3,6,7,8-HxCDD	102	100	102	76-134		25-Apr-25 15:38	1
1,2,3,7,8,9-HxCDD	104	100	104	64-162		25-Apr-25 15:38	1
1,2,3,4,6,7,8-HpCDD	103	100	103	70-140		25-Apr-25 15:38	1
OCDD	228	200	114	78-144		25-Apr-25 15:38	1
2,3,7,8-TCDF	23.2	20.0	116	75-158		25-Apr-25 15:38	1
1,2,3,7,8-PeCDF	113	100	113	80-134		25-Apr-25 15:38	1
2,3,4,7,8-PeCDF	108	100	108	68-160		25-Apr-25 15:38	1
1,2,3,4,7,8-HxCDF	108	100	108	72-134		25-Apr-25 15:38	1
1,2,3,6,7,8-HxCDF	109	100	109	84-130		25-Apr-25 15:38	1
2,3,4,6,7,8-HxCDF	110	100	110	70-156		25-Apr-25 15:38	1
1,2,3,7,8,9-HxCDF	108	100	108	78-130		25-Apr-25 15:38	1
1,2,3,4,6,7,8-HpCDF	112	100	112	82-122		25-Apr-25 15:38	1
1,2,3,4,7,8,9-HpCDF	110	100	110	78-138		25-Apr-25 15:38	1
OCDF	226	200	113	63-170		25-Apr-25 15:38	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	96.9	20-175		25-Apr-25 15:38	1
13C-1,2,3,7,8-PeCDD	IS	87.1	21-227		25-Apr-25 15:38	1
13C-1,2,3,4,7,8-HxCDD	IS	75.9	21-193		25-Apr-25 15:38	1
13C-1,2,3,6,7,8-HxCDD	IS	78.4	25-163		25-Apr-25 15:38	1
13C-1,2,3,7,8,9-HxCDD	IS	75.8	21-193		25-Apr-25 15:38	1
13C-1,2,3,4,6,7,8-HpCDD	IS	70.7	26-166		25-Apr-25 15:38	1
13C-OCDD	IS	58.4	13-199		25-Apr-25 15:38	1
13C-2,3,7,8-TCDF	IS	77.0	22-152		25-Apr-25 15:38	1
13C-1,2,3,7,8-PeCDF	IS	71.7	21-192		25-Apr-25 15:38	1
13C-2,3,4,7,8-PeCDF	IS	74.6	13-328		25-Apr-25 15:38	1
13C-1,2,3,4,7,8-HxCDF	IS	76.0	19-202		25-Apr-25 15:38	1
13C-1,2,3,6,7,8-HxCDF	IS	74.9	21-159		25-Apr-25 15:38	1
13C-2,3,4,6,7,8-HxCDF	IS	72.9	22-176		25-Apr-25 15:38	1
13C-1,2,3,7,8,9-HxCDF	IS	74.1	17-205		25-Apr-25 15:38	1
13C-1,2,3,4,6,7,8-HpCDF	IS	68.3	21-158		25-Apr-25 15:38	1
13C-1,2,3,4,7,8,9-HpCDF	IS	67.5	20-186		25-Apr-25 15:38	1
13C-OCDF	IS	56.2	13-199		25-Apr-25 15:38	1
37Cl-2,3,7,8-TCDD	CRS	112	31-191		25-Apr-25 15:38	1

Sample ID: HA-36-COMP-S-2.5-3.0 **EPA Method 1613B**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 11-Mar-25 15:15

Laboratory Data
Lab Sample: 2504171-01
QC Batch: B25D266
Sample Size: 13.5 g
% Solids: 74.4
Date Received: 22-Apr-25 09:39
Date Extracted: 23-Apr-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.189	0.130	0.498		25-Apr-25 17:58	1
1,2,3,7,8-PeCDD	1.82		0.781		2.49	J	25-Apr-25 17:58	1
1,2,3,4,7,8-HxCDD	4.14		0.631		2.49		25-Apr-25 17:58	1
1,2,3,6,7,8-HxCDD	19.7		0.638		2.49		25-Apr-25 17:58	1
1,2,3,7,8,9-HxCDD	8.69		0.714		2.49		25-Apr-25 17:58	1
1,2,3,4,6,7,8-HpCDD	408		0.703		2.49		25-Apr-25 17:58	1
OCDD	3090		1.61		4.98		25-Apr-25 17:58	1
2,3,7,8-TCDF	ND	0.0901	0.182		0.498		25-Apr-25 17:58	1
1,2,3,7,8-PeCDF	0.684		0.574		2.49	J	25-Apr-25 17:58	1
2,3,4,7,8-PeCDF	0.683		0.683		2.49	J	25-Apr-25 17:58	1
1,2,3,4,7,8-HxCDF	3.54		0.657		2.49		25-Apr-25 17:58	1
1,2,3,6,7,8-HxCDF	4.27		0.619		2.49		25-Apr-25 17:58	1
2,3,4,6,7,8-HxCDF	2.20		0.659		2.49	J	25-Apr-25 17:58	1
1,2,3,7,8,9-HxCDF	0.747		0.713		2.49	J	25-Apr-25 17:58	1
1,2,3,4,6,7,8-HpCDF	73.4		0.647		2.49		25-Apr-25 17:58	1
1,2,3,4,7,8,9-HpCDF	4.91		0.815		2.49		25-Apr-25 17:58	1
OCDF	148		3.83		4.98		25-Apr-25 17:58	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	12.2							
Totals								
Total TCDD	ND			0.266	0.498			
Total PeCDD	2.33			7.94	2.49	J		
Total HxCDD	76.8				2.49			
Total HpCDD	666				2.49	B		
Total TCDF	2.54			2.74	0.498			
Total PeCDF	22.5			27.5	2.49			
Total HxCDF	109				2.49			
Total HpCDF	211			212	2.49			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	95.5	25 - 164		25-Apr-25 17:58	1
13C-1,2,3,7,8-PeCDD	IS	79.9	25 - 181		25-Apr-25 17:58	1
13C-1,2,3,4,7,8-HxCDD	IS	72.0	32 - 141		25-Apr-25 17:58	1
13C-1,2,3,6,7,8-HxCDD	IS	72.0	28 - 130		25-Apr-25 17:58	1
13C-1,2,3,7,8,9-HxCDD	IS	73.2	32 - 141		25-Apr-25 17:58	1
13C-1,2,3,4,6,7,8-HpCDD	IS	59.6	23 - 140		25-Apr-25 17:58	1
13C-OCDD	IS	49.2	17 - 157		25-Apr-25 17:58	1
13C-2,3,7,8-TCDF	IS	76.2	24 - 169		25-Apr-25 17:58	1
13C-1,2,3,7,8-PeCDF	IS	69.3	24 - 185		25-Apr-25 17:58	1
13C-2,3,4,7,8-PeCDF	IS	65.1	21 - 178		25-Apr-25 17:58	1
13C-1,2,3,4,7,8-HxCDF	IS	71.0	26 - 152		25-Apr-25 17:58	1
13C-1,2,3,6,7,8-HxCDF	IS	69.1	26 - 123		25-Apr-25 17:58	1
13C-2,3,4,6,7,8-HxCDF	IS	67.0	28 - 136		25-Apr-25 17:58	1
13C-1,2,3,7,8,9-HxCDF	IS	70.4	29 - 147		25-Apr-25 17:58	1
13C-1,2,3,4,6,7,8-HpCDF	IS	55.6	28 - 143		25-Apr-25 17:58	1
13C-1,2,3,4,7,8,9-HpCDF	IS	58.4	26 - 138		25-Apr-25 17:58	1
13C-OCDF	IS	50.0	17 - 157		25-Apr-25 17:58	1
37Cl-2,3,7,8-TCDD	CRS	109	35 - 197		25-Apr-25 17:58	1

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

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

Sample ID: HA-35-COMP-S-2.5-3.0 **EPA Method 1613B**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 11-Mar-25 17:00

Laboratory Data
Lab Sample: 2504171-02
QC Batch: B25D266
Sample Size: 13.4 g
% Solids: 75.7
Date Received: 22-Apr-25 09:39
Date Extracted: 23-Apr-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.123	0.187		0.492		25-Apr-25 18:45	1
1,2,3,7,8-PeCDD	2.36		0.772		2.46	J	25-Apr-25 18:45	1
1,2,3,4,7,8-HxCDD	5.01		0.623		2.46		25-Apr-25 18:45	1
1,2,3,6,7,8-HxCDD	23.7		0.630		2.46		25-Apr-25 18:45	1
1,2,3,7,8,9-HxCDD	11.4		0.706		2.46		25-Apr-25 18:45	1
1,2,3,4,6,7,8-HpCDD	448		0.695		2.46		25-Apr-25 18:45	1
OCDD	3020		1.60		4.92		25-Apr-25 18:45	1
2,3,7,8-TCDF	0.328		0.180		0.492	J	25-Apr-25 18:45	1
1,2,3,7,8-PeCDF	1.16		0.567		2.46	J	25-Apr-25 18:45	1
2,3,4,7,8-PeCDF	1.09		0.676		2.46	J	25-Apr-25 18:45	1
1,2,3,4,7,8-HxCDF	3.90		0.649		2.46		25-Apr-25 18:45	1
1,2,3,6,7,8-HxCDF	5.17		0.612		2.46		25-Apr-25 18:45	1
2,3,4,6,7,8-HxCDF	2.64		0.651		2.46		25-Apr-25 18:45	1
1,2,3,7,8,9-HxCDF	ND		0.705		2.46		25-Apr-25 18:45	1
1,2,3,4,6,7,8-HpCDF	80.3		0.639		2.46		25-Apr-25 18:45	1
1,2,3,4,7,8,9-HpCDF	5.43		0.806		2.46		25-Apr-25 18:45	1
OCDF	136		3.78		4.92		25-Apr-25 18:45	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	14.2							
Totals								
Total TCDD	0.0962			0.459	0.492	J		
Total PeCDD	7.61			10.8	2.46			
Total HxCDD	97.4				2.46			
Total HpCDD	745				2.46	B		
Total TCDF	4.81			5.10	0.492			
Total PeCDF	15.9			36.9	2.46			
Total HxCDF	127				2.46			
Total HpCDF	218				2.46			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	90.4	25 - 164		25-Apr-25 18:45	1
13C-1,2,3,7,8-PeCDD	IS	78.1	25 - 181		25-Apr-25 18:45	1
13C-1,2,3,4,7,8-HxCDD	IS	67.5	32 - 141		25-Apr-25 18:45	1
13C-1,2,3,6,7,8-HxCDD	IS	66.9	28 - 130		25-Apr-25 18:45	1
13C-1,2,3,7,8,9-HxCDD	IS	65.2	32 - 141		25-Apr-25 18:45	1
13C-1,2,3,4,6,7,8-HpCDD	IS	58.3	23 - 140		25-Apr-25 18:45	1
13C-OCDD	IS	49.4	17 - 157		25-Apr-25 18:45	1
13C-2,3,7,8-TCDF	IS	72.1	24 - 169		25-Apr-25 18:45	1
13C-1,2,3,7,8-PeCDF	IS	61.0	24 - 185		25-Apr-25 18:45	1
13C-2,3,4,7,8-PeCDF	IS	64.5	21 - 178		25-Apr-25 18:45	1
13C-1,2,3,4,7,8-HxCDF	IS	67.0	26 - 152		25-Apr-25 18:45	1
13C-1,2,3,6,7,8-HxCDF	IS	64.5	26 - 123		25-Apr-25 18:45	1
13C-2,3,4,6,7,8-HxCDF	IS	64.7	28 - 136		25-Apr-25 18:45	1
13C-1,2,3,7,8,9-HxCDF	IS	65.0	29 - 147		25-Apr-25 18:45	1
13C-1,2,3,4,6,7,8-HpCDF	IS	54.5	28 - 143		25-Apr-25 18:45	1
13C-1,2,3,4,7,8,9-HpCDF	IS	57.6	26 - 138		25-Apr-25 18:45	1
13C-OCDF	IS	50.4	17 - 157		25-Apr-25 18:45	1
37Cl-2,3,7,8-TCDD	CRS	115	35 - 197		25-Apr-25 18:45	1

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

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

Sample ID: HA-32-COMP-S-1-2 **EPA Method 1613B**

Client Data

Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 12-Mar-25 12:30

Laboratory Data

Lab Sample: 2504171-03
QC Batch: B25D266
Sample Size: 12.4 g
% Solids: 81.0
Date Received: 22-Apr-25 09:39
Date Extracted: 23-Apr-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.114	0.190		0.500		25-Apr-25 19:31	1
1,2,3,7,8-PeCDD	ND		0.784	0.679	2.50		25-Apr-25 19:31	1
1,2,3,4,7,8-HxCDD	1.70		0.633		2.50	J	25-Apr-25 19:31	1
1,2,3,6,7,8-HxCDD	7.77		0.640		2.50		25-Apr-25 19:31	1
1,2,3,7,8,9-HxCDD	4.01		0.717		2.50		25-Apr-25 19:31	1
1,2,3,4,6,7,8-HpCDD	147		0.706		2.50		25-Apr-25 19:31	1
OCDD	1090		1.62		5.00		25-Apr-25 19:31	1
2,3,7,8-TCDF	ND		0.183	0.163	0.500		25-Apr-25 19:31	1
1,2,3,7,8-PeCDF	ND		0.576		2.50		25-Apr-25 19:31	1
2,3,4,7,8-PeCDF	ND		0.686	0.281	2.50		25-Apr-25 19:31	1
1,2,3,4,7,8-HxCDF	ND		0.659	1.31	2.50		25-Apr-25 19:31	1
1,2,3,6,7,8-HxCDF	1.60		0.621		2.50	J	25-Apr-25 19:31	1
2,3,4,6,7,8-HxCDF	ND		0.661	0.847	2.50		25-Apr-25 19:31	1
1,2,3,7,8,9-HxCDF	ND		0.716	0.287	2.50		25-Apr-25 19:31	1
1,2,3,4,6,7,8-HpCDF	26.8		0.649		2.50		25-Apr-25 19:31	1
1,2,3,4,7,8,9-HpCDF	1.89		0.818		2.50	J	25-Apr-25 19:31	1
OCDF	49.2		3.84		5.00		25-Apr-25 19:31	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	3.61							
Totals								
Total TCDD	ND			0.124	0.500			
Total PeCDD	ND			6.50	2.50			
Total HxCDD	33.4			34.2	2.50			
Total HpCDD	247				2.50	B		
Total TCDF	1.17			1.65	0.500			
Total PeCDF	7.28			10.3	2.50			
Total HxCDF	38.7			41.3	2.50			
Total HpCDF	78.4				2.50			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	76.6	25 - 164		25-Apr-25 19:31	1
13C-1,2,3,7,8-PeCDD	IS	61.3	25 - 181		25-Apr-25 19:31	1
13C-1,2,3,4,7,8-HxCDD	IS	52.8	32 - 141		25-Apr-25 19:31	1
13C-1,2,3,6,7,8-HxCDD	IS	52.4	28 - 130		25-Apr-25 19:31	1
13C-1,2,3,7,8,9-HxCDD	IS	51.1	32 - 141		25-Apr-25 19:31	1
13C-1,2,3,4,6,7,8-HpCDD	IS	43.0	23 - 140		25-Apr-25 19:31	1
13C-OCDD	IS	33.7	17 - 157		25-Apr-25 19:31	1
13C-2,3,7,8-TCDF	IS	64.1	24 - 169		25-Apr-25 19:31	1
13C-1,2,3,7,8-PeCDF	IS	51.9	24 - 185		25-Apr-25 19:31	1
13C-2,3,4,7,8-PeCDF	IS	53.4	21 - 178		25-Apr-25 19:31	1
13C-1,2,3,4,7,8-HxCDF	IS	53.4	26 - 152		25-Apr-25 19:31	1
13C-1,2,3,6,7,8-HxCDF	IS	50.8	26 - 123		25-Apr-25 19:31	1
13C-2,3,4,6,7,8-HxCDF	IS	49.0	28 - 136		25-Apr-25 19:31	1
13C-1,2,3,7,8,9-HxCDF	IS	51.5	29 - 147		25-Apr-25 19:31	1
13C-1,2,3,4,6,7,8-HpCDF	IS	38.9	28 - 143		25-Apr-25 19:31	1
13C-1,2,3,4,7,8,9-HpCDF	IS	42.6	26 - 138		25-Apr-25 19:31	1
13C-OCDF	IS	34.9	17 - 157		25-Apr-25 19:31	1
37Cl-2,3,7,8-TCDD	CRS	118	35 - 197		25-Apr-25 19:31	1

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

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

Sample ID: HA-33-COMP-S-2-3 **EPA Method 1613B**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 12-Mar-25 13:30

Laboratory Data
Lab Sample: 2504171-04
QC Batch: B25D266
Sample Size: 13.1 g
% Solids: 76.8
Date Received: 22-Apr-25 09:39
Date Extracted: 23-Apr-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.189	0.171	0.497		25-Apr-25 20:18	1
1,2,3,7,8-PeCDD	ND		0.779		2.48		25-Apr-25 20:18	1
1,2,3,4,7,8-HxCDD	1.62		0.629		2.48	J	25-Apr-25 20:18	1
1,2,3,6,7,8-HxCDD	7.36		0.636		2.48		25-Apr-25 20:18	1
1,2,3,7,8,9-HxCDD	3.61		0.713		2.48		25-Apr-25 20:18	1
1,2,3,4,6,7,8-HpCDD	166		0.702		2.48		25-Apr-25 20:18	1
OCDD	1220		1.61		4.97		25-Apr-25 20:18	1
2,3,7,8-TCDF	ND		0.182		0.497		25-Apr-25 20:18	1
1,2,3,7,8-PeCDF	ND		0.572	0.399	2.48		25-Apr-25 20:18	1
2,3,4,7,8-PeCDF	ND		0.682		2.48		25-Apr-25 20:18	1
1,2,3,4,7,8-HxCDF	1.46		0.655		2.48	J	25-Apr-25 20:18	1
1,2,3,6,7,8-HxCDF	1.45		0.617		2.48	J	25-Apr-25 20:18	1
2,3,4,6,7,8-HxCDF	1.01		0.657		2.48	J	25-Apr-25 20:18	1
1,2,3,7,8,9-HxCDF	ND		0.712	0.436	2.48		25-Apr-25 20:18	1
1,2,3,4,6,7,8-HpCDF	24.4		0.645		2.48		25-Apr-25 20:18	1
1,2,3,4,7,8,9-HpCDF	2.07		0.813		2.48	J	25-Apr-25 20:18	1
OCDF	55.7		3.82		4.97		25-Apr-25 20:18	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	3.96							
Totals								
Total TCDD	ND			0.171	0.497			
Total PeCDD	1.24			4.87	2.48	J		
Total HxCDD	30.9				2.48			
Total HpCDD	269				2.48	B		
Total TCDF	0.523			1.53	0.497			
Total PeCDF	6.20			9.59	2.48			
Total HxCDF	37.3			38.2	2.48			
Total HpCDF	80.6				2.48			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	73.9	25 - 164		25-Apr-25 20:18	1
13C-1,2,3,7,8-PeCDD	IS	64.5	25 - 181		25-Apr-25 20:18	1
13C-1,2,3,4,7,8-HxCDD	IS	59.3	32 - 141		25-Apr-25 20:18	1
13C-1,2,3,6,7,8-HxCDD	IS	58.4	28 - 130		25-Apr-25 20:18	1
13C-1,2,3,7,8,9-HxCDD	IS	57.6	32 - 141		25-Apr-25 20:18	1
13C-1,2,3,4,6,7,8-HpCDD	IS	48.2	23 - 140		25-Apr-25 20:18	1
13C-OCDD	IS	37.8	17 - 157		25-Apr-25 20:18	1
13C-2,3,7,8-TCDF	IS	63.7	24 - 169		25-Apr-25 20:18	1
13C-1,2,3,7,8-PeCDF	IS	57.7	24 - 185		25-Apr-25 20:18	1
13C-2,3,4,7,8-PeCDF	IS	56.5	21 - 178		25-Apr-25 20:18	1
13C-1,2,3,4,7,8-HxCDF	IS	59.9	26 - 152		25-Apr-25 20:18	1
13C-1,2,3,6,7,8-HxCDF	IS	57.5	26 - 123		25-Apr-25 20:18	1
13C-2,3,4,6,7,8-HxCDF	IS	55.0	28 - 136		25-Apr-25 20:18	1
13C-1,2,3,7,8,9-HxCDF	IS	57.8	29 - 147		25-Apr-25 20:18	1
13C-1,2,3,4,6,7,8-HpCDF	IS	44.2	28 - 143		25-Apr-25 20:18	1
13C-1,2,3,4,7,8,9-HpCDF	IS	49.1	26 - 138		25-Apr-25 20:18	1
13C-OCDF	IS	39.1	17 - 157		25-Apr-25 20:18	1
37Cl-2,3,7,8-TCDD	CRS	103	35 - 197		25-Apr-25 20:18	1

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

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

Sample ID: HA-34-COMP-S-2-3 **EPA Method 1613B**

Client Data
Name: Apex Laboratories
Project: A5C1334
Matrix: Soil
Date Collected: 12-Mar-25 14:30

Laboratory Data
Lab Sample: 2504171-05
QC Batch: B25D266
Sample Size: 12.9 g
% Solids: 77.7
Date Received: 22-Apr-25 09:39
Date Extracted: 23-Apr-25
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	RL	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.0930	0.190		0.499		25-Apr-25 21:05	1
1,2,3,7,8-PeCDD	1.41		0.783		2.50	J	25-Apr-25 21:05	1
1,2,3,4,7,8-HxCDD	4.68		0.632		2.50		25-Apr-25 21:05	1
1,2,3,6,7,8-HxCDD	20.7		0.639		2.50		25-Apr-25 21:05	1
1,2,3,7,8,9-HxCDD	9.00		0.716		2.50		25-Apr-25 21:05	1
1,2,3,4,6,7,8-HpCDD	642		0.705		2.50		25-Apr-25 21:05	1
OCDD	6690		8.09		25.0	D	26-Apr-25 16:02	5
2,3,7,8-TCDF	ND		0.183	0.162	0.499		25-Apr-25 21:05	1
1,2,3,7,8-PeCDF	0.857		0.575		2.50	J	25-Apr-25 21:05	1
2,3,4,7,8-PeCDF	0.999		0.685		2.50	J	25-Apr-25 21:05	1
1,2,3,4,7,8-HxCDF	4.46		0.658		2.50		25-Apr-25 21:05	1
1,2,3,6,7,8-HxCDF	3.57		0.620		2.50		25-Apr-25 21:05	1
2,3,4,6,7,8-HxCDF	1.97		0.660		2.50	J	25-Apr-25 21:05	1
1,2,3,7,8,9-HxCDF	0.854		0.715		2.50	J	25-Apr-25 21:05	1
1,2,3,4,6,7,8-HpCDF	93.3		0.648		2.50		25-Apr-25 21:05	1
1,2,3,4,7,8,9-HpCDF	7.67		0.817		2.50		25-Apr-25 21:05	1
OCDF	260		3.83		4.99		25-Apr-25 21:05	1
Toxic Equivalent								
TEQMinWHO2005Dioxin	15.8							
Totals								
Total TCDD	ND	0.0930			0.499			
Total PeCDD	1.41			6.16	2.50	J		
Total HxCDD	80.9			83.2	2.50			
Total HpCDD	1050				2.50	B		
Total TCDF	0.372			1.29	0.499	J		
Total PeCDF	19.4			20.5	2.50			
Total HxCDF	122				2.50			
Total HpCDF	349				2.50			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	69.8	25 - 164		25-Apr-25 21:05	1
13C-1,2,3,7,8-PeCDD	IS	55.6	25 - 181		25-Apr-25 21:05	1
13C-1,2,3,4,7,8-HxCDD	IS	48.0	32 - 141		25-Apr-25 21:05	1
13C-1,2,3,6,7,8-HxCDD	IS	46.1	28 - 130		25-Apr-25 21:05	1
13C-1,2,3,7,8,9-HxCDD	IS	44.9	32 - 141		25-Apr-25 21:05	1
13C-1,2,3,4,6,7,8-HpCDD	IS	37.2	23 - 140		25-Apr-25 21:05	1
13C-OCDD	IS	27.6	17 - 157	D	26-Apr-25 16:02	5
13C-2,3,7,8-TCDF	IS	59.0	24 - 169		25-Apr-25 21:05	1
13C-1,2,3,7,8-PeCDF	IS	49.3	24 - 185		25-Apr-25 21:05	1
13C-2,3,4,7,8-PeCDF	IS	47.8	21 - 178		25-Apr-25 21:05	1
13C-1,2,3,4,7,8-HxCDF	IS	47.7	26 - 152		25-Apr-25 21:05	1
13C-1,2,3,6,7,8-HxCDF	IS	46.2	26 - 123		25-Apr-25 21:05	1
13C-2,3,4,6,7,8-HxCDF	IS	44.0	28 - 136		25-Apr-25 21:05	1
13C-1,2,3,7,8,9-HxCDF	IS	46.4	29 - 147		25-Apr-25 21:05	1
13C-1,2,3,4,6,7,8-HpCDF	IS	33.4	28 - 143		25-Apr-25 21:05	1
13C-1,2,3,4,7,8,9-HpCDF	IS	37.2	26 - 138		25-Apr-25 21:05	1
13C-OCDF	IS	31.1	17 - 157		25-Apr-25 21:05	1
37Cl-2,3,7,8-TCDD	CRS	111	35 - 197		25-Apr-25 21:05	1

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

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

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
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
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
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.

SUBCONTRACT ORDER

Apex Laboratories

A5C1334

AKK 4/16/25 KN 2504171 2.8°C

SENDING LABORATORY:

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

RECEIVING LABORATORY:

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

Analysis added per client request 4/16/25 akk

Sample Name: HA-36-COMP-S-2.5-3.0 **Soil** **Sampled: 03/11/25 15:15** (A5C1334-12)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	05/07/25 17:00	03/11/26 15:15	+4/16
Containers Supplied: (B)4 oz Glass Jar			

Analysis added per client request 4/16/25 akk

Sample Name: HA-35-COMP-S-2.5-3.0 **Soil** **Sampled: 03/11/25 17:00** (A5C1334-16)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	05/07/25 17:00	03/11/26 17:00	+4/16
Containers Supplied: (B)4 oz Glass Jar - Amber			

Subcontracted Analysis added per client reques

Sample Name: HA-32-COMP-S-1-2 **Soil** **Sampled: 03/12/25 12:30** (A5C1334-23)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	05/07/25 17:00	03/12/26 12:30	+4/16
Containers Supplied: (B)4 oz Glass Jar - Amber			

Analysis added per client request 4/16/25 akk

Sample Name: HA-33-COMP-S-2-3 **Soil** **Sampled: 03/12/25 13:30** (A5C1334-24)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	05/07/25 17:00	03/12/26 13:30	+4/16
Containers Supplied: (B)4 oz Glass Jar - Amber			

Standard TAT

4/21/25

Released By	Date	Received By	Date
Fed Ex (Shipper)			
Released By	Date	Received By	Date
Fed Ex (Shipper)		Karen Ast	04/22/25 08:39

SUBCONTRACT ORDER

Apex Laboratories

A5C1334 KN 2504171

Subcontracted Analysis added per client reques

Sample Name: HA-34-COMP-S-2-3 **Soil** **Sampled: 03/12/25 14:30** (A5C1334-25)

Analysis	Due	Expires	Comments
1613B Dioxins and Furans (SUB)	05/07/25 17:00	03/12/26 14:30	+4/16
Containers Supplied:			
(B)4 oz Glass Jar - Amber			

Standard TAT

Released By	Date	Received By	Date
	4/21/25	Fed Ex (Shipper)	
Fed Ex (Shipper)			
		07/22/25	09:39

CoC/Label Reconciliation Report WO# 2504171

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2504171-01	A HA-36-COMP-S-2.5-3.0	☑	A5C1334-12	11-Mar-25 15:15	☑	Clear Glass Jar, 120mL	Solid	
2504171-02	A HA-35-COMP-S-2.5-3.0	☑	A5C1334-16	11-Mar-25 17:00	☑	Amber Glass, 120 mL	Solid	
2504171-03	A HA-32-COMP-S-1-2	☑	A5C1334-23	12-Mar-25 12:30	☑	Amber Glass, 120 mL	Solid	
2504171-04	A HA-33-COMP-S-2-3	☑	A5C1334-24	12-Mar-25 13:30	☑	Amber Glass, 120 mL	Solid	
2504171-05	A HA-34-COMP-S-2-3	☑	A5C1334-25	12-Mar-25 14:30	☑	Amber Glass, 120 mL	Solid	

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

CONDITION	Yes	No	NA
Sample Container Intact?	✓		
Sample Container(s) Custody Seals Intact?			✓
Custody Seals On Cooler Intact?			✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)?	✓		

Comments:

Preservation Documented: Na2S2O3 Trizma NH4CH3CO2 (None) Other

Verifed by/Date: MVS 04/24/25 (originally labeled/reconciled by VLA on 04/22/25)

Attachment B

Data Validation Memoranda

MAUL
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DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. M8012.01.001 | JULY 14, 2023 | PERMAPOST PRODUCTS, INC.

Maul Foster & Alongi, Inc. (MFA), conducted an independent Stage 2A review of the quality of analytical results for soil and associated quality control samples collected on October 5, 2022, at the Permapost study area located south of 4205 SE Witch Hazel Road in Hillsboro, Oregon.

Apex Laboratories, LLC (Apex), Bureau Veritas (BV), and Enthalpy Analytical, LLC (Enthalpy) located in El Dorado Hills, California performed the analyses. Portions of samples submitted to Apex were subcontracted to BV and Enthalpy for dioxin and furan analysis. MFA reviewed Apex report number A2J0128**,** BV report numbers C2U4196 and C2Z1621, and Enthalpy report 2301252. The analyses performed and the samples analyzed are listed in the following tables. All samples collected by hand auger (named with "HA") were submitted to Apex on hold. Following evaluation of results initially requested for reports A2J0128 and C2U4196, some hand auger samples were removed from hold and analyzed by Apex for total arsenic. Samples that were removed from hold were also submitted to BV and Enthalpy for dioxins and furans analysis and results are provided in reports C2Z1621 and 2301252.

Analysis	References
Dioxins and furans	EPA 8290, 8290A
Percent solids	EPA 8000D
Percent moisture	Carter, 2008
Total arsenic	EPA 6020B
Notes EPA = U.S. Environmental Protection Agency.	

Samples Analyzed		
Report A2J0128, C2U4196, C2Z1621, 2301252		
HA20-S-2.0[a]	HA19-S-2.0[a]	DU03C-S-0.5
HA20-S-3.0 (hold)	HA19-S-3.0 (hold)	DU03A-S-0.5
HA18-S-2.0[a]	HA16-S-2.0[a]	DU02-S-0.5
HA18-S-3.0[a]	HA16-S-3.0[a]	DU01-S-0.5
HA21-S-2.0[a]	HA17-S-2.0[a]	DU05-S-0.5
HA21-S-3.0[a]	HA17-S-3.0 (hold)	DU03B-S-0.5
Note [a]Sample originally submitted to laboratory on hold. Analysis requested after evaluation of dataset reported in A2J0128 and C2U4196.		

DATA QUALIFICATION

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA 2020a, 2020b) and appropriate laboratory- and method-specific guidelines (Apex 2022, BV 2022, Enthalpy 2023, EPA 1986).

Based on the results of the data quality review procedures described below, the data, with the appropriate final data qualifiers assigned, are considered acceptable for their intended use. Final data qualifiers represent qualifiers originating from the laboratory and accepted by the reviewer, and data qualifiers assigned by the reviewer during validation.

Final data qualifiers:

- J = result is estimated.
- J- = result is estimated but may be biased low.
- JK = result is estimated and an estimated maximum potential value (EMPC).
- U = result is non-detect at the estimated detection limit (EDL) or method reporting limit (MRL).
- UJK = result is non-detect, an estimated value, and an EMPC.

Positive identification of 2,3,7,8-TCDF cannot be achieved using typical EPA Method 8290A columns; therefore, BV performed second analysis using an analytical column with 2,3,7,8-TCDF specificity to confirm and qualify any detected 2,3,7,8-TCDF results. The confirmation analysis was referenced in report C2U4196 as "EPA Method 8290A modified/Method 1613B modified." In reports C2U4196 and C2Z1621, the TCDF results that are shown in the following table were confirmed by secondary analysis and are considered the results of record:

Report	Sample	Analyte	Primary Result (pg/g)	Confirmation Result (Result of Record) (pg/g)
C2U4196	DU03C-S-0.5	2,3,7,8-TCDF	4.77	3.90
	DU03A-S-0.5		5.64	5.00
	DU02-S-0.5		1.3 U[a]	0.60 J
	DU01-S-0.5		1.02 J	0.83 J
	DU05-S-0.5		3.0 U[a]	1.50
	DU03B-S-0.5		4.57	3.80
C2Z1621	HA18-S-2.0		4.04	3.81

Notes
J = result is estimated.
pg/g = picograms per gram.
U = result is non-detect at the estimated detection limit.
[a]Result qualified by the laboratory as non-detect because the analyte peak exceeded the expected retention time.

EPA Method 8290 confirmation of detected 2,3,7,8-TCDF results was not required in Enthalpy report 2301252 because the analysis was performed using a column with sufficient 2,3,7,8-TCDF resolution.

The reviewer qualified EPA Method 8290 EMPC results in accordance with EPA Region 10 guidance for data validation of polychlorinated dibenzodioxins and polychlorinated dibenzofurans (EPA 2014) and EPA national functional guidelines for high-resolution Superfund methods data review (EPA 2020a). BV did not flag any EPA Method 8290A results as EMPCs. Enthalpy flagged some dioxin and furan congener results as EMPCs, which the reviewer confirmed were also below MRLs. The reviewer qualified the results at the reported concentrations with UJK.

When Enthalpy reported EPA Method 8290 total homolog results as EMPCs and one or more associated dioxin or furan congeners were detected but without EMPC flags, the reviewer qualified the total homolog results with JK. The reviewer noted that Enthalpy provided a lower result concentration along with the EMPC result, and confirmed with Enthalpy that the EMPC was the final result value. When Enthalpy reported total homolog results as EMPCs and all associated dioxin or furan congeners were either EMPCs or non-detect, the reviewer qualified the total homolog result at the reported concentration with UJK.

Final data qualifiers for EPA Method 8290 EMPC results are as follows:

Report	Sample	Component	Original Result (pg/g)	Qualified Result (pg/g)
2301252	HA18-S-3.0	2,3,7,8-TCDD	0.285	0.285 UJK
		Total TCDD	0.494	0.494 UJK
		Total PeCDD	21.7	21.7 JK
		Total TCDF	6.20	6.20 JK
		Total PeCDF	118	118 JK
		Total HxCDF	763	763 JK
	HA21-S-3.0	Total PeCDD	12.2	12.2 JK
		Total HxCDD	332	332 JK
		Total TCDF	3.54	3.54 JK
	HA16-S-3.0	2,3,7,8-TCDF	0.132	0.132 UJK
		Total PeCDD	4.14	4.14 JK
		Total TCDF	1.40	1.40 UJK
		Total HxCDF	135	135 JK

Notes
J = result is estimated.
JK = result is estimated and an estimated maximum potential concentration.
pg/g = picograms per gram.
U = result is non-detect at the reported detection limit.
UJK = result is non-detect, an estimated value, and an estimated maximum potential concentration.

SAMPLE CONDITIONS

Sample Custody

Sample custody was appropriately documented on the chain-of-custody (COC) forms accompanying the reports.

Holding Times

According to report A2J0128, the EPA Method 8000D percent solids results for samples HA18-S-2.0, HA21-S-2.0, HA19-S-2.0, HA-16-S-2.0, and HA17-S-2.0 were flagged by Apex due to analysis after the recommended holding time. The reviewer confirmed that a 14-day holding time was applied by Apex to the percent solids analysis based on general accepted EPA holding times for soil analysis, and that samples were analyzed approximately eight weeks after sample collection. Qualification was not required, as there is no official holding time or qualification recommendation for holding time exceedance for soil percent solids analysis, and the associated metals and dioxins and furans analyses were performed within method-recommended holding times.

According to the case narrative and the sample receipt anomaly form provided with report 2301252, all samples were received by Enthalpy after the EPA Method 8290 recommended 30-day holding time. Enthalpy confirmed with the primary laboratory, Apex, that the samples had been stored frozen at -18 degrees Celsius to extend the holding time to one year. Samples were held in frozen storage from the date of receipt by Apex to the day before shipment from Apex to Enthalpy. The reviewer confirmed that EPA Method 8290 states that dioxins and furans are very stable in a variety of matrices and that holding times may be as long as a year for certain matrices. EPA SW-846 organic analytes chapter four (EPA 1986) indicates that there is no recommended holding time for dioxins and furans analysis of solid samples. Qualification was not required.

The remaining extractions and analyses were performed within the recommended holding times.

Preservation and Sample Storage

The reviewer confirmed with the MFA field sampler that samples DU03C-S-0.5, DU3A-S-0.5, DU2-S-0.5, DU01-S-0.5, DU05-S-0.5, and DU03B-S-0.5 were collected from five decision units (DUs) as 30-part incremental sampling methodology (ISM) samples. Samples DU03A-S-0.5, DU03B-S-0.5, and DU03C-S-0.5 were collected from DU 3 in triplicate. Apex performed representative sampling methodology (RSM) processing, as requested on the COC form provided with report A2J0128 and noted that the samples were processed prior to extraction and analysis; the reviewer confirmed RSM was performed consistent with standard ISM guidance. The samples were air-dried, passed through #10 sieves, and a 260-gram portion of each sample was retained after processing with a sectorial rotary splitter. The entire split mass of each sample was ground to 70 micron particle size. All ground material from each sample was retained, mixed to evenly distribute the sample, and then subsampled for analysis.

According to the COC form provided with report C2Z1621, samples HA20-S-2.0, HA18-S-2.0, HA21-S-2.0, HA19-S-2.0, HA16-S-2.0, and HA17-S-2.0 were shipped by Apex to BV on November 29, 2022, and were received by BV on November 30, 2022. BV measured the temperature of the sample cooler instead of the provided temperature blank, and the averaged cooler temperature was acceptable, at 5.5 degrees Celsius. The COC form listed samples DU03C-S-0.5, DU03A-S-0.5, DU02-S-0.5, DU01-S-0.5, DU05-S-0.5, and DU03B-S-0.5, but these were crossed out by Apex and noted as "already received." The reviewer confirmed that these samples were not included in the November 29, 2022 shipment. Apex also noted on the COC form that the hand auger samples provided to BV had been frozen since October 5, 2022 and were thawed and subsampled on November 28, 2022. These storage and handling conditions were acceptable. No action was required by the reviewer.

The samples were preserved and stored appropriately.

REPORTING LIMITS

Apex evaluated EPA Method 6020B results to MRLs. BV evaluated percent moisture results to method detection limits, and BV and Enthalpy reported EPA Method 8290A and 8290 non-detect results to EDLs. BV labeled MRLs as reporting detection limits. Enthalpy did not provide MRLs. Samples that required dilutions because of high analyte concentrations, matrix interferences, and/or dilutions necessary for preparation and/or analysis were reported with raised EDLs, method detection limits, and MRLs. BV and Enthalpy qualified results between the EDL and the MRL with J, as estimated.

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 C2U4196, the EPA Method 8290A batch 8324575 laboratory method blank had a detection of OCDD between the EDL and MRL, at 0.29 picograms per gram (pg/g). The reviewer confirmed that the OCDD concentration was less than three times the MRL. All associated sample results had detected OCDD results that were greater than three times the MRL; thus, qualification was not required.

According to report C2Z1621, the EPA Method 8290A batch 8409212 laboratory method blank had a detection of 1,2,3,4,6,7,8-HpCDF and total HpCDF between the EDL and MRL, both at 0.64 pg/g. The reviewer confirmed that the associated sample concentrations were greater than five times the laboratory method blank concentrations; thus, qualification was not required.

According to report 2301252, the EPA Method 8290 batch B23B125 laboratory method blank analysis detected total PeCDF, at 0.515 picograms per gram. The associated sample results

were all greater than five times the laboratory method blank concentration; thus, qualification was not required.

All remaining BV laboratory method blank results were non-detect to EDLs. The Apex EPA Method 6020B laboratory method blank was non-detect to the MRL.

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 during shipment between the sampling location and the laboratory.

Trip blank samples were not required for this sampling event because samples were not analyzed for 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 were prepared and analyzed at the required frequency. LCSD were not reported by Apex, BV, or Enthalpy; batch precision was evaluated with available laboratory duplicate sample results.

All LCS results were within acceptance limits for percent recovery.

LABORATORY DUPLICATE RESULTS

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

Laboratory duplicate results greater than five times the MRL were evaluated using laboratory relative percent difference (RPD) control limits. Laboratory duplicate results less than five times the MRL, including non-detect results, 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 C2U4196, the EPA Method 8290A batch 8324575 laboratory duplicate (DU03B-S-0.5-Lab-Dup) total TCDD result exceeded the laboratory duplicate RPD of 25 percent, at 59 percent. BV noted that the exceedance may be due to sample heterogeneity. The

sample results shown in the following table including associated ISM triplicate sample results were qualified by the reviewer:

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
C2U4196	DU03C-S-0.5	Total TCDD	8.78	8.78 J
	DU03A-S-0.5	Total TCDD	13.1	13.1 J
	DU03B-S-0.5	Total TCDD	13.2	13.2 J
Notes J = result is estimated. pg/g = picograms per gram.				

A laboratory duplicate sample was not included with EPA Method 8290 batch quality control results in report 2301252. The reviewer could not evaluate laboratory precision for this analytical batch.

All remaining 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. All MS samples were prepared and analyzed at the required frequency. MSD sample results were not reported by Apex or BV; batch precision was evaluated with laboratory duplicate sample results.

When MS were prepared from samples with high concentrations of target analytes, associated MS percent recovery 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 were prepared with samples from unrelated projects, the MS percent recovery exceedances did not require qualification because these sample matrices were not representative of project sample matrices.

According to report C2Z1621, the EPA Method 8290A batch 8409212 MS prepared with sample HA20-S-2.0 had a result for 1,2,3,4,7,8-HxCDD that was below the lower percent recovery acceptance limit of 80 percent, at 79 percent, and the results for 1,2,3,4,6,7,8-HpCDD, OCDD, and OCDF exceeded the upper percent recovery acceptance limit of 140 percent, at 178 percent, 330 percent, and 151 percent, respectively. The reviewer confirmed with BV that MS spike concentrations were 1,250 pg/g for 1,2,3,4,7,8-HxCDD and 1,2,3,4,6,7,8-HpCDD and 2,500 pg/g for OCDD and OCDF. Qualification of OCDD was not required due to high associated sample concentrations. Qualification based on 1,2,3,4,7,8-HxCDD recovery was not required because the associated sample result was already qualified as estimated due to detection below the MRL. The sample results were qualified by the reviewer as shown in the following table:

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
C2Z1621	HA20-S-2.0	1,2,3,4,6,7,8-HpCDD	337	337 J
		OCDF	134	134 J
Notes J = result is estimated. pg/g = picograms per gram.				

All remaining MS results were within acceptance limits for percent recovery.

SURROGATE RECOVERY RESULTS

Surrogate compounds are used to evaluate laboratory performance for individual samples for organic analyses. No surrogates were reported, as they were not required by the analytical methods that were reviewed.

LABELED ANALOG RECOVERY RESULTS

According to report C2U4196, EPA Method 8290A samples were spiked with carbon-13 labeled standards to quantify the relative response of analytes in each sample. A chlorine-37 labeled standard was also used to evaluate the efficiency of the extract cleanup process.

According to report C2Z1621, the labeled analog standard $^{13}C_{12}$-OCDD recovery was below the lower control limit, at 29 percent. The reviewer confirmed with BV by a separate email communication that the lower control limit for $^{13}C_{12}$-OCDD was 40 percent. BV indicated that the low recovery was likely caused by matrix interference. The reviewer confirmed that the low recovery may indicate a low bias in the associated OCDD and OCDF sample results. The associated sample results were by the reviewer with J, as shown in the following table.

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
C2Z1621	HA18-S-2.0	OCDD	180,000	180,000 J-
		OCDF	16,300	16,300 J-
Notes J- = result is estimated, but the result may be biased low. pg/g = picograms per gram.				

All remaining labeled analog standard results 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. CCV results were not required for validation but were reviewed when provided. 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. Field duplicate samples were not submitted for analysis.

ISM TRIPLICATE RESULTS

According to report C2U4196, ISM samples were collected and named according to DUs. As described in the Sample Conditions section above, Apex processed and composited ISM samples prior to analysis consistent with industry standard procedures. DU 3 was sampled in triplicate, and the replicate set included samples DU03A-S-0.5, DU03B-S-0.5, and DU03C-S-0.5. Triplicate sample results were compared to acceptance criteria of 35 percent relative standard deviation (RSD) for analytes with one or more detected results (DEQ 2020). All triplicate ISM results met the RSD criterion.

Analyte	DU03A-S-0.5 Results (pg/g)	DU03B-S-0.5 Results (pg/g)	DU03C-S-0.5 Results (pg/g)	RSD (%)
2,3,7,8-TCDD	1.7 J	1.2 J	1.8 U	21
1,2,3,7,8-PeCDD	32.2	30.1	29.8	4.3
1,2,3,4,7,8-HxCDD	119	104	115	6.9
1,2,3,6,7,8-HxCDD	653	574	597	6.7
1,2,3,7,8,9-HxCDD	238	216	230	4.9
1,2,3,4,6,7,8-HpCDD	15,300	14,600	14600	2.7
OCDD	134,000	105,000	118000	12
Total TCDD	13.1	13.2	8.78	22
Total PeCDD	125	118	127	3.8
Total HxCDD	2,210	2,020	2,100	4.5
Total HpCDD	23,600	22,700	22,900	2.0
2,3,7,8-TCDF	5.64	4.57	4.77	11
1,2,3,7,8-PeCDF	24.1	19.7	21.6	10
2,3,4,7,8-PeCDF	20.6	16.9	20.1	10
1,2,3,4,7,8-HxCDF	146	116	125	12
1,2,3,6,7,8-HxCDF	100	89.6	95.7	5.5
2,3,4,6,7,8-HxCDF	49.2	48	47.1	2.2
1,2,3,7,8,9-HxCDF	5.24	5.04	5.06	2.2
1,2,3,4,6,7,8-HpCDF	2,380	2,390	2,450	1.6
1,2,3,4,7,8,9-HpCDF	238	227	230	2.5
OctaCDF	9,390	9,980	7,750	13
Total TCDF	41.1	36.9	39.5	5.4

Analyte	DU03A-S-0.5 Results (pg/g)	DU03B-S-0.5 Results (pg/g)	DU03C-S-0.5 Results (pg/g)	RSD (%)
Total PeCDF	677	563	644	9.3
Total HxCDF	2,940	2,600	2,740	6.2
Total HpCDF	7,920	7,680	7,640	2.0
Confirmation 2,3,7,8-TCDF	5	3.8	3.9	16

Notes
J = result is estimated.
pg/g = picograms per gram.
RSD = relative standard deviation.
U = result is non-detect at the estimated detection limit.

DATA PACKAGE

The data package was reviewed for transcription errors, omissions, and anomalies.

According to report C2U4196, BV noted that the 1,2,3,4,6,7,8-HpCDD and total HpCDD results for sample DU01-S-0.5 were associated with a dilution of 20. The note of explanation provided by BV included OCDD in addition to the HpCDD compounds; however, the OCDD result for sample DU01-S-0.5 was separately annotated by the laboratory. Because the dilution factor was correctly identified in both notes, no change was required.

According to reports C2U4196 and C2Z1621, 2,3,7,8-TCDF confirmation was performed in accordance with EPA Method 8290A, but because the confirmation analysis meets both EPA Method 8290A and 1613B requirements, both analytical methods are referenced in the laboratory's reporting system.

EPA Method 8290 MRLs were not provided with report 2301252. The reviewer confirmed that results flagged by Enthalpy with "J" were detected below MRLs by reviewing the electronic data deliverable file that accompanied the report.

No additional issues were found.

REFERENCES

Apex. 2022. *Quality Systems Manual.* Rev. 10. Apex Laboratories, LLC: Tigard, OR. June 20.

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EPA. 2014. *R10 Data Validation and Review Guidelines for Polychlorinated Dibenzo-p-dioxin and Polychlorinated Dibenzofuran Data (PCDD/PCDF) using Method 1613B and SW846 Method 8290A.* EPA-910-R-14-003. U.S. Environmental Protection Agency, Office of Environmental Assessment. May.

EPA. 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.

EPA. 2020b. *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.

Data Quality Assurance/Quality Control Review

Project No. M8012.01.001 | June 9, 2025 | Permapost Products, Inc.

Maul Foster & Alongi, Inc. (MFA), conducted an independent Stage 2A review of the quality of analytical results for soil samples collected in May, July, and November 2023 at the Permapost study area located south of 4205 SE Witch Hazel Road in Hillsboro, Oregon.

Apex Laboratories, LLC (Apex), and Enthalphy Analytical LLC (Enthalpy) located in El Dorado Hills, California, performed the analyses. Portions of samples submitted to Apex were subcontracted to Enthalpy for dioxin and furan analysis. MFA reviewed Apex report numbers A3E1301, A3G1175, and A3K1113 and Enthalpy report numbers 2305185, 2305254, 2307224, 2308007, and 2311099. The analyses performed and the samples analyzed are listed in the following tables. Samples submitted on hold are indicated below.

Analysis	Reference
Dioxins and furans	EPA 8290A, EPA 1613B
Percent dry weight	EPA 8000D
Total arsenic	EPA 6020B

Note
EPA = U.S. Environmental Protection Agency.

Samples Analyzed			
Reports A3E1301/2305185/2308007			
HA-28-Comp-1-2 (hold)	HA-26-Comp-2-3	HA-29-Comp-1-2 (hold)	HA-22-Comp-2-3
HA-28-Comp-2-3	HA-25-Comp-1-2	HA-29-Comp-2-3	DU1-A
HA-27-Comp-1-2	HA-25-Comp-2-3	HA-23-Comp-1-2	DU1-B
HA-27-Comp-2-3	HA-24-Comp-1-2	HA-23-Comp-2-3	DU2-A
HA-26-Comp-1-2	HA-24-Comp-2-3	HA-22-Comp-1-2	DU2-B
Report 2305254			**Reports A3G1175/2307224**
PP-1	PP-2	PP-3	PP-4
Reports A3K1113/2311099			
PP-5	PP-6	PP-7	PP-8

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) and appropriate laboratory- and method-specific guidelines (Apex 2023, Enthalpy 2023, EPA 1986).

Based on the results of the data quality review procedures described below, the data, with the appropriate final data qualifiers assigned, are considered acceptable for their intended use. Final data qualifiers represent qualifiers originating from the laboratory and accepted by the reviewer, and data qualifiers assigned by the reviewer during validation.

Final data qualifiers:

- J = result is estimated.

- JK = result is estimated and an estimated maximum potential concentration (EMPC).
- U = result is non-detect at the estimated detection limit (EDL), method detection limit (MDL), or method reporting limit (MRL).
- UJ = result is non-detect with an estimated detection limit.
- UJK = result is non-detect, an estimated value, and an EMPC.

Second Column Confirmation

Positive identification of 2,3,7,8-TCDF cannot be achieved using typical EPA Method 8290A or 1613B columns; therefore, analysis using a second column is required to confirm and qualify any detections above the MRL. The reviewer confirmed that EPA Method 8290A or 1613B confirmation of detected 2,3,7,8-TCDF results was not required in Enthalpy reports because the analyses were performed using a column with sufficient resolution.

Estimated Maximum Potential Concentration Results

In accordance with EPA Region 10 guidance for data validation of polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDDs/PCDFs) (EPA 2014) and EPA national functional guidelines for high-resolution Superfund methods data review (EPA 2020a), the reviewer qualified EPA Method 8290A and 1613B results in Enthalpy report numbers 2305185, 2305254, 2307224, and 2311099 because of laboratory EMPC detections. The reviewer confirmed that where Enthalpy provided a lower result concentration along with an EMPC result, the EMPC is considered the final result value.

Where Enthalpy flagged non-detect congener or total homolog results as EMPCs, the reviewer accepted the laboratory qualification. Results were additionally qualified by the reviewer due to improper storage in the Preservation and Sample Storage below. Final qualification for these results is UJK.

Where Enthalpy flagged detected total homolog results above or below MRLs as EMPCs, and all associated congeners were either EMPCs or non-detect, the reviewer qualified the total homolog result as non-detect at the reported concentration. Results were additionally qualified by the reviewer due to improper storage in the Preservation and Sample Storage below. Final qualification for these results is UJK.

Where Enthalpy flagged total homolog results above MRLs as EMPCs and one or more associated congeners were detected without an EMPC flag, the reviewer accepted the laboratory qualification. Results were additionally qualified by the reviewer due to improper storage in the Preservation and Sample Storage below. Final qualification for these results is JK.

Final data qualifiers for EMPC results are shown in the following table.

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result[a] (pg/g)
2305185	HA-28-Comp-2-3	2,3,7,8-TCDD	0.160 UK	0.160 UJK
		2,3,7,8-TCDF	0.349 UK	0.349 UJK
		Total TCDDs	0.160 UK	0.160 UJK
		Total PeCDDs	11.5 K	11.5 JK
2305185	HA-28-Comp-2-3	Total TCDFs	3.87 K	3.87 UJK
	HA-25-Comp-1-2	2,3,7,8-TCDD	0.179 UK	0.179 UJK

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result[a] (pg/g)
		1,2,3,7,8-PeCDD	1.41 UK	1.41 UJK
		Total TCDDs	0.179 UK	0.179 UJK
		Total PeCDDs	2.58 K	2.58 UJK
		Total TCDFs	1.02 UK	1.02 UJK
		Total PeCDFs	11.8 K	11.8 JK
		Total HxCDFs	59.3 K	59.3 JK
	HA-29-Comp-2-3	Total PeCDDs	5.21 K	5.21 JK
		Total TCDFs	1.29 K	1.29 JK
		Total PeCDFs	33.7 K	33.7 JK
	HA-22-Comp-1-2	2,3,7,8-TCDD	0.106 UK	0.106 UJK
		2,3,7,8-TCDF	0.391 UK	0.391 UJK
		Total TCDDs	0.492 K	0.492 UJK
		Total PeCDDs	7.39 K	7.39 JK
		Total TCDFs	3.05 K	3.05 UJK
		Total PeCDFs	45.0 K	45.0 JK
		Total HxCDFs	193 K	193 JK
	DU1-A	2,3,7,8-TCDF	0.318 UK	0.318 UJK
		Total TCDDs	3.46 K	3.46 JK
		Total PeCDDs	8.82 K	8.82 JK
		Total TCDFs	2.06 K	2.06 UJK
		Total HxCDFs	98.5 K	98.5 JK
	DU1-B	1,2,3,7,8,9-HxCDF	0.451 UK	0.451 UJK
		Total TCDDs	4.96 K	4.96 JK
		Total PeCDDs	10.2 K	10.2 JK
		Total TCDFs	2.54 K	2.54 JK
		Total HxCDFs	171 K	171 JK
	DU2-A	Total TCDDs	2.47 K	2.47 JK
		Total TCDFs	26.3 K	26.3 JK
		Total PeCDFs	129 K	129 JK
		Total HxCDFs	583 K	583 JK
	DU2-B	Total TCDDs	4.83 K	4.83 JK
		Total PeCDDs	30.2 K	30.2 JK
		Total TCDFs	31.6 K	31.6 JK
		Total PeCDFs	198 K	198 JK
		Total HxCDFs	706 K	706 JK
2305254	PP-1	2,3,7,8-TCDD	0.294 UK	0.294 UJK
		2,3,7,8-TCDF	0.930 UK	0.930 UJK
		Total TCDDs	4.66 K	4.66 UJK
		Total PeCDDs	14.1 K	14.1 JK
		Total HxCDDs	58.2 K	58.2 JK
		Total TCDF	10.1 K	10.1 UJK
	PP-2	1,2,3,7,8-PeCDD	0.324 UK	0.324 UJK
2305254	PP-2	1,2,3,4,7,8,9-HpCDF	0.544 UK	0.544 UJK
		Total PeCDDs	2.24 K	2.24 UJK

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result[a] (pg/g)
		Total HxCDDs	11.2 K	11.2 JK
2305254	PP-2	Total PeCDFs	2.55 K	2.55 JK
		Total HpCDFs	23.8 K	23.8 JK
	PP-3	2,3,7,8-TCDD	0.290 UK	0.290 UJK
		Total TCDDs	3.09 K	3.09 UJK
		Total PeCDDs	13.3 K	13.3 JK
		Total TCDFs	9.71 K	9.71 JK
2307224	PP-4	2,3,7,8-TCDD	0.218 UK	0.218 UJK
		1,2,3,7,8-PeCDF	0.361 UK	0.361 UJK
		1,2,3,7,8,9-HxCDF	0.191 UK	0.191 UJK
		Total TCDD	2.11 K	2.11 UJK
		Total PeCDD	7.52 K	7.52 JK
		Total HxCDD	37.8 K	37.8 JK
		Total TCDF	6.59 K	6.59 JK
		Total PeCDF	12.8 K	12.8 JK
		Total HxCDF	39.8 K	39.8 JK
2308007	HA-27-Comp-1-2	1,2,3,7,8-PeCDD	1.92 UK	1.92 UJK
		2,3,4,7,8-PeCDF	2.13 UK	2.13 UJK
		2,3,4,6,7,8-HxCDF	3.59 UK	3.59 UJK
		Total TCDDs	0.602 K	0.602 UJK
		Total PeCDDs	7.99 K	7.99 UJK
		Total TCDFs	3.22 K	3.22 JK
		Total PeCDFs	44.4 K	44.4 JK
		Total HxCDFs	208 K	208 JK
	HA-27-Comp-2-3	1,2,3,7,8-PeCDD	0.902 UK	0.902 UJK
		1,2,3,4,7,8-HxCDD	2.17 UK	2.17 UJK
		1,2,3,7,8-PeCDF	0.456 UK	0.456 UJK
		2,3,4,6,7,8-HxCDF	1.11 UK	1.11 UJK
		1,2,3,7,8,9-HxCDF	0.500 UK	0.500 UJK
		Total PeCDDs	2.08 K	2.08 UJK
		Total HxCDDs	44.1 K	44.1 JK
		Total TCDFs	1.70 K	1.70 UJK
		Total PeCDFs	15.4 K	15.4 JK
		Total HxCDFs	65.9 K	65.9 JK
	HA-26-Comp-1-2	2,3,7,8-TCDD	0.133 UK	0.133 UJK
		1,2,3,4,7,8-HxCDD	1.75 UK	1.75 UJK
		2,3,4,7,8-PeCDF	0.809 UK	0.809 UJK
		2,3,4,6,7,8-HxCDF	1.10 UK	1.10 UJK
		Total TCDDs	0.292 UK	0.292 UJK
		Total PeCDDs	2.33 K	2.33 JK
		Total HxCDDs	36.2 K	36.2 JK
		Total TCDF	2.14 UK	2.14 UJK
2308007	HA-26-Comp-1-2	Total PeCDF	13.3 K	13.3 JK
		Total HxCDF	49.0 K	49.0 JK

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result[a] (pg/g)
	HA-26-Comp-2-3	2,3,7,8-TCDF	0.182 UK	0.182 UJK
		1,2,3,7,8-PeCDF	0.640 UK	0.640 UJK
		Total PeCDDs	4.53 K	4.53 JK
		Total TCDF	1.51 K	1.51 UJK
		Total PeCDF	27.6 K	27.6 JK
	HA-25-Comp-2-3	1,2,3,4,7,8-HxCDD	1.12 UK	1.12 UJK
		2,3,4,7,8-PeCDF	0.421 UK	0.421 UJK
		2,3,4,6,7,8-HxCDF	0.980 UK	0.980 UJK
		Total HxCDDs	23.1 K	23.1 JK
		Total TCDFs	0.379 UK	0.379 UJK
		Total PeCDFs	8.10 K	8.10 JK
		Total HxCDFs	32.3 K	32.3 JK
	HA-24-Comp-1-2	2,3,4,6,7,8-HxCDF	3.56 UK	3.56 UJK
		1,2,3,7,8,9-HxCDF	0.886 UK	0.886 UJK
		Total PeCDDs	6.32 K	6.32 JK
		Total TCDFs	2.82 K	2.82 JK
		Total PeCDFs	42.6 K	42.6 JK
		Total HxCDFs	185 K	185 JK
	HA-24-Comp-2-3	1,2,3,7,8,9-HxCDF	0.218 UK	0.218 UJK
		1,2,3,4,7,8,9-HpCDF	1.56 UK	1.56 UJK
		Total TCDDs	0.292 UK	0.292 UJK
		Total TCDFs	1.47 K	1.47 UJK
		Total PeCDFs	6.33 K	6.33 JK
		Total HxCDFs	24.0 K	24.0 JK
		Total HpCDFs	45.7 K	45.7 JK
	HA-23-Comp-1-2	2,3,7,8-TCDD	0.207 UK	0.207 UJK
		Total TCDDs	0.471 K	0.471 UJK
		Total PeCDDs	4.93 K	4.93 JK
		Total TCDFs	2.56 K	2.56 JK
		Total PeCDFs	36.8 K	36.8 JK
		Total HpCDFs	276 K	276 JK
	HA-23-Comp-2-3	2,3,7,8-TCDF	0.264 UK	0.264 UJK
		1,2,3,7,8-PeCDF	1.12 UK	1.12 UJK[b]
		Total PeCDDs	4.16 K	4.16 JK
		Total TCDFs	3.01 K	3.01 UJK
		Total PeCDFs	32.8 K	32.8 JK
	HA-22-Comp-2-3	2,3,7,8-TCDD	0.241 UK	0.241 UJK
		Total TCDD	0.528 UK	0.528 UJK
		Total PeCDD	9.83 K	9.83 JK
		Total TCDF	3.90 K	3.90 JK
2311099	PP-5	2,3,4,7,8-PeCDF	1.32 UK	1.32 UJK
		Total PeCDD	3.23 UK	3.23 UJK
		Total PeCDF	7.49 K	7.49 UJK
		Total HxCDF	34.4 K	34.4 JK

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result[a] (pg/g)
	PP-6	2,3,7,8-TCDD	0.316 UK	0.316 UJK
		1,2,3,7,8-PeCDD	0.549 UK	0.549 UJK
		1,2,3,7,8,9-HxCDF	0.167 UK	0.167 UJK
		Total TCDD	2.12 K	2.12 UJK
		Total PeCDD	8.19 K	8.19 UJK
		Total TCDF	21.1 K	21.1 JK
		Total HxCDF	35.9 K	35.9 JK
	PP-7	2,3,7,8-TCDD	0.127 UK	0.127 UJK
		1,2,3,7,8,9-HxCDD	0.390 UK	0.390 UJK
		2,3,4,7,8-PeCDF	0.182 UK	0.182 UJK
		1,2,3,6,7,8-HxCDF	0.212 UK	0.212 UJK
		2,3,4,6,7,8-HxCDF	0.227 UK	0.227 UJK
		Total TCDD	0.332 UK	0.332 UJK
		Total PeCDD	1.28 JK	1.28 UJK
		Total HxCDD	9.28 K	9.28 JK
		Total PeCDF	1.89 JK	1.89 UJK
		Total HxCDF	7.52 K	7.52 JK
	PP-8	1,2,3,7,8-PeCDD	0.683 UK	0.683 UJK
		2,3,7,8-TCDF	0.488 UK	0.488 UJK
		Total TCDD	2.69 K	2.69 JK
		Total PeCDD	8.53 K	8.53 UJK
		Total TCDF	17.0 K	17.0 UJK
		Total PeCDF	28.8 K	28.8 JK
		Total HxCDF	49.6 K	49.6 JK

Notes
JK = result is estimated and an estimated maximum potential concentration.
K = result is an estimated maximum potential concentration.
pg/g = picograms per gram.
UJK = result is non-detect, an estimated value, and an estimated maximum potential concentration.
UK = result is non-detect and an estimated maximum potential concentration.
[a]Final qualifications are based on estimated maximum potential concentration flags and improper storage.
[b]Final qualification based on estimated maximum potential concentration flag and carbon-13 labeled standard result.

Sample Conditions

Sample Custody

Sample custody was appropriately documented on the chain-of-custody (COC) forms accompanying the reports.

Holding Times

Extractions and analyses were performed within the recommended holding times.

Preservation and Sample Storage

According to report A3G1175, sample PP-4 was received at Apex at 34.1 degrees Celius, which is above the recommended storage temperature range of 0 to 6 degrees for dioxins and furans

analysis. The reviewer confirmed that the sample was collected less than two hours prior to receipt at the laboratory, however, the sample was not submitted on ice and no attempt was made to cool the sample between collection and submittal to the laboratory. EPA Method 6020B does not have temperature requirements and thus the associated total arsenic result did not require qualification. A portion of this sample was subcontracted by Apex to Enthalpy, and the reviewer confirmed that Apex shipped this portion on ice. The subcontracted EPA Method 1613B results in report 2307224 are qualified by the reviewer based on the initial temperature exceedance and the lack of protection from light, as indicated below.

According to reports 2305185, 2305254, 2307224, and 2311099, all samples for EPA Method 8290A and 1613B analysis were received in clear jars with no foil around the outside of the jars. The reviewer confirmed with the laboratory that the samples for report 2308007 were also in clear jars with no foil. Samples for EPA Method 8290A or 1613B analysis should be protected from light. The reviewer alerted the MFA project manager about the proper storage requirements for the method. Since samples were improperly stored, the reviewer qualified all sample results with J or UJ, as shown in the following table. Qualifications based on EMPC detections take precedence and combined final qualifications for those results are shown in the EMPC Results section above.

Reports	Samples	Analysis	Original Results	Qualification[a]
2305185,2305254, 2307224, 2308007, 2311099	All	EPA 8290A EPA 1613B	Detected	J
			Non-detect	UJ

Notes
EPA = U.S. Environmental Protection Agency.
J = result is estimated.
UJ = result is non-detect with an estimated detection limit.
[a]Qualifications based on estimated maximum potential concentration results take precedence.

The remaining samples were preserved and stored appropriately.

Reporting Limits

Apex evaluated results to MRLs. Enthalpy reported EPA Method 8290A and 1613B non-detect results to EDLs or 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 EDLs or MDLs, and MRLs.

Enthalpy qualified results between the EDL or MDL and the MRL with J, as estimated. The reviewer confirmed that results flagged by Enthalpy with J were detected below MRLs by reviewing the electronic data deliverable file that accompanied the report.

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.

In report 2311099, the EPA Method 1613B batch B23K196 laboratory method blank was non-detect for analytes but total PeCDD and total PeCDF were flagged as EMPCs at concentrations of 1.24 picograms per gram (pg/g) and 0.146 pg/g, respectively. All associated sample results were

flagged as EMPCs or were detected without EMPC flags at concentrations greater than five times the laboratory method blank EMPC concentrations. Qualifications by the reviewer based on sample EMPC flags are shown in the EMPC results section above. Additional qualification based on the laboratory method blank results was not necessary.

All remaining laboratory method blank results were non-detect.

Equipment Rinsate Blanks

Equipment rinsate blanks are used to evaluate field equipment decontamination. These blanks were not required for this sampling event.

Trip Blanks

Trip blanks are used to evaluate whether volatile organic compound contamination was introduced during sample storage and during shipment between the sampling location and the laboratory.

Trip blank samples were not required for this sampling event because samples were not analyzed for 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.

No LCSDs were reported, in accordance with the methods. The LCSs were prepared and analyzed at the required frequency. Enthalpy reported LCSs as “ongoing precision and recovery” samples, in accordance with EPA Method 8290A.

All LCS results were within acceptance limits for percent recovery.

Laboratory Duplicate Results

Laboratory duplicate results are used to evaluate laboratory precision. The EPA Method 6020B laboratory duplicate samples were prepared and analyzed at the required frequency. Enthalpy did not report laboratory duplicate results for EPA Method 8290A or 1613B, in accordance with the methods.

Laboratory duplicate results greater than five times the MRL were evaluated using laboratory relative percent difference 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.

The laboratory duplicate result 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.

The EPA Method 6020B MSs and batch 23H0221 MSD were prepared and analyzed at the required frequency. No other MS or MSD were reported, in accordance with the methods.

The EPA Method 602B MS and MSD results were within acceptance limits for percent recovery and relative percent difference.

Labeled Analog Recovery Results

According to reports 2305185, 2305254, and 2308007, EPA Method 8290A and 1613B samples were spiked with carbon-13 (C13) labeled standards to quantify the relative response of analytes in each sample.

According to report 2308007, the EPA Method 8290A C13 labeled standard 13C-1,2,3,7,8-PeCDF for sample HA-23-Comp-2-3 was below the lower percent recovery limit of 40 percent, at 37.5 percent. The associated 1,2,3,7,8-PeCDF result was qualified by the reviewer due to an EMPC detection which takes precedence and the final qualification is shown in the EMPC Results section above.

According to report 2311099, several EPA Method 1613B C13 labeled standards and the Cl-37 cleanup internal standard for sample PP-5 were below their respective lower percent recovery limits, ranging from 22.4 percent 27.3 percent. Widespread internal and labeled standard issues indicate a matrix effect for sample PP-5, which was reported from an undiluted analysis. Enthalpy did not reanalyze this sample at a higher dilution. All associated sample results were qualified due to improper storage in the Preservation and Sample Storage section above and did not require additional qualification.

All remaining C13 labeled standard recoveries were within acceptance limits.

Field Duplicate Results

Field duplicate samples measure both field and laboratory precision. No field duplicate samples were submitted for analysis.

Data Package

The data package was reviewed for transcription errors, omissions, and anomalies.

The COC form accompanying report A3G1175 does not list a project number. Additionally, the company is not noted under the relinquishment section. The reviewer confirmed that the sample was collected and relinquished by Tim Browning of Permapost.

According to the cooler receipt form accompanying report A3E1301, the sample container for HA-22-Comp2-3 listed a collection time of 14:50. Apex correctly reported the sample using the collection time of 14:55 as written on the COC form.

At MFA's request, several samples initially submitted on hold were taken off hold on July 20, 2023, for analysis by EPA Method 8290A and EPA Method 6020B for sample HA-22-Comp-2-3. These additional results are reported in Enthalpy report 2308007 and Apex report A3E1301.

Report A3K1113 was revised on January 17, 2024, to update the project name to “Permapost Property.”

No other issues were found.

References

Apex. 2023. *Quality Systems Manual.* Rev. 11. Apex Laboratories, LLC: Tigard, OR. June 20.

Enthalpy. 2023. *Quality Manual*. Rev. 33. Enthalpy Analytical LLC: El Dorado Hills, CA. February 20.

EPA. 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* EPA publication SW-846. 3rd ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA

(1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), VI phase III (2019), VII phase I (2019), and VII phase II (2020).

EPA. 2014. *R10 Data Validation and Review Guidelines for Polychlorinated Dibenzo-p-dioxin and Polychlorinated Dibenzofuran Data (PCDD/PCDF) using Method 1613B and SW846 Method 8290A.* EPA-910-R-14-003. U.S. Environmental Protection Agency, Office of Environmental Assessment. May.

EPA. 2020a. *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.

EPA. 2020b. *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.

Data Validation Memorandum

Project No. M8012.01.001| July 26, 2024 | Permapost Products, Inc.

Maul Foster & Alongi, Inc. (MFA), conducted an independent Stage 2A review of the quality of analytical results for soil samples collected on May 31, 2024 at the Permapost study area located south of 4205 SE Witch Hazel Road in Hillsboro, Oregon.

Apex Laboratories, LLC (Apex), and Enthalpy Analytical LLC (Enthalpy) located in El Dorado Hills, California, performed the analyses. Portions of samples submitted to Apex were subcontracted to Enthalpy for dioxin and furan analysis, and Enthalpy reports are appended to the Apex reports. MFA reviewed Apex report number A4E1783 and Enthalpy report 2406043. The analyses performed and the samples analyzed are listed in the following tables.

Analysis	Reference
Dioxins and furans	EPA 1613B[a]

Notes
EPA = U.S. Environmental Protection Agency.
[a]Percent moisture measurement for dry-weight calculation is included in EPA Method 1613B.

Samples Analyzed
Report A4E1783/2406043
HA-30-1.5-Comp
HA-30-2.5-Comp
HA-31-1.5-Comp

Data Validation Procedures

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA 2014, EPA 2020) and appropriate laboratory- and method-specific guidelines (Apex 2023, Enthalpy 2023, EPA 1986).

Based on the data quality assurance/quality control review described herein, the data, with the appropriate final data qualifiers assigned, are considered acceptable for their intended use. Final data qualifiers represent qualifiers originating from the laboratory and accepted by the reviewer, and data qualifiers assigned by the reviewer during validation.

Final data qualifiers:

- J = result is estimated.
- J+ = result is estimated, but the result may be biased high.
- J- = result is estimated, but the result may be biased low.
- U = result is non-detect at the estimated detection limit (EDL).
- UJ = result is non-detect with an estimated LDL/MDL/MRL.
- UJK = result is non-detect at the estimated maximum potential concentration (EMPC) and qualified as estimated.

- UK = result is non-detect at the EMPC.

Dioxins and Furans

Second Column Confirmation

Positive identification of 2,3,7,8-TCDF cannot be achieved using typical EPA Method 1613B analytical columns; therefore, analysis using a second column is required to confirm and qualify any detections above the method reporting limit (MRL). Enthalpy noted that EPA Method 1613B analysis of all samples was performed with a column that resolves 2,3,7,8-TCDD and 2,3,7,8-TCDF. Second column confirmation of 2,3,7,8-TCDF detected results was therefore not required.

Estimated Maximum Potential Concentration Results

In accordance with EPA Region 10 guidance for data validation of dioxins and furans (EPA 2014) and EPA national functional guidelines for high-resolution Superfund methods data review (EPA 2020), the reviewer qualified EPA Method 8290A results that were identified by Enthalpy as EMPC detections. The reviewer confirmed that, where Enthalpy provided a lower result concentration along with an EMPC result, the EMPC is considered the final result value.

Where Enthalpy flagged non-detect congener results or total homolog below MRLs as EMPCs, the reviewer qualified the results with UJK. The reviewer qualified congener or total homolog results above MRLs that were flagged as EMPCs with UK.

Where Enthalpy flagged detected total homolog results as EMPCs, and all associated congeners were either EMPCs or non-detect, the reviewer qualified the total homolog result as non-detect at the reported concentration. Final qualification for total homolog results above MRLs is UK. Final qualification for total homolog results below MRLs is UJK.

Where Enthalpy flagged total homolog results as EMPCs and one or more associated congeners were detected without an EMPC flag, the reviewer accepted the laboratory qualification. Final qualification for total homolog results above MRLs is K.

Final data qualifiers for EMPC results are shown in the following table. Some EMPC results were also qualified based on holding time or laboratory control sample (LCS) recovery. Final qualification is shown.

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
2406043	HA-30-1.5-Comp	2,3,7,8-TCDD	0.119 K	0.119 UJK
		2,3,7,8-TCDF	0.230 K	0.230 UJK
		1,2,3,7,8,9-HxCDF	0.473 K	0.473 UJK
		Total TCDD	0.205 JK	0.205 UJK
		Total PeCDD	4.88 K	4.88 K
		Total TCDF	1.98 K	1.98 UK
		Total PeCDF	38.4 K	38.4 K
		Total HpCDF	211 K	211 K
	HA-30-2.5-Comp	2,3,7,8-TCDD	0.609 K	0.609 UJK
		Total TCDD	2.90 K	2.90 UK
		Total PeCDD	61.0 K	61.0 K
		Total TCDF	24.7 K	24.7 K

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
	HA-31-1.5-Comp	2,3,7,8-TCDD	0.0689 K	0.0689 UJK
		1,2,3,7,8-PeCDD	0.228 K	0.228 UJK
		1,2,3,4,7,8-HxCDD	0.895 K	0.895 UJK
		Total TCDD	0.0689 K	0.0689 UJK
		Total PeCDD	0.412 K	0.412 UJK
		Total HxCDD	17.3 K	17.3 K
		Total PeCDF	5.36 K	5.36 K

Notes
J = result is estimated.
JK = result is qualified as estimated and an estimated maximum potential concentration.
K = result is an estimated maximum potential concentration.
pg/g = picograms per gram.
UJK = result is non-detect at the estimated maximum potential concentration and qualified as estimated.
UK = result is non-detect at the estimated maximum potential concentration.

Sample Conditions

Sample Custody

Sample custody was appropriately documented on the chain-of-custody (COC) form accompanying the reports with the following exceptions:

According to the chain-of-custody (COC) forms provided with report 2406043, sample relinquishment time was not recorded by Apex for shipments to Enthalpy. The reviewer notified the laboratory. No qualification was required. The reviewer also confirmed that the gap in custody on the COC form accompanying the Enthalpy reports was for shipment via a third-party service.

Holding Times

Extractions and analyses were performed within the recommended holding times.

Preservation and Sample Storage

The samples were preserved and stored appropriately. The reviewer confirmed that samples were protected from light; Enthalpy noted on the COC label reconciliation report provided with report 2406043, that the samples were received in clear glass wrapped in foil.

Reporting Limits

Enthalpy reported EPA Method 1613B non-detect results to EDLs. EDLs are sample-specific detection limits calculated for non-detect results. Method detection limits (MDLs) were also provided for all EPA Method 1613B dioxin and furan congener results. Samples that required dilutions because of high analyte concentrations were reported with raised MDLs.

Enthalpy qualified results detected between the MDL and MRL with J. Because MRLs were not included in the reports, the reviewer confirmed that results flagged by Enthalpy with J were detected below MRLs by reviewing the electronic data deliverable file that accompanied the report. These qualifiers were accepted by the reviewer.

Blank Results

Method Blanks

Laboratory method blanks are used to evaluate whether laboratory contamination was introduced during sample preparation and analysis. Laboratory method blank analyses were performed at the required frequencies, in accordance with laboratory- and method-specific requirements.

All laboratory method blank results were non-detect to EDLs.

Equipment Rinsate Blanks

Equipment rinsate blanks are used to evaluate the adequacy of the field equipment decontamination process when decontaminated sampling equipment is used to collect samples.

No equipment rinsate blanks were submitted for analysis. The reviewer was unable to evaluate field samples for possible contamination from sampling equipment.

Trip Blanks

Trip blanks are used to evaluate whether volatile organic compound contamination was introduced during sample storage and during shipment between the sampling location and the laboratory. Trip blank samples were not required because samples were not analyzed for volatile organic compounds.

Laboratory Control Sample and Laboratory Control Sample Duplicate Results

An LCS and a laboratory control sample duplicate (LCSD) are spiked with target analytes to provide information about laboratory precision and accuracy. No LCSD results were reported, in accordance with the method. The LCS samples were prepared and analyzed at the required frequency. Enthalpy reported LCS samples as “ongoing precision and recovery” samples.

All LCS results were within acceptance limits for percent recovery.

Laboratory Duplicate Results

Laboratory duplicate results are used to evaluate laboratory precision. Laboratory duplicate samples are not required for EPA Method 1613B and were not reported by Enthalpy.

Matrix Spike and Matrix Spike Duplicate Results

Matrix spike (MS) and matrix spike duplicate (MSD) results are used to evaluate laboratory precision, accuracy, and the effect of the sample matrix on sample preparation and analysis. MS and MSD results were not reported by Enthalpy.

Labeled Analog Results

All EPA Method 1613B project samples and associated batch quality control samples were spiked with carbon-13 (C13) labeled analogs as internal standards to quantify the relative response of analytes in each sample. Samples were also spiked with labeled cleanup standards to evaluate the efficiency of extract cleanup.

All labeled standard recoveries were within acceptance limits.

Field Duplicate Results

Field duplicate samples measure both field and laboratory precision. Feld duplicate samples were not submitted for analysis.

Data Package

The data package was reviewed for transcription errors, omissions, and anomalies.

None were found.

References

Apex. 2023. *Quality Systems Manual.* Rev. 11. Apex Laboratories, LLC: Tigard, OR. June 20.

Enthalpy. 2023. *Quality Manual*. Rev. 33. Enthalpy Analytical, LLC: El Dorado Hills, CA. February 20.

EPA. 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* EPA publication SW-846. 3rd ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), VI phase III (2019), VII phase I (2019), and VII phase II (2020).

EPA. 2014. *R10 Data Validation and Review Guidelines for Polychlorinated Dibenzo-p-dioxin and Polychlorinated Dibenzofuran Data (PCDD/PCDF) Using Method 1613B and SW846 Method 8290A.* EPA-910-R-14-003. U.S. Environmental Protection Agency, Office of Environmental Assessment. May.

EPA. 2020. *National Functional Guidelines for High Resolution Superfund Methods Data Review*. EPA 542-R-20-007. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. November.

Data Validation Memorandum

Project No. M8012.01.001 | May 8, 2025 | Permapost Products, Inc.

Maul Foster & Alongi, Inc. (MFA), conducted an independent Stage 2A review of the quality of analytical results for soil samples collected on March 11 and 12, 2025, at the Permapost study area located south of 4205 SE Witch Hazel Road in Hillsboro, Oregon.

Apex Laboratories, LLC (Apex), and Enthalpy Analytical LLC (Enthalpy) performed the analyses. MFA reviewed Apex report numbers A5C1334 and A5C1334 (follow-up analyses) and Enthalpy report numbers 2503187 and 2504171. Dioxins and furans analysis was subcontracted by Apex to Enthalpy and results are in separate reports. The analyses performed and the samples analyzed are listed in the following tables. Samples submitted on hold are not shown. Follow-up analyses were requested by MFA after initial results were received.

Analysis	Reference
Dioxins and furans	EPA 8290A. EPA 1613B
Percent dry weight	EPA 8000D
Total arsenic	EPA 6020B

Note
EPA = U.S. Environmental Protection Agency.

Samples Analyzed	
Reports A5C1334/2503187	**Reports A5C1334 (follow-ups)/2504171**
DU4-A-S-0.5	HA-36-COMP-S-2.5-3.0
DU4-B-S-0.5	HA-35-COMP-S-2.5-3.0
DU4-C-S-0.5	HA-32-COMP-S-1-2
DU4-D-S-0.5	HA-33-COMP-S-2-3
DU-2c-S-0.5	HA-34-COMP-S-2-3
DU-2d-S-0.5	--
DU-2e-S-0.5	--

Data Validation Procedures

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA 2020a, 2020b) and appropriate laboratory- and method-specific guidelines (Apex 2023, Enthalpy 2023, EPA 1986).

EPA Method 8000D percent dry-weight results reported by the laboratory for dry-weight correction were reviewed for completeness but were not included in Stage 2A data validation.

Based on the data quality assurance/quality control review described herein, 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.
- K = result is an estimated maximum potential concentration (EMPC).

- U = result is non-detect at the method detection limit (MDL) or method reporting limit (MRL).
- UJK = result is non-detect, an estimated value, and an EMPC.
- UK = result is non-detect and an EMPC.

General Qualifications

Second Column Confirmation

The reviewer confirmed that EPA Method 8290A and 1613B confirmation of detected 2,3,7,8-TCDF results was not required in Enthalpy reports 2503187 and 2504171 because the analyses were performed using a column with sufficient resolution.

Estimated Maximum Potential Concentration Results

In accordance with EPA Region 10 guidance for data validation of polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDDs/PCDFs) (EPA 2014) and EPA national functional guidelines for high-resolution Superfund methods data review (EPA 2020a), the reviewer qualified EPA Method 8290A and 1613B results in Enthalpy report numbers 2503187 and 2504171 because of laboratory EMPC detections. The reviewer confirmed that where Enthalpy provided a lower result concentration along with an EMPC result, the EMPC is considered the final value.

Where Enthalpy flagged non-detect congener or total homolog results as EMPCs, the reviewer accepted the laboratory qualification. Final qualification for these results is UK.

Where Enthalpy flagged detected total homolog results above or below MRLs as EMPCs, and all associated congeners were either EMPCs or non-detect, the reviewer qualified the total homolog result as non-detect at the reported concentration. Final qualification for these results is UK or UJK.

Where Enthalpy flagged total homolog results above MRLs as EMPCs and one or more associated congeners were detected without an EMPC flag, the reviewer accepted the laboratory qualification. Final qualification for these results is K.

Final data qualifiers for EMPC results are shown in the following table.

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
2503187	DU4-A-S-0.5	2,3,7,8-TCDF	0.819 UK	0.819 UK[(a)]
		Total TCDD	3.37 K	3.37 K[(a)]
		Total PeCDD	40.9 K	40.9 K[(a)]
		Total TCDF	14.4 K	14.4 UK
		Total PeCDF	203 K	203 K[(a)]
		Total HxCDF	756 K	756 K[(a)]
		Total HpCDF	1,830 K	1,830 K[(a)]
	DU4-B-S-0.5	2,3,7,8-TCDD	0.384 UK	0.384 UK[(a)]
		2,3,7,8-TCDF	0.183 UK	0.183 UK[(a)]
		1,2,3,7,8-PeCDF	0.725 UK	0.725 UK[(a)]
		2,3,4,7,8-PeCDF	0.743 UK	0.743 UK[(a)]
		1,2,3,4,7,8-HxCDF	2.47 UK	2.47 UK[(a)]
		2,3,4,6,7,8-HxCDF	1.07 UK	1.07 UK[(a)]
		Total TCDD	1.40 K	1.40 UK

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
2503187	DU4-B-S-0.5	Total PeCDD	9.15 K	9.15 K[(a)]
		Total HxCDD	101 K	101 K[(a)]
		Total TCDF	3.40 K	3.40 UK
		Total PeCDF	22.9 K	22.9 UK
		Total HxCDF	70.1 K	70.1 K[(a)]
	DU4-C-S-0.5	2,3,7,8-TCDD	1.65 UK	1.65 UK[(a)]
		Total TCDD	17.3 K	17.3 UK
		Total TCDF	102 K	102 K[(a)]
		Total PeCDF	1,350 K	1,350 K[(a)]
	DU4-D-S-0.5	2,3,7,8-TCDD	0.289 UK	0.289 UK[(a)]
		1,2,3,7,8,9-HxCDF	0.306 UK	0.306 UK[(a)]
		Total TCDD	1.82 K	1.82 UK
		Total PeCDD	9.97 K	9.97 K[(a)]
		Total HxCDD	100 K	100 K[(a)]
		Total TCDF	2.76 K	2.76 K[(a)]
		Total PeCDF	15.5 K	15.5 K[(a)]
		Total HxCDF	63.2 K	63.2 K[(a)]
	DU-2c-S-0.5	1,2,3,7,8,9-HxCDF	0.602 UK	0.602 UK[(a)]
		Total TCDD	6.94 K	6.94 K[(a)]
		Total PeCDD	17.3 K	17.3 K[(a)]
		Total TCDF	26.6 K	26.6 K[(a)]
		Total PeCDF	83.8 K	83.8 K[(a)]
		Total HxCDF	136 K	136 K[(a)]
		Total HpCDF	288 K	288 K[(a)]
	DU-2d-S-0.5	Total TCDD	8.47 K	8.47 K[(a)]
		Total HxCDF	352 K	352 K[(a)]
	DU-2e-S-0.5	2,3,7,8-TCDD	0.446 UK	0.446 UK[(a)]
		1,2,3,7,8,9-HxCDF	2.33 UK	2.33 UK[(a)]
		Total TCDD	1.83 K	1.83 UK
		Total PeCDD	15.1 K	15.1 K[(a)]
		Total TCDF	13.7 K	13.7 K[(a)]
		Total HxCDF	238 K	238 K[(a)]
2504171	HA-36-COMP-S-2.5-3.0	2,3,7,8-TCDD	0.130 UK	0.130 UK[(a)]
		Total TCDD	0.266 UK	0.266 UK[(a)]
		Total PeCDD	7.94 JK	7.94 JK[(a)]
		Total TCDF	2.74 K	2.74 UK
		Total PeCDF	27.5 K	27.5 K[(a)]
		Total HpCDF	212 K	212 K[(a)]
	HA-35-COMP-S-2.5-3.0	Total TCDD	0.459 JK	0.459 UJK
		Total PeCDD	10.8 K	10.8 K[(a)]
		Total TCDF	5.10 K	5.10 K[(a)]
		Total PeCDF	36.9 K	36.9 K[(a)]
2504171	HA-32-COMP-S-1-2	1,2,3,7,8-PeCDD	0.679 UK	0.679 UK[(a)]
		2,3,7,8-TCDF	0.163 UK	0.163 UK[(a)]

Report	Sample	Analyte	Original Result (pg/g)	Qualified Result (pg/g)
		2,3,4,7,8-PeCDF	0.281 UK	0.281 UK[a]
		1,2,3,4,7,8-HxCDF	1.31 UK	1.31 UK[a]
		2,3,4,6,7,8-HxCDF	0.847 UK	0.847 UK[a]
		1,2,3,7,8,9-HxCDF	0.287 UK	0.287 UK[a]
		Total TCDD	0.124 UK	0.124 UK[a]
		Total PeCDD	6.50 UK	6.50 UK[a]
		Total HxCDD	34.2 K	34.2 K[a]
		Total TCDF	1.65 K	1.65 UK
		Total PeCDF	10.3 K	10.3 UK
		Total HxCDF	41.3 K	41.3 K[a]
	HA-33-COMP-S-2-3	2,3,7,8-TCDD	0.171 UK	0.171 UK[a]
		1,2,3,7,8-PeCDF	0.399 UK	0.399 UK[a]
		1,2,3,7,8,9-HxCDF	0.436 UK	0.436 UK[a]
		Total TCDD	0.171 UK	0.171 UK[a]
		Total PeCDD	4.87 JK	4.87 UJK
		Total TCDF	1.53 K	1.53 UK
		Total PeCDF	9.59 K	9.59 UK
		Total HxCDF	38.2 K	38.2 K[a]
	HA-34-COMP-S-2-3	2,3,7,8-TCDF	0.162 UK	0.162 UK[a]
		Total PeCDD	6.16 JK	6.16 JK[a]
		Total HxCDD	83.2 K	83.2 K[a]
		Total TCDF	1.29 JK	1.29 UJK
		Total PeCDF	20.5 K	20.5 K[a]

Notes
K = result is an estimated maximum potential concentration.
pg/g = picograms per gram.
UJK = result is non-detect, an estimated value, and an estimated maximum potential concentration.
UK = result is non-detect and an estimated maximum potential concentration.
[a]Laboratory qualification accepted by the reviewer.

Sample Conditions

Sample Custody

Sample custody was appropriately documented on the chain-of-custody forms accompanying the reports.

Holding Times

According to follow-up report A5C1334, the EPA Method 8000D percent dry weight analysis for all samples was performed outside the method-recommended holding time. Percent dry weight results are used for dry weight correction only and qualification by the reviewer was not required.

The remaining extractions and analyses were performed within the recommended holding times.

Preservation and Sample Storage

According to 2503187, all samples for EPA Method 8290A analysis were received in clear jars with no foil around the outside of the jars. Samples for EPA Method 8290A analysis should be protected from light. The reviewer confirmed with the MFA field sampler that tinted jars were requested from the laboratory during project setup but were not provided, and that the samples were kept inside covered containers and protected from light in the field when not actively being sampled. Since samples were protected from light, qualification by the reviewer was not necessary.

According to follow-up report A5C1334, some sample containers were not provided by Apex and not verified under Apex' quality system. The reviewer confirmed that sample containers were from an accredited laboratory. Qualification by the reviewer was not required.

The samples were preserved and stored appropriately.

Reporting Limits

Apex evaluated results to MRLs. Enthalpy reported EPA Method 8290A non-detect 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 MDLs and MRLs.

Enthalpy qualified results between the MDL and the MRL with J, as estimated.

Blank Results

Method Blanks

Laboratory method blanks are used to evaluate whether laboratory contamination was introduced during sample preparation and analysis. Laboratory method blank analyses were performed at the required frequencies, in accordance with laboratory- and method-specific requirements.

In report 2503187, the EPA Method 8290A batch B25C335 laboratory method blank had an OCDD detection below the estimated detection limit and flagged as an EMPC, at a concentration of 0.282 picograms per gram (pg/g). The reviewer confirmed with the laboratory that the result was reported as a detection below the estimated detection limit since the result met signal-to-noise ratio and retention time requirements. All associated sample results were detected without EMPCs flags at concentrations greater than five times the laboratory method blank concentration; thus, qualification by the reviewer was not required.

In report 2504171, the EPA Method 1613B batch B25D266 laboratory method blank had a total HpCDD detection below the MRL, at a concentration of 0.192 pg/g. All associated total HpCDD sample results were greater than five times the blank concentration and thus did not require qualification. Additionally, the laboratory method blank had total PeCDD, total TCDF, and total PeCDF detections flagged as EMPCs, at concentrations of 2.71 pg/g, 0.230 pg/g, and 0.379 pg/g, respectively. All associated sample results were also qualified as EMPCs and qualification based on EMPCs takes precedence; see General Qualifications section above.

All remaining laboratory method blank results were non-detect to MDLs or MRLs.

Equipment Rinsate Blanks

Equipment rinsate blanks are used to evaluate the adequacy of the field equipment decontamination process when decontaminated sampling equipment is used to collect samples.

These blanks were not required for this sampling event, as all samples were collected using dedicated or single-use equipment.

Laboratory Control Sample and Laboratory Control Sample Duplicate Results

Laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) results are used to evaluate laboratory precision and accuracy. No LCSD were reported; all LCS were prepared and analyzed at the required frequency, in accordance with laboratory- and method-specific requirements. Enthalpy reported the LCS as an "ongoing precision and recovery" sample, in accordance with EPA Method 8290A.

All LCS results were within acceptance limits for percent.

Laboratory Duplicate Results

Laboratory duplicate results are used to evaluate laboratory precision and sample homogeneity. The EPA Method 6020B laboratory duplicates were prepared and analyzed at the required frequency. No other laboratory duplicates were reported, in accordance with laboratory- and method-specific requirements.

Laboratory duplicate results greater than five times the MRL were evaluated using laboratory and relative percent difference control limits. A secondary criterion was used when laboratory duplicate results were non-detect or less than five times the MRL. Results meet the secondary criterion if the absolute difference of the laboratory duplicate sample result and the parent sample result, or the MRL for non-detects, is equal to or less than the MRL value of the parent sample.

In cases where the laboratory had prepared laboratory duplicates with samples from unrelated projects, laboratory duplicate RPD control limit exceedances did not require qualification because these sample matrices were not representative of project sample matrices.

All remaining 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 target analyte recovery. The EPA Method 6020B MSs were prepared and analyzed at the required frequency. No other MS or MSD were reported, in accordance with laboratory- and method-specific requirements.

The EPA Method 602B MS results were within acceptance limits for percent recovery.

Labeled Analog Recovery Results

In report 2503187, EPA Method 8290A samples and associated batch quality control samples were spiked with carbon-13 labeled standards and a chlorine-37 labeled cleanup recovery standard to quantify the relative response of analytes in each sample.

All labeled standard recoveries were within acceptance limits.

Field Duplicate Results

Field duplicate results are used to evaluate field precision and sample homogeneity. No field duplicate samples were submitted for analysis.

Data Package

The data package was reviewed for transcription errors, omissions, and anomalies.

Report 2503187 was revised by Enthalpy on April 29, 2025, to show MRLs on the report.

No other issues were found.

References

Apex. 2023. *Quality Systems Manual.* Rev. 11. Apex Laboratories, LLC: Tigard, OR. June 20.

Enthalpy. 2023. *Quality Manual*. Rev. 33. Enthalpy Analytical LLC: El Dorado Hills, CA. February 20.

EPA. 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* EPA publication SW-846. 3rd ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), VI phase III (2019), VII phase I (2019), and VII phase II (2020).

EPA. 2014. *R10 Data Validation and Review Guidelines for Polychlorinated Dibenzo-p-dioxin and Polychlorinated Dibenzofuran Data (PCDD/PCDF) using Method 1613B and SW846 Method 8290A.* EPA-910-R-14-003. U.S. Environmental Protection Agency, Office of Environmental Assessment. May.

EPA. 2020a. *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.

EPA. 2020b. *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.