Technical Memorandum

To:	Katie Daugherty, RG	Date:	August 22, 2024
From:	Carolyn Wise, RG Tim Browning, RG	Project No.:	M8012.01.001
Re:	Residential Yard May 2023 Sampling Permapost Products, Inc. Hillsboro, Oregon ECSI #148		

Maul Foster & Alongi, Inc. (MFA) and Permapost Products, Inc. (Permapost) have prepared this memorandum to summarize the results of the May 2023 supplemental soil sampling at Properties 1, 2, and 3 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 vertical extent of dioxin/furan (D/F) and arsenic concentrations at depth for Properties 1, 2, and 3 of AOI-5.

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).

In October 2022, concentrations of dioxins/furans and arsenic were identified in shallow soil in the residentials yards (AOI-5) (see Table) (MFA 2022). In May 2023, additional data were collected from the residential yards to support the design of an interim remedial action measure, consistent with the sampling approach described in *Revised Yard Pre-Design Investigation Work Plan* (MFA 2023).

The following objectives were identified for this investigation (MFA 2023):

- Further delineation of the extent of D/F and arsenic concentrations in soil within the study area.
- Confirm the transport mechanism and spatial distribution of D/F and arsenic concentrations to support the preliminary conceptual site model.
- Collection of data that will be of sufficient quality and quantity to screen against applicable RBCs and background concentrations.
- Collection of data that will inform development of an interim remedial action measure.
- Gather additional data evaluating the presence of dioxins/furans and arsenic in soil in residential areas with residential zoning to the south of the Permapost Property to inform interim remedial action measure.
- Collect data that will be of sufficient quality and quantity to screen against applicable DEQ risk-based concentrations (RBCs) and inform cleanup planning.

- Characterization of topsoil source material for use in interim remedial action measures.[1]

Sampling Approach

Property 1

Additional sampling was performed to further characterize dioxins/furans and arsenic at Property 1.

Back Yard

Within the northern portion (back yard) of Property 1, two three-point composite soil samples were collected from 1 to 2 feet below ground surface (bgs) and 2 to 3 feet bgs to characterize the vertical extent of arsenic and D/F concentrations (HA-22-COMP-1-2 and HA-22-COMP-2-3, respectively).

Mid Yard

Within the middle portion (mid yard) of Property 1, ISM surface sampling (DU1-B) was performed to characterize arsenic and D/F concentrations. Two three-point composite soil samples were also collected from 1 to 2 feet bgs and 2 to 3 feet bgs to characterize the vertical extent of arsenic and/or D/F concentrations in subsurface soil (HA-23-COMP-1-2 and HA-23-COMP-2-3, respectively).

Front Yard

Within the southern portion (front yard) of Property 1, ISM surface sampling (DU1-A) was performed to characterize D/F and arsenic concentrations. Two three-point composite soil samples will also be collected from 1 to 2 feet bgs and 2 to 3 feet bgs to characterize the vertical extent of arsenic and/or D/F concentrations in subsurface soil (HA-24-COMP-1-2 and HA-24-COMP-2-3, respectively).

Property 2

Additional sampling was performed to further characterize the extent of dioxins/furans at Property 2. Arsenic was not detected above the natural background value within DU-2; therefore, no additional investigation for arsenic within DU-2 of Property 2 was conducted.

Back Yard

Within the northern portion (back yard) of Property 2, two three-point composite soil samples were be collected from 1 to 2 feet bgs and 2 to 3 feet bgs to characterize the vertical extent of D/F concentrations (HA-25-COMP-1-2 and HA-25-COMP-2-3, respectively).

Mid Yard

Within the middle portion (mid yard) of Property 2, ISM surface sampling (DU2-B) was performed to characterize D/F concentrations in shallow soil. Two three-point composite soil samples were collected from 1 to 2 feet bgs and 2 to 3 feet bgs to characterize the vertical extent of D/F concentrations (HA-26-COMP-1-2 and HA-26-COMP-2-3, respectively).

Front Yard

Within the southern portion (front yard) of Property 2, ISM surface sampling (DU2-A) was performed to characterize D/F concentrations in shallow soil. Two three-point composite soil samples will also be collected from 1 to 2 feet bgs and 2 to 3 feet bgs to characterize the vertical extent of D/F concentrations (HA-27-COMP-1-2 and HA-27-COMP-2-3). The three-point composite samples provide

[1] This objective was completed in the *Topsoil Source Evaluation and Proposed Residential Preliminary Remediation Goal for Dioxins/Furans* memorandum (MFA 2023).

a more representative estimate of subsurface conditions than the previously collected discrete sample HA-20.

Property 3

Prior data collected (ISM sample DU-03) will inform remedial decision making for surface soil (0 to 1 feet bgs) for all of Property 3. Additional subsurface sampling was performed to further characterize the vertical extent of D/F and arsenic concentrations.

Back Yard and Mid Yard

Within the northern portion (back yard and mid yard) of Property 3, two three-point composite soil samples were collected from 1 to 2 feet bgs and 2 to 3 feet bgs to characterize the vertical extent of D/F and (HA-28-COMP-1-2 and HA-28-COMP-2-3, respectively).

Front Yard

Within the southern portion (front yard) of Property 3, two three-point composite soil samples were collected from 1 to 2 feet bgs and 2 to 3 feet bgs to characterize the vertical extent in subsurface soil (HA-29-COMP-1-2 and HA-29-COMP-2-3, respectively). The three-point composite sample provides a more representative estimate of subsurface conditions than the previously collected discrete sample HA-21.

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

Property 1

Back Yard

Arsenic and D/F concentrations from subsurface soil collected at 1-2 feet bgs and 2-3 feet bgs (HA-22-COMP-1-2 and HA-22-COMP-2-3, respectively), exceed the regional background value for arsenic and the site-specific PRG for D/F.

Within property 1 DU-05 portion, prior data collected (ISM sample DU-05) will inform remedial decision making for surface soil (0 to 1 feet bgs). At location HA-16 (within DU-05), results exceed the regional background value for arsenic and the site-specific PRG for D/F in the 2-to-3 feet bgs depth interval.

Mid Yard

Arsenic and D/F concentrations from ISM surface sampling (DU1-B), are below regional background for arsenic and exceed the site-specific PRG for D/F.

Therefore, D/F concentrations were analyzed from the two three-point composite soil samples collected from 1 to 2 feet bgs and 2 to 3 feet bgs to characterize the vertical extent of D/F concentrations in subsurface soil (HA-23-COMP-1-2 and HA-23-COMP-2-3, respectively). D/F concentrations exceed the site-specific PRG for D/F at 1-2 and 2-3 feet bgs.

Front-Yard

Arsenic and D/F concentrations from ISM surface sampling (DU1-A), are below regional background for arsenic and exceed the site-specific PRG for D/F.

Therefore, D/F concentrations were analyzed from the two three-point composite soil samples collected from 1 to 2 feet bgs and 2 to 3 feet bgs to characterize the vertical extent of D/F concentrations in subsurface soil (HA-24-COMP-1-2 and HA-24-COMP-2-3, respectively). D/F concentrations exceed the site-specific PRG for D/F at 1-2 feet bgs and below the site-specific PRG at 2-3 feet bgs.

Property 2

Back Yard

D/F concentrations from subsurface soil collected in the 1-2 feet bgs and 2-3 feet bgs depth intervals (HA-25-COMP-1-2 and HA-25-COMP-2-3, respectively), are below the site-specific PRG for D/F.

Within the Property 2 DU-05 portion, prior data collected (ISM sample DU-05) will inform remedial decision making for surface soil (0 to 1 feet bgs). At location HA-17 (within DU-05), results do not exceed the site-specific PRG for D/F in the 1 to 2 feet bgs depth interval.

Mid Yard

The D/F concentration from ISM surface sampling (DU2-B) exceeds the site-specific PRG for D/F.

Therefore, D/F concentrations were analyzed from the two three-point composite soil samples collected from 1 to 2 feet bgs and 2 to 3 feet bgs to characterize the vertical extent of D/F concentrations in subsurface soil (HA-26-COMP-1-2 and HA-26-COMP-2-3, respectively). D/F concentrations are below the site-specific PRG for D/F at 1-2 feet bgs and exceed the site-specific PRG for D/F at 2-3 feet bgs.

Front Yard

The D/F concentration from ISM surface sampling (DU2-A), is above the site-specific PRG for D/F.

Therefore, D/F concentrations were analyzed from the two three-point composite soil samples collected from 1 to 2 feet bgs and 2 to 3 feet bgs to characterize the vertical extent of D/F concentrations in subsurface soil (HA-27-COMP-1-2 and HA-27-COMP-2-3, respectively). D/F concentrations exceed the site-specific PRG for D/F at 1-2 feet bgs and are below the site-specific PRG for D/F at 2-3 feet bgs.

Property 3

Back and Mid Yard

Arsenic and D/F concentrations from subsurface soil collected at the 2-3 feet bgs depth interval (HA-28-COMP-2-3), exceed the regional background value for arsenic and the site-specific PRG for D/F.

Due to the high concentrations observed in shallow soil within this Property, the 1–2-foot depth interval sample was not analyzed.

Within the Property 3 DU-05 portion, prior data collected (ISM sample DU-05) will inform remedial decision making for surface soil (0 to 1 feet bgs). At location HA-18 (within DU-05), results indicate that dioxins/furans and arsenic exceed the regional background value for arsenic and the site-specific PRG for D/F in the 2-to-3 feet bgs depth interval.

Front Yard

Arsenic and D/F concentrations from subsurface soil collected at 2-3 feet bgs depth interval (HA-29-COMP-2-3), exceed the regional background value for arsenic and the site-specific PRG for D/F. Due to the high concentrations observed in shallow soil within this Property, the 1–2-foot depth interval sample was not analyzed.

Conclusions

All arsenic and D/F concentrations of soil up to 3 feet bgs were below the applicable excavation worker criteria (420 mg/kg and 4,800 pg/g, respectively). Therefore, further investigation of the vertical extent of these chemicals (e.g., deeper than 3 feet bgs) is not needed in Properties 1, 2, or 3 of AOI-5.

Based on the results of this sampling event, data was obtained in AOI-5 to inform development of interim remedial action measures and inform cleanup planning. Additional data were obtained for Property 1 which were reported as part of the Interim Remedial Action Measures Work Plan (MFA, 2024).

Attachments

References

Limitations

Figures

Table

A—Analytical Laboratory Reports

B—Data Validation Memorandum

References

MFA. 2022. *Yard Investigation Work Plan, Permapost Products, Inc., Hillsboro, Oregon, ECSI #148*. Prepared by Maul Foster & Alongi, Inc. Portland, Oregon. July 7.

MFA. 2023a. Phil Wiescher, PhD and Carolyn Wise, RG, Maul Foster & Alongi, Inc. *Revised Yard Pre-Design Investigation Work Plan, Permapost Products, Inc., Hillsboro, Oregon, ECSI #148*. Memorandum to Katie Daugherty, RG, Oregon Department of Environmental Quality. April 11.

MFA. 2023b. 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. 2024. *Interim Remedial Action Measures Work Plan, Permapost Products, Inc., Hillsboro, Oregon, ECSI #148*. Prepared by Maul Foster & Alongi, Inc. Portland, Oregon. August 9.

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 1
AOI-5 Sample Locations

Permapost Products, Inc.
Hillsboro, OR

Legend

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

Notes
Sampling locations shown through October 2023.
AOI = area of interest.
Permapost = Permapost Products, Inc.

0 40
Feet

Data Sources
Aerial photograph obtained from the City of Portland (2023); tax lot data obtained from Oregon Metro (2024).

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

Path: X:\8012.01\Projects\Permapost_YardSampling\WP\Pro\M8012_01_001_Oct_2023_Sampling.aprx\Fig 1 AOI-5 Sample Locs Oct 2023
Print Date: 8/22/2024
Reviewed By: cwise
Produced By: bmurphy
Project: M8012.01.001

Table

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

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

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

Decision Unit:	Screening Criteria	DU-01 (cont.)	DU-02							
Sample Name:		HA-24-COMP-2-3	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	HA-26-COMP-2-3
Sample Date:		05/11/2023	10/05/2022	10/05/2022	05/09/2023	05/09/2023	05/11/2023	05/11/2023	05/11/2023	05/11/2023
Sample Depth (ft bgs):		2.0-3.0	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	2.0-3.0
Total Metals (mg/kg)										
Arsenic	8.8[a][1]	--	7.99	--	--	--	--	--	--	--
Dioxins and Furans (pg/g)										
Dioxin and Furan TEQ[b][2]	11.8[c][3]	2.90 J	28.6 J	9.8 J	71.7 J	80.2 J	7.60 J	3.96 J	6.30 J	18.4 J

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

Decision Unit:	Screening Criteria	DU-02 (cont.)		DU-03						
Sample Name:		HA-27-COMP-1-2	HA-27-COMP-2-3	DU03A-S-0.5	DU03B-S-0.5	DU03C-S-0.5	HA21-S-2.0	HA21-S-3.0	HA-28-Comp-2-3	HA-29-Comp-2-3
Sample Date:		05/11/2023	05/11/2023	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):		1.0-2.0	2.0-3.0	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]	26.7 J	7.90 J	395 J	359 J	370	26.1 J	73.3 J	53.1 J	29.2 J

Table
Summary of Soil Analytical Results
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

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

Notes

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

-- = not analyzed.

ft bgs = feet below ground surface.

J = result is estimated.

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

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

mg/kg = milligrams per kilogram.

NV = no value.

pg/g = picograms per gram.

TEQ = toxicity equivalency.

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

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

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

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

[a]Oregon background concentration, Portland Basin.

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

[c]Preliminary remediation goal.

References

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

[2]Van den Berg et al. 2006. "The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds." *Toxicological Sciences.* 93(2): 223–241.

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

Attachment A

Analytical Laboratory Reports

MAUL FOSTER ALONGI

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

ANALYTICAL REPORT

Monday, October 2, 2023

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

RE: A3E1301 - 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 A3E1301, which was received by the laboratory on 5/11/2023 at 5:30:00PM.

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 5.6 degC	Cooler #2 3.3 degC

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

Apex Laboratories

Philip Nerenberg, 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	A3E1301 - 10 02 23 1044

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
HA-28-Comp-2-3	A3E1301-02	Soil	05/11/23 10:35	05/11/23 17:30
HA-27-Comp-1-2	A3E1301-03	Soil	05/11/23 11:50	05/11/23 17:30
HA-27-Comp-2-3	A3E1301-04	Soil	05/11/23 11:55	05/11/23 17:30
HA-26-Comp-1-2	A3E1301-05	Soil	05/11/23 12:20	05/11/23 17:30
HA-26-Comp-2-3	A3E1301-06	Soil	05/11/23 12:25	05/11/23 17:30
HA-25-Comp-1-2	A3E1301-07	Soil	05/11/23 12:40	05/11/23 17:30
HA-25-Comp-2-3	A3E1301-08	Soil	05/11/23 12:45	05/11/23 17:30
HA-24-Comp-1-2	A3E1301-09	Soil	05/11/23 13:40	05/11/23 17:30
HA-24-Comp-2-3	A3E1301-10	Soil	05/11/23 13:45	05/11/23 17:30
HA-29-Comp-2-3	A3E1301-12	Soil	05/11/23 11:25	05/11/23 17:30
HA-23-Comp-1-2	A3E1301-13	Soil	05/11/23 14:20	05/11/23 17:30
HA-23-Comp-2-3	A3E1301-14	Soil	05/11/23 14:25	05/11/23 17:30
HA-22-Comp-1-2	A3E1301-15	Soil	05/11/23 14:50	05/11/23 17:30
HA-22-Comp-2-3	A3E1301-16	Soil	05/11/23 14:55	05/11/23 17:30
DU1-A	A3E1301-17	Soil	05/09/23 13:30	05/11/23 17:30
DU1-A	A3E1301-18	Soil	05/09/23 13:30	05/11/23 17:30
DU1-B	A3E1301-19	Soil	05/09/23 14:00	05/11/23 17:30
DU1-B	A3E1301-20	Soil	05/09/23 14:00	05/11/23 17:30
DU2-A	A3E1301-21	Soil	05/09/23 12:30	05/11/23 17:30
DU2-A	A3E1301-22	Soil	05/09/23 12:30	05/11/23 17:30
DU2-B	A3E1301-23	Soil	05/09/23 13:00	05/11/23 17:30
DU2-B	A3E1301-24	Soil	05/09/23 13:00	05/11/23 17:30

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	A3E1301 - 10 02 23 1044

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
HA-28-Comp-2-3 (A3E1301-02)				**Matrix: Soil**				
Batch: 23E0752								
Arsenic	**16.4**	0.641	1.28	mg/kg dry	10	05/17/23 20:12	EPA 6020B	
HA-29-Comp-2-3 (A3E1301-12)				**Matrix: Soil**				
Batch: 23E0752								
Arsenic	**9.96**	0.623	1.25	mg/kg dry	10	05/17/23 20:18	EPA 6020B	
HA-22-Comp-1-2 (A3E1301-15)				**Matrix: Soil**				
Batch: 23E0752								
Arsenic	**9.25**	0.596	1.19	mg/kg dry	10	05/17/23 20:40	EPA 6020B	
HA-22-Comp-2-3 (A3E1301-16)				**Matrix: Soil**				
Batch: 23H0221								
Arsenic	**12.2**	0.536	1.07	mg/kg wet	10	08/07/23 19:37	EPA 6020B	
DU1-A (A3E1301-18)				**Matrix: Soil**				
Batch: 23E0752								
Arsenic	**6.21**	0.537	1.07	mg/kg dry	10	05/17/23 20:46	EPA 6020B	**PRO**
DU1-B (A3E1301-20)				**Matrix: Soil**				
Batch: 23E0752								
Arsenic	**7.75**	0.515	1.03	mg/kg dry	10	05/17/23 20:51	EPA 6020B	**PRO**

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	A3E1301 - 10 02 23 1044

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
HA-28-Comp-2-3 (A3E1301-02)				**Matrix: Soil**		**Batch: 23E0553**		
% Solids	**76.5**	---	1.00	%	1	05/15/23 05:52	EPA 8000D	
HA-29-Comp-2-3 (A3E1301-12)				**Matrix: Soil**		**Batch: 23E0553**		
% Solids	**77.5**	---	1.00	%	1	05/15/23 05:52	EPA 8000D	
HA-22-Comp-1-2 (A3E1301-15)				**Matrix: Soil**		**Batch: 23E0553**		
% Solids	**83.8**	---	1.00	%	1	05/15/23 05:52	EPA 8000D	
DU1-A (A3E1301-18)				**Matrix: Soil**		**Batch: 23E0746**		**PRO**
% Solids	**98.4**	---	1.00	%	1	05/18/23 05:33	EPA 8000D	
DU1-B (A3E1301-20)				**Matrix: Soil**		**Batch: 23E0746**		**PRO**
% Solids	**98.5**	---	1.00	%	1	05/18/23 05:33	EPA 8000D	

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Philip Nerenberg, Lab Director

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Portland, OR 97232	Project Manager: **Phil Wiescher**	**A3E1301 - 10 02 23 1044**

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 23E0752 - EPA 3051A							**Soil**					
Blank (23E0752-BLK1)			Prepared: 05/17/23 10:03		Analyzed: 05/17/23 19:33							
EPA 6020B												
Arsenic	ND	0.250	0.500	mg/kg wet	5	---	---	---	---	---	---	
LCS (23E0752-BS1)			Prepared: 05/17/23 10:03		Analyzed: 05/17/23 19:45							
EPA 6020B												
Arsenic	49.8	0.500	1.00	mg/kg wet	10	50.0	---	100	80-120%	---	---	
Duplicate (23E0752-DUP1)			Prepared: 05/17/23 10:03		Analyzed: 05/17/23 19:56							
QC Source Sample: Non-SDG (A3E1276-01)												
Arsenic	**3.94**	0.701	1.40	mg/kg dry	10	---	4.12	---	---	5	20%	
Matrix Spike (23E0752-MS1)			Prepared: 05/17/23 10:03		Analyzed: 05/17/23 20:01							
QC Source Sample: Non-SDG (A3E1276-01)												
EPA 6020B												
Arsenic	75.8	0.743	1.49	mg/kg dry	10	74.3	4.12	96	75-125%	---	---	
Batch 23H0221 - EPA 3051A							**Soil**					
Blank (23H0221-BLK1)			Prepared: 08/07/23 10:36		Analyzed: 08/07/23 19:27							
EPA 6020B												
Arsenic	ND	0.500	1.00	mg/kg wet	10	---	---	---	---	---	---	
LCS (23H0221-BS1)			Prepared: 08/07/23 10:36		Analyzed: 08/07/23 19:32							
EPA 6020B												
Arsenic	49.8	0.500	1.00	mg/kg wet	10	50.0	---	100	80-120%	---	---	
Duplicate (23H0221-DUP1)			Prepared: 08/07/23 10:36		Analyzed: 08/07/23 20:08							
QC Source Sample: Non-SDG (A3H0697-01)												
Arsenic	**1.71**	0.629	1.26	mg/kg dry	10	---	1.51	---	---	12	20%	
Matrix Spike (23H0221-MS1)			Prepared: 08/07/23 10:36		Analyzed: 08/07/23 20:23							
QC Source Sample: Non-SDG (A3H0697-01)												
EPA 6020B												

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Portland, OR 97232	Project Manager: **Phil Wiescher**	**A3E1301 - 10 02 23 1044**

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 23H0221 - EPA 3051A							**Soil**					
Matrix Spike (23H0221-MS1)			Prepared: 08/07/23 10:36		Analyzed: 08/07/23 20:23							
QC Source Sample: Non-SDG (A3H0697-01)												
Arsenic	68.5	0.682	1.36	mg/kg dry	10	68.2	1.51	98	75-125%	---	---	
Matrix Spike Dup (23H0221-MSD1)			Prepared: 08/07/23 10:36		Analyzed: 08/07/23 20:28							
QC Source Sample: Non-SDG (A3H0697-01)												
Arsenic	65.5	0.650	1.30	mg/kg dry	10	65.0	1.51	98	75-125%	5	20%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23E0553 - Total Solids (Dry Weight) - 2022							Soil					
Duplicate (23E0553-DUP1)			Prepared: 05/12/23 08:47		Analyzed: 05/15/23 05:52							
QC Source Sample: Non-SDG (A3E1268-01)												
% Solids	**66.2**	---	1.00	%	1	---	66.1	---	---	0.1	10%	
Duplicate (23E0553-DUP2)			Prepared: 05/12/23 08:47		Analyzed: 05/15/23 05:52							
QC Source Sample: Non-SDG (A3E1271-01)												
% Solids	**89.4**	---	1.00	%	1	---	88.6	---	---	1	10%	
Duplicate (23E0553-DUP3)			Prepared: 05/12/23 08:47		Analyzed: 05/15/23 05:52							
QC Source Sample: Non-SDG (A3E1271-02)												
% Solids	**87.4**	---	1.00	%	1	---	88.9	---	---	2	10%	
Duplicate (23E0553-DUP4)			Prepared: 05/12/23 19:14		Analyzed: 05/15/23 05:52							
QC Source Sample: Non-SDG (A3E1346-01)												
% Solids	**87.1**	---	1.00	%	1	---	87.5	---	---	0.4	10%	
Duplicate (23E0553-DUP5)			Prepared: 05/12/23 19:14		Analyzed: 05/15/23 05:52							
QC Source Sample: Non-SDG (A3E1350-01)												
% Solids	**89.6**	---	1.00	%	1	---	97.7	---	---	9	10%	
Duplicate (23E0553-DUP6)			Prepared: 05/12/23 19:14		Analyzed: 05/15/23 05:52							
QC Source Sample: Non-SDG (A3E1354-04)												
% Solids	**88.9**	---	1.00	%	1	---	88.8	---	---	0.1	10%	

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

Apex Laboratories

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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 23E0746 - Total Solids (Dry Weight) - 2022							Soil					
Duplicate (23E0746-DUP1)			Prepared: 05/17/23 09:49		Analyzed: 05/18/23 05:33							PRO
QC Source Sample: DU1-A (A3E1301-18)												
EPA 8000D												
% Solids	**98.4**	---	1.00	%	1	---	98.4	---	---	0.06	10%	
Duplicate (23E0746-DUP2)			Prepared: 05/17/23 19:47		Analyzed: 05/18/23 05:33							
QC Source Sample: Non-SDG (A3E1484-01)												
% Solids	**86.7**	---	1.00	%	1	---	87.5	---	---	0.9	10%	
Duplicate (23E0746-DUP3)			Prepared: 05/17/23 19:47		Analyzed: 05/18/23 05:33							
QC Source Sample: Non-SDG (A3E1491-02)												
% Solids	**74.7**	---	1.00	%	1	---	74.5	---	---	0.4	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: 23E0752							
A3E1301-02	Soil	EPA 6020B	05/11/23 10:35	05/17/23 10:03	0.51g/50mL	0.5g/50mL	0.98
A3E1301-12	Soil	EPA 6020B	05/11/23 11:25	05/17/23 10:03	0.518g/50mL	0.5g/50mL	0.97
A3E1301-15	Soil	EPA 6020B	05/11/23 14:50	05/17/23 10:03	0.501g/50mL	0.5g/50mL	1.00
A3E1301-18	Soil	EPA 6020B	05/09/23 13:30	05/17/23 10:03	0.473g/50mL	0.5g/50mL	1.06
A3E1301-20	Soil	EPA 6020B	05/09/23 14:00	05/17/23 10:03	0.493g/50mL	0.5g/50mL	1.01
Batch: 23H0221							
A3E1301-16	Soil	EPA 6020B	05/11/23 14:55	08/07/23 10:36	0.466g/50mL	0.5g/50mL	1.07

Percent Dry Weight

Prep: Total Solids (Dry Weight) - 2022

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 23E0553							
A3E1301-02	Soil	EPA 8000D	05/11/23 10:35	05/12/23 08:47			NA
A3E1301-12	Soil	EPA 8000D	05/11/23 11:25	05/12/23 08:47			NA
A3E1301-15	Soil	EPA 8000D	05/11/23 14:50	05/12/23 08:47			NA
Batch: 23E0746							
A3E1301-18	Soil	EPA 8000D	05/09/23 13:30	05/17/23 09:49			NA
A3E1301-20	Soil	EPA 8000D	05/09/23 14:00	05/17/23 09:49			NA

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QUALIFIER DEFINITIONS

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

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

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

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

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

NR Result Not Reported

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

Detection Limits: Limit of Detection (LOD)

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

Reporting Limits: Limit of Quantitation (LOQ)

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

Reporting Conventions:

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

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

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

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

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

QC Source:

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

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

Miscellaneous Notes:

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

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

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REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).

-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.

-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

-Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

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

Soil and Sediment Samples:

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

Sampling and Preservation Notes:

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

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

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

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

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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.

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Philip Nerenberg

Philip Nerenberg, Lab Director

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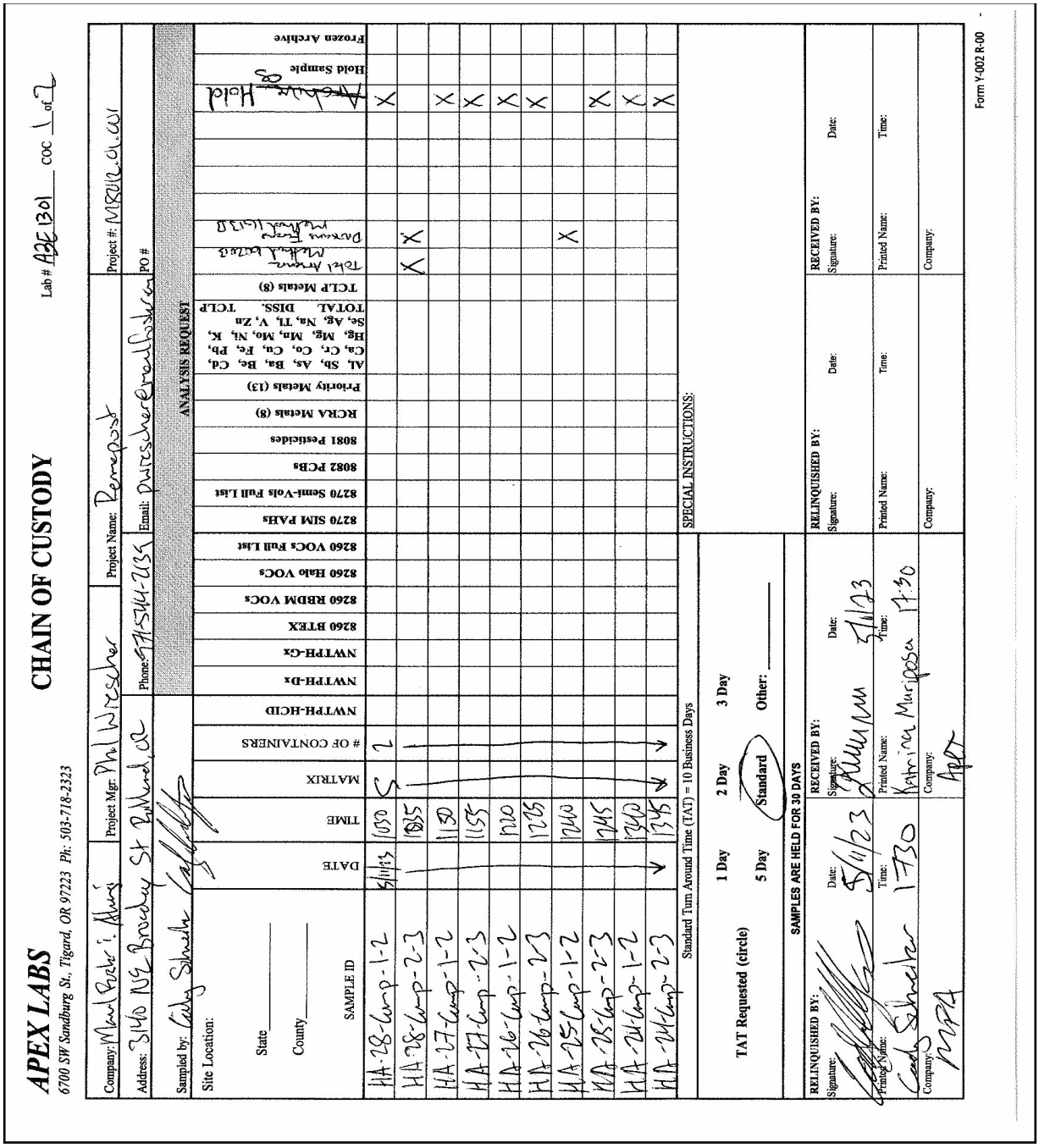

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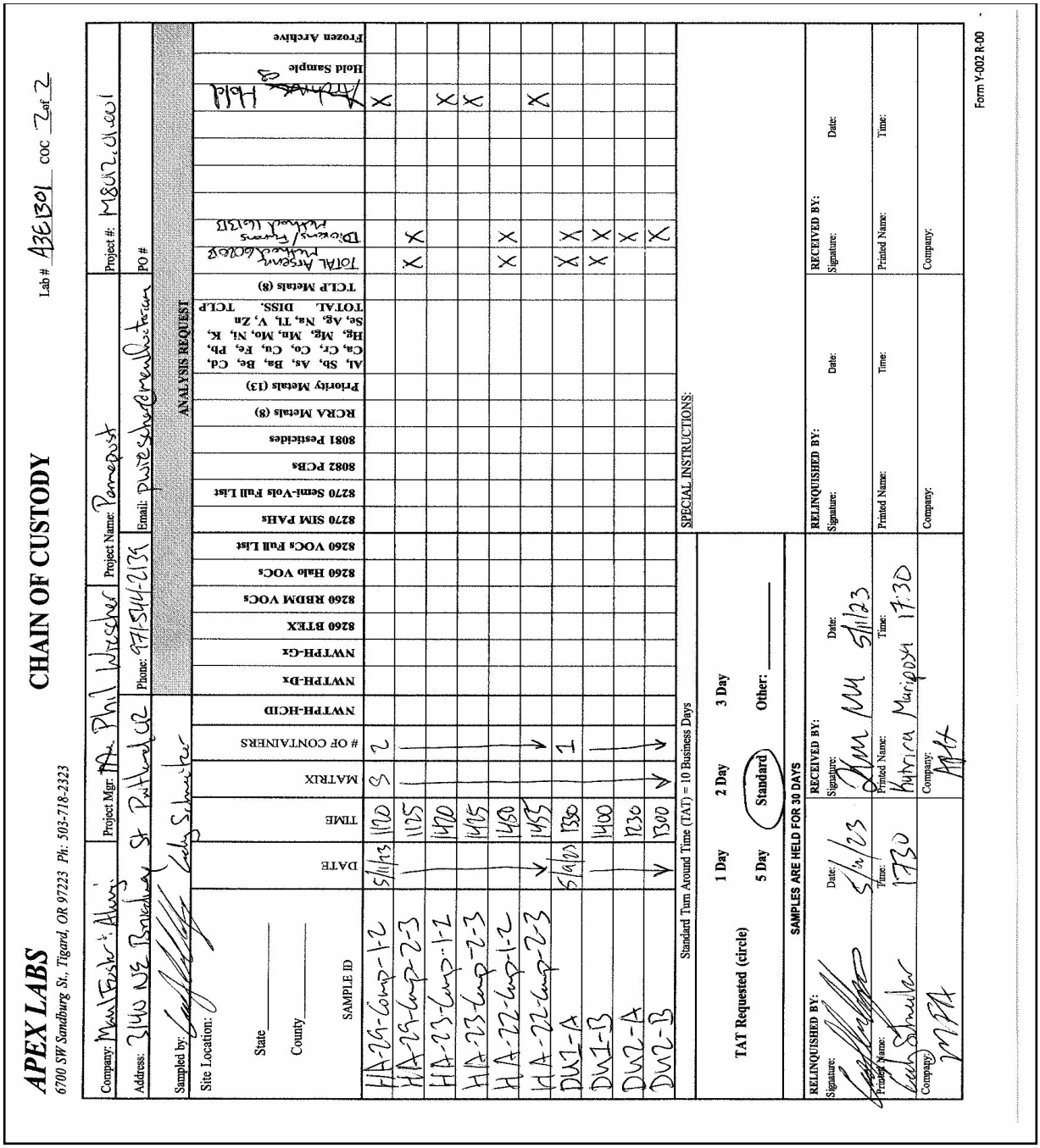

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APEX LABS COOLER RECEIPT FORM

Client: Maul Foster & Alongi Element WO#: A3E1301

Project/Project #: ~~Permapost~~ M8012.01.001 Permapost A3E1301123

Delivery Info:

Date/time received: 5/1/23 @ 17:30 By: RAM

Delivered by: Apex__Client X ESS__FedEx__UPS__Radio__Morgan__SDS__Evergreen__Other__

Cooler Inspection Date/time inspected: 5/1/23 @ 17:30 By: RAM

Chain of Custody included? Yes X No ____

Signed/dated by client? Yes X No ____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	5.6	3.3					
Custody seals? (Y/N)	N	N					
Received on ice? (Y/N)	Y	Y					
Temp. blanks? (Y/N)	N	N					
Ice type: (Gel/Real/Other)	Real	Real					
Condition (In/Out):	In	In					

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

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

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

Sample Inspection: Date/time inspected: 5/1/23 @ 17:54 By: RAM

All samples intact? Yes X No ___ Comments: ____

Bottle labels/COCs agree? Yes ___ No X Comments: HA-22-Comp-2-3 Coc time reads 1450

COC/container discrepancies form initiated? Yes ___ No X

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

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

Comments ____

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

Comments: ____

Additional information: ____

Labeled by: RAM Witness: RAM Cooler Inspected by: RAM

Form Y-003 R-00 -

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Philip Nerenberg

Philip Nerenberg, Lab Director

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July 05, 2023

Enthalpy Analytical - El Dorado Hills
Work Order No. 2305185

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 May 18, 2023 under your Project Name 'A3E1301'.

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,

tor

Kathy Zipp
Project Manager

Enthalpy Analytical - EDH Work Order No. 2305185
Case Narrative

Sample Condition on Receipt:

Eight soil samples were received and stored securely in accordance with Enthalpy Analytical - EDH standard operating procedures and EPA methodology. The samples were received in good condition and within the method temperature requirements. Samples were received in the clear jars. As directed, analysis of the samples were performed.

Analytical Notes:

EPA Method 8290A

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

Holding Times

The method holding time criteria were met for these samples.

Quality Control

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

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

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

TABLE OF CONTENTS

Sample Inventory Report

Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2305185-01	HA-28-Comp-2-3	11-May-23 10:35	18-May-23 09:00	Clear Glass Jar, 120mL
2305185-02	HA-25-Comp-1-2	11-May-23 12:40	18-May-23 09:00	Clear Glass Jar, 120mL
2305185-03	HA-29-Comp-2-3	11-May-23 11:25	18-May-23 09:00	Clear Glass Jar, 120mL
2305185-04	HA-22-Comp-1-2	11-May-23 14:50	18-May-23 09:00	Clear Glass Jar, 120mL
2305185-05	DU1-A	09-May-23 13:30	18-May-23 09:00	Clear Glass Jar, 120mL
2305185-06	DU1-B	09-May-23 14:00	18-May-23 09:00	Clear Glass Jar, 120mL
2305185-07	DU2-A	09-May-23 12:30	18-May-23 09:00	Clear Glass Jar, 120mL
2305185-08	DU2-B	09-May-23 13:00	18-May-23 09:00	Clear Glass Jar, 120mL

ANALYTICAL RESULTS

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

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Solid

Laboratory Data
Lab Sample: B23E292-BLK1
QC Batch: B23E292 Date Extracted: 30-May-23
Sample Size: 10.0 g Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.0804	0.273			27-Jun-23 18:41	1
1,2,3,7,8-PeCDD	ND	0.135	0.608			27-Jun-23 18:41	1
1,2,3,4,7,8-HxCDD	ND	0.154	0.710			27-Jun-23 18:41	1
1,2,3,6,7,8-HxCDD	ND	0.159	0.668			27-Jun-23 18:41	1
1,2,3,7,8,9-HxCDD	ND	0.230	0.694			27-Jun-23 18:41	1
1,2,3,4,6,7,8-HpCDD	ND	0.169	0.655			27-Jun-23 18:41	1
OCDD	ND	0.311	1.85			27-Jun-23 18:41	1
2,3,7,8-TCDF	ND	0.0861	0.256			27-Jun-23 18:41	1
1,2,3,7,8-PeCDF	ND	0.101	0.724			27-Jun-23 18:41	1
2,3,4,7,8-PeCDF	ND	0.0761	0.736			27-Jun-23 18:41	1
1,2,3,4,7,8-HxCDF	ND	0.0840	0.764			27-Jun-23 18:41	1
1,2,3,6,7,8-HxCDF	ND	0.0882	0.924			27-Jun-23 18:41	1
2,3,4,6,7,8-HxCDF	ND	0.0967	0.765			27-Jun-23 18:41	1
1,2,3,7,8,9-HxCDF	ND	0.129	0.737			27-Jun-23 18:41	1
1,2,3,4,6,7,8-HpCDF	ND	0.107	0.889			27-Jun-23 18:41	1
1,2,3,4,7,8,9-HpCDF	ND	0.130	0.765			27-Jun-23 18:41	1
OCDF	ND	0.236	1.51			27-Jun-23 18:41	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	0.00						
Totals							
Total TCDD	ND	0.0804					
Total PeCDD	ND	0.135					
Total HxCDD	ND	0.230					
Total HpCDD	ND	0.169					
Total TCDF	ND	0.0861					
Total PeCDF	ND	0.101					
Total HxCDF	ND	0.129					
Total HpCDF	ND	0.130					

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	99.4	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,7,8-PeCDD	IS	87.2	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,4,7,8-HxCDD	IS	85.2	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,6,7,8-HxCDD	IS	88.7	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,7,8,9-HxCDD	IS	70.0	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,4,6,7,8-HpCDD	IS	84.5	40 - 135		27-Jun-23 18:41	1
13C-OCDD	IS	79.6	40 - 135		27-Jun-23 18:41	1
13C-2,3,7,8-TCDF	IS	82.7	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,7,8-PeCDF	IS	85.4	40 - 135		27-Jun-23 18:41	1
13C-2,3,4,7,8-PeCDF	IS	92.9	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,4,7,8-HxCDF	IS	76.9	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,6,7,8-HxCDF	IS	83.2	40 - 135		27-Jun-23 18:41	1
13C-2,3,4,6,7,8-HxCDF	IS	80.8	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,7,8,9-HxCDF	IS	82.1	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,4,6,7,8-HpCDF	IS	65.5	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,4,7,8,9-HpCDF	IS	82.7	40 - 135		27-Jun-23 18:41	1
13C-OCDF	IS	70.5	40 - 135		27-Jun-23 18:41	1
37Cl-2,3,7,8-TCDD	CRS	98.8	40 - 135		27-Jun-23 18:41	1

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

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

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

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Solid

Laboratory Data
Lab Sample: B23E292-BS1
QC Batch: B23E292 Date Extracted: 30-May-23 07:45
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	18.6	20.0	92.9	70-130		27-Jun-23 15:38	1
1,2,3,7,8-PeCDD	108	100	108	70-130		27-Jun-23 15:38	1
1,2,3,4,7,8-HxCDD	97.9	100	97.9	70-130		27-Jun-23 15:38	1
1,2,3,6,7,8-HxCDD	98.4	100	98.4	70-130		27-Jun-23 15:38	1
1,2,3,7,8,9-HxCDD	98.9	100	98.9	70-130		27-Jun-23 15:38	1
1,2,3,4,6,7,8-HpCDD	104	100	104	70-130		27-Jun-23 15:38	1
OCDD	196	200	97.8	70-130		27-Jun-23 15:38	1
2,3,7,8-TCDF	19.7	20.0	98.7	70-130		27-Jun-23 15:38	1
1,2,3,7,8-PeCDF	96.6	100	96.6	70-130		27-Jun-23 15:38	1
2,3,4,7,8-PeCDF	104	100	104	70-130		27-Jun-23 15:38	1
1,2,3,4,7,8-HxCDF	102	100	102	70-130		27-Jun-23 15:38	1
1,2,3,6,7,8-HxCDF	105	100	105	70-130		27-Jun-23 15:38	1
2,3,4,6,7,8-HxCDF	103	100	103	70-130		27-Jun-23 15:38	1
1,2,3,7,8,9-HxCDF	97.4	100	97.4	70-130		27-Jun-23 15:38	1
1,2,3,4,6,7,8-HpCDF	104	100	104	70-130		27-Jun-23 15:38	1
1,2,3,4,7,8,9-HpCDF	103	100	103	70-130		27-Jun-23 15:38	1
OCDF	202	200	101	70-130		27-Jun-23 15:38	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	94.6	40-135		27-Jun-23 15:38	1
13C-1,2,3,7,8-PeCDD	IS	89.9	40-135		27-Jun-23 15:38	1
13C-1,2,3,4,7,8-HxCDD	IS	92.3	40-135		27-Jun-23 15:38	1
13C-1,2,3,6,7,8-HxCDD	IS	96.2	40-135		27-Jun-23 15:38	1
13C-1,2,3,7,8,9-HxCDD	IS	83.1	40-135		27-Jun-23 15:38	1
13C-1,2,3,4,6,7,8-HpCDD	IS	89.0	40-135		27-Jun-23 15:38	1
13C-OCDD	IS	81.0	40-135		27-Jun-23 15:38	1
13C-2,3,7,8-TCDF	IS	87.0	40-135		27-Jun-23 15:38	1
13C-1,2,3,7,8-PeCDF	IS	99.8	40-135		27-Jun-23 15:38	1
13C-2,3,4,7,8-PeCDF	IS	96.1	40-135		27-Jun-23 15:38	1
13C-1,2,3,4,7,8-HxCDF	IS	81.6	40-135		27-Jun-23 15:38	1
13C-1,2,3,6,7,8-HxCDF	IS	86.7	40-135		27-Jun-23 15:38	1
13C-2,3,4,6,7,8-HxCDF	IS	84.6	40-135		27-Jun-23 15:38	1
13C-1,2,3,7,8,9-HxCDF	IS	87.7	40-135		27-Jun-23 15:38	1
13C-1,2,3,4,6,7,8-HpCDF	IS	74.4	40-135		27-Jun-23 15:38	1
13C-1,2,3,4,7,8,9-HpCDF	IS	80.8	40-135		27-Jun-23 15:38	1
13C-OCDF	IS	71.3	40-135		27-Jun-23 15:38	1
37Cl-2,3,7,8-TCDD	CRS	93.5	40-135		27-Jun-23 15:38	1

Sample ID: HA-28-Comp-2-3 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 10:35

Laboratory Data
Lab Sample: 2305185-01
QC Batch: B23E292
Sample Size: 13.6 g
% Solids: 74.9
Date Received: 18-May-23 09:00
Date Extracted: 30-May-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.269	0.160		28-Jun-23 00:02	1
1,2,3,7,8-PeCDD	3.82		0.599			28-Jun-23 00:02	1
1,2,3,4,7,8-HxCDD	12.8		0.699			28-Jun-23 00:02	1
1,2,3,6,7,8-HxCDD	69.0		0.658			28-Jun-23 00:02	1
1,2,3,7,8,9-HxCDD	27.9		0.684			28-Jun-23 00:02	1
1,2,3,4,6,7,8-HpCDD	2300		0.645			28-Jun-23 00:02	1
OCDD	19900		9.11		D	29-Jun-23 03:04	5
2,3,7,8-TCDF	ND		0.252	0.349		28-Jun-23 00:02	1
1,2,3,7,8-PeCDF	1.93		0.713		J	28-Jun-23 00:02	1
2,3,4,7,8-PeCDF	3.57		0.725			28-Jun-23 00:02	1
1,2,3,4,7,8-HxCDF	13.7		0.752			28-Jun-23 00:02	1
1,2,3,6,7,8-HxCDF	12.8		0.910			28-Jun-23 00:02	1
2,3,4,6,7,8-HxCDF	8.37		0.753			28-Jun-23 00:02	1
1,2,3,7,8,9-HxCDF	2.01		0.726		J	28-Jun-23 00:02	1
1,2,3,4,6,7,8-HpCDF	383		0.876			28-Jun-23 00:02	1
1,2,3,4,7,8,9-HpCDF	25.7		0.753			28-Jun-23 00:02	1
OCDF	996		1.49			28-Jun-23 00:02	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	53.0						
Totals							
Total TCDD	ND			0.160			
Total PeCDD	10.8			11.5			
Total HxCDD	259						
Total HpCDD	3680						
Total TCDF	3.06			3.87			
Total PeCDF	64.6						
Total HxCDF	408						
Total HpCDF	1260						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	100	40 - 135		28-Jun-23 00:02	1
13C-1,2,3,7,8-PeCDD	IS	94.0	40 - 135		28-Jun-23 00:02	1
13C-1,2,3,4,7,8-HxCDD	IS	89.9	40 - 135		28-Jun-23 00:02	1
13C-1,2,3,6,7,8-HxCDD	IS	88.8	40 - 135		28-Jun-23 00:02	1
13C-1,2,3,7,8,9-HxCDD	IS	81.7	40 - 135		28-Jun-23 00:02	1
13C-1,2,3,4,6,7,8-HpCDD	IS	92.3	40 - 135		28-Jun-23 00:02	1
13C-OCDD	IS	90.7	40 - 135	D	29-Jun-23 03:04	5
13C-2,3,7,8-TCDF	IS	87.1	40 - 135		28-Jun-23 00:02	1
13C-1,2,3,7,8-PeCDF	IS	96.6	40 - 135		28-Jun-23 00:02	1
13C-2,3,4,7,8-PeCDF	IS	100	40 - 135		28-Jun-23 00:02	1
13C-1,2,3,4,7,8-HxCDF	IS	79.2	40 - 135		28-Jun-23 00:02	1
13C-1,2,3,6,7,8-HxCDF	IS	82.9	40 - 135		28-Jun-23 00:02	1
13C-2,3,4,6,7,8-HxCDF	IS	80.3	40 - 135		28-Jun-23 00:02	1
13C-1,2,3,7,8,9-HxCDF	IS	81.0	40 - 135		28-Jun-23 00:02	1
13C-1,2,3,4,6,7,8-HpCDF	IS	70.5	40 - 135		28-Jun-23 00:02	1
13C-1,2,3,4,7,8,9-HpCDF	IS	83.9	40 - 135		28-Jun-23 00:02	1
13C-OCDF	IS	81.3	40 - 135		28-Jun-23 00:02	1
37Cl-2,3,7,8-TCDD	CRS	102	40 - 135		28-Jun-23 00:02	1

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

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

Sample ID: HA-25-Comp-1-2 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 12:40

Laboratory Data
Lab Sample: 2305185-02
QC Batch: B23E292
Sample Size: 12.9 g
% Solids: 79.4
Date Received: 18-May-23 09:00
Date Extracted: 30-May-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.267	0.179		28-Jun-23 00:48	1
1,2,3,7,8-PeCDD	ND		0.594	1.41		28-Jun-23 00:48	1
1,2,3,4,7,8-HxCDD	2.30		0.694		J	28-Jun-23 00:48	1
1,2,3,6,7,8-HxCDD	11.1		0.653			28-Jun-23 00:48	1
1,2,3,7,8,9-HxCDD	5.06		0.679			28-Jun-23 00:48	1
1,2,3,4,6,7,8-HpCDD	298		0.640			28-Jun-23 00:48	1
OCDD	2180		1.81			28-Jun-23 00:48	1
2,3,7,8-TCDF	ND	0.141	0.250			28-Jun-23 00:48	1
1,2,3,7,8-PeCDF	0.478		0.708		J	28-Jun-23 00:48	1
2,3,4,7,8-PeCDF	0.703		0.720		J	28-Jun-23 00:48	1
1,2,3,4,7,8-HxCDF	2.14		0.747		J	28-Jun-23 00:48	1
1,2,3,6,7,8-HxCDF	2.35		0.903		J	28-Jun-23 00:48	1
2,3,4,6,7,8-HxCDF	0.866		0.748		J	28-Jun-23 00:48	1
1,2,3,7,8,9-HxCDF	ND	0.402	0.721			28-Jun-23 00:48	1
1,2,3,4,6,7,8-HpCDF	47.3		0.869			28-Jun-23 00:48	1
1,2,3,4,7,8,9-HpCDF	3.28		0.748			28-Jun-23 00:48	1
OCDF	107		1.48			28-Jun-23 00:48	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	6.78						
Totals							
Total TCDD	ND			0.179			
Total PeCDD	1.17			2.58			
Total HxCDD	44.9						
Total HpCDD	489						
Total TCDF	ND			1.02			
Total PeCDF	11.3			11.8			
Total HxCDF	58.8			59.3			
Total HpCDF	137						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	95.3	40 - 135		28-Jun-23 00:48	1
13C-1,2,3,7,8-PeCDD	IS	93.3	40 - 135		28-Jun-23 00:48	1
13C-1,2,3,4,7,8-HxCDD	IS	88.9	40 - 135		28-Jun-23 00:48	1
13C-1,2,3,6,7,8-HxCDD	IS	89.1	40 - 135		28-Jun-23 00:48	1
13C-1,2,3,7,8,9-HxCDD	IS	83.8	40 - 135		28-Jun-23 00:48	1
13C-1,2,3,4,6,7,8-HpCDD	IS	86.7	40 - 135		28-Jun-23 00:48	1
13C-OCDD	IS	83.4	40 - 135		28-Jun-23 00:48	1
13C-2,3,7,8-TCDF	IS	82.8	40 - 135		28-Jun-23 00:48	1
13C-1,2,3,7,8-PeCDF	IS	95.5	40 - 135		28-Jun-23 00:48	1
13C-2,3,4,7,8-PeCDF	IS	93.8	40 - 135		28-Jun-23 00:48	1
13C-1,2,3,4,7,8-HxCDF	IS	79.6	40 - 135		28-Jun-23 00:48	1
13C-1,2,3,6,7,8-HxCDF	IS	81.9	40 - 135		28-Jun-23 00:48	1
13C-2,3,4,6,7,8-HxCDF	IS	82.3	40 - 135		28-Jun-23 00:48	1
13C-1,2,3,7,8,9-HxCDF	IS	84.1	40 - 135		28-Jun-23 00:48	1
13C-1,2,3,4,6,7,8-HpCDF	IS	77.0	40 - 135		28-Jun-23 00:48	1
13C-1,2,3,4,7,8,9-HpCDF	IS	80.1	40 - 135		28-Jun-23 00:48	1
13C-OCDF	IS	72.7	40 - 135		28-Jun-23 00:48	1
37Cl-2,3,7,8-TCDD	CRS	95.7	40 - 135		28-Jun-23 00:48	1

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

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

Sample ID: HA-29-Comp-2-3 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 11:25

Laboratory Data
Lab Sample: 2305185-03
QC Batch: B23E292
Sample Size: 13.8 g
% Solids: 75.9
Date Received: 18-May-23 09:00
Date Extracted: 30-May-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.101	0.261			28-Jun-23 04:00	1
1,2,3,7,8-PeCDD	2.28		0.581		J	28-Jun-23 04:00	1
1,2,3,4,7,8-HxCDD	6.39		6.79		D, J	30-Jun-23 01:32	10
1,2,3,6,7,8-HxCDD	39.1		6.38		D	30-Jun-23 01:32	10
1,2,3,7,8,9-HxCDD	11.5		6.63		D, J	30-Jun-23 01:32	10
1,2,3,4,6,7,8-HpCDD	1230		6.26		D	30-Jun-23 01:32	10
OCDD	10900		17.7		D	30-Jun-23 01:32	10
2,3,7,8-TCDF	0.187		0.245		J	28-Jun-23 04:00	1
1,2,3,7,8-PeCDF	0.883		0.692		J	28-Jun-23 04:00	1
2,3,4,7,8-PeCDF	1.49		0.703		J	28-Jun-23 04:00	1
1,2,3,4,7,8-HxCDF	7.91		7.30		D, J	30-Jun-23 01:32	10
1,2,3,6,7,8-HxCDF	7.23		8.83		D, J	30-Jun-23 01:32	10
2,3,4,6,7,8-HxCDF	12.4		7.31		D, J	30-Jun-23 01:32	10
1,2,3,7,8,9-HxCDF	ND	4.00	7.04		D	30-Jun-23 01:32	10
1,2,3,4,6,7,8-HpCDF	187		8.50		D	30-Jun-23 01:32	10
1,2,3,4,7,8,9-HpCDF	15.3		7.31		D, J	30-Jun-23 01:32	10
OCDF	535		14.4		D	30-Jun-23 01:32	10
Toxic Equivalent							
TEQMinWHO2005Dioxin	29.0						
Totals							
Total TCDD	ND	0.101					
Total PeCDD	4.52			5.21			
Total HxCDD	160						
Total HpCDD	1990						
Total TCDF	0.705			1.29			
Total PeCDF	33.4			33.7			
Total HxCDF	240						
Total HpCDF	652						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	97.2	40 - 135		28-Jun-23 04:00	1
13C-1,2,3,7,8-PeCDD	IS	73.2	40 - 135		28-Jun-23 04:00	1
13C-1,2,3,4,7,8-HxCDD	IS	68.1	40 - 135	D	30-Jun-23 01:32	10
13C-1,2,3,6,7,8-HxCDD	IS	87.7	40 - 135	D	30-Jun-23 01:32	10
13C-1,2,3,7,8,9-HxCDD	IS	52.8	40 - 135	D	30-Jun-23 01:32	10
13C-1,2,3,4,6,7,8-HpCDD	IS	91.7	40 - 135	D	30-Jun-23 01:32	10
13C-OCDD	IS	70.4	40 - 135	D	30-Jun-23 01:32	10
13C-2,3,7,8-TCDF	IS	83.3	40 - 135		28-Jun-23 04:00	1
13C-1,2,3,7,8-PeCDF	IS	99.7	40 - 135		28-Jun-23 04:00	1
13C-2,3,4,7,8-PeCDF	IS	62.5	40 - 135		28-Jun-23 04:00	1
13C-1,2,3,4,7,8-HxCDF	IS	82.7	40 - 135	D	30-Jun-23 01:32	10
13C-1,2,3,6,7,8-HxCDF	IS	87.5	40 - 135	D	30-Jun-23 01:32	10
13C-2,3,4,6,7,8-HxCDF	IS	59.5	40 - 135	D	30-Jun-23 01:32	10
13C-1,2,3,7,8,9-HxCDF	IS	72.2	40 - 135	D	30-Jun-23 01:32	10
13C-1,2,3,4,6,7,8-HpCDF	IS	85.8	40 - 135	D	30-Jun-23 01:32	10
13C-1,2,3,4,7,8,9-HpCDF	IS	80.3	40 - 135	D	30-Jun-23 01:32	10
13C-OCDF	IS	67.9	40 - 135	D	30-Jun-23 01:32	10
37Cl-2,3,7,8-TCDD	CRS	98.6	40 - 135		28-Jun-23 04:00	1

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

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

Sample ID: HA-22-Comp-1-2 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 14:50

Laboratory Data
Lab Sample: 2305185-04
QC Batch: B23E292
Sample Size: 12.4 g
% Solids: 81.8
Date Received: 18-May-23 09:00
Date Extracted: 30-May-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.269	0.106		28-Jun-23 04:45	1
1,2,3,7,8-PeCDD	2.56		0.598			28-Jun-23 04:45	1
1,2,3,4,7,8-HxCDD	5.71		0.699			28-Jun-23 04:45	1
1,2,3,6,7,8-HxCDD	33.8		0.657			28-Jun-23 04:45	1
1,2,3,7,8,9-HxCDD	13.7		0.683			28-Jun-23 04:45	1
1,2,3,4,6,7,8-HpCDD	814		0.645			28-Jun-23 04:45	1
OCDD	4980		1.82			28-Jun-23 04:45	1
2,3,7,8-TCDF	ND		0.252	0.391		28-Jun-23 04:45	1
1,2,3,7,8-PeCDF	1.53		0.712		J	28-Jun-23 04:45	1
2,3,4,7,8-PeCDF	2.81		0.724			28-Jun-23 04:45	1
1,2,3,4,7,8-HxCDF	5.92		0.752			28-Jun-23 04:45	1
1,2,3,6,7,8-HxCDF	6.33		0.909			28-Jun-23 04:45	1
2,3,4,6,7,8-HxCDF	2.49		0.753			28-Jun-23 04:45	1
1,2,3,7,8,9-HxCDF	0.514		0.725		J	28-Jun-23 04:45	1
1,2,3,4,6,7,8-HpCDF	120		0.875			28-Jun-23 04:45	1
1,2,3,4,7,8,9-HpCDF	8.55		0.753			28-Jun-23 04:45	1
OCDF	268		1.49			28-Jun-23 04:45	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	21.3						
Totals							
Total TCDD	0.386			0.492			
Total PeCDD	6.23			7.39			
Total HxCDD	119						
Total HpCDD	1300						
Total TCDF	2.07			3.05			
Total PeCDF	44.8			45.0			
Total HxCDF	192			193			
Total HpCDF	353						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	106	40 - 135		28-Jun-23 04:45	1
13C-1,2,3,7,8-PeCDD	IS	89.8	40 - 135		28-Jun-23 04:45	1
13C-1,2,3,4,7,8-HxCDD	IS	83.9	40 - 135		28-Jun-23 04:45	1
13C-1,2,3,6,7,8-HxCDD	IS	81.5	40 - 135		28-Jun-23 04:45	1
13C-1,2,3,7,8,9-HxCDD	IS	98.1	40 - 135		28-Jun-23 04:45	1
13C-1,2,3,4,6,7,8-HpCDD	IS	87.4	40 - 135		28-Jun-23 04:45	1
13C-OCDD	IS	87.6	40 - 135		28-Jun-23 04:45	1
13C-2,3,7,8-TCDF	IS	86.6	40 - 135		28-Jun-23 04:45	1
13C-1,2,3,7,8-PeCDF	IS	92.9	40 - 135		28-Jun-23 04:45	1
13C-2,3,4,7,8-PeCDF	IS	93.0	40 - 135		28-Jun-23 04:45	1
13C-1,2,3,4,7,8-HxCDF	IS	76.3	40 - 135		28-Jun-23 04:45	1
13C-1,2,3,6,7,8-HxCDF	IS	77.6	40 - 135		28-Jun-23 04:45	1
13C-2,3,4,6,7,8-HxCDF	IS	79.1	40 - 135		28-Jun-23 04:45	1
13C-1,2,3,7,8,9-HxCDF	IS	82.1	40 - 135		28-Jun-23 04:45	1
13C-1,2,3,4,6,7,8-HpCDF	IS	86.1	40 - 135		28-Jun-23 04:45	1
13C-1,2,3,4,7,8,9-HpCDF	IS	85.0	40 - 135		28-Jun-23 04:45	1
13C-OCDF	IS	75.5	40 - 135		28-Jun-23 04:45	1
37Cl-2,3,7,8-TCDD	CRS	105	40 - 135		28-Jun-23 04:45	1

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

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

Sample ID: DU1-A **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 09-May-23 13:30

Laboratory Data
Lab Sample: 2305185-05
QC Batch: B23E292
Sample Size: 10.8 g
% Solids: 94.9
Date Received: 18-May-23 09:00
Date Extracted: 30-May-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	1.81		0.266			28-Jun-23 05:31	1
1,2,3,7,8-PeCDD	2.07		0.592		J	28-Jun-23 05:31	1
1,2,3,4,7,8-HxCDD	4.03		0.691			28-Jun-23 05:31	1
1,2,3,6,7,8-HxCDD	19.7		0.650			28-Jun-23 05:31	1
1,2,3,7,8,9-HxCDD	9.40		0.675			28-Jun-23 05:31	1
1,2,3,4,6,7,8-HpCDD	541		0.637			28-Jun-23 05:31	1
OCDD	3780		1.80			28-Jun-23 05:31	1
2,3,7,8-TCDF	ND		0.249	0.318		28-Jun-23 05:31	1
1,2,3,7,8-PeCDF	0.787		0.705		J	28-Jun-23 05:31	1
2,3,4,7,8-PeCDF	1.33		0.716		J	28-Jun-23 05:31	1
1,2,3,4,7,8-HxCDF	4.10		0.743			28-Jun-23 05:31	1
1,2,3,6,7,8-HxCDF	3.16		0.899			28-Jun-23 05:31	1
2,3,4,6,7,8-HxCDF	1.18		0.744		J	28-Jun-23 05:31	1
1,2,3,7,8,9-HxCDF	0.609		0.717		J	28-Jun-23 05:31	1
1,2,3,4,6,7,8-HpCDF	82.7		0.865			28-Jun-23 05:31	1
1,2,3,4,7,8,9-HpCDF	5.22		0.744			28-Jun-23 05:31	1
OCDF	182		1.47			28-Jun-23 05:31	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	16.0						
Totals							
Total TCDD	3.30			3.46			
Total PeCDD	8.01			8.82			
Total HxCDD	83.9						
Total HpCDD	881						
Total TCDF	0.847			2.06			
Total PeCDF	19.4						
Total HxCDF	98.2			98.5			
Total HpCDF	231						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	107	40 - 135		28-Jun-23 05:31	1
13C-1,2,3,7,8-PeCDD	IS	88.4	40 - 135		28-Jun-23 05:31	1
13C-1,2,3,4,7,8-HxCDD	IS	85.5	40 - 135		28-Jun-23 05:31	1
13C-1,2,3,6,7,8-HxCDD	IS	85.4	40 - 135		28-Jun-23 05:31	1
13C-1,2,3,7,8,9-HxCDD	IS	92.0	40 - 135		28-Jun-23 05:31	1
13C-1,2,3,4,6,7,8-HpCDD	IS	93.4	40 - 135		28-Jun-23 05:31	1
13C-OCDD	IS	94.7	40 - 135		28-Jun-23 05:31	1
13C-2,3,7,8-TCDF	IS	84.3	40 - 135		28-Jun-23 05:31	1
13C-1,2,3,7,8-PeCDF	IS	92.5	40 - 135		28-Jun-23 05:31	1
13C-2,3,4,7,8-PeCDF	IS	97.0	40 - 135		28-Jun-23 05:31	1
13C-1,2,3,4,7,8-HxCDF	IS	77.6	40 - 135		28-Jun-23 05:31	1
13C-1,2,3,6,7,8-HxCDF	IS	80.8	40 - 135		28-Jun-23 05:31	1
13C-2,3,4,6,7,8-HxCDF	IS	81.0	40 - 135		28-Jun-23 05:31	1
13C-1,2,3,7,8,9-HxCDF	IS	84.6	40 - 135		28-Jun-23 05:31	1
13C-1,2,3,4,6,7,8-HpCDF	IS	85.3	40 - 135		28-Jun-23 05:31	1
13C-1,2,3,4,7,8,9-HpCDF	IS	90.1	40 - 135		28-Jun-23 05:31	1
13C-OCDF	IS	84.2	40 - 135		28-Jun-23 05:31	1
37Cl-2,3,7,8-TCDD	CRS	105	40 - 135		28-Jun-23 05:31	1

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

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

Sample ID: DU1-B **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 09-May-23 14:00

Laboratory Data
Lab Sample: 2305185-06
QC Batch: B23E292
Sample Size: 10.4 g
% Solids: 95.8
Date Received: 18-May-23 09:00
Date Extracted: 30-May-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	4.04		0.273			28-Jun-23 06:17	1
1,2,3,7,8-PeCDD	2.46		0.608		J	28-Jun-23 06:17	1
1,2,3,4,7,8-HxCDD	6.53		0.710			28-Jun-23 06:17	1
1,2,3,6,7,8-HxCDD	31.7		0.668			28-Jun-23 06:17	1
1,2,3,7,8,9-HxCDD	13.5		0.694			28-Jun-23 06:17	1
1,2,3,4,6,7,8-HpCDD	979		0.655			28-Jun-23 06:17	1
OCDD	6990		9.25		D	29-Jun-23 10:05	5
2,3,7,8-TCDF	0.470		0.256		J	28-Jun-23 06:17	1
1,2,3,7,8-PeCDF	1.16		0.724		J	28-Jun-23 06:17	1
2,3,4,7,8-PeCDF	2.13		0.736		J	28-Jun-23 06:17	1
1,2,3,4,7,8-HxCDF	5.99		0.764			28-Jun-23 06:17	1
1,2,3,6,7,8-HxCDF	5.73		0.924			28-Jun-23 06:17	1
2,3,4,6,7,8-HxCDF	2.98		0.765			28-Jun-23 06:17	1
1,2,3,7,8,9-HxCDF	ND		0.737	0.451		28-Jun-23 06:17	1
1,2,3,4,6,7,8-HpCDF	153		0.889			28-Jun-23 06:17	1
1,2,3,4,7,8,9-HpCDF	8.36		0.765			28-Jun-23 06:17	1
OCDF	310		1.51			28-Jun-23 06:17	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	27.5						
Totals							
Total TCDD	4.74			4.96			
Total PeCDD	9.41			10.2			
Total HxCDD	140						
Total HpCDD	1590						
Total TCDF	2.09			2.54			
Total PeCDF	30.9						
Total HxCDF	170			171			
Total HpCDF	455						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	97.8	40 - 135		28-Jun-23 06:17	1
13C-1,2,3,7,8-PeCDD	IS	88.4	40 - 135		28-Jun-23 06:17	1
13C-1,2,3,4,7,8-HxCDD	IS	84.1	40 - 135		28-Jun-23 06:17	1
13C-1,2,3,6,7,8-HxCDD	IS	85.4	40 - 135		28-Jun-23 06:17	1
13C-1,2,3,7,8,9-HxCDD	IS	72.1	40 - 135		28-Jun-23 06:17	1
13C-1,2,3,4,6,7,8-HpCDD	IS	87.2	40 - 135		28-Jun-23 06:17	1
13C-OCDD	IS	81.6	40 - 135	D	29-Jun-23 10:05	5
13C-2,3,7,8-TCDF	IS	81.7	40 - 135		28-Jun-23 06:17	1
13C-1,2,3,7,8-PeCDF	IS	91.0	40 - 135		28-Jun-23 06:17	1
13C-2,3,4,7,8-PeCDF	IS	95.7	40 - 135		28-Jun-23 06:17	1
13C-1,2,3,4,7,8-HxCDF	IS	73.5	40 - 135		28-Jun-23 06:17	1
13C-1,2,3,6,7,8-HxCDF	IS	75.9	40 - 135		28-Jun-23 06:17	1
13C-2,3,4,6,7,8-HxCDF	IS	78.4	40 - 135		28-Jun-23 06:17	1
13C-1,2,3,7,8,9-HxCDF	IS	80.9	40 - 135		28-Jun-23 06:17	1
13C-1,2,3,4,6,7,8-HpCDF	IS	62.1	40 - 135		28-Jun-23 06:17	1
13C-1,2,3,4,7,8,9-HpCDF	IS	80.0	40 - 135		28-Jun-23 06:17	1
13C-OCDF	IS	78.6	40 - 135		28-Jun-23 06:17	1
37Cl-2,3,7,8-TCDD	CRS	99.3	40 - 135		28-Jun-23 06:17	1

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

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

Sample ID: DU2-A **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 09-May-23 12:30

Laboratory Data
Lab Sample: 2305185-07
QC Batch: B23E292
Sample Size: 10.4 g
% Solids: 95.8
Date Received: 18-May-23 09:00
Date Extracted: 30-May-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	0.760		0.273			28-Jun-23 07:03	1
1,2,3,7,8-PeCDD	6.93		0.608			28-Jun-23 07:03	1
1,2,3,4,7,8-HxCDD	18.6		0.710			28-Jun-23 07:03	1
1,2,3,6,7,8-HxCDD	101		0.668			28-Jun-23 07:03	1
1,2,3,7,8,9-HxCDD	46.3		0.694			28-Jun-23 07:03	1
1,2,3,4,6,7,8-HpCDD	2750		0.655			28-Jun-23 07:03	1
OCDD	21300		9.25		D	29-Jun-23 10:51	5
2,3,7,8-TCDF	1.20		0.256			28-Jun-23 07:03	1
1,2,3,7,8-PeCDF	3.71		0.724			28-Jun-23 07:03	1
2,3,4,7,8-PeCDF	9.20		0.736			28-Jun-23 07:03	1
1,2,3,4,7,8-HxCDF	24.4		0.764			28-Jun-23 07:03	1
1,2,3,6,7,8-HxCDF	17.3		0.924			28-Jun-23 07:03	1
2,3,4,6,7,8-HxCDF	6.85		0.765			28-Jun-23 07:03	1
1,2,3,7,8,9-HxCDF	3.80		0.737			28-Jun-23 07:03	1
1,2,3,4,6,7,8-HpCDF	475		0.889			28-Jun-23 07:03	1
1,2,3,4,7,8,9-HpCDF	27.7		0.765			28-Jun-23 07:03	1
OCDF	1050		1.51			28-Jun-23 07:03	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	71.7						
Totals							
Total TCDD	1.87			2.47			
Total PeCDD	26.8						
Total HxCDD	418						
Total HpCDD	4390						
Total TCDF	25.5			26.3			
Total PeCDF	128			129			
Total HxCDF	580			583			
Total HpCDF	1470						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	99.4	40 - 135		28-Jun-23 07:03	1
13C-1,2,3,7,8-PeCDD	IS	96.7	40 - 135		28-Jun-23 07:03	1
13C-1,2,3,4,7,8-HxCDD	IS	86.5	40 - 135		28-Jun-23 07:03	1
13C-1,2,3,6,7,8-HxCDD	IS	87.1	40 - 135		28-Jun-23 07:03	1
13C-1,2,3,7,8,9-HxCDD	IS	76.8	40 - 135		28-Jun-23 07:03	1
13C-1,2,3,4,6,7,8-HpCDD	IS	94.4	40 - 135		28-Jun-23 07:03	1
13C-OCDD	IS	88.4	40 - 135	D	29-Jun-23 10:51	5
13C-2,3,7,8-TCDF	IS	82.4	40 - 135		28-Jun-23 07:03	1
13C-1,2,3,7,8-PeCDF	IS	97.9	40 - 135		28-Jun-23 07:03	1
13C-2,3,4,7,8-PeCDF	IS	103	40 - 135		28-Jun-23 07:03	1
13C-1,2,3,4,7,8-HxCDF	IS	74.2	40 - 135		28-Jun-23 07:03	1
13C-1,2,3,6,7,8-HxCDF	IS	79.1	40 - 135		28-Jun-23 07:03	1
13C-2,3,4,6,7,8-HxCDF	IS	78.7	40 - 135		28-Jun-23 07:03	1
13C-1,2,3,7,8,9-HxCDF	IS	78.2	40 - 135		28-Jun-23 07:03	1
13C-1,2,3,4,6,7,8-HpCDF	IS	67.0	40 - 135		28-Jun-23 07:03	1
13C-1,2,3,4,7,8,9-HpCDF	IS	80.8	40 - 135		28-Jun-23 07:03	1
13C-OCDF	IS	83.6	40 - 135		28-Jun-23 07:03	1
37Cl-2,3,7,8-TCDD	CRS	103	40 - 135		28-Jun-23 07:03	1

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

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

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

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Solid

Laboratory Data
Lab Sample: B23E292-BLK1
QC Batch: B23E292 Date Extracted: 30-May-23
Sample Size: 10.0 g Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.0804	0.273			27-Jun-23 18:41	1
1,2,3,7,8-PeCDD	ND	0.135	0.608			27-Jun-23 18:41	1
1,2,3,4,7,8-HxCDD	ND	0.154	0.710			27-Jun-23 18:41	1
1,2,3,6,7,8-HxCDD	ND	0.159	0.668			27-Jun-23 18:41	1
1,2,3,7,8,9-HxCDD	ND	0.230	0.694			27-Jun-23 18:41	1
1,2,3,4,6,7,8-HpCDD	ND	0.169	0.655			27-Jun-23 18:41	1
OCDD	ND	0.311	1.85			27-Jun-23 18:41	1
2,3,7,8-TCDF	ND	0.0861	0.256			27-Jun-23 18:41	1
1,2,3,7,8-PeCDF	ND	0.101	0.724			27-Jun-23 18:41	1
2,3,4,7,8-PeCDF	ND	0.0761	0.736			27-Jun-23 18:41	1
1,2,3,4,7,8-HxCDF	ND	0.0840	0.764			27-Jun-23 18:41	1
1,2,3,6,7,8-HxCDF	ND	0.0882	0.924			27-Jun-23 18:41	1
2,3,4,6,7,8-HxCDF	ND	0.0967	0.765			27-Jun-23 18:41	1
1,2,3,7,8,9-HxCDF	ND	0.129	0.737			27-Jun-23 18:41	1
1,2,3,4,6,7,8-HpCDF	ND	0.107	0.889			27-Jun-23 18:41	1
1,2,3,4,7,8,9-HpCDF	ND	0.130	0.765			27-Jun-23 18:41	1
OCDF	ND	0.236	1.51			27-Jun-23 18:41	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	0.00						
Totals							
Total TCDD	ND	0.0804					
Total PeCDD	ND	0.135					
Total HxCDD	ND	0.230					
Total HpCDD	ND	0.169					
Total TCDF	ND	0.0861					
Total PeCDF	ND	0.101					
Total HxCDF	ND	0.129					
Total HpCDF	ND	0.130					

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	99.4	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,7,8-PeCDD	IS	87.2	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,4,7,8-HxCDD	IS	85.2	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,6,7,8-HxCDD	IS	88.7	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,7,8,9-HxCDD	IS	70.0	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,4,6,7,8-HpCDD	IS	84.5	40 - 135		27-Jun-23 18:41	1
13C-OCDD	IS	79.6	40 - 135		27-Jun-23 18:41	1
13C-2,3,7,8-TCDF	IS	82.7	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,7,8-PeCDF	IS	85.4	40 - 135		27-Jun-23 18:41	1
13C-2,3,4,7,8-PeCDF	IS	92.9	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,4,7,8-HxCDF	IS	76.9	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,6,7,8-HxCDF	IS	83.2	40 - 135		27-Jun-23 18:41	1
13C-2,3,4,6,7,8-HxCDF	IS	80.8	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,7,8,9-HxCDF	IS	82.1	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,4,6,7,8-HpCDF	IS	65.5	40 - 135		27-Jun-23 18:41	1
13C-1,2,3,4,7,8,9-HpCDF	IS	82.7	40 - 135		27-Jun-23 18:41	1
13C-OCDF	IS	70.5	40 - 135		27-Jun-23 18:41	1
37Cl-2,3,7,8-TCDD	CRS	98.8	40 - 135		27-Jun-23 18:41	1

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

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

Sample ID: DU2-B **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 09-May-23 13:00

Laboratory Data
Lab Sample: 2305185-08
QC Batch: B23E292
Sample Size: 10.9 g
% Solids: 95.4
Date Received: 18-May-23 09:00
Date Extracted: 30-May-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	1.83		0.262			28-Jun-23 07:49	1
1,2,3,7,8-PeCDD	6.76		0.583			28-Jun-23 07:49	1
1,2,3,4,7,8-HxCDD	19.8		3.41		D	29-Jun-23 01:32	5
1,2,3,6,7,8-HxCDD	117		3.21		D	29-Jun-23 01:32	5
1,2,3,7,8,9-HxCDD	45.8		3.33		D	29-Jun-23 01:32	5
1,2,3,4,6,7,8-HpCDD	3220		3.14		D	29-Jun-23 01:32	5
OCDD	25800		17.8		D	29-Jun-23 02:18	10
2,3,7,8-TCDF	1.25		0.246			28-Jun-23 07:49	1
1,2,3,7,8-PeCDF	3.32		0.695			28-Jun-23 07:49	1
2,3,4,7,8-PeCDF	9.54		0.706			28-Jun-23 07:49	1
1,2,3,4,7,8-HxCDF	20.4		3.67		D	29-Jun-23 01:32	5
1,2,3,6,7,8-HxCDF	16.7		4.43		D	29-Jun-23 01:32	5
2,3,4,6,7,8-HxCDF	9.93		3.67		D, J	29-Jun-23 01:32	5
1,2,3,7,8,9-HxCDF	2.24		3.54		D, J	29-Jun-23 01:32	5
1,2,3,4,6,7,8-HpCDF	472		4.27		D	29-Jun-23 01:32	5
1,2,3,4,7,8,9-HpCDF	29.9		3.67		D	29-Jun-23 01:32	5
OCDF	1310		7.25		D	29-Jun-23 01:32	5
Toxic Equivalent							
TEQMinWHO2005Dioxin	80.2						
Totals							
Total TCDD	4.33			4.83			
Total PeCDD	29.4			30.2			
Total HxCDD	590						
Total HpCDD	5110						
Total TCDF	26.3			31.6			
Total PeCDF	197			198			
Total HxCDF	702			706			
Total HpCDF	1530						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	94.5	40 - 135		28-Jun-23 07:49	1
13C-1,2,3,7,8-PeCDD	IS	74.1	40 - 135		28-Jun-23 07:49	1
13C-1,2,3,4,7,8-HxCDD	IS	49.8	40 - 135	D	29-Jun-23 01:32	5
13C-1,2,3,6,7,8-HxCDD	IS	70.1	40 - 135	D	29-Jun-23 01:32	5
13C-1,2,3,7,8,9-HxCDD	IS	45.5	40 - 135	D	29-Jun-23 01:32	5
13C-1,2,3,4,6,7,8-HpCDD	IS	110	40 - 135	D	29-Jun-23 01:32	5
13C-OCDD	IS	79.7	40 - 135	D	29-Jun-23 02:18	10
13C-2,3,7,8-TCDF	IS	87.6	40 - 135		28-Jun-23 07:49	1
13C-1,2,3,7,8-PeCDF	IS	102	40 - 135		28-Jun-23 07:49	1
13C-2,3,4,7,8-PeCDF	IS	67.5	40 - 135		28-Jun-23 07:49	1
13C-1,2,3,4,7,8-HxCDF	IS	78.4	40 - 135	D	29-Jun-23 01:32	5
13C-1,2,3,6,7,8-HxCDF	IS	85.9	40 - 135	D	29-Jun-23 01:32	5
13C-2,3,4,6,7,8-HxCDF	IS	40.4	40 - 135	D	29-Jun-23 01:32	5
13C-1,2,3,7,8,9-HxCDF	IS	76.6	40 - 135	D	29-Jun-23 01:32	5
13C-1,2,3,4,6,7,8-HpCDF	IS	98.5	40 - 135	D	29-Jun-23 01:32	5
13C-1,2,3,4,7,8,9-HpCDF	IS	95.3	40 - 135	D	29-Jun-23 01:32	5
13C-OCDF	IS	84.9	40 - 135	D	29-Jun-23 01:32	5
37Cl-2,3,7,8-TCDD	CRS	97.4	40 - 135		28-Jun-23 07:49	1

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

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

DATA QUALIFIERS & ABBREVIATIONS

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

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

Enthalpy Analytical - EDH Certifications

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

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

SUBCONTRACT ORDER EST

Apex Laboratories

ARC 5/17/23 **A3E1301** 2305185 4.3°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: -

Sample Name: HA-28-Comp-2-3 **Soil** **Sampled: 05/11/23 10:35** (A3E1301-02)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/10/23 10:35	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: HA-25-Comp-1-2 **Soil** **Sampled: 05/11/23 12:40** (A3E1301-07)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/10/23 12:40	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: HA-29-Comp-2-3 **Soil** **Sampled: 05/11/23 11:25** (A3E1301-12)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/10/23 11:25	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: HA-22-Comp-1-2 **Soil** **Sampled: 05/11/23 14:50** (A3E1301-15)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/10/23 14:50	
Containers Supplied:			
(B)4 oz Glass Jar			

Standard TAT

Released By	Date 5.17.23 5.16.23 DJS	Received By	Date
Fed Ex (Shipper)		Fed Ex (Shipper)	
Released By	Date	Received By Kelia Wadsworth	Date 05/18/23 0900

SUBCONTRACT ORDER EST

Apex Laboratories

A3E1301

2305185

Sample Name: DU1-A | **Soil** | **After Processing** **Sampled: 05/09/23 13:30** | (A3E1301-18)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/08/23 13:30	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: DU1-B | **Soil** | **After Processing** **Sampled: 05/09/23 14:00** | (A3E1301-20)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/08/23 14:00	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: DU2-A | **Soil** | **After Processing** **Sampled: 05/09/23 12:30** | (A3E1301-22)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/08/23 12:30	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: DU2-B | **Soil** | **After Processing** **Sampled: 05/09/23 13:00** | (A3E1301-24)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/08/23 13:00	
Containers Supplied:			
(B)4 oz Glass Jar			

Standard TAT

Released By	Date	Received By	Date
	5.17.23	Fed Ex (Shipper)	
Fed Ex (Shipper)	DJS	Kelia Wadsworth	05/18/23 0900
Released By	Date	Received By	Date

Sample Log-In Checklist

ENTHALPY ANALYTICAL

Work Order #: 2305185 **TAT** 43

Samples Arrival:	**Date/Time** 05/18/23 0900		**Initials:** KW		**Location:** WR-2 **Shelf/Rack:** NA		
Delivered By:	(FedEx)	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	(Ice)		Blue Ice		Techni Ice	Dry Ice	None
Temp °C: 5.7 (uncorrected) / **Temp °C:** 4.3 (corrected)			**Probe used: Y / (N)**			**Thermometer ID:** IR-4	

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?		✓	✓
Airbill ← Trk # 7721 7689 5122	✓		
Shipping Documentation Present?	✓		
Shipping Container: Enthalpy / (Client) / Retain / (Return)		Dispose	
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 14:20 05/18/23	**Initials:** BAC	**Location:** WR-2 **Shelf/Rack:** D-5
COC Anomaly/Sample Acceptance Form completed?	✓		

Comments:

CoC/Label Reconciliation Report WO# 2305185

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container		BaseMatrix	Sample Comments
2305185-01	A HA-28-Comp-2-3	☑	A3E1301-02	11-May-23 10:35	☑	Clear Glass Jar, 120mL	(A)	Solid	
2305185-02	A HA-25-Comp-1-2	☑	A3E1301-07	11-May-23 12:40	☑	Clear Glass Jar, 120mL		Solid	
2305185-03	A HA-29-Comp-2-3	☑	A3E1301-12	11-May-23 11:25	☑	Clear Glass Jar, 120mL		Solid	
2305185-04	A HA-22-Comp-1-2	☑	A3E1301-15	11-May-23 14:50	☑	Clear Glass Jar, 120mL		Solid	
2305185-05	A DU1-A	☑	A3E1301-18	09-May-23 13:30	☑	Clear Glass Jar, 120mL		Solid	
2305185-06	A DU1-B	☑	A3E1301-20	09-May-23 14:00	☑	Clear Glass Jar, 120mL		Solid	
2305185-07	A DU2-A	☑	A3E1301-22	09-May-23 12:30	☑	Clear Glass Jar, 120mL		Solid	
2305185-08	A DU2-B	☑	A3E1301-24	09-May-23 13:00	☑	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.

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

Preservation Documented: Na2S2O3 Trizma NH4CH3CO2 None (All) Other

Comments: *Reconciled using printed label
(A) No foil present on clear glass jar

Verifed by/Date: KW 05/18/23
BAC 05/18/23

ENTHALPY ANALYTICAL

ANOMALY FORM

Work Order # 2305185

Initial/Date — The following checked issues were noted during sample receipt and login:

- ☐ **1. The samples were received out of temperature at (WI-PHT):** _____
  Was Ice present: Yes No Melted Blue Ice
- ☐ 2. The Chain-of-Custody (CoC) was not relinquished properly.
- ☐ 3. The CoC did not include collection time(s). 00:00 will be used unless notified otherwise.
- ☐ 4. The sample(s) did not include a sample collection time. All or Sample Name: _____
- ☐ 5. A sample ID discrepancy was found. See the Reconciliation report.
  The CoC Sample ID will be used unless notified otherwise.
- ☐ 6. A sample date and/or time discrepancy was found. See the Reconciliation report.
  The CoC Sample date/time will be used unless notified otherwise.
- ☐ **7. The CoC did not include a sample matrix. The following sample matrix will be used:** _____
- ☐ **8. Insufficent volume received for analysis. All or Sample Name:** _____
- ☐ 9. The backup bottle was received broken. Sample Name: _____
- ☐ **10. CoC not received, illegible or destroyed.**
- ☐ **11. The sample(s) were received out of holding time. All or Sample Name:** _____
- ☐ **12. The CoC did not include an analysis. All or Sample Name:** _____
- ☐ **13. Sample(s) received without collection date. All or Sample Name:** _____
- ☐ **14. Sample(s) not received. All or Sample Name:** _____
- ☐ **15. Sample(s) received broken. All or Sample Name:** _____
- BAC 05/18/23 ☑ **16. An incorrect container-type was used. All or Sample Name:** All
- ☐ 17. The Field Reagent Blank (FRB) preservative was from a different lot than the field samples.
  Will proceed with analysis and narrate unless notified otherwise.
- ☐ 18. Other:

Bolded items require sign-off

Client Contacted: Phil Nerenberg

Date of Contact: 05/18/2023

Lab Project Manager: Kathy Zipp

Resolution:
Proceed with analysis.

September 29, 2023

Enthalpy Analytical - El Dorado Hills
Work Order No. 2308007

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 August 01, 2023 under your Project Name 'A3E1301'.

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

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

Sincerely,

Kathy Zipp
Project Manager

Enthalpy Analytical - EDH Work Order No. 2308007
Case Narrative

Sample Condition on Receipt:

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

Analytical Notes:

EPA Method 8290A

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

Holding Times

The method holding time criteria were met for these samples.

Quality Control

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

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

The labeled standard recoveries outside the acceptance criteria are flagged with an "H" qualifier.

TABLE OF CONTENTS

Sample Inventory Report

Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2308007-01	HA-27-Comp-1-2	11-May-23 11:50	01-Aug-23 08:56	Clear Glass Jar, 120mL
2308007-02	HA-27-Comp-2-3	11-May-23 11:55	01-Aug-23 08:56	Clear Glass Jar, 120mL
2308007-03	HA-26-Comp-1-2	11-May-23 12:20	01-Aug-23 08:56	Clear Glass Jar, 120mL
2308007-04	HA-26-Comp-2-3	11-May-23 12:25	01-Aug-23 08:56	Clear Glass Jar, 120mL
2308007-05	HA-25-Comp-2-3	11-May-23 12:45	01-Aug-23 08:56	Clear Glass Jar, 120mL
2308007-06	HA-24-Comp-1-2	11-May-23 13:40	01-Aug-23 08:56	Clear Glass Jar, 120mL
2308007-07	HA-24-Comp-2-3	11-May-23 13:45	01-Aug-23 08:56	Clear Glass Jar, 120mL
2308007-08	HA-23-Comp-1-2	11-May-23 14:20	01-Aug-23 08:56	Clear Glass Jar, 120mL
2308007-09	HA-23-Comp-2-3	11-May-23 14:25	01-Aug-23 08:56	Clear Glass Jar, 120mL
2308007-10	HA-22-Comp-2-3	11-May-23 14:55	01-Aug-23 08:56	Clear Glass Jar, 120mL

ANALYTICAL RESULTS

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

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Solid

Laboratory Data
Lab Sample: B23H246-BLK1
QC Batch: B23H246 Date Extracted: 24-Aug-23
Sample Size: 10.0 g Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.0857	0.190			27-Sep-23 19:22	1
1,2,3,7,8-PeCDD	ND	0.199	0.784			27-Sep-23 19:22	1
1,2,3,4,7,8-HxCDD	ND	0.245	0.633			27-Sep-23 19:22	1
1,2,3,6,7,8-HxCDD	ND	0.264	0.640			27-Sep-23 19:22	1
1,2,3,7,8,9-HxCDD	ND	0.258	0.717			27-Sep-23 19:22	1
1,2,3,4,6,7,8-HpCDD	ND	0.258	0.706			27-Sep-23 19:22	1
OCDD	ND	0.445	1.62			27-Sep-23 19:22	1
2,3,7,8-TCDF	ND	0.115	0.183			27-Sep-23 19:22	1
1,2,3,7,8-PeCDF	ND	0.0961	0.576			27-Sep-23 19:22	1
2,3,4,7,8-PeCDF	ND	0.0907	0.686			27-Sep-23 19:22	1
1,2,3,4,7,8-HxCDF	ND	0.160	0.659			27-Sep-23 19:22	1
1,2,3,6,7,8-HxCDF	ND	0.169	0.621			27-Sep-23 19:22	1
2,3,4,6,7,8-HxCDF	ND	0.189	0.661			27-Sep-23 19:22	1
1,2,3,7,8,9-HxCDF	ND	0.195	0.716			27-Sep-23 19:22	1
1,2,3,4,6,7,8-HpCDF	ND	0.207	0.649			27-Sep-23 19:22	1
1,2,3,4,7,8,9-HpCDF	ND	0.287	0.818			27-Sep-23 19:22	1
OCDF	ND	0.403	3.84			27-Sep-23 19:22	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	0.00						
Totals							
Total TCDD	ND	0.0857					
Total PeCDD	ND	0.199					
Total HxCDD	ND	0.264					
Total HpCDD	ND	0.258					
Total TCDF	ND	0.115					
Total PeCDF	ND	0.0961					
Total HxCDF	ND	0.195					
Total HpCDF	ND	0.287					

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	83.4	40 - 135		27-Sep-23 19:22	1
13C-1,2,3,7,8-PeCDD	IS	92.2	40 - 135		27-Sep-23 19:22	1
13C-1,2,3,4,7,8-HxCDD	IS	105	40 - 135		27-Sep-23 19:22	1
13C-1,2,3,6,7,8-HxCDD	IS	106	40 - 135		27-Sep-23 19:22	1
13C-1,2,3,7,8,9-HxCDD	IS	102	40 - 135		27-Sep-23 19:22	1
13C-1,2,3,4,6,7,8-HpCDD	IS	102	40 - 135		27-Sep-23 19:22	1
13C-OCDD	IS	91.7	40 - 135		27-Sep-23 19:22	1
13C-2,3,7,8-TCDF	IS	86.1	40 - 135		27-Sep-23 19:22	1
13C-1,2,3,7,8-PeCDF	IS	97.4	40 - 135		27-Sep-23 19:22	1
13C-2,3,4,7,8-PeCDF	IS	96.8	40 - 135		27-Sep-23 19:22	1
13C-1,2,3,4,7,8-HxCDF	IS	86.0	40 - 135		27-Sep-23 19:22	1
13C-1,2,3,6,7,8-HxCDF	IS	86.5	40 - 135		27-Sep-23 19:22	1
13C-2,3,4,6,7,8-HxCDF	IS	90.3	40 - 135		27-Sep-23 19:22	1
13C-1,2,3,7,8,9-HxCDF	IS	94.1	40 - 135		27-Sep-23 19:22	1
13C-1,2,3,4,6,7,8-HpCDF	IS	81.6	40 - 135		27-Sep-23 19:22	1
13C-1,2,3,4,7,8,9-HpCDF	IS	85.4	40 - 135		27-Sep-23 19:22	1
13C-OCDF	IS	80.1	40 - 135		27-Sep-23 19:22	1
37Cl-2,3,7,8-TCDD	CRS	78.8	40 - 135		27-Sep-23 19:22	1

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

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

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

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Solid

Laboratory Data
Lab Sample: B23H246-BS1
QC Batch: B23H246 Date Extracted: 24-Aug-23 06:51
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	19.4	20.0	97.0	70-130		27-Sep-23 14:42	1
1,2,3,7,8-PeCDD	103	100	103	70-130		27-Sep-23 14:42	1
1,2,3,4,7,8-HxCDD	97.6	100	97.6	70-130		27-Sep-23 14:42	1
1,2,3,6,7,8-HxCDD	97.0	100	97.0	70-130		27-Sep-23 14:42	1
1,2,3,7,8,9-HxCDD	97.8	100	97.8	70-130		27-Sep-23 14:42	1
1,2,3,4,6,7,8-HpCDD	99.4	100	99.4	70-130		27-Sep-23 14:42	1
OCDD	188	200	93.8	70-130		27-Sep-23 14:42	1
2,3,7,8-TCDF	19.9	20.0	99.6	70-130		27-Sep-23 14:42	1
1,2,3,7,8-PeCDF	95.2	100	95.2	70-130		27-Sep-23 14:42	1
2,3,4,7,8-PeCDF	99.8	100	99.8	70-130		27-Sep-23 14:42	1
1,2,3,4,7,8-HxCDF	101	100	101	70-130		27-Sep-23 14:42	1
1,2,3,6,7,8-HxCDF	101	100	101	70-130		27-Sep-23 14:42	1
2,3,4,6,7,8-HxCDF	100	100	100	70-130		27-Sep-23 14:42	1
1,2,3,7,8,9-HxCDF	101	100	101	70-130		27-Sep-23 14:42	1
1,2,3,4,6,7,8-HpCDF	94.1	100	94.1	70-130		27-Sep-23 14:42	1
1,2,3,4,7,8,9-HpCDF	99.4	100	99.4	70-130		27-Sep-23 14:42	1
OCDF	212	200	106	70-130		27-Sep-23 14:42	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	74.8	40-135		27-Sep-23 14:42	1
13C-1,2,3,7,8-PeCDD	IS	90.0	40-135		27-Sep-23 14:42	1
13C-1,2,3,4,7,8-HxCDD	IS	112	40-135		27-Sep-23 14:42	1
13C-1,2,3,6,7,8-HxCDD	IS	109	40-135		27-Sep-23 14:42	1
13C-1,2,3,7,8,9-HxCDD	IS	105	40-135		27-Sep-23 14:42	1
13C-1,2,3,4,6,7,8-HpCDD	IS	105	40-135		27-Sep-23 14:42	1
13C-OCDD	IS	101	40-135		27-Sep-23 14:42	1
13C-2,3,7,8-TCDF	IS	87.0	40-135		27-Sep-23 14:42	1
13C-1,2,3,7,8-PeCDF	IS	95.3	40-135		27-Sep-23 14:42	1
13C-2,3,4,7,8-PeCDF	IS	97.0	40-135		27-Sep-23 14:42	1
13C-1,2,3,4,7,8-HxCDF	IS	89.9	40-135		27-Sep-23 14:42	1
13C-1,2,3,6,7,8-HxCDF	IS	92.2	40-135		27-Sep-23 14:42	1
13C-2,3,4,6,7,8-HxCDF	IS	94.5	40-135		27-Sep-23 14:42	1
13C-1,2,3,7,8,9-HxCDF	IS	100	40-135		27-Sep-23 14:42	1
13C-1,2,3,4,6,7,8-HpCDF	IS	88.5	40-135		27-Sep-23 14:42	1
13C-1,2,3,4,7,8,9-HpCDF	IS	90.6	40-135		27-Sep-23 14:42	1
13C-OCDF	IS	86.0	40-135		27-Sep-23 14:42	1
37Cl-2,3,7,8-TCDD	CRS	72.0	40-135		27-Sep-23 14:42	1

Sample ID: HA-27-Comp-1-2 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 11:50

Laboratory Data
Lab Sample: 2308007-01
QC Batch: B23H246
Sample Size: 12.2 g
% Solids: 82.4
Date Received: 01-Aug-23 08:56
Date Extracted: 24-Aug-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.118	0.189			21-Sep-23 17:22	1
1,2,3,7,8-PeCDD	ND		0.782	1.92		21-Sep-23 17:22	1
1,2,3,4,7,8-HxCDD	5.68		0.631			21-Sep-23 17:22	1
1,2,3,6,7,8-HxCDD	35.7		0.638			21-Sep-23 17:22	1
1,2,3,7,8,9-HxCDD	14.0		0.715			21-Sep-23 17:22	1
1,2,3,4,6,7,8-HpCDD	1300		0.704			21-Sep-23 17:22	1
OCDD	10900		8.07		D	28-Sep-23 00:50	5
2,3,7,8-TCDF	0.351		0.182		J	21-Sep-23 17:22	1
1,2,3,7,8-PeCDF	1.35		0.574		J	21-Sep-23 17:22	1
2,3,4,7,8-PeCDF	ND		0.684	2.13		21-Sep-23 17:22	1
1,2,3,4,7,8-HxCDF	6.89		0.657			21-Sep-23 17:22	1
1,2,3,6,7,8-HxCDF	5.14		0.619			21-Sep-23 17:22	1
2,3,4,6,7,8-HxCDF	ND		0.659	3.59		21-Sep-23 17:22	1
1,2,3,7,8,9-HxCDF	1.24		0.714		J	21-Sep-23 17:22	1
1,2,3,4,6,7,8-HpCDF	170		0.647			21-Sep-23 17:22	1
1,2,3,4,7,8,9-HpCDF	11.9		0.815			21-Sep-23 17:22	1
OCDF	522		3.83			21-Sep-23 17:22	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	25.2						
Totals							
Total TCDD	0.137			0.602			
Total PeCDD	4.03			7.99			
Total HxCDD	137						
Total HpCDD	2050						
Total TCDF	3.05			3.22			
Total PeCDF	41.8			44.4			
Total HxCDF	204			208			
Total HpCDF	610						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	74.3	40 - 135		21-Sep-23 17:22	1
13C-1,2,3,7,8-PeCDD	IS	64.8	40 - 135		21-Sep-23 17:22	1
13C-1,2,3,4,7,8-HxCDD	IS	96.2	40 - 135		21-Sep-23 17:22	1
13C-1,2,3,6,7,8-HxCDD	IS	66.8	40 - 135		21-Sep-23 17:22	1
13C-1,2,3,7,8,9-HxCDD	IS	82.8	40 - 135		21-Sep-23 17:22	1
13C-1,2,3,4,6,7,8-HpCDD	IS	83.3	40 - 135		21-Sep-23 17:22	1
13C-OCDD	IS	105	40 - 135	D	28-Sep-23 00:50	5
13C-2,3,7,8-TCDF	IS	78.2	40 - 135		21-Sep-23 17:22	1
13C-1,2,3,7,8-PeCDF	IS	52.9	40 - 135		21-Sep-23 17:22	1
13C-2,3,4,7,8-PeCDF	IS	70.0	40 - 135		21-Sep-23 17:22	1
13C-1,2,3,4,7,8-HxCDF	IS	75.9	40 - 135		21-Sep-23 17:22	1
13C-1,2,3,6,7,8-HxCDF	IS	76.7	40 - 135		21-Sep-23 17:22	1
13C-2,3,4,6,7,8-HxCDF	IS	80.2	40 - 135		21-Sep-23 17:22	1
13C-1,2,3,7,8,9-HxCDF	IS	81.9	40 - 135		21-Sep-23 17:22	1
13C-1,2,3,4,6,7,8-HpCDF	IS	69.9	40 - 135		21-Sep-23 17:22	1
13C-1,2,3,4,7,8,9-HpCDF	IS	74.6	40 - 135		21-Sep-23 17:22	1
13C-OCDF	IS	74.7	40 - 135		21-Sep-23 17:22	1
37Cl-2,3,7,8-TCDD	CRS	72.6	40 - 135		21-Sep-23 17:22	1

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

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

Sample ID: HA-27-Comp-2-3 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 11:55

Laboratory Data
Lab Sample: 2308007-02
QC Batch: B23H246
Sample Size: 12.9 g
% Solids: 78.1
Date Received: 01-Aug-23 08:56
Date Extracted: 24-Aug-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.109	0.189			21-Sep-23 18:09	1
1,2,3,7,8-PeCDD	ND		0.780	0.902		21-Sep-23 18:09	1
1,2,3,4,7,8-HxCDD	ND		0.630	2.17		21-Sep-23 18:09	1
1,2,3,6,7,8-HxCDD	11.5		0.637			21-Sep-23 18:09	1
1,2,3,7,8,9-HxCDD	5.11		0.714			21-Sep-23 18:09	1
1,2,3,4,6,7,8-HpCDD	349		0.703			21-Sep-23 18:09	1
OCDD	2700		1.61			21-Sep-23 18:09	1
2,3,7,8-TCDF	ND	0.103	0.182			21-Sep-23 18:09	1
1,2,3,7,8-PeCDF	ND		0.573	0.456		21-Sep-23 18:09	1
2,3,4,7,8-PeCDF	0.876		0.683		J	21-Sep-23 18:09	1
1,2,3,4,7,8-HxCDF	2.08		0.656		J	21-Sep-23 18:09	1
1,2,3,6,7,8-HxCDF	2.03		0.618		J	21-Sep-23 18:09	1
2,3,4,6,7,8-HxCDF	ND		0.658	1.11		21-Sep-23 18:09	1
1,2,3,7,8,9-HxCDF	ND		0.713	0.500		21-Sep-23 18:09	1
1,2,3,4,6,7,8-HpCDF	48.3		0.646			21-Sep-23 18:09	1
1,2,3,4,7,8,9-HpCDF	3.36		0.814			21-Sep-23 18:09	1
OCDF	125		3.82			21-Sep-23 18:09	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	7.19						
Totals							
Total TCDD	ND	0.109					
Total PeCDD	1.17			2.08			
Total HxCDD	42.0			44.1			
Total HpCDD	560						
Total TCDF	1.11			1.70			
Total PeCDF	14.5			15.4			
Total HxCDF	64.1			65.9			
Total HpCDF	148						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	74.5	40 - 135		21-Sep-23 18:09	1
13C-1,2,3,7,8-PeCDD	IS	73.7	40 - 135		21-Sep-23 18:09	1
13C-1,2,3,4,7,8-HxCDD	IS	96.4	40 - 135		21-Sep-23 18:09	1
13C-1,2,3,6,7,8-HxCDD	IS	88.9	40 - 135		21-Sep-23 18:09	1
13C-1,2,3,7,8,9-HxCDD	IS	88.8	40 - 135		21-Sep-23 18:09	1
13C-1,2,3,4,6,7,8-HpCDD	IS	90.2	40 - 135		21-Sep-23 18:09	1
13C-OCDD	IS	90.2	40 - 135		21-Sep-23 18:09	1
13C-2,3,7,8-TCDF	IS	84.3	40 - 135		21-Sep-23 18:09	1
13C-1,2,3,7,8-PeCDF	IS	59.5	40 - 135		21-Sep-23 18:09	1
13C-2,3,4,7,8-PeCDF	IS	81.9	40 - 135		21-Sep-23 18:09	1
13C-1,2,3,4,7,8-HxCDF	IS	79.6	40 - 135		21-Sep-23 18:09	1
13C-1,2,3,6,7,8-HxCDF	IS	80.4	40 - 135		21-Sep-23 18:09	1
13C-2,3,4,6,7,8-HxCDF	IS	85.3	40 - 135		21-Sep-23 18:09	1
13C-1,2,3,7,8,9-HxCDF	IS	60.6	40 - 135		21-Sep-23 18:09	1
13C-1,2,3,4,6,7,8-HpCDF	IS	80.9	40 - 135		21-Sep-23 18:09	1
13C-1,2,3,4,7,8,9-HpCDF	IS	83.1	40 - 135		21-Sep-23 18:09	1
13C-OCDF	IS	79.7	40 - 135		21-Sep-23 18:09	1
37Cl-2,3,7,8-TCDD	CRS	69.9	40 - 135		21-Sep-23 18:09	1

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

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

Sample ID: HA-26-Comp-1-2 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 12:20

Laboratory Data
Lab Sample: 2308007-03
QC Batch: B23H246
Sample Size: 12.4 g
% Solids: 81.0
Date Received: 01-Aug-23 08:56
Date Extracted: 24-Aug-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.190	0.133		21-Sep-23 18:56	1
1,2,3,7,8-PeCDD	0.955		0.782		J	21-Sep-23 18:56	1
1,2,3,4,7,8-HxCDD	ND		0.631	1.75		21-Sep-23 18:56	1
1,2,3,6,7,8-HxCDD	9.41		0.638			21-Sep-23 18:56	1
1,2,3,7,8,9-HxCDD	4.64		0.715			21-Sep-23 18:56	1
1,2,3,4,6,7,8-HpCDD	242		0.704			21-Sep-23 18:56	1
OCDD	1400		1.62			21-Sep-23 18:56	1
2,3,7,8-TCDF	ND	0.121	0.183			21-Sep-23 18:56	1
1,2,3,7,8-PeCDF	0.519		0.575		J	21-Sep-23 18:56	1
2,3,4,7,8-PeCDF	ND		0.684	0.809		21-Sep-23 18:56	1
1,2,3,4,7,8-HxCDF	1.76		0.657		J	21-Sep-23 18:56	1
1,2,3,6,7,8-HxCDF	1.49		0.619		J	21-Sep-23 18:56	1
2,3,4,6,7,8-HxCDF	ND		0.659	1.10		21-Sep-23 18:56	1
1,2,3,7,8,9-HxCDF	0.554		0.714		J	21-Sep-23 18:56	1
1,2,3,4,6,7,8-HpCDF	32.0		0.647			21-Sep-23 18:56	1
1,2,3,4,7,8,9-HpCDF	2.68		0.816			21-Sep-23 18:56	1
OCDF	78.7		3.83			21-Sep-23 18:56	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	5.97						
Totals							
Total TCDD	ND			0.292			
Total PeCDD	1.69			2.33			
Total HxCDD	34.4			36.2			
Total HpCDD	372						
Total TCDF	ND			2.14			
Total PeCDF	12.5			13.3			
Total HxCDF	46.6			49.0			
Total HpCDF	104						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	81.6	40 - 135		21-Sep-23 18:56	1
13C-1,2,3,7,8-PeCDD	IS	81.2	40 - 135		21-Sep-23 18:56	1
13C-1,2,3,4,7,8-HxCDD	IS	98.0	40 - 135		21-Sep-23 18:56	1
13C-1,2,3,6,7,8-HxCDD	IS	97.6	40 - 135		21-Sep-23 18:56	1
13C-1,2,3,7,8,9-HxCDD	IS	93.0	40 - 135		21-Sep-23 18:56	1
13C-1,2,3,4,6,7,8-HpCDD	IS	98.3	40 - 135		21-Sep-23 18:56	1
13C-OCDD	IS	95.9	40 - 135		21-Sep-23 18:56	1
13C-2,3,7,8-TCDF	IS	88.1	40 - 135		21-Sep-23 18:56	1
13C-1,2,3,7,8-PeCDF	IS	61.9	40 - 135		21-Sep-23 18:56	1
13C-2,3,4,7,8-PeCDF	IS	88.7	40 - 135		21-Sep-23 18:56	1
13C-1,2,3,4,7,8-HxCDF	IS	84.2	40 - 135		21-Sep-23 18:56	1
13C-1,2,3,6,7,8-HxCDF	IS	86.3	40 - 135		21-Sep-23 18:56	1
13C-2,3,4,6,7,8-HxCDF	IS	88.8	40 - 135		21-Sep-23 18:56	1
13C-1,2,3,7,8,9-HxCDF	IS	91.6	40 - 135		21-Sep-23 18:56	1
13C-1,2,3,4,6,7,8-HpCDF	IS	87.2	40 - 135		21-Sep-23 18:56	1
13C-1,2,3,4,7,8,9-HpCDF	IS	90.5	40 - 135		21-Sep-23 18:56	1
13C-OCDF	IS	87.3	40 - 135		21-Sep-23 18:56	1
37Cl-2,3,7,8-TCDD	CRS	74.9	40 - 135		21-Sep-23 18:56	1

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

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

Sample ID: HA-26-Comp-2-3 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 12:25

Laboratory Data
Lab Sample: 2308007-04
QC Batch: B23H246
Sample Size: 12.7 g
% Solids: 78.9
Date Received: 01-Aug-23 08:56
Date Extracted: 24-Aug-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.109	0.189			21-Sep-23 19:42	1
1,2,3,7,8-PeCDD	1.54		0.781		J	21-Sep-23 19:42	1
1,2,3,4,7,8-HxCDD	4.80		0.631			21-Sep-23 19:42	1
1,2,3,6,7,8-HxCDD	24.7		0.638			21-Sep-23 19:42	1
1,2,3,7,8,9-HxCDD	10.5		0.715			21-Sep-23 19:42	1
1,2,3,4,6,7,8-HpCDD	807		0.704			21-Sep-23 19:42	1
OCDD	5510		1.61			21-Sep-23 19:42	1
2,3,7,8-TCDF	ND		0.182	0.182		21-Sep-23 19:42	1
1,2,3,7,8-PeCDF	ND		0.574	0.640		21-Sep-23 19:42	1
2,3,4,7,8-PeCDF	1.36		0.684		J	21-Sep-23 19:42	1
1,2,3,4,7,8-HxCDF	4.87		0.657			21-Sep-23 19:42	1
1,2,3,6,7,8-HxCDF	4.04		0.619			21-Sep-23 19:42	1
2,3,4,6,7,8-HxCDF	3.61		0.659			21-Sep-23 19:42	1
1,2,3,7,8,9-HxCDF	1.47		0.714		J	21-Sep-23 19:42	1
1,2,3,4,6,7,8-HpCDF	111		0.647			21-Sep-23 19:42	1
1,2,3,4,7,8,9-HpCDF	8.36		0.815			21-Sep-23 19:42	1
OCDF	323		3.83			21-Sep-23 19:42	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	18.4						
Totals							
Total TCDD	ND	0.109					
Total PeCDD	3.43			4.53			
Total HxCDD	93.6						
Total HpCDD	1280						
Total TCDF	1.33			1.51			
Total PeCDF	25.7			27.6			
Total HxCDF	141						
Total HpCDF	391						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	79.9	40 - 135		21-Sep-23 19:42	1
13C-1,2,3,7,8-PeCDD	IS	83.0	40 - 135		21-Sep-23 19:42	1
13C-1,2,3,4,7,8-HxCDD	IS	97.9	40 - 135		21-Sep-23 19:42	1
13C-1,2,3,6,7,8-HxCDD	IS	94.4	40 - 135		21-Sep-23 19:42	1
13C-1,2,3,7,8,9-HxCDD	IS	92.0	40 - 135		21-Sep-23 19:42	1
13C-1,2,3,4,6,7,8-HpCDD	IS	100	40 - 135		21-Sep-23 19:42	1
13C-OCDD	IS	107	40 - 135		21-Sep-23 19:42	1
13C-2,3,7,8-TCDF	IS	84.4	40 - 135		21-Sep-23 19:42	1
13C-1,2,3,7,8-PeCDF	IS	65.5	40 - 135		21-Sep-23 19:42	1
13C-2,3,4,7,8-PeCDF	IS	88.1	40 - 135		21-Sep-23 19:42	1
13C-1,2,3,4,7,8-HxCDF	IS	83.6	40 - 135		21-Sep-23 19:42	1
13C-1,2,3,6,7,8-HxCDF	IS	83.8	40 - 135		21-Sep-23 19:42	1
13C-2,3,4,6,7,8-HxCDF	IS	87.4	40 - 135		21-Sep-23 19:42	1
13C-1,2,3,7,8,9-HxCDF	IS	91.1	40 - 135		21-Sep-23 19:42	1
13C-1,2,3,4,6,7,8-HpCDF	IS	86.7	40 - 135		21-Sep-23 19:42	1
13C-1,2,3,4,7,8,9-HpCDF	IS	93.0	40 - 135		21-Sep-23 19:42	1
13C-OCDF	IS	93.0	40 - 135		21-Sep-23 19:42	1
37Cl-2,3,7,8-TCDD	CRS	77.6	40 - 135		21-Sep-23 19:42	1

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

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

Sample ID: HA-25-Comp-2-3 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 12:45

Laboratory Data
Lab Sample: 2308007-05
QC Batch: B23H246
Sample Size: 13.0 g
% Solids: 77.3
Date Received: 01-Aug-23 08:56
Date Extracted: 24-Aug-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.0928	0.189			21-Sep-23 20:29	1
1,2,3,7,8-PeCDD	0.598		0.780		J	21-Sep-23 20:29	1
1,2,3,4,7,8-HxCDD	ND		0.630	1.12		21-Sep-23 20:29	1
1,2,3,6,7,8-HxCDD	5.87		0.637			21-Sep-23 20:29	1
1,2,3,7,8,9-HxCDD	2.48		0.713		J	21-Sep-23 20:29	1
1,2,3,4,6,7,8-HpCDD	149		0.702			21-Sep-23 20:29	1
OCDD	971		1.61			21-Sep-23 20:29	1
2,3,7,8-TCDF	ND	0.0909	0.182			21-Sep-23 20:29	1
1,2,3,7,8-PeCDF	0.245		0.573		J	21-Sep-23 20:29	1
2,3,4,7,8-PeCDF	ND		0.682	0.421		21-Sep-23 20:29	1
1,2,3,4,7,8-HxCDF	1.22		0.655		J	21-Sep-23 20:29	1
1,2,3,6,7,8-HxCDF	1.28		0.618		J	21-Sep-23 20:29	1
2,3,4,6,7,8-HxCDF	ND		0.657	0.980		21-Sep-23 20:29	1
1,2,3,7,8,9-HxCDF	0.211		0.712		J	21-Sep-23 20:29	1
1,2,3,4,6,7,8-HpCDF	22.1		0.646			21-Sep-23 20:29	1
1,2,3,4,7,8,9-HpCDF	1.66		0.814		J	21-Sep-23 20:29	1
OCDF	47.5		3.82			21-Sep-23 20:29	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	3.74						
Totals							
Total TCDD	ND	0.0928					
Total PeCDD	0.598						
Total HxCDD	22.0			23.1			
Total HpCDD	237						
Total TCDF	ND			0.379			
Total PeCDF	7.37			8.10			
Total HxCDF	30.7			32.3			
Total HpCDF	63.9						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	75.1	40 - 135		21-Sep-23 20:29	1
13C-1,2,3,7,8-PeCDD	IS	76.7	40 - 135		21-Sep-23 20:29	1
13C-1,2,3,4,7,8-HxCDD	IS	93.5	40 - 135		21-Sep-23 20:29	1
13C-1,2,3,6,7,8-HxCDD	IS	86.4	40 - 135		21-Sep-23 20:29	1
13C-1,2,3,7,8,9-HxCDD	IS	80.9	40 - 135		21-Sep-23 20:29	1
13C-1,2,3,4,6,7,8-HpCDD	IS	92.3	40 - 135		21-Sep-23 20:29	1
13C-OCDD	IS	90.0	40 - 135		21-Sep-23 20:29	1
13C-2,3,7,8-TCDF	IS	80.3	40 - 135		21-Sep-23 20:29	1
13C-1,2,3,7,8-PeCDF	IS	62.8	40 - 135		21-Sep-23 20:29	1
13C-2,3,4,7,8-PeCDF	IS	81.9	40 - 135		21-Sep-23 20:29	1
13C-1,2,3,4,7,8-HxCDF	IS	74.5	40 - 135		21-Sep-23 20:29	1
13C-1,2,3,6,7,8-HxCDF	IS	79.9	40 - 135		21-Sep-23 20:29	1
13C-2,3,4,6,7,8-HxCDF	IS	81.8	40 - 135		21-Sep-23 20:29	1
13C-1,2,3,7,8,9-HxCDF	IS	77.7	40 - 135		21-Sep-23 20:29	1
13C-1,2,3,4,6,7,8-HpCDF	IS	78.3	40 - 135		21-Sep-23 20:29	1
13C-1,2,3,4,7,8,9-HpCDF	IS	88.8	40 - 135		21-Sep-23 20:29	1
13C-OCDF	IS	85.0	40 - 135		21-Sep-23 20:29	1
37Cl-2,3,7,8-TCDD	CRS	73.6	40 - 135		21-Sep-23 20:29	1

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

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

Sample ID: HA-24-Comp-1-2 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 13:40

Laboratory Data
Lab Sample: 2308007-06
QC Batch: B23H246
Sample Size: 12.2 g
% Solids: 82.3
Date Received: 01-Aug-23 08:56
Date Extracted: 24-Aug-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	0.655		0.189			21-Sep-23 21:15	1
1,2,3,7,8-PeCDD	2.14		0.782		J	21-Sep-23 21:15	1
1,2,3,4,7,8-HxCDD	5.96		0.631			21-Sep-23 21:15	1
1,2,3,6,7,8-HxCDD	32.5		0.638			21-Sep-23 21:15	1
1,2,3,7,8,9-HxCDD	14.2		0.715			21-Sep-23 21:15	1
1,2,3,4,6,7,8-HpCDD	986		0.704			21-Sep-23 21:15	1
OCDD	5790		1.62			21-Sep-23 21:15	1
2,3,7,8-TCDF	0.438		0.183		J	21-Sep-23 21:15	1
1,2,3,7,8-PeCDF	1.58		0.574		J	21-Sep-23 21:15	1
2,3,4,7,8-PeCDF	2.59		0.684			21-Sep-23 21:15	1
1,2,3,4,7,8-HxCDF	6.92		0.657			21-Sep-23 21:15	1
1,2,3,6,7,8-HxCDF	6.17		0.619			21-Sep-23 21:15	1
2,3,4,6,7,8-HxCDF	ND		0.659	3.56		21-Sep-23 21:15	1
1,2,3,7,8,9-HxCDF	ND		0.714	0.886		21-Sep-23 21:15	1
1,2,3,4,6,7,8-HpCDF	138		0.647			21-Sep-23 21:15	1
1,2,3,4,7,8,9-HpCDF	8.50		0.816			21-Sep-23 21:15	1
OCDF	355		3.83			21-Sep-23 21:15	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	23.4						
Totals							
Total TCDD	0.845						
Total PeCDD	4.95			6.32			
Total HxCDD	124						
Total HpCDD	1550						
Total TCDF	2.13			2.82			
Total PeCDF	40.4			42.6			
Total HxCDF	176			185			
Total HpCDF	441						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	77.0	40 - 135		21-Sep-23 21:15	1
13C-1,2,3,7,8-PeCDD	IS	78.5	40 - 135		21-Sep-23 21:15	1
13C-1,2,3,4,7,8-HxCDD	IS	93.5	40 - 135		21-Sep-23 21:15	1
13C-1,2,3,6,7,8-HxCDD	IS	67.3	40 - 135		21-Sep-23 21:15	1
13C-1,2,3,7,8,9-HxCDD	IS	86.6	40 - 135		21-Sep-23 21:15	1
13C-1,2,3,4,6,7,8-HpCDD	IS	94.9	40 - 135		21-Sep-23 21:15	1
13C-OCDD	IS	97.4	40 - 135		21-Sep-23 21:15	1
13C-2,3,7,8-TCDF	IS	82.5	40 - 135		21-Sep-23 21:15	1
13C-1,2,3,7,8-PeCDF	IS	63.5	40 - 135		21-Sep-23 21:15	1
13C-2,3,4,7,8-PeCDF	IS	85.4	40 - 135		21-Sep-23 21:15	1
13C-1,2,3,4,7,8-HxCDF	IS	78.2	40 - 135		21-Sep-23 21:15	1
13C-1,2,3,6,7,8-HxCDF	IS	79.1	40 - 135		21-Sep-23 21:15	1
13C-2,3,4,6,7,8-HxCDF	IS	81.9	40 - 135		21-Sep-23 21:15	1
13C-1,2,3,7,8,9-HxCDF	IS	87.9	40 - 135		21-Sep-23 21:15	1
13C-1,2,3,4,6,7,8-HpCDF	IS	80.1	40 - 135		21-Sep-23 21:15	1
13C-1,2,3,4,7,8,9-HpCDF	IS	88.8	40 - 135		21-Sep-23 21:15	1
13C-OCDF	IS	84.2	40 - 135		21-Sep-23 21:15	1
37Cl-2,3,7,8-TCDD	CRS	76.1	40 - 135		21-Sep-23 21:15	1

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

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

Sample ID: HA-24-Comp-2-3 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 13:45

Laboratory Data
Lab Sample: 2308007-07
QC Batch: B23H246
Sample Size: 12.7 g
% Solids: 79.1
Date Received: 01-Aug-23 08:56
Date Extracted: 24-Aug-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.0849	0.189			21-Sep-23 22:02	1
1,2,3,7,8-PeCDD	0.526		0.779		J	21-Sep-23 22:02	1
1,2,3,4,7,8-HxCDD	0.709		0.629		J	21-Sep-23 22:02	1
1,2,3,6,7,8-HxCDD	4.13		0.636			21-Sep-23 22:02	1
1,2,3,7,8,9-HxCDD	1.83		0.712		J	21-Sep-23 22:02	1
1,2,3,4,6,7,8-HpCDD	104		0.701			21-Sep-23 22:02	1
OCDD	609		1.61			21-Sep-23 22:02	1
2,3,7,8-TCDF	ND	0.0843	0.182			21-Sep-23 22:02	1
1,2,3,7,8-PeCDF	0.275		0.572		J	21-Sep-23 22:02	1
2,3,4,7,8-PeCDF	0.192		0.681		J	21-Sep-23 22:02	1
1,2,3,4,7,8-HxCDF	0.815		0.655		J	21-Sep-23 22:02	1
1,2,3,6,7,8-HxCDF	0.812		0.617		J	21-Sep-23 22:02	1
2,3,4,6,7,8-HxCDF	0.432		0.657		J	21-Sep-23 22:02	1
1,2,3,7,8,9-HxCDF	ND		0.711	0.218		21-Sep-23 22:02	1
1,2,3,4,6,7,8-HpCDF	14.2		0.645			21-Sep-23 22:02	1
1,2,3,4,7,8,9-HpCDF	ND		0.813	1.56		21-Sep-23 22:02	1
OCDF	32.0		3.81			21-Sep-23 22:02	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	2.84						
Totals							
Total TCDD	ND			0.292			
Total PeCDD	0.800						
Total HxCDD	15.7						
Total HpCDD	167						
Total TCDF	1.47			1.47			
Total PeCDF	5.81			6.33			
Total HxCDF	23.8			24.0			
Total HpCDF	44.1			45.7			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	84.3	40 - 135		21-Sep-23 22:02	1
13C-1,2,3,7,8-PeCDD	IS	88.6	40 - 135		21-Sep-23 22:02	1
13C-1,2,3,4,7,8-HxCDD	IS	102	40 - 135		21-Sep-23 22:02	1
13C-1,2,3,6,7,8-HxCDD	IS	101	40 - 135		21-Sep-23 22:02	1
13C-1,2,3,7,8,9-HxCDD	IS	98.1	40 - 135		21-Sep-23 22:02	1
13C-1,2,3,4,6,7,8-HpCDD	IS	101	40 - 135		21-Sep-23 22:02	1
13C-OCDD	IS	102	40 - 135		21-Sep-23 22:02	1
13C-2,3,7,8-TCDF	IS	91.4	40 - 135		21-Sep-23 22:02	1
13C-1,2,3,7,8-PeCDF	IS	67.9	40 - 135		21-Sep-23 22:02	1
13C-2,3,4,7,8-PeCDF	IS	97.3	40 - 135		21-Sep-23 22:02	1
13C-1,2,3,4,7,8-HxCDF	IS	88.0	40 - 135		21-Sep-23 22:02	1
13C-1,2,3,6,7,8-HxCDF	IS	90.7	40 - 135		21-Sep-23 22:02	1
13C-2,3,4,6,7,8-HxCDF	IS	91.8	40 - 135		21-Sep-23 22:02	1
13C-1,2,3,7,8,9-HxCDF	IS	71.1	40 - 135		21-Sep-23 22:02	1
13C-1,2,3,4,6,7,8-HpCDF	IS	89.9	40 - 135		21-Sep-23 22:02	1
13C-1,2,3,4,7,8,9-HpCDF	IS	94.1	40 - 135		21-Sep-23 22:02	1
13C-OCDF	IS	89.5	40 - 135		21-Sep-23 22:02	1
37Cl-2,3,7,8-TCDD	CRS	82.0	40 - 135		21-Sep-23 22:02	1

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

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

Sample ID: HA-23-Comp-1-2 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 14:20

Laboratory Data
Lab Sample: 2308007-08
QC Batch: B23H246
Sample Size: 12.2 g
% Solids: 82.2
Date Received: 01-Aug-23 08:56
Date Extracted: 24-Aug-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.190	0.207		21-Sep-23 22:49	1
1,2,3,7,8-PeCDD	2.09		0.783		J	21-Sep-23 22:49	1
1,2,3,4,7,8-HxCDD	4.11		0.632			21-Sep-23 22:49	1
1,2,3,6,7,8-HxCDD	23.1		0.639			21-Sep-23 22:49	1
1,2,3,7,8,9-HxCDD	9.24		0.716			21-Sep-23 22:49	1
1,2,3,4,6,7,8-HpCDD	617		0.705			21-Sep-23 22:49	1
OCDD	3390		1.62			21-Sep-23 22:49	1
2,3,7,8-TCDF	0.335		0.183		J	21-Sep-23 22:49	1
1,2,3,7,8-PeCDF	1.36		0.575		J	21-Sep-23 22:49	1
2,3,4,7,8-PeCDF	1.85		0.685		J	21-Sep-23 22:49	1
1,2,3,4,7,8-HxCDF	4.49		0.658			21-Sep-23 22:49	1
1,2,3,6,7,8-HxCDF	4.36		0.620			21-Sep-23 22:49	1
2,3,4,6,7,8-HxCDF	1.65		0.660		J	21-Sep-23 22:49	1
1,2,3,7,8,9-HxCDF	0.722		0.715		J	21-Sep-23 22:49	1
1,2,3,4,6,7,8-HpCDF	79.7		0.648			21-Sep-23 22:49	1
1,2,3,4,7,8,9-HpCDF	5.93		0.817			21-Sep-23 22:49	1
OCDF	205		3.83			21-Sep-23 22:49	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	15.6						
Totals							
Total TCDD	0.264			0.471			
Total PeCDD	4.43			4.93			
Total HxCDD	85.4						
Total HpCDD	980						
Total TCDF	2.15			2.56			
Total PeCDF	35.4			36.8			
Total HxCDF	129						
Total HpCDF	275			276			

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	79.1	40 - 135		21-Sep-23 22:49	1
13C-1,2,3,7,8-PeCDD	IS	85.7	40 - 135		21-Sep-23 22:49	1
13C-1,2,3,4,7,8-HxCDD	IS	98.4	40 - 135		21-Sep-23 22:49	1
13C-1,2,3,6,7,8-HxCDD	IS	96.8	40 - 135		21-Sep-23 22:49	1
13C-1,2,3,7,8,9-HxCDD	IS	92.7	40 - 135		21-Sep-23 22:49	1
13C-1,2,3,4,6,7,8-HpCDD	IS	98.0	40 - 135		21-Sep-23 22:49	1
13C-OCDD	IS	104	40 - 135		21-Sep-23 22:49	1
13C-2,3,7,8-TCDF	IS	86.4	40 - 135		21-Sep-23 22:49	1
13C-1,2,3,7,8-PeCDF	IS	65.1	40 - 135		21-Sep-23 22:49	1
13C-2,3,4,7,8-PeCDF	IS	90.8	40 - 135		21-Sep-23 22:49	1
13C-1,2,3,4,7,8-HxCDF	IS	84.5	40 - 135		21-Sep-23 22:49	1
13C-1,2,3,6,7,8-HxCDF	IS	84.1	40 - 135		21-Sep-23 22:49	1
13C-2,3,4,6,7,8-HxCDF	IS	87.3	40 - 135		21-Sep-23 22:49	1
13C-1,2,3,7,8,9-HxCDF	IS	91.4	40 - 135		21-Sep-23 22:49	1
13C-1,2,3,4,6,7,8-HpCDF	IS	86.9	40 - 135		21-Sep-23 22:49	1
13C-1,2,3,4,7,8,9-HpCDF	IS	92.1	40 - 135		21-Sep-23 22:49	1
13C-OCDF	IS	90.3	40 - 135		21-Sep-23 22:49	1
37Cl-2,3,7,8-TCDD	CRS	77.1	40 - 135		21-Sep-23 22:49	1

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

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

Sample ID: HA-23-Comp-2-3 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 14:25

Laboratory Data
Lab Sample: 2308007-09
QC Batch: B23H246
Sample Size: 12.6 g
% Solids: 79.9
Date Received: 01-Aug-23 08:56
Date Extracted: 24-Aug-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND	0.171	0.190			21-Sep-23 23:35	1
1,2,3,7,8-PeCDD	2.14		0.782		J	21-Sep-23 23:35	1
1,2,3,4,7,8-HxCDD	4.21		0.631			21-Sep-23 23:35	1
1,2,3,6,7,8-HxCDD	23.7		0.638			21-Sep-23 23:35	1
1,2,3,7,8,9-HxCDD	9.62		0.715			21-Sep-23 23:35	1
1,2,3,4,6,7,8-HpCDD	676		0.704			21-Sep-23 23:35	1
OCDD	4520		1.62			21-Sep-23 23:35	1
2,3,7,8-TCDF	ND		0.183	0.264		21-Sep-23 23:35	1
1,2,3,7,8-PeCDF	ND		0.574	1.12		21-Sep-23 23:35	1
2,3,4,7,8-PeCDF	1.86		0.684		J	21-Sep-23 23:35	1
1,2,3,4,7,8-HxCDF	4.60		0.657			21-Sep-23 23:35	1
1,2,3,6,7,8-HxCDF	4.21		0.619			21-Sep-23 23:35	1
2,3,4,6,7,8-HxCDF	2.57		0.659			21-Sep-23 23:35	1
1,2,3,7,8,9-HxCDF	1.55		0.714		J	21-Sep-23 23:35	1
1,2,3,4,6,7,8-HpCDF	88.5		0.647			21-Sep-23 23:35	1
1,2,3,4,7,8,9-HpCDF	6.69		0.816			21-Sep-23 23:35	1
OCDF	258		3.83			21-Sep-23 23:35	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	16.9						
Totals							
Total TCDD	ND	0.171					
Total PeCDD	3.59			4.16			
Total HxCDD	88.8						
Total HpCDD	1070						
Total TCDF	1.38			3.01			
Total PeCDF	26.3			32.8			
Total HxCDF	129						
Total HpCDF	310						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	44.2	40 - 135		21-Sep-23 23:35	1
13C-1,2,3,7,8-PeCDD	IS	42.8	40 - 135		21-Sep-23 23:35	1
13C-1,2,3,4,7,8-HxCDD	IS	53.1	40 - 135		21-Sep-23 23:35	1
13C-1,2,3,6,7,8-HxCDD	IS	50.5	40 - 135		21-Sep-23 23:35	1
13C-1,2,3,7,8,9-HxCDD	IS	50.3	40 - 135		21-Sep-23 23:35	1
13C-1,2,3,4,6,7,8-HpCDD	IS	53.1	40 - 135		21-Sep-23 23:35	1
13C-OCDD	IS	52.1	40 - 135		21-Sep-23 23:35	1
13C-2,3,7,8-TCDF	IS	48.5	40 - 135		21-Sep-23 23:35	1
13C-1,2,3,7,8-PeCDF	IS	37.5	40 - 135	H	21-Sep-23 23:35	1
13C-2,3,4,7,8-PeCDF	IS	49.5	40 - 135		21-Sep-23 23:35	1
13C-1,2,3,4,7,8-HxCDF	IS	46.0	40 - 135		21-Sep-23 23:35	1
13C-1,2,3,6,7,8-HxCDF	IS	46.2	40 - 135		21-Sep-23 23:35	1
13C-2,3,4,6,7,8-HxCDF	IS	48.0	40 - 135		21-Sep-23 23:35	1
13C-1,2,3,7,8,9-HxCDF	IS	51.9	40 - 135		21-Sep-23 23:35	1
13C-1,2,3,4,6,7,8-HpCDF	IS	46.7	40 - 135		21-Sep-23 23:35	1
13C-1,2,3,4,7,8,9-HpCDF	IS	49.1	40 - 135		21-Sep-23 23:35	1
13C-OCDF	IS	46.1	40 - 135		21-Sep-23 23:35	1
37Cl-2,3,7,8-TCDD	CRS	41.1	40 - 135		21-Sep-23 23:35	1

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

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

Sample ID: HA-22-Comp-2-3 **EPA Method 8290A**

Client Data
Name: Apex Laboratories
Project: A3E1301
Matrix: Soil
Date Collected: 11-May-23 14:55

Laboratory Data
Lab Sample: 2308007-10
QC Batch: B23H246
Sample Size: 12.7 g
% Solids: 79.0
Date Received: 01-Aug-23 08:56
Date Extracted: 24-Aug-23
Column: ZB-DIOXIN

Analyte	Conc. (pg/g)	EDL	MDL	EMPC	Qualifiers	Analyzed	Dilution
2,3,7,8-TCDD	ND		0.190	0.241		22-Sep-23 00:22	1
1,2,3,7,8-PeCDD	3.48		0.782			22-Sep-23 00:22	1
1,2,3,4,7,8-HxCDD	7.31		0.632			22-Sep-23 00:22	1
1,2,3,6,7,8-HxCDD	44.9		0.639			22-Sep-23 00:22	1
1,2,3,7,8,9-HxCDD	17.4		0.715			22-Sep-23 00:22	1
1,2,3,4,6,7,8-HpCDD	1130		0.704			22-Sep-23 00:22	1
OCDD	5930		1.62			22-Sep-23 00:22	1
2,3,7,8-TCDF	0.475		0.183		J	22-Sep-23 00:22	1
1,2,3,7,8-PeCDF	1.99		0.575		J	22-Sep-23 00:22	1
2,3,4,7,8-PeCDF	2.61		0.684			22-Sep-23 00:22	1
1,2,3,4,7,8-HxCDF	8.08		0.657			22-Sep-23 00:22	1
1,2,3,6,7,8-HxCDF	8.42		0.620			22-Sep-23 00:22	1
2,3,4,6,7,8-HxCDF	5.76		0.659			22-Sep-23 00:22	1
1,2,3,7,8,9-HxCDF	2.29		0.714		J	22-Sep-23 00:22	1
1,2,3,4,6,7,8-HpCDF	167		0.648			22-Sep-23 00:22	1
1,2,3,4,7,8,9-HpCDF	11.2		0.816			22-Sep-23 00:22	1
OCDF	389		3.83			22-Sep-23 00:22	1
Toxic Equivalent							
TEQMinWHO2005Dioxin	28.8						
Totals							
Total TCDD	ND			0.528			
Total PeCDD	9.61			9.83			
Total HxCDD	166						
Total HpCDD	1790						
Total TCDF	2.97			3.90			
Total PeCDF	70.3						
Total HxCDF	248						
Total HpCDF	519						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Analyzed	Dilution
13C-2,3,7,8-TCDD	IS	76.9	40 - 135		22-Sep-23 00:22	1
13C-1,2,3,7,8-PeCDD	IS	80.3	40 - 135		22-Sep-23 00:22	1
13C-1,2,3,4,7,8-HxCDD	IS	96.5	40 - 135		22-Sep-23 00:22	1
13C-1,2,3,6,7,8-HxCDD	IS	81.9	40 - 135		22-Sep-23 00:22	1
13C-1,2,3,7,8,9-HxCDD	IS	86.9	40 - 135		22-Sep-23 00:22	1
13C-1,2,3,4,6,7,8-HpCDD	IS	95.1	40 - 135		22-Sep-23 00:22	1
13C-OCDD	IS	102	40 - 135		22-Sep-23 00:22	1
13C-2,3,7,8-TCDF	IS	84.0	40 - 135		22-Sep-23 00:22	1
13C-1,2,3,7,8-PeCDF	IS	61.0	40 - 135		22-Sep-23 00:22	1
13C-2,3,4,7,8-PeCDF	IS	88.7	40 - 135		22-Sep-23 00:22	1
13C-1,2,3,4,7,8-HxCDF	IS	78.5	40 - 135		22-Sep-23 00:22	1
13C-1,2,3,6,7,8-HxCDF	IS	81.1	40 - 135		22-Sep-23 00:22	1
13C-2,3,4,6,7,8-HxCDF	IS	83.1	40 - 135		22-Sep-23 00:22	1
13C-1,2,3,7,8,9-HxCDF	IS	87.8	40 - 135		22-Sep-23 00:22	1
13C-1,2,3,4,6,7,8-HpCDF	IS	81.3	40 - 135		22-Sep-23 00:22	1
13C-1,2,3,4,7,8,9-HpCDF	IS	86.6	40 - 135		22-Sep-23 00:22	1
13C-OCDF	IS	84.3	40 - 135		22-Sep-23 00:22	1
37Cl-2,3,7,8-TCDD	CRS	77.0	40 - 135		22-Sep-23 00:22	1

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

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

DATA QUALIFIERS & ABBREVIATIONS

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

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

Enthalpy Analytical - EDH Certifications

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

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

2308007 3.8°C

SUBCONTRACT ORDER

Apex Laboratories

A3E1301

AKK 7/31/23 APW

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: -

AKK 7/31/23

Sample Name: HA-28-Comp-2-3 **Soil** **Sampled: 05/11/23 10:35** (A3E1301-02)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/10/23 10:35	
Containers Supplied:			
(B)4 oz Glass Jar			Already Sent

Sample Name: HA-27-Comp-1-2 **Soil** **Sampled: 05/11/23 11:50** (A3E1301-03)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	08/14/23 17:00	06/10/23 11:50	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: HA-27-Comp-2-3 **Soil** **Sampled: 05/11/23 11:55** (A3E1301-04)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	08/14/23 17:00	06/10/23 11:55	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: HA-26-Comp-1-2 **Soil** **Sampled: 05/11/23 12:20** (A3E1301-05)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	08/14/23 17:00	06/10/23 12:20	
Containers Supplied:			
(B)4 oz Glass Jar			

Standard TAT

Released By	Date	Received By	Date
	7-31-23	Fed Ex (Shipper)	
Fed Ex (Shipper)	08/9/23 0856		08/10/23
Released By	Date	Received By	Date

2309007

SUBCONTRACT ORDER

Apex Laboratories

A3E1301

Sample Name: HA-26-Comp-2-3 **Soil** **Sampled: 05/11/23 12:25** (A3E1301-06)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	08/14/23 17:00	06/10/23 12:25	
Containers Supplied:			
(B)4 oz Glass Jar			

acc 7/31/23

Sample Name: HA-25-Comp-1-2 **Soil** **Sampled: 05/11/23 12:40** (A3E1301-07)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/10/23 12:40	
Containers Supplied:			
(B)4 oz Glass Jar			

Already sent

Sample Name: HA-25-Comp-2-3 **Soil** **Sampled: 05/11/23 12:45** (A3E1301-08)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	08/14/23 17:00	06/10/23 12:45	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: HA-24-Comp-1-2 **Soil** **Sampled: 05/11/23 13:40** (A3E1301-09)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	08/14/23 17:00	06/10/23 13:40	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: HA-24-Comp-2-3 **Soil** **Sampled: 05/11/23 13:45** (A3E1301-10)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	08/14/23 17:00	06/10/23 13:45	
Containers Supplied:			
(B)4 oz Glass Jar			

acc 7/31/23

Sample Name: HA-29-Comp-2-3 **Soil** **Sampled: 05/11/23 11:25** (A3E1301-12)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/10/23 11:25	
Containers Supplied:			
(B)4 oz Glass Jar			

Already sent

Standard TAT

Released By	Date	Received By	Date
	7-31-23	Fed Ex (Shipper)	
Fed Ex (Shipper)	08/01/23 0856		08/01/23
Released By	Date	Received By	Date

2308007

SUBCONTRACT ORDER

Apex Laboratories

A3E1301

Sample Name: HA-23-Comp-1-2 **Soil** **Sampled: 05/11/23 14:20** (A3E1301-13)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	08/14/23 17:00	06/10/23 14:20	
Containers Supplied:			
(B)4 oz Glass Jar			

Sample Name: HA-23-Comp-2-3 **Soil** **Sampled: 05/11/23 14:25** (A3E1301-14)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	08/14/23 17:00	06/10/23 14:25	
Containers Supplied:			
(B)4 oz Glass Jar			

arac 7/31/23

Sample Name: HA-22-Comp-1-2 **Soil** **Sampled: 05/11/23 14:50** (A3E1301-15)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/10/23 14:50	
Containers Supplied:			
(B)4 oz Glass Jar			

Already Sent

Containers read time as 14:50

Sample Name: HA-22-Comp-2-3 **Soil** **Sampled: 05/11/23 14:55** (A3E1301-16)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	08/14/23 17:00	06/10/23 14:55	
Containers Supplied:			
(B)4 oz Glass Jar			

arac 7/31/23 **After Processing**

Sample Name: DU1-A **Soil** **Sampled: 05/09/23 13:30** (A3E1301-18)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/08/23 13:30	
Containers Supplied:			
(B)4 oz Glass Jar			

After Processing

Sample Name: DU1-B **Soil** **Sampled: 05/09/23 14:00** (A3E1301-20)

Analysis	Due	Expires	Comments
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/08/23 14:00	
Containers Supplied:			
(B)4 oz Glass Jar			

Already Sent
Standard TAT

Released By	Date	Received By	Date
	7-31-23	Fed Ex (Shipper)	
Fed Ex (Shipper)	08/01/23 0856		08/01/23 0856
Released By	Date	Received By	Date

2308007

SUBCONTRACT ORDER

Apex Laboratories

A3E1301

ARC 7/31/23

After Processing

Sample Name: DU2-A		**Soil**	**Sampled: 05/09/23 12:30**	(A3E1301-22)
Analysis	Due	Expires	Comments	
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/08/23 12:30		
Containers Supplied:				
(B)4 oz Glass Jar				

After Processing

Sample Name: DU2-B		**Soil**	**Sampled: 05/09/23 13:00**	(A3E1301-24)
Analysis	Due	Expires	Comments	
8290 Dioxins/Furans by HRGC/HRMS (SUB)	05/24/23 17:00	06/08/23 13:00		
Containers Supplied:				
(B)4 oz Glass Jar				

Already sent

Standard TAT

	7-31-23	Fed Ex (Shipper)	
Released By	Date	Received By	Date
Fed Ex (Shipper)	08/01/23 0856		08/01/23 0856
Released By	Date	Received By	Date

Sample Log-In Checklist

ENTHALPY ANALYTICAL

Page # 1 of 1

Work Order #: 2308007 TAT Std

Samples Arrival:	Date/Time: 08/01/23 0856	Initials: SWH	Location: WR-2 Shelf/Rack: NA

Delivered By:	(FedEx)	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	(Ice)		Blue Ice		Techni Ice	Dry Ice	None

Temp °C: 2.4 (uncorrected)	Probe used: Y / (N)	Thermometer ID: IR-3
Temp °C: 3.8 (corrected)		

	YES	NO	NA
Shipping Container(s) Intact?	✓		✓
Shipping Custody Seals Intact?		✓	✓
Airbill ——— Trk # 7729 0569 4152	✓		
Shipping Documentation Present?	✓		
Shipping Container: ~~Enthalpy~~ (Enthalpy) / Client / (Retain) / Return		Dispose	
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?		✓(A)	

Logged In:	Date/Time: 08/01/23 1429	Initials: KW	Location: WR-2 Shelf/Rack: D-5

COC Anomaly/Sample Acceptance Form completed?		✓	✓

Comments: (A) Sample Date 05/11/23

CoC/Label Reconciliation Report WO# 2308007

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2308007-01	A HA-27-Comp-1-2	☑	(A3E1301-03)	11-May-23 11:50	☑	Clear Glass Jar, 120mL	Solid	
2308007-02	A HA-27-Comp-2-3	☑	(A3E1301-04)	11-May-23 11:55	☑	Clear Glass Jar, 120mL	Solid	
2308007-03	A HA-26-Comp-1-2	☑	(A3E1301-05)	11-May-23 12:20	☑	Clear Glass Jar, 120mL	Solid	
2308007-04	A HA-26-Comp-2-3	☑	(A3E1301-06)	11-May-23 12:25	☑	Clear Glass Jar, 120mL	Solid	
2308007-05	A HA-25-Comp-2-3	☑	(A3E1301-08)	11-May-23 12:45	☑	Clear Glass Jar, 120mL	Solid	
2308007-06	A HA-24-Comp-1-2	☑	(A3E1301-09)	11-May-23 13:40	☑	Clear Glass Jar, 120mL	Solid	
2308007-07	A HA-24-Comp-2-3	☑	(A3E1301-10) kw 08/01/23	11-May-23 13:45	☑	Clear Glass Jar, 120mL	Solid	
2308007-08	A HA-23-Comp-1-2	☑	(A3E1301-13)	11-May-23 14:20	☑	Clear Glass Jar, 120mL	Solid	
2308007-09	A HA-23-Comp-2-3	☑	(A3E1301-14)	11-May-23 14:25	☑	Clear Glass Jar, 120mL	Solid	
2308007-10	A HA-22-Comp-2-3	☑	(A3E1301-16)	11-May-23 14:55	☑ (A)	Clear Glass Jar, 120mL	Solid	

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

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

Comments: (A) ~~Sample label Time 1455~~ kw for SNH 08/01/23

Preservation Documented: Na2S2O3 Trizma NH4CH3CO2 (None) Other

Verifed by/Date: SNH 08/01/23
KW 08/01/23

Attachment B

Data Validation Memorandum

MAUL
FOSTER
ALONGI

Data Quality Assurance/Quality Control Review

Project No. M8012.01.001 | August 22, 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 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

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