



September 25, 2024

Project No. M0363.17.003

Caren and Skip Carlson
Circle C Corporation
31313 NW Paradise Park Road
La Center, WA 98642

Re: Underdrain Irrigation Area Phase II Environmental Site Assessment for Circle C Landfill, 31313 NW Paradise Park Road, La Center, WA 98642

Dear Caren and Skip Carlson:

On behalf of Circle C Corporation and Clark County Public Health (CCPH), Maul Foster & Alongi, Inc. (MFA), conducted this underdrain irrigation area Phase II environmental site assessment (ESA) of the Circle C Landfill to characterize potential environmental impacts at 31313 NW Paradise Park Road in La Center, WA 98642 (the Property; see Figure 1). This letter summarizes the recognized environmental conditions (RECs) and significant data gaps associated with or potentially associated with the underdrain irrigation area identified in a Phase I ESA (MFA 2024a), and the results of the underdrain irrigation area Phase II ESA conducted.

In coalition with the City of Vancouver (the City), CCPH initiated characterization of the Property under a U.S. Environmental Protection Agency (EPA) Community-Wide Assessment Grant (agreement no. BF-01J87801) for sites with suspected hazardous materials contamination.

Property Background

The Property is approximately 72.81 acres, approximately 8 acres of which was a limited purpose landfill that was operated by a nonmunicipal entity in the 1970s and 1980s. The operator (Circle C Corporation) accepted and disposed of wastes in an unlined cell on the Property (a ravine that previously contributed water to McCormick Creek). Structures and features associated with these operations were built on Property, and most continue to exist. These structures and features include an office; a maintenance shop; leachate collection tanks; collection systems for leachate, landfill gas, and underdrain water; an underdrain water irrigation area; and other infrastructure (Figure 2).

Historic reports of the Property (including landfill cross sections) state that refuse fill depth is up to 50 feet in landfill areas. Closure of the landfill began in 1991, and post-closure monitoring continues to present day. While most of the waste and associated chemicals likely remain within the boundaries of the landfill cell, evidence exists that media, including groundwater and surface water, are impacted beyond the landfill cell. Other media, including soil and soil vapor, may be impacted as well. Multiple areas of the Property are potentially impacted by the landfill activities.

This investigation focused on the underdrain irrigation area. The system was installed, and irrigation began in February 1993. The irrigation system covers an area of approximately 160 feet by 200 feet for a total area of approximately 0.75 acres. According to the irrigation system design specifications (Brown and Caldwell Consultants 1992), the irrigation system was designed to use liquid recovered from the underdrain sump for surface irrigation purposes. The system pumps liquid from a holding

tank to 12 sprinklers. The sprinklers were operated at the same time and the pump was controlled by float switches located in the holding tank. The system used the underdrain sump pump and piping system to move liquid from the underdrain sump to the irrigation holding tank.

According to a technical memorandum prepared in 2015 (SCS Engineers), liquid that accumulates in the underdrain discharge manhole is pumped to the second manhole in the southeast corner of the landfill near the primary leachate manhole. The combined leachate and underdrain system liquids were (as of 2015) pumped to the spray irrigation area. SCS Engineers indicated that routine compliance monitoring (i.e., sampling and analysis) of leachate is not required or performed, nor is monitoring of liquid discharged through the spray irrigation system. The spray irrigation area is monitored through semiannual sampling and analysis of liquids accumulated (if any) in four soil moisture lysimeters (which includes a background lysimeter, and yearly collection and analysis of soil samples. Historical lysimeter liquid sample results dating back from 1994, and soil sample results dating back to 2003, were summarized in the 2013 annual monitoring report. Parameters analyzed from the underdrain and spray irrigation system include one or more of the following: manganese, chloride, nitrate, sulfate, chemical oxygen demand, total organic carbon, arsenic, chromium, mercury, selenium, and phosphorus. According to SCS Engineers, in general, the analytical results appear to indicate that the irrigation area is functioning as intended; significant concentrations of parameters monitored do not appear to be passing the root zone or accumulating in soil.

Prior Environmental Findings

2024 Phase I ESA

MFA conducted a Phase I ESA (MFA 2024a) and identified the following recognized environmental conditions (RECs) associated with or potentially associated with the underdrain irrigation area:

- **Closed landfill cell:** A closed 8-acre landfill cell exists in a ravine on the Property. This landfill operated from 1977 to 1990 and is either known or reported to have received the following wastes: wood waste, construction wastes (including asbestos wastes), electrical wastes (potentially including transformer oils), incinerator ash from a wood treatment facility, and impacted soils from at least one petroleum cleanup project. The landfill was closed in the early 1990s and post-closure monitoring has been performed since this closure.

Post-closure monitoring has included sampling of groundwater, surface water, leachate, landfill gas, underdrain water, and monitoring of physical characteristics of the landfill surfaces. There have been multiple discussions of termination of post-closure monitoring; however, a 2015 memorandum from SCS Engineers regarding post-closure compliance indicates the following concerns and data gaps, and it is unclear whether these have been addressed:

- At least two elevation benchmark surveys (with at least a six-month timespan between surveys) need to be completed to determine whether landfill settlement has stabilized.
- Analysis of landfill gas production rate needs to be performed. There are no devices connected to the landfill gas collection system to quantify production rates, if any.
- Analysis of leachate production rate needs to be performed. There are no devices connected to the leachate collection system to quantify leachate production rates. Additionally, a not insignificant quantity of produced leachate is being discharged to the underdrain system, as opposed to being collected in the leachate collection system.
- A feasibility study to close the underdrain monitoring system is needed. Water currently collected by the underdrain system does not meet certain criteria for discharge to

Washington State surface waters, and there are no devices connected to the underdrain system to quantify underdrain discharge flow rates.

Additional issues identified by MFA but not discussed in the 2015 memorandum include the following issues:

- It is unknown whether a procedure is in place for monitoring landfill cap integrity. This is especially important given the fact that the landfill contains construction waste and potentially includes a dedicated asbestos disposal area.
- The Property does not have adequate institutional and engineering controls in place to allow for exiting post-closure monitoring. The site is unsecured, and there is evidence of recent dumping having taken place in areas.
- ***Leachate and underdrain water infiltration:*** An underdrain irrigation area has existed in the east-central portion of the Property since approximately 1993. A 2021 monitoring report states that the underdrain receives roughly one-third groundwater and two-thirds leachate, and prior reports indicate that this ratio has been substantially similar for years. This underdrain water is pumped from its collection point to an irrigation area in the east-central portion of the Property for discharge via infiltration. Soils in, and potentially groundwater beneath, this infiltration area are potentially impacted by decades of this leachate infiltration, which is a REC in this portion of the Property.

MFA identified the following significant data gaps for the Property associated with or potentially associated with the underdrain irrigation area:

- ***Leachate characterization and volumes:*** Chemical composition of leachate has been monitored at the Property since closure; however, this characterization has been limited and additional information should be obtained to determine if pollutants are in the leachate. Based on the origin of material received at the landfill, additional pollutants that may be in the leachate, but have not been analyzed for in long-term monitoring, include but are not limited to the following:
 - Wood preservative chemicals that are known to have existed at Pacific Wood Treating Company, including arsenic, chromium, pentachlorophenol, and chlorinated dibenzo-p-dioxins and dibenzofurans.
 - Polychlorinated biphenyls (PCBs) from electrical materials (including transformers).
 - Per- and polyfluoroalkyl substances (PFAS), a suite of substances that are commonly known to be present in landfill materials.

These chemicals are persistent, may potentially be in landfill materials on the Property, and have potential to migrate with groundwater. Since leachate has been regularly discovered in the landfill underdrain water, not knowing whether these chemicals are in the leachate indicates a significant data gap.

Additionally, no volumetric data of leachate has been collected to date, so it is not possible to quantify whether leachate production has decreased over time.

- ***Landfill cell underdrain piping coverage and layout:*** Documentation of the layout, extent, and condition of the underdrain piping for the landfill cell was not found and may not exist. Without review of an as-built of the underdrain pipe network, and without an analysis of the current condition of the piping, it cannot be said with certainty that this underdrain network is fully functional. Additionally, since approximately two-thirds of the liquid conveyed in the underdrain is leachate, there is potential that the underdrain has been damaged. If this damage includes blockage and the underdrain is not functioning appropriately, this commingled underdrain water

and leachate may be following preferential pathways (or migrating with groundwater flow outside of the landfill cell boundaries), rather than being discharged through the underdrain.

Additionally, no volumetric data of underdrain water has been collected to date, so it is not possible to quantify whether underdrain water production has changed over time. This data gap also makes it difficult to estimate pollutant loading in the underdrain infiltration area mentioned as a REC above. This data gap is considered significant.

- ***Condition and design of additional drainage features:*** There are additional drainage features present on the Property, and locations and conditions of these are also unknown. If and when the underdrains are assessed, similar efforts should be performed on these additional drainage features. Without knowing where the structures are, or their condition in their respective locations, it is difficult to determine whether impacted waters are entering these systems and potentially being routed to unintended discharge locations. This data gap is considered significant.
- ***Hydrogeologic coverage and assessment of groundwater quality:*** The Property has two underlying aquifers, and currently the flow direction and condition of both of these aquifers beneath the Property are determined using a network of eight monitoring wells (two each upgradient and downgradient in the deep aquifer, and two each upgradient and downgradient in the shallow aquifer). To better characterize potential impacts of landfill on groundwater quality and to better define the flow direction of both aquifers, this monitoring well network should be expanded. This data gap is considered significant.

September 2017 and March 2018 Groundwater, Leachate, and Underdrain Sampling

Sampling of media at the Property has been on-going as part of post-closure monitoring. Additional analyses that would allow for comparison with standards were added in September 2017 and March 2018 for the groundwater monitoring wells, leachate, and underdrain. This expanded suite of analytes included diesel- and oil-range total petroleum hydrocarbons (TPH), total metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, selenium, silver, thallium, and zinc), PCB Aroclors, volatile organic compounds, and semi-volatile organic compounds (SVOCs). Refer to the work plan (MFA 2024b) for a summary of the sampling results.

Phase II ESA Summary

The purpose of this Phase II ESA was to evaluate surface soil conditions in the underdrain irrigation area of the Property that are associated with landfill operations. The assessment activities were conducted consistent with the site-specific work plan (MFA 2024b) and quality assurance project plan (MFA 2021) that MFA prepared for the City. A site-specific health and safety plan for the proposed activities was prepared in general accordance with the Occupational Safety and Health Act and the Washington Administrative Code. A copy of the health and safety plan was maintained on site for use by MFA staff during the field activities.

Before conducting ground-disturbing activities, MFA contacted the Washington Utility Notification Center to locate public underground utilities entering the Property. In addition, MFA subcontracted with Applied Professional Services, Inc., of Portland, Oregon, to assess the location of underground utilities and other features. The geophysical survey and utility locate was conducted on April 8 and 10, 2024. The results of this are summarized in the work plan (MFA 2024b).

MFA conducted fieldwork at the Property on July 10, 2024. A photograph log of site conditions is provided in Attachment A.

Consistent with the work plan (MFA 2024b) and guidance (ITRC 2020), 30 soil increments (see Figure 3) were collected from locations distributed via systematic random grid sampling and composited into one incremental sampling methodology (ISM) sample. One primary ISM sample, one duplicate ISM sample, and one triplicate ISM sample were collected. Soil increments were collected from surface to 6 inches below ground surface. All sampling locations were recorded with a handheld global positioning system with submeter accuracy. The surface soil beneath the Property generally consists of silty sand. No staining, sheen, or odors were observed in the soil. Groundwater was not encountered.

Analytical Methods

The soil samples were submitted under chain-of-custody protocols to Apex Laboratories, LLC (Apex), in Tigard, Oregon. Apex holds both national and Washington State laboratory accreditations.

Apex completed the steps for compositing each ISM sample using processing protocols prior to analysis. Apex subcontracted analysis of PFAS to Bureau Veritas in Mississauga, Ontario, Canada. ISM surface soil samples collected from the underdrain irrigation area were analyzed for the following:

- PFAS by EPA Method 1633
- Diesel- and oil-range TPH by Northwest Total Petroleum Hydrocarbons Dx Method
- Metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, zinc) by EPA Method 6020B
- PCB Aroclors by EPA Method 8082A
- SVOCs by EPA Method 8270E

The laboratory reports are provided in Attachment B. A data validation memorandum is provided in Attachment C. All data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

Results

The analytical results are provided in the attached table. MFA screened the soil sample results against Ecology's MTCA Method A cleanup levels (CULs) for unrestricted land use, which are based on the reasonable maximum exposure expected to occur under residential land use condition (i.e., the land use conditions requiring the most protective CULs). MFA also screened the analytical results against MTCA Method B CULs when MTCA Method A CULs were unavailable. Values for Clark County, Washington natural background metals concentrations in soil (Ecology 1994) are also provided in the attached table for reference.

Detections below the reporting limits are recorded as the respective method reporting limit on the analytical tables and denoted with a "U" qualifier.

Consistent with the WAC 173-340-708(8), mixtures of carcinogenic polycyclic aromatic hydrocarbons (cPAHs) are considered as a single hazardous substance in evaluation of compliance with CULs such that the toxicity of a particular congener is expressed relative to the most toxic congener (benzo(a)pyrene for cPAHs). The toxicity of cPAHs as a group was assessed using a toxic equivalency (TEQ) approach. Each congener in the group is assigned a toxic equivalence factor (TEF) corresponding to the toxicity of that congener relative to the toxicity of benzo(a)pyrene. For example, a congener that is equal in toxicity to benzo(a)pyrene would have a TEF of 1. Similarly, a congener

that is half as toxic as benzo(a)pyrene would have a TEF of 0.5, and so on. Multiplying the concentration of a congener by its TEF produces the concentration for that congener that is equivalent in toxicity to the benzo(a)pyrene concentration, known as the toxicity equivalent concentration (TEC). Computing the TEC for each congener in a sample, followed by summing all TEC values, results in a single cPAH total TEC (i.e., cPAH TEQ) that can be compared to the CUL. cPAH TEQs were qualified and calculated as follows:

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

Consistent with Ecology Implementation Memorandum No. 4, the diesel- and oil-range TPH results were summed for a total detection value and were calculated as follows (Ecology 2004):

- Diesel- and oil-range hydrocarbon results qualified as non-detect and flagged with a “U” are used in the total calculation at one-half the associated value. When both results are non-detect, the highest detection limit is used.
- Diesel- and oil-range hydrocarbon results qualified as estimated and flagged with a “J” are used in the total calculation without modification.

Consistent with MTCA Method A CUL Tables 720-1 and 740-1, WAC 173-340-900, the naphthalenes (i.e., 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene) results were summed for a total naphthalenes value and calculated as follows:

- Results qualified as non-detect and flagged with a “U” are used in the total calculation at one-half the associated value.

Per WAC 173-340-840(5) and Ecology Toxics Cleanup Program Policy 840 (Data Submittal Requirements), data generated shall be submitted simultaneously in both written and electronic formats. The data presented in this report were loaded into Ecology’s Environmental Information Management System in September 2024.

The following subsections summarize analytical results (see table), arranged by chemical group.

PFAS

Perfluorooctanoic acid (PFOA) was detected at a concentration exceeding the CUL in all three soil samples. The remaining PFAS were not detected or were detected below the CULs.

Diesel- and Oil-Range TPH

Diesel- and oil-range hydrocarbons were detected in all three soil samples. These detections did not exceed CULs for unrestricted land use.

Metals

Arsenic, beryllium, chromium, copper, lead, nickel, and zinc were detected in all three soil samples. These detections did not exceed CULs for unrestricted land use and were below the natural background levels generally encountered in Clark County.

PCB Aroclors

There were no detections of PCB Aroclors in the soil samples.

SVOCs

Fluoranthene, chrysene, pyrene, and CPAH TEQ were detected at concentrations that did not exceed their applicable CULs. The remaining SVOCs were not detected.

Recommendations and Conclusions

The Phase II ESA conducted in July 2024 included an investigation of surface soils to assess the REC and recommendation associated with the underdrain irrigation area identified in the Phase I ESA (MFA 2024a). The Phase II ESA results support the following conclusions and recommendations:

- The only chemical detected in shallow soil of the underdrain irrigation area at a concentration that exceeds the applicable CULs is PFOA. Due to the exceedance of PFOA at the Property, further characterization of the impacts under MTCA and additional discrete samples will need to be collected to evaluate the nature and extent of PFAS contamination. MFA recommends this characterization be completed in accordance with Ecology's *Guidance for Investigating and Remediating PFAS Contamination in Washington State (2023)*. As part of this assessment, a natural background concentration should be established using a site-specific study to determine area background in accordance with WAC 173-340-709. Numerous studies have shown PFAS to have a ubiquitous nature in the environment. Offsite sources and atmospheric deposition can generate PFAS at a site, unrelated to any site-specific operations being the source.
- Although additional significant data gaps and RECs were identified in the Phase I ESA, this Phase II ESA did not include collection of environmental media samples from other areas on the Property (e.g., leachate tanks, maintenance shop septic tank and former UST, groundwater quality, landfill gas). MFA recommends that those be assessed to develop a for a full understanding of environmental conditions at the Property and to end post-closure care.

If you have any questions regarding this report, please contact us.

Sincerely,

Maul Foster & Alongi, Inc.



Ysabel Perez, GIT
Staff Geologist

8/25/2024

Emily Hess, LHG
Senior Hydrogeologist

Attachments

References

Limitations

Figures

Table

A—Photograph Log

B—Analytical Laboratory Reports

C—Data Validation Memorandum

References

- Brown and Caldwell Consultants. 1992. Steven A. Wilson. *Circle C Landfill Irrigation System Design*. Letter to Tom Barton, Southwest Washington Health District: Vancouver, WA. September 17.
- Ecology. 1994. *Natural Background Soil Metals Concentrations in Washington State. Publication Number 94-115*. Prepared by C. San Juan, Washington State Department of Ecology. October.
- Ecology. 2004. Memorandum (re: Determining Compliance with Method A Cleanup Levels for Diesel and Heavy Oil) to file. Implementation Memorandum Number 4. Prepared by T. Nord, Washington State Department of Ecology. June.
- Ecology. 2023. *Guidance for Investigating and Remediating PFAS Contamination in Washington State. Publication Number 22-09-058*. Washington State Department of Ecology Toxics Cleanup Program: Olympia, WA. June.
- ITRC. 2020. *Incremental Sampling Methodology (ISM) Update ISM-2*. Interstate Technology & Regulatory Council: Washington, D.C. Accessed April 22, 2024. <https://ism-2.itrcweb.org/>. October.
- MFA. 2021. *Programmatic Quality Assurance Project Plan, City of Vancouver, Washington*. Prepared for City of Vancouver, Washington. Maul Foster & Alongi, Inc.: Vancouver, WA. November 15.
- MFA. 2024a. *Phase I Environmental Site Assessment, Circle C Landfill, 31313 NW Paradise Park Road, La Center, WA 98642*. Prepared for Circle C Corporation. Maul Foster & Alongi, Inc., Vancouver, Washington. January 22
- MFA. 2024b. *Underdrain Irrigation Area Site-Specific Sampling Work Plan, Circle C Landfill, 31313 NW Paradise Park Road, La Center, WA 98642*. Prepared for Circle C Corporation. Maul Foster & Alongi, Inc.: Vancouver, WA. July 1.
- SCS Engineers. 2015. David Lamadrid and Louis Caruso. *Evaluation of the Circle C Landfill, Ridgefield, Washington, to Determine Compliance for Termination of Post-Closure Activities*. Letter to Caren Carlson and Skip Carlson, Circle C Corporation. February 3.

Limitations

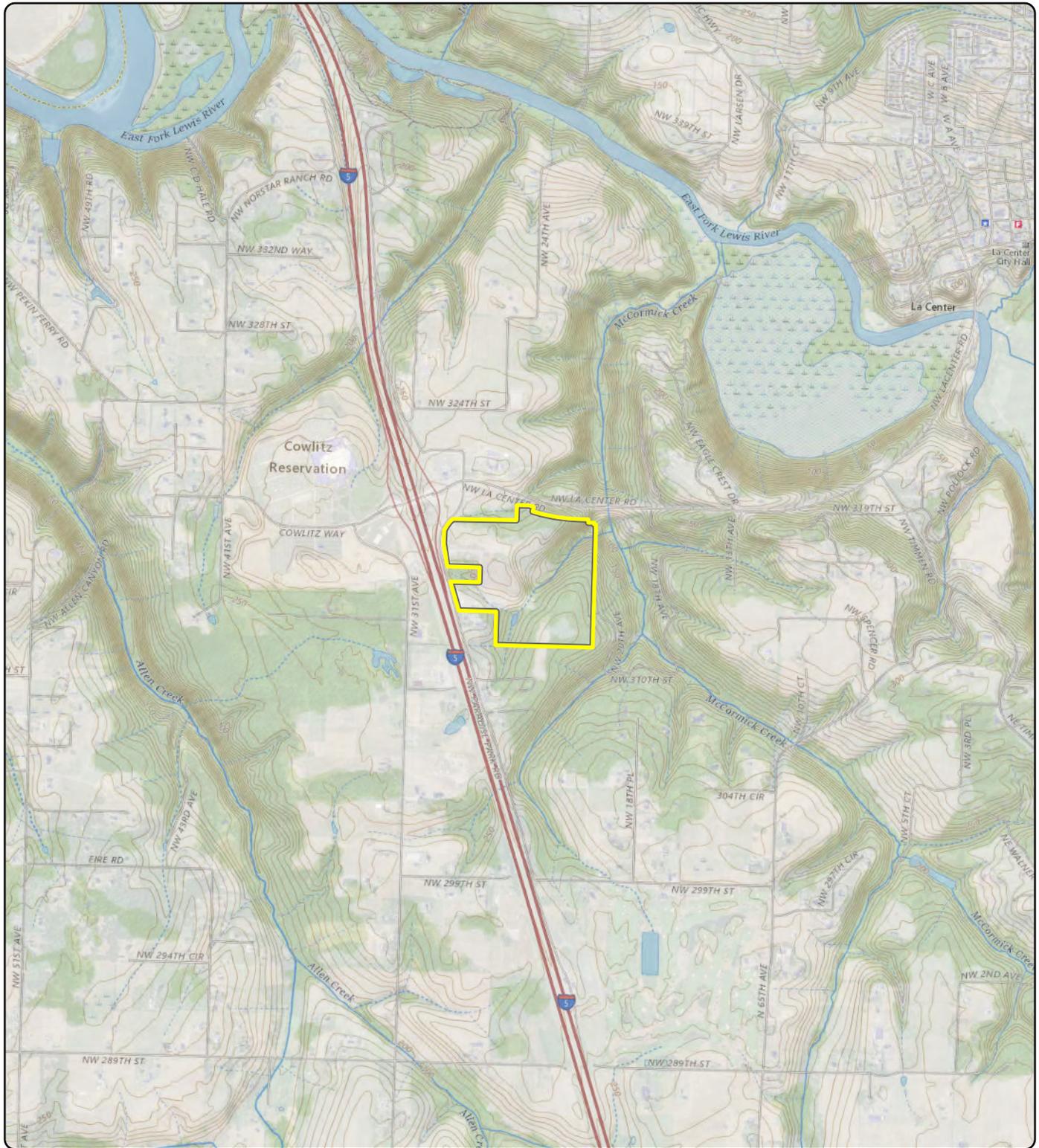
The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for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

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

Figures



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Notes
 U.S. Geological Survey 7.5-minute topographic quadrangle (2020): Ridgefield.
 Township 4 north, range 1 east, section 9.

Data Source
 Property boundary obtained from Clark County.

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Legend
 Property Boundary

Figure 1
Property Location

Circle C Landfill
 La Center, WA



Project: M0363.17.003 Produced By: jstetrom Reviewed By: ehess Print Date: 1/22/2024 Path: X:\0363.17\City of Vancouver EPA Grant\Appl\03\004\Pro\M0363.17\003_004_Circle C Landfill.aprx\Fig 2-2 Landfill Features



Figure 2 Landfill Features

Circle C Landfill
La Center, WA

Legend

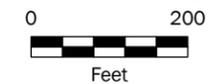
-  Monitoring Well
-  Gas Monitoring Probe
-  Lysimeter
-  Domestic Well
-  Septic Tank
-  Manhole Cover
-  Underdrain Sump
-  Approximate Waste Boundary
-  Underdrain Irrigation Area
-  Dedicated Abestos Disposal Area
-  Former UST
-  Former AST
-  Pond
-  Stream
-  Property Boundary
-  Parcel

Notes

Landfill features are approximate and were digitized from Circle C Landfill 2021 Annual Report for Groundwater and Surface Water Monitoring prepared by Bright Fields Groundwater, Inc., on February 22, 2022.

Location of former UST is unknown. Property owner representative indicated it may have been south of the shop.

AST = aboveground storage tank.
UST = underground storage tank.



Data Sources

Streams and pond obtained from the U.S. Geological Survey National Hydrographic Dataset; aerial photograph obtained from the U.S. Department of Agriculture; parcel data obtained from Clark County.

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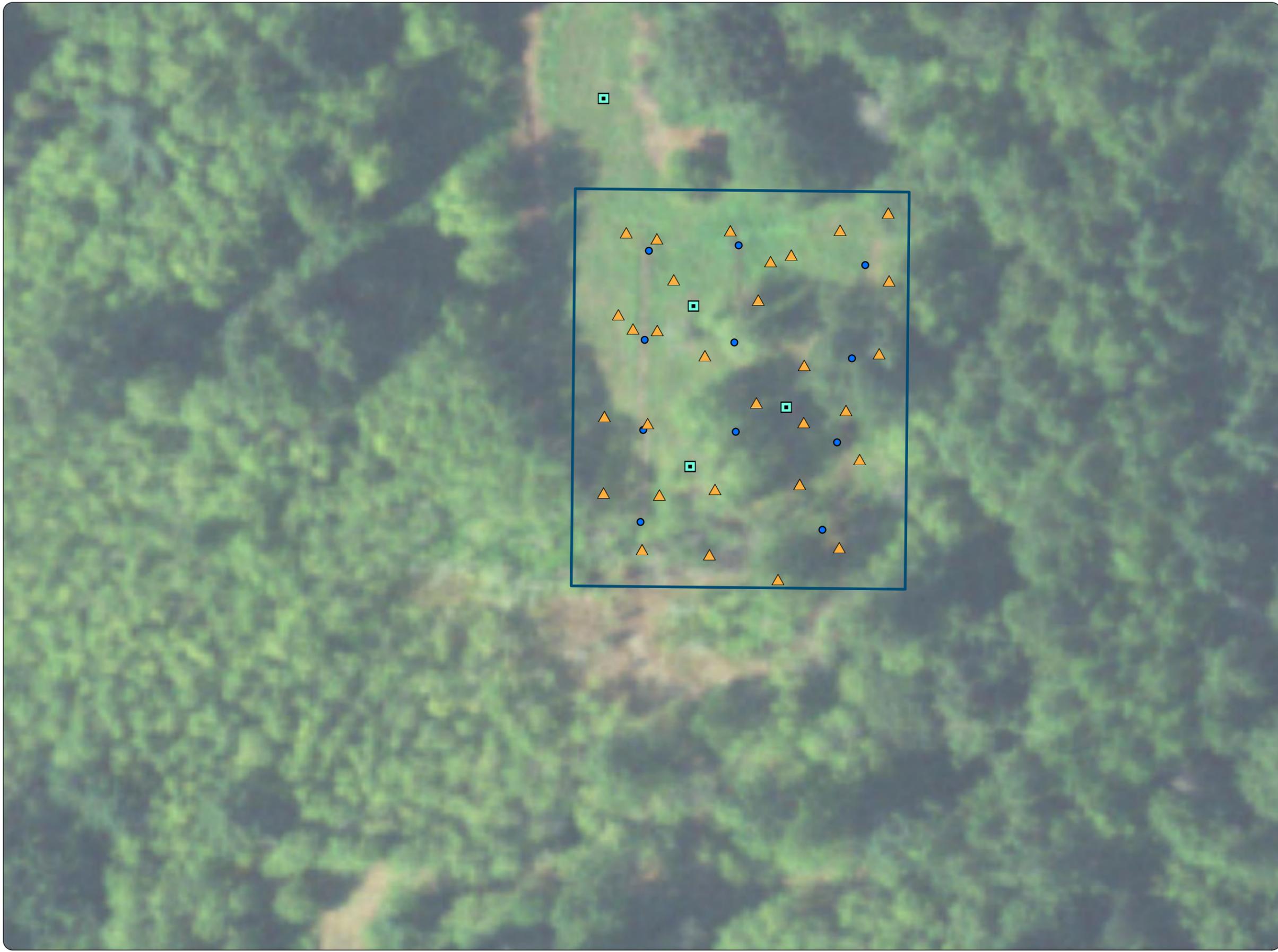


Figure 3 Sample Locations Underdrain Irrigation Area

Circle C Landfill
La Center, WA

Legend

-  DU-1: Underdrain Irrigation Area
-  Lysimeter
-  Irrigation Discharge Point
-  Soil Increment for CCLF-001

Notes
Lysimeter and irrigation discharge point locations obtained from geophysical survey conducted by Applied Professional Services, Inc. in April 2024. DU = sampling decision unit.



Data Sources
Aerial photograph obtained from the U.S. Department of Agriculture.



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Table



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Table
Soil Analytical Results
Circle C Landfill
Circle C Corporation



Location:	MTCA Method A, Unrestricted Land Use ⁽¹⁾	MTCA Method B ⁽¹⁾		Washington State Background Metals ⁽²⁾	CCLF-001	CCLF-001	CCLF-001
Sample Name:		Cancer	Noncancer	Clark County	CCLF-001-SS-0.5-A	CCLF-001-SS-0.5-B	CCLF-001-SS-0.5-C
Sample Date:					07/10/2024	07/10/2024	07/10/2024
PFAS (ng/g)							
3:3 FTCA	NV	NV	NV	NV	0.26 U	0.26 U	0.26 U
4:2 FTSA	NV	NV	NV	NV	0.094 U	0.094 U	0.094 U
5:3 FTCA	NV	NV	NV	NV	0.89 U	0.89 U	0.89 U
6:2 FTSA	NV	NV	NV	NV	0.12 U	0.12 U	0.12 U
7:3 FTCA	NV	NV	NV	NV	0.85 U	0.85 U	0.85 U
8:2 FTSA	NV	NV	NV	NV	0.15 U	0.15 U	0.15 U
ADONA	NV	NV	NV	NV	0.077 U	0.077 U	0.077 U
EtFOSA	NV	NV	NV	NV	0.013 U	0.013 U	0.013 U
EtFOSAA	NV	NV	NV	NV	0.059 U	0.059 U	0.059 U
EtFOSE	NV	NV	NV	NV	0.59 U	0.59 U	0.59 U
F-53B Minor	NV	NV	NV	NV	0.096 U	0.096 U	0.096 U
F-53B Major	NV	NV	NV	NV	0.082 U	0.082 U	0.082 U
HFPO-DA (GenX)	NV	NV	240	NV	0.077 U	0.077 U	0.077 U
MeFOSA	NV	NV	NV	NV	0.03 U	0.03 U	0.03 U
MeFOSAA	NV	NV	NV	NV	0.046 U	0.046 U	0.046 U
MeFOSE	NV	NV	NV	NV	0.26 U	0.26 U	0.26 U
NFDHA	NV	NV	NV	NV	0.54 U	0.54 U	0.54 U
PFDS	NV	NV	NV	NV	0.02 U	0.02 U	0.02 U
PFDoS	NV	NV	NV	NV	0.063 U	0.063 U	0.063 U
PFBA	NV	NV	80,000	NV	0.26 J	0.24 J	0.23 J
PFBS	NV	NV	24,000	NV	0.018 U	0.018 U	0.018 U
PFDA	NV	NV	NV	NV	0.03 U	0.03 U	0.03 U
PFDoA	NV	NV	NV	NV	0.03 U	0.03 U	0.03 U
PFEESA	NV	NV	NV	NV	0.063 U	0.063 U	0.063 U
PFHpA	NV	NV	NV	NV	0.091 J	0.091 J	0.081 J
PFHpS	NV	NV	NV	NV	0.045 U	0.045 U	0.045 U
PFHxA	NV	NV	40,000	NV	0.15 J	0.15 J	0.13 J
PFHxS	NV	NV	780	NV	0.13 J	0.12 J	0.1 J
PFMBA	NV	NV	NV	NV	0.05 U	0.05 U	0.05 U
PFMPA	NV	NV	NV	NV	0.024 U	0.024 U	0.024 U
PFNA	NV	NV	200	NV	0.068 J	0.061 J	0.064 J
PFNS	NV	NV	NV	NV	0.04 U	0.04 U	0.04 U
PFOA	NV	0.034	2.4	NV	0.45	0.43	0.42
PFOS	NV	25	8	NV	0.65	0.61	0.62
PFOSA	NV	NV	NV	NV	0.018 U	0.018 U	0.018 U
PFPeA	NV	NV	NV	NV	0.15 J	0.14 J	0.13 J
PFPeS	NV	NV	NV	NV	0.026 U	0.026 U	0.026 U
PFTeDA	NV	NV	NV	NV	0.025 U	0.025 U	0.025 U
PFTeDA	NV	NV	NV	NV	0.04 U	0.04 U	0.04 U
PFTeDA	NV	NV	NV	NV	0.04 U	0.04 U	0.04 U
PFUnA	NV	NV	NV	NV	0.031 U	0.031 U	0.031 U

**Table
Soil Analytical Results
Circle C Landfill
Circle C Corporation**



Location:	MTCA Method A, Unrestricted Land Use ⁽¹⁾	MTCA Method B ⁽¹⁾		Washington State Background Metals ⁽²⁾	CCLF-001	CCLF-001	CCLF-001
Sample Name:		Cancer	Noncancer	Clark County	CCLF-001-SS-0.5-A	CCLF-001-SS-0.5-B	CCLF-001-SS-0.5-C
Sample Date:					07/10/2024	07/10/2024	07/10/2024
TPH (mg/kg)							
Diesel-range hydrocarbons	2,000	NV	NV	NV	18.2 U	18.1 U	17.4 U
Motor-oil-range hydrocarbons	2,000	NV	NV	NV	39.7	36.5	42.3
Diesel+Oil ^(a)	2,000 ^(b)	NV	NV	NV	48.8	45.6	51.0
Total Metals (mg/kg)							
Antimony	NV	NV	32	NV	1 U	1.05 U	1.02 U
Arsenic	20	0.67	24	6	3.64	4.09	3.95
Beryllium	NV	NV	160	2	0.59	0.695	0.693
Cadmium	2	NV	80	1	0.2 U	0.21 U	0.204 U
Chromium	2,000 ^(c)	NV	120,000 ^(c)	27	16.6	19.7	17.8
Copper	NV	NV	3,200	34	12.5	14.6	13.2
Lead	250	NV	NV	17	12.3	13.5	13
Mercury	2	NV	NV	0.04	0.0801 U	0.0841 U	0.0818 U
Nickel	NV	NV	1,600	21	10.8	12.9	11.5
Selenium	NV	NV	400	NV	1 U	1.05 U	1.02 U
Silver	NV	NV	400	NV	0.2 U	0.21 U	0.204 U
Thallium	NV	NV	0.8	NV	0.2 U	0.21 U	0.204 U
Zinc	NV	NV	24,000	96	61.6 J	74	66.9
PCBs (mg/kg)							
Aroclor 1016	NV	14	5.6	NV	0.00897 U	0.00888 U	0.00894 U
Aroclor 1221	NV	NV	NV	NV	0.00897 U	0.00888 U	0.00894 U
Aroclor 1232	NV	NV	NV	NV	0.00897 U	0.00888 U	0.00894 U
Aroclor 1242	NV	NV	NV	NV	0.00897 U	0.00888 U	0.00894 U
Aroclor 1248	NV	NV	NV	NV	0.00897 U	0.00888 U	0.00894 U
Aroclor 1254	NV	0.5	1.6	NV	0.00897 U	0.00888 U	0.00894 U
Aroclor 1260	NV	0.5	NV	NV	0.00897 U	0.00888 U	0.00894 U
Total PCBs ^(d)	1	0.5	NV	NV	0.00897 U	0.00888 U	0.00894 U
SVOCs (mg/kg)							
1,2,4-Trichlorobenzene	NV	34	800	NV	0.0254 U	0.0261 U	0.0268 U
1,2-Dichlorobenzene	NV	NV	7,200	NV	0.0254 U	0.0261 U	0.0268 U
1,2-Dinitrobenzene	NV	NV	8	NV	0.254 U	0.261 U	0.268 U
1,2-Diphenylhydrazine	NV	1.3	NV	NV	0.0254 U	0.0261 U	0.0268 U
1,3-Dichlorobenzene	NV	NV	NV	NV	0.0254 U	0.0261 U	0.0268 U
1,3-Dinitrobenzene	NV	NV	8	NV	0.254 U	0.261 U	0.268 U
1,4-Dichlorobenzene	NV	190	5,600	NV	0.0254 U	0.0261 U	0.0268 U
1,4-Dinitrobenzene	NV	NV	8	NV	0.254 U	0.261 U	0.268 U
1-Methylnaphthalene	NV	34	5,600	NV	0.0203 U	0.0209 U	0.0214 U
2,2'-oxybis(1-Chloropropane)	NV	NV	NV	NV	0.0254 U	0.0261 U	0.0268 U
2,3,4,6-Tetrachlorophenol	NV	NV	2,400	NV	0.0507 U	0.0521 U	0.0534 UJ
2,3,5,6-Tetrachlorophenol	NV	NV	NV	NV	0.0507 U	0.0521 U	0.0534 UJ
2,4,5-Trichlorophenol	NV	NV	8,000	NV	0.0507 U	0.0521 U	0.0534 U
2,4,6-Trichlorophenol	NV	91	80	NV	0.0507 U	0.0521 U	0.0534 U
2,4-Dichlorophenol	NV	NV	240	NV	0.0507 U	0.0521 U	0.0534 UJ
2,4-Dimethylphenol	NV	NV	1,600	NV	0.0507 U	0.0521 U	0.0534 UJ
2,4-Dinitrophenol	NV	NV	160	NV	0.254 U	0.261 U	0.268 UJ

**Table
Soil Analytical Results
Circle C Landfill
Circle C Corporation**



Location:	MTCA Method A, Unrestricted Land Use ⁽¹⁾	MTCA Method B ⁽¹⁾		Washington State Background Metals ⁽²⁾ Clark County	CCLF-001	CCLF-001	CCLF-001
Sample Name:		Cancer	Noncancer		CCLF-001-SS-0.5-A	CCLF-001-SS-0.5-B	CCLF-001-SS-0.5-C
Sample Date:					07/10/2024	07/10/2024	07/10/2024
2,4-Dinitrotoluene	NV	3.2	160	NV	0.102 U	0.105 U	0.107 U
2,6-Dinitrotoluene	NV	0.67	24	NV	0.102 U	0.105 U	0.107 U
2-Chloronaphthalene	NV	NV	6,400	NV	0.0102 U	0.0105 U	0.0107 U
2-Chlorophenol	NV	NV	400	NV	0.0507 U	0.0521 U	0.0534 U
2-Methylnaphthalene	NV	NV	320	NV	0.0203 U	0.0209 U	0.0214 U
2-Methylphenol	NV	NV	4,000	NV	0.0254 U	0.0261 U	0.0268 U
2-Nitroaniline	NV	NV	800	NV	0.203 U	0.209 U	0.214 U
2-Nitrophenol	NV	NV	NV	NV	0.102 U	0.105 U	0.107 U
3- & 4-Methylphenol	NV	NV	NV	NV	0.0254 U	0.0261 U	0.0268 U
3,3-Dichlorobenzidine	NV	2.2	NV	NV	0.203 UJ	0.209 UJ	0.214 R
3-Nitroaniline	NV	NV	NV	NV	0.203 U	0.209 U	0.214 UJ
4,6-Dinitro-2-methylphenol	NV	NV	6.4	NV	0.254 U	0.261 U	0.268 U
4-Bromophenyl phenyl ether	NV	NV	NV	NV	0.0254 U	0.0261 U	0.0268 U
4-Chloro-3-methylphenol	NV	NV	8,000	NV	0.102 U	0.105 U	0.107 U
4-Chloroaniline	NV	5	320	NV	0.0254 U	0.0261 U	0.0268 R
4-Chlorophenyl phenyl ether	NV	NV	NV	NV	0.0254 U	0.0261 U	0.0268 U
4-Nitroaniline	NV	50	320	NV	0.203 U	0.209 U	0.214 UJ
4-Nitrophenol	NV	NV	NV	NV	0.102 U	0.105 U	0.107 UJ
Acenaphthene	NV	NV	4,800	NV	0.0102 U	0.0105 U	0.0107 U
Acenaphthylene	NV	NV	NV	NV	0.0102 U	0.0105 U	0.0107 U
Aniline	NV	180	560	NV	0.0507 U	0.0521 U	0.0534 UJ
Anthracene	NV	NV	24,000	NV	0.0102 U	0.0105 U	0.0107 U
Benzo(a)anthracene	NV	NV	NV	NV	0.0102 U	0.0105 U	0.0107 U
Benzo(a)pyrene	0.1	0.19	24	NV	0.0152 U	0.0157 U	0.0161 U
Benzo(b)fluoranthene	NV	NV	NV	NV	0.0152 U	0.0157 U	0.0161 U
Benzo(ghi)perylene	NV	NV	NV	NV	0.0102 U	0.0105 U	0.0107 U
Benzo(k)fluoranthene	NV	NV	NV	NV	0.0152 U	0.0157 U	0.0161 U
Benzoic acid	NV	NV	320,000	NV	1.27 U	1.3 U	1.34 U
Benzyl alcohol	NV	NV	8,000	NV	0.0507 U	0.0521 U	0.0534 U
Bis(2-chloroethoxy)methane	NV	NV	240	NV	0.0254 U	0.0261 U	0.0268 U
Bis(2-chloroethyl) ether	NV	0.91	NV	NV	0.0254 U	0.0261 U	0.0268 U
Bis(2-ethylhexyl) phthalate	NV	71	1,600	NV	0.152 U	0.157 U	0.161 U
Butylbenzyl phthalate	NV	530	16,000	NV	0.102 U	0.105 U	0.107 U
Carbazole	NV	NV	NV	NV	0.0152 U	0.0157 U	0.0161 U
Chrysene	NV	NV	NV	NV	0.0102 U	0.0131	0.0107 U
Di(2-ethylhexyl)adipate	NV	830	48,000	NV	0.254 U	0.261 U	0.268 U
Dibenzo(a,h)anthracene	NV	NV	NV	NV	0.0102 U	0.0105 U	0.0107 U
Dibenzofuran	NV	NV	80	NV	0.0102 U	0.0105 U	0.0107 U
Diethyl phthalate	NV	NV	64,000	NV	0.102 U	0.105 U	0.107 U
Dimethyl phthalate	NV	NV	NV	NV	0.102 U	0.105 U	0.107 U
Di-n-butyl phthalate	NV	NV	8,000	NV	0.102 U	0.105 U	0.107 U
Di-n-octyl phthalate	NV	NV	800	NV	0.102 U	0.105 U	0.107 U
Fluoranthene	NV	NV	3,200	NV	0.0156	0.0318	0.0226
Fluorene	NV	NV	3,200	NV	0.0102 U	0.0105 U	0.0107 U
Hexachlorobenzene	NV	0.63	64	NV	0.0102 U	0.0105 U	0.0107 U

**Table
Soil Analytical Results
Circle C Landfill
Circle C Corporation**



Location:	MTCA Method A, Unrestricted Land Use ⁽¹⁾	MTCA Method B ⁽¹⁾		Washington State Background Metals ⁽²⁾ Clark County	CCLF-001	CCLF-001	CCLF-001
Sample Name:		Cancer	Noncancer		CCLF-001-SS-0.5-A	CCLF-001-SS-0.5-B	CCLF-001-SS-0.5-C
Sample Date:					07/10/2024	07/10/2024	07/10/2024
Hexachlorobutadiene	NV	13	80	NV	0.0254 U	0.0261 U	0.0268 U
Hexachlorocyclopentadiene	NV	NV	480	NV	0.0507 U	0.0521 U	0.0534 U
Hexachloroethane	NV	25	56	NV	0.0254 U	0.0261 U	0.0268 U
Indeno(1,2,3-cd)pyrene	NV	NV	NV	NV	0.0102 U	0.0105 U	0.0107 U
Isophorone	NV	1,100	16,000	NV	0.0254 U	0.0261 U	0.0268 U
Naphthalene	5	NV	1,600	NV	0.0203 U	0.0209 U	0.0214 U
Nitrobenzene	NV	NV	160	NV	0.102 U	0.105 U	0.107 U
N-Nitrosodimethylamine	NV	0.0037	0.64	NV	0.0254 U	0.0261 U	0.0268 U
N-Nitrosodiphenylamine	NV	200	NV	NV	0.0254 U	0.0261 U	0.0268 U
N-Nitrosodipropylamine	NV	0.14	NV	NV	0.0254 U	0.0261 U	0.0268 U
Pentachlorophenol	NV	2.5	400	NV	0.102 U	0.105 U	0.107 U
Phenanthrene	NV	NV	NV	NV	0.0102 U	0.0105 U	0.0107 U
Phenol	NV	NV	24,000	NV	0.0203 U	0.0209 U	0.0214 U
Pyrene	NV	NV	2,400	NV	0.0123	0.0204	0.015
Pyridine	NV	NV	80	NV	0.0507 U	0.0521 U	0.0534 U
cPAH TEQ ^{(e)(3)}	NA ^(f)	0.19	24	NV	0.0152 U	0.0111	0.0161 U
Total Naphthalenes ^(g)	5	NV	1,600	NV	0.0203 U	0.0209 U	0.0214 U

Table
Soil Analytical Results
Circle C Landfill
Circle C Corporation



Notes

Data summation rules are as follows: non-detect results are multiplied by one-half when used for sums or TEQ calculations. When all results are non-detect, the highest reporting limit is provided as the sum or TEQ.

Metals results screened to MTCA cleanup levels only if results are above Washington State Background Metals values (if available).

Shading (color key below) indicates values that exceed screening criteria: non-detects (U and UJ) and rejected results (R) were not compared with screening criteria. Where multiple criteria are exceeded, results are shaded based on the highest value.

MTCA Method B, cancer

cPAH = carcinogenic polycyclic aromatic hydrocarbon.

EPA = U.S. Environmental Protection Agency.

ft bgs = feet below ground surface.

J = result is estimated.

mg/kg = milligrams per kilogram.

MTCA = Model Toxics Control Act.

NA = not applicable.

ng/g = nanogram per gram.

NV = no value.

PFAS = per- and polyfluoroalkyl substances.

PCB = polychlorinated biphenyl.

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

SVOC = semivolatile organic compound.

TEQ = toxicity equivalency.

TPH = total petroleum hydrocarbons.

U = result is non-detect at the method reporting limit.

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

^(a)Diesel+Oil is the sum of diesel-range and motor-oil-range hydrocarbons.

^(b)Value is the lowest applicable screening value for diesel- and lube-oil-range hydrocarbons.

^(c)Screening level for Chromium III.

^(d)Total PCBs is the sum of all PCB Aroclors.

^(e)cPAH TEQ calculated as the sum of each cPAH concentration multiplied by the corresponding toxic equivalent factor.

^(f)MTCA Method A value for benzo(a)pyrene and cPAH TEQ is outdated. Screening level shown is MTCA Method B, which reflects toxicity updates from 2021.

^(g)Total naphthalenes is the sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene.

References

⁽¹⁾Ecology. 2024. *Cleanup Levels and Risk Calculation (CLARC)*. Washington State Department of Ecology Toxics Cleanup Program. July.

⁽²⁾Ecology. 1994. *Natural Background Soil Metals Concentrations in Washington State*. Publication No. 94-115. Washington State Department of Ecology Toxics Cleanup Program: Olympia, WA. October.

⁽³⁾Ecology. 2015. *Implementation Memorandum #10: Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors (TEFs)*. Publication No. 15-09-049. Washington State Department of Ecology, Toxics Cleanup Program. April 20.

Attachment A

Photograph Log



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Photographs

Project Name: Circle C Landfill
Project Number: M0363.17.003
Location: 31313 NW Paradise Park Road, La Center, WA 98642
Date: July 10, 2024

Photo No. 1.

Description

View of the underdrain irrigation area, facing north. Sample locations shown by white flags.



Photo No. 2.

Description

Surface soil sample aliquot from underdrain irrigation area. Sample locations shown by white flags.





Photographs

Project Name: Circle C Landfill
Project Number: M0363.17.003
Location: 31313 NW Paradise Park Road, La Center, WA 98642
Date: July 10, 2024

Photo No. 3.

Description

Surface soil sample from one aliquot. Surface soils consisted of silty sand.



Photo No. 4.

Description

Sample collection near central section of sample area prior to sampling.





Photographs

Project Name: Circle C Landfill
Project Number: M0363.17.003
Location: 31313 NW Paradise Park Road, La Center, WA 98642
Date: July 10, 2024

Photo No. 5.

Description

Sample collection near northwest corner of underdrain irrigation area, facing north.



Photo No. 6.

Description

View of surface soil sample aliquot. Surface soils mainly consisted of silty sand.





Photographs

Project Name: Circle C Landfill
Project Number: M0363.17.003
Location: 31313 NW Paradise Park Road, La Center, WA 98642
Date: July 10, 2024

Photo No. 7.

Description

View of the underdrain irrigation area.



Photo No. 8.

Description

Surface soil composition from aliquot near southeast corner of sampling area. Surface soils mainly consisted of silty sand.



Attachment B

Analytical Laboratory Reports



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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Thursday, August 1, 2024

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

RE: A4G1133 - Circle C Landfill - M0363.17.003

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 A4G1133, which was received by the laboratory on 7/11/2024 at 11:17:00AM.

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

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

Cooler Receipt Information	
<p><u>Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.</u></p> <p>(See Cooler Receipt Form for details)</p>	
<p>Default Cooler</p>	<p style="text-align: center; border-top: 1px solid black;">2.1 degC</p>

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



Apex Laboratories

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

Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

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

<u>Maul Foster & Alongi, INC.</u> 3140 NE Broadway Street Portland, OR 97232	Project: <u>Circle C Landfill</u> Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
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ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
CCLF-001-SS-0.5-A	A4G1133-01	Soil	07/10/24 12:25	07/11/24 11:17
CCLF-001-SS-0.5-A	A4G1133-02	Soil	07/10/24 12:25	07/11/24 11:17
CCLF-001-SS-0.5-B	A4G1133-03	Soil	07/10/24 14:10	07/11/24 11:17
CCLF-001-SS-0.5-B	A4G1133-04	Soil	07/10/24 14:10	07/11/24 11:17
CCLF-001-SS-0.5-C	A4G1133-05	Soil	07/10/24 15:05	07/11/24 11:17
CCLF-001-SS-0.5-C	A4G1133-06	Soil	07/10/24 15:05	07/11/24 11:17

Apex Laboratories

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
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ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-A (A4G1133-02)				Matrix: Soil		Batch: 24G0735		PRO
Diesel	ND	---	18.2	mg/kg dry	1	07/23/24 20:23	NWTPH-Dx	
Oil	39.7	---	36.5	mg/kg dry	1	07/23/24 20:23	NWTPH-Dx	F-17
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 62 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>07/23/24 20:23</i>	<i>NWTPH-Dx</i>
CCLF-001-SS-0.5-B (A4G1133-04)				Matrix: Soil		Batch: 24G0735		PRO
Diesel	ND	---	18.1	mg/kg dry	1	07/23/24 20:44	NWTPH-Dx	
Oil	36.5	---	36.3	mg/kg dry	1	07/23/24 20:44	NWTPH-Dx	F-17
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 64 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>07/23/24 20:44</i>	<i>NWTPH-Dx</i>
CCLF-001-SS-0.5-C (A4G1133-06)				Matrix: Soil		Batch: 24G0735		PRO
Diesel	ND	---	17.4	mg/kg dry	1	07/23/24 21:04	NWTPH-Dx	
Oil	42.3	---	34.8	mg/kg dry	1	07/23/24 21:04	NWTPH-Dx	F-17
<i>Surrogate: o-Terphenyl (Surr)</i>		<i>Recovery: 65 %</i>		<i>Limits: 50-150 %</i>		<i>1</i>	<i>07/23/24 21:04</i>	<i>NWTPH-Dx</i>

Apex Laboratories

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

Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
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ANALYTICAL SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-A (A4G1133-02)				Matrix: Soil		Batch: 24G0637		C-07, PRO
Aroclor 1016	ND	---	8.97	ug/kg dry	1	07/19/24 18:59	EPA 8082A	
Aroclor 1221	ND	---	8.97	ug/kg dry	1	07/19/24 18:59	EPA 8082A	
Aroclor 1232	ND	---	8.97	ug/kg dry	1	07/19/24 18:59	EPA 8082A	
Aroclor 1242	ND	---	8.97	ug/kg dry	1	07/19/24 18:59	EPA 8082A	
Aroclor 1248	ND	---	8.97	ug/kg dry	1	07/19/24 18:59	EPA 8082A	
Aroclor 1254	ND	---	8.97	ug/kg dry	1	07/19/24 18:59	EPA 8082A	
Aroclor 1260	ND	---	8.97	ug/kg dry	1	07/19/24 18:59	EPA 8082A	
<i>Surrogate: Decachlorobiphenyl (Surr)</i>		<i>Recovery: 96 %</i>		<i>Limits: 60-125 %</i>		<i>1</i>	<i>07/19/24 18:59</i>	<i>EPA 8082A</i>
CCLF-001-SS-0.5-B (A4G1133-04)				Matrix: Soil		Batch: 24G0637		C-07, PRO
Aroclor 1016	ND	---	8.88	ug/kg dry	1	07/19/24 19:34	EPA 8082A	
Aroclor 1221	ND	---	8.88	ug/kg dry	1	07/19/24 19:34	EPA 8082A	
Aroclor 1232	ND	---	8.88	ug/kg dry	1	07/19/24 19:34	EPA 8082A	
Aroclor 1242	ND	---	8.88	ug/kg dry	1	07/19/24 19:34	EPA 8082A	
Aroclor 1248	ND	---	8.88	ug/kg dry	1	07/19/24 19:34	EPA 8082A	
Aroclor 1254	ND	---	8.88	ug/kg dry	1	07/19/24 19:34	EPA 8082A	
Aroclor 1260	ND	---	8.88	ug/kg dry	1	07/19/24 19:34	EPA 8082A	
<i>Surrogate: Decachlorobiphenyl (Surr)</i>		<i>Recovery: 95 %</i>		<i>Limits: 60-125 %</i>		<i>1</i>	<i>07/19/24 19:34</i>	<i>EPA 8082A</i>
CCLF-001-SS-0.5-C (A4G1133-06)				Matrix: Soil		Batch: 24G0637		C-07, PRO
Aroclor 1016	ND	---	8.94	ug/kg dry	1	07/19/24 20:10	EPA 8082A	
Aroclor 1221	ND	---	8.94	ug/kg dry	1	07/19/24 20:10	EPA 8082A	
Aroclor 1232	ND	---	8.94	ug/kg dry	1	07/19/24 20:10	EPA 8082A	
Aroclor 1242	ND	---	8.94	ug/kg dry	1	07/19/24 20:10	EPA 8082A	
Aroclor 1248	ND	---	8.94	ug/kg dry	1	07/19/24 20:10	EPA 8082A	
Aroclor 1254	ND	---	8.94	ug/kg dry	1	07/19/24 20:10	EPA 8082A	
Aroclor 1260	ND	---	8.94	ug/kg dry	1	07/19/24 20:10	EPA 8082A	
<i>Surrogate: Decachlorobiphenyl (Surr)</i>		<i>Recovery: 96 %</i>		<i>Limits: 60-125 %</i>		<i>1</i>	<i>07/19/24 20:10</i>	<i>EPA 8082A</i>

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-A (A4G1133-02RE1)				Matrix: Soil		Batch: 24G0705		PRO
Acenaphthene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Acenaphthylene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Anthracene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Benz(a)anthracene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Benzo(a)pyrene	ND	---	15.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Benzo(b)fluoranthene	ND	---	15.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Benzo(k)fluoranthene	ND	---	15.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	Q-37
Benzo(g,h,i)perylene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Chrysene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Dibenz(a,h)anthracene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Fluoranthene	15.6	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Fluorene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
1-Methylnaphthalene	ND	---	20.3	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2-Methylnaphthalene	ND	---	20.3	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Naphthalene	ND	---	20.3	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Phenanthrene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Pyrene	12.3	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Carbazole	ND	---	15.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Dibenzofuran	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2-Chlorophenol	ND	---	50.7	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
4-Chloro-3-methylphenol	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2,4-Dichlorophenol	ND	---	50.7	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2,4-Dimethylphenol	ND	---	50.7	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2,4-Dinitrophenol	ND	---	254	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	---	254	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2-Methylphenol	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
3+4-Methylphenol(s)	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2-Nitrophenol	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
4-Nitrophenol	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Pentachlorophenol (PCP)	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Phenol	ND	---	20.3	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	---	50.7	ug/kg dry	4	07/23/24 22:34	EPA 8270E	

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-A (A4G1133-02RE1)				Matrix: Soil		Batch: 24G0705		PRO
2,3,5,6-Tetrachlorophenol	ND	---	50.7	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2,4,5-Trichlorophenol	ND	---	50.7	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2,4,6-Trichlorophenol	ND	---	50.7	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Bis(2-ethylhexyl)phthalate	ND	---	152	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Butyl benzyl phthalate	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Diethylphthalate	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Dimethylphthalate	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Di-n-butylphthalate	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Di-n-octyl phthalate	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
N-Nitrosodimethylamine	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
N-Nitrosodiphenylamine	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Bis(2-Chloroethoxy) methane	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Bis(2-Chloroethyl) ether	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Hexachlorobenzene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Hexachlorobutadiene	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Hexachlorocyclopentadiene	ND	---	50.7	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Hexachloroethane	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2-Chloronaphthalene	ND	---	10.2	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
1,2,4-Trichlorobenzene	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
4-Bromophenyl phenyl ether	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
4-Chlorophenyl phenyl ether	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Aniline	ND	---	50.7	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
4-Chloroaniline	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2-Nitroaniline	ND	---	203	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
3-Nitroaniline	ND	---	203	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
4-Nitroaniline	ND	---	203	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Nitrobenzene	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2,4-Dinitrotoluene	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
2,6-Dinitrotoluene	ND	---	102	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Benzoic acid	ND	---	1270	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Benzyl alcohol	ND	---	50.7	ug/kg dry	4	07/23/24 22:34	EPA 8270E	Q-37

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
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ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-A (A4G1133-02RE1)				Matrix: Soil		Batch: 24G0705		PRO
Isophorone	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Azobenzene (1,2-DPH)	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	---	254	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
3,3'-Dichlorobenzidine	ND	---	203	ug/kg dry	4	07/23/24 22:34	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	---	254	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
1,3-Dinitrobenzene	ND	---	254	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
1,4-Dinitrobenzene	ND	---	254	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
Pyridine	ND	---	50.7	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
1,2-Dichlorobenzene	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
1,3-Dichlorobenzene	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
1,4-Dichlorobenzene	ND	---	25.4	ug/kg dry	4	07/23/24 22:34	EPA 8270E	
<i>Surrogate: Nitrobenzene-d5 (Surr)</i>			<i>Recovery: 75 %</i>	<i>Limits: 37-122 %</i>	<i>4</i>	<i>07/23/24 22:34</i>	<i>EPA 8270E</i>	
<i>2-Fluorobiphenyl (Surr)</i>			<i>82 %</i>	<i>44-120 %</i>	<i>4</i>	<i>07/23/24 22:34</i>	<i>EPA 8270E</i>	
<i>Phenol-d6 (Surr)</i>			<i>51 %</i>	<i>33-122 %</i>	<i>4</i>	<i>07/23/24 22:34</i>	<i>EPA 8270E</i>	
<i>p-Terphenyl-d14 (Surr)</i>			<i>84 %</i>	<i>54-127 %</i>	<i>4</i>	<i>07/23/24 22:34</i>	<i>EPA 8270E</i>	
<i>2-Fluorophenol (Surr)</i>			<i>45 %</i>	<i>35-120 %</i>	<i>4</i>	<i>07/23/24 22:34</i>	<i>EPA 8270E</i>	
<i>2,4,6-Tribromophenol (Surr)</i>			<i>61 %</i>	<i>39-132 %</i>	<i>4</i>	<i>07/23/24 22:34</i>	<i>EPA 8270E</i>	
CCLF-001-SS-0.5-B (A4G1133-04)				Matrix: Soil		Batch: 24G0705		PRO
Acenaphthene	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Acenaphthylene	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Anthracene	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Benz(a)anthracene	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Benzo(a)pyrene	ND	---	15.7	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Benzo(b)fluoranthene	ND	---	15.7	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Benzo(k)fluoranthene	ND	---	15.7	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Benzo(g,h,i)perylene	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Chrysene	13.1	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Dibenz(a,h)anthracene	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Fluoranthene	31.8	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Fluorene	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
1-Methylnaphthalene	ND	---	20.9	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2-Methylnaphthalene	ND	---	20.9	ug/kg dry	4	07/23/24 23:43	EPA 8270E	

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

<p><u>Maul Foster & Alongi, INC.</u> 3140 NE Broadway Street Portland, OR 97232</p>	<p>Project: <u>Circle C Landfill</u> Project Number: M0363.17.003 Project Manager: Emily Hess</p>	<p style="text-align: right;">Report ID: A4G1133 - 08 01 24 1405</p>
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ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-B (A4G1133-04)				Matrix: Soil		Batch: 24G0705		PRO
Naphthalene	ND	---	20.9	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Phenanthrene	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Pyrene	20.4	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Carbazole	ND	---	15.7	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Dibenzofuran	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2-Chlorophenol	ND	---	52.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
4-Chloro-3-methylphenol	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2,4-Dichlorophenol	ND	---	52.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2,4-Dimethylphenol	ND	---	52.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2,4-Dinitrophenol	ND	---	261	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
4,6-Dinitro-2-methylphenol	ND	---	261	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2-Methylphenol	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
3+4-Methylphenol(s)	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2-Nitrophenol	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
4-Nitrophenol	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Pentachlorophenol (PCP)	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Phenol	ND	---	20.9	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	---	52.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2,3,5,6-Tetrachlorophenol	ND	---	52.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2,4,5-Trichlorophenol	ND	---	52.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2,4,6-Trichlorophenol	ND	---	52.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Bis(2-ethylhexyl)phthalate	ND	---	157	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Butyl benzyl phthalate	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Diethylphthalate	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Dimethylphthalate	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Di-n-butylphthalate	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Di-n-octyl phthalate	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
N-Nitrosodimethylamine	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
N-Nitrosodiphenylamine	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Bis(2-Chloroethoxy) methane	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Bis(2-Chloroethyl) ether	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	

Apex Laboratories

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-B (A4G1133-04)				Matrix: Soil		Batch: 24G0705		PRO
Hexachlorobenzene	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Hexachlorobutadiene	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Hexachlorocyclopentadiene	ND	---	52.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Hexachloroethane	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2-Chloronaphthalene	ND	---	10.5	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
1,2,4-Trichlorobenzene	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
4-Bromophenyl phenyl ether	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
4-Chlorophenyl phenyl ether	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Aniline	ND	---	52.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
4-Chloroaniline	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2-Nitroaniline	ND	---	209	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
3-Nitroaniline	ND	---	209	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
4-Nitroaniline	ND	---	209	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Nitrobenzene	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2,4-Dinitrotoluene	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
2,6-Dinitrotoluene	ND	---	105	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Benzoic acid	ND	---	1300	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Benzyl alcohol	ND	---	52.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Isophorone	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Azobenzene (1,2-DPH)	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	---	261	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
3,3'-Dichlorobenzidine	ND	---	209	ug/kg dry	4	07/23/24 23:43	EPA 8270E	Q-52
1,2-Dinitrobenzene	ND	---	261	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
1,3-Dinitrobenzene	ND	---	261	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
1,4-Dinitrobenzene	ND	---	261	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
Pyridine	ND	---	52.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
1,2-Dichlorobenzene	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
1,3-Dichlorobenzene	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
1,4-Dichlorobenzene	ND	---	26.1	ug/kg dry	4	07/23/24 23:43	EPA 8270E	
<i>Surrogate: Nitrobenzene-d5 (Surr)</i>			<i>Recovery: 71 %</i>	<i>Limits: 37-122 %</i>	<i>4</i>	<i>07/23/24 23:43</i>	<i>EPA 8270E</i>	
<i>2-Fluorobiphenyl (Surr)</i>			<i>75 %</i>	<i>44-120 %</i>	<i>4</i>	<i>07/23/24 23:43</i>	<i>EPA 8270E</i>	
<i>Phenol-d6 (Surr)</i>			<i>44 %</i>	<i>33-122 %</i>	<i>4</i>	<i>07/23/24 23:43</i>	<i>EPA 8270E</i>	
<i>p-Terphenyl-d14 (Surr)</i>			<i>79 %</i>	<i>54-127 %</i>	<i>4</i>	<i>07/23/24 23:43</i>	<i>EPA 8270E</i>	
<i>2-Fluorophenol (Surr)</i>			<i>38 %</i>	<i>35-120 %</i>	<i>4</i>	<i>07/23/24 23:43</i>	<i>EPA 8270E</i>	

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-B (A4G1133-04)				Matrix: Soil		Batch: 24G0705		PRO
<i>Surrogate: 2,4,6-Tribromophenol (Surr)</i>		<i>Recovery: 50 %</i>		<i>Limits: 39-132 %</i>		<i>4</i>	<i>07/23/24 23:43</i>	<i>EPA 8270E</i>
CCLF-001-SS-0.5-C (A4G1133-06)				Matrix: Soil		Batch: 24G0705		PRO
Acenaphthene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Acenaphthylene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Anthracene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Benz(a)anthracene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Benzo(a)pyrene	ND	---	16.1	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Benzo(b)fluoranthene	ND	---	16.1	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Benzo(k)fluoranthene	ND	---	16.1	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Benzo(g,h,i)perylene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Chrysene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Dibenz(a,h)anthracene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Fluoranthene	22.6	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Fluorene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Indeno(1,2,3-cd)pyrene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
1-Methylnaphthalene	ND	---	21.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2-Methylnaphthalene	ND	---	21.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Naphthalene	ND	---	21.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Phenanthrene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Pyrene	15.0	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Carbazole	ND	---	16.1	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Dibenzofuran	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2-Chlorophenol	ND	---	53.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
4-Chloro-3-methylphenol	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2,4-Dichlorophenol	ND	---	53.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2,4-Dimethylphenol	ND	---	53.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
2,4-Dinitrophenol	ND	---	268	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
4,6-Dinitro-2-methylphenol	ND	---	268	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2-Methylphenol	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
3+4-Methylphenol(s)	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2-Nitrophenol	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
4-Nitrophenol	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
Pentachlorophenol (PCP)	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-C (A4G1133-06)				Matrix: Soil		Batch: 24G0705		PRO
Phenol	ND	---	21.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2,3,4,6-Tetrachlorophenol	ND	---	53.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
2,3,5,6-Tetrachlorophenol	ND	---	53.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
2,4,5-Trichlorophenol	ND	---	53.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2,4,6-Trichlorophenol	ND	---	53.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Bis(2-ethylhexyl)phthalate	ND	---	161	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Butyl benzyl phthalate	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Diethylphthalate	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Dimethylphthalate	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Di-n-butylphthalate	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Di-n-octyl phthalate	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
N-Nitrosodimethylamine	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
N-Nitroso-di-n-propylamine	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
N-Nitrosodiphenylamine	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
Bis(2-Chloroethoxy) methane	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Bis(2-Chloroethyl) ether	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2,2'-Oxybis(1-Chloropropane)	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Hexachlorobenzene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Hexachlorobutadiene	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Hexachlorocyclopentadiene	ND	---	53.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Hexachloroethane	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2-Chloronaphthalene	ND	---	10.7	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
1,2,4-Trichlorobenzene	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
4-Bromophenyl phenyl ether	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
4-Chlorophenyl phenyl ether	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Aniline	ND	---	53.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
4-Chloroaniline	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
2-Nitroaniline	ND	---	214	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
3-Nitroaniline	ND	---	214	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
4-Nitroaniline	ND	---	214	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
Nitrobenzene	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2,4-Dinitrotoluene	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
2,6-Dinitrotoluene	ND	---	107	ug/kg dry	4	07/23/24 19:09	EPA 8270E	

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

ANALYTICAL SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-C (A4G1133-06)				Matrix: Soil		Batch: 24G0705		PRO
Benzoic acid	ND	---	1340	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
Benzyl alcohol	ND	---	53.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Isophorone	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Azobenzene (1,2-DPH)	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Bis(2-Ethylhexyl) adipate	ND	---	268	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
3,3'-Dichlorobenzidine	ND	---	214	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42, Q-52
1,2-Dinitrobenzene	ND	---	268	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
1,3-Dinitrobenzene	ND	---	268	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
1,4-Dinitrobenzene	ND	---	268	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
Pyridine	ND	---	53.4	ug/kg dry	4	07/23/24 19:09	EPA 8270E	Q-42
1,2-Dichlorobenzene	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
1,3-Dichlorobenzene	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
1,4-Dichlorobenzene	ND	---	26.8	ug/kg dry	4	07/23/24 19:09	EPA 8270E	
<i>Surrogate: Nitrobenzene-d5 (Surr)</i>			<i>Recovery: 79 %</i>	<i>Limits: 37-122 %</i>	<i>4</i>	<i>07/23/24 19:09</i>	<i>EPA 8270E</i>	
<i>2-Fluorobiphenyl (Surr)</i>			<i>92 %</i>	<i>44-120 %</i>	<i>4</i>	<i>07/23/24 19:09</i>	<i>EPA 8270E</i>	
<i>Phenol-d6 (Surr)</i>			<i>50 %</i>	<i>33-122 %</i>	<i>4</i>	<i>07/23/24 19:09</i>	<i>EPA 8270E</i>	
<i>p-Terphenyl-d14 (Surr)</i>			<i>96 %</i>	<i>54-127 %</i>	<i>4</i>	<i>07/23/24 19:09</i>	<i>EPA 8270E</i>	
<i>2-Fluorophenol (Surr)</i>			<i>46 %</i>	<i>35-120 %</i>	<i>4</i>	<i>07/23/24 19:09</i>	<i>EPA 8270E</i>	
<i>2,4,6-Tribromophenol (Surr)</i>			<i>59 %</i>	<i>39-132 %</i>	<i>4</i>	<i>07/23/24 19:09</i>	<i>EPA 8270E</i>	

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Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
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ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-A (A4G1133-02)								
Matrix: Soil								
Batch: 24G0541								
Antimony	ND	---	1.00	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Arsenic	3.64	---	1.00	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Beryllium	0.590	---	0.200	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Cadmium	ND	---	0.200	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Chromium	16.6	---	1.00	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Copper	12.5	---	2.00	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Lead	12.3	---	0.200	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Mercury	ND	---	0.0801	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Nickel	10.8	---	2.00	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Selenium	ND	---	1.00	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Silver	ND	---	0.200	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Thallium	ND	---	0.200	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO
Zinc	61.6	---	4.01	mg/kg dry	10	07/17/24 15:33	EPA 6020B	PRO,Q-42
CCLF-001-SS-0.5-B (A4G1133-04)								
Matrix: Soil								
Batch: 24G0541								
Antimony	ND	---	1.05	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Arsenic	4.09	---	1.05	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Beryllium	0.695	---	0.210	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Cadmium	ND	---	0.210	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Chromium	19.7	---	1.05	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Copper	14.6	---	2.10	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Lead	13.5	---	0.210	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Mercury	ND	---	0.0841	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Nickel	12.9	---	2.10	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Selenium	ND	---	1.05	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Silver	ND	---	0.210	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Thallium	ND	---	0.210	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
Zinc	74.0	---	4.20	mg/kg dry	10	07/17/24 16:12	EPA 6020B	PRO
CCLF-001-SS-0.5-C (A4G1133-06)								
Matrix: Soil								
Batch: 24G0541								
Antimony	ND	---	1.02	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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503-718-2323
ORELAP ID: OR100062

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020B (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-C (A4G1133-06)				Matrix: Soil				
Arsenic	3.95	---	1.02	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO
Beryllium	0.693	---	0.204	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO
Cadmium	ND	---	0.204	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO
Chromium	17.8	---	1.02	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO
Copper	13.2	---	2.04	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO
Lead	13.0	---	0.204	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO
Mercury	ND	---	0.0818	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO
Nickel	11.5	---	2.04	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO
Selenium	ND	---	1.02	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO
Silver	ND	---	0.204	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO
Thallium	ND	---	0.204	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO
Zinc	66.9	---	4.09	mg/kg dry	10	07/17/24 16:17	EPA 6020B	PRO

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ANALYTICAL REPORT

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
CCLF-001-SS-0.5-A (A4G1133-02)				Matrix: Soil		Batch: 24G0428		PRO
% Solids	99.0	---	1.00	%	1	07/16/24 06:51	EPA 8000D	
CCLF-001-SS-0.5-B (A4G1133-04)				Matrix: Soil		Batch: 24G0428		PRO
% Solids	98.7	---	1.00	%	1	07/16/24 06:51	EPA 8000D	
CCLF-001-SS-0.5-C (A4G1133-06)				Matrix: Soil		Batch: 24G0428		PRO
% Solids	99.4	---	1.00	%	1	07/16/24 06:51	EPA 8000D	

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ANALYTICAL REPORT

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ORELAP ID: OR100062

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0735 - EPA 3546 (Fuels)						Soil						
Blank (24G0735-BLK1)						Prepared: 07/23/24 06:24 Analyzed: 07/23/24 11:05						
<u>NWTPH-Dx</u>												
Diesel	ND	---	20.0	mg/kg wet	1	---	---	---	---	---	---	
Oil	ND	---	40.0	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 90 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
LCS (24G0735-BS1)						Prepared: 07/23/24 06:24 Analyzed: 07/23/24 11:25						
<u>NWTPH-Dx</u>												
Diesel	124	---	20.0	mg/kg wet	1	125	---	99	38-132%	---	---	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 87 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						
Duplicate (24G0735-DUP1)						Prepared: 07/23/24 06:24 Analyzed: 07/23/24 12:05						
<u>QC Source Sample: Non-SDG (A4G1409-01)</u>												
Diesel	34800	---	427	mg/kg dry	20	---	31800	---	---	9	30%	
Oil	ND	---	855	mg/kg dry	20	---	ND	---	---	---	30%	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 20x</i>						<i>S-01</i>
Duplicate (24G0735-DUP2)						Prepared: 07/23/24 07:13 Analyzed: 07/23/24 22:48						
<u>QC Source Sample: Non-SDG (A4G1282-03)</u>												
Diesel	ND	---	20.9	mg/kg dry	1	---	ND	---	---	---	30%	
Oil	ND	---	41.8	mg/kg dry	1	---	ND	---	---	---	30%	
<i>Surr: o-Terphenyl (Surr)</i>		<i>Recovery: 74 %</i>		<i>Limits: 50-150 %</i>		<i>Dilution: 1x</i>						

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC.	Project: Circle C Landfill	
3140 NE Broadway Street	Project Number: M0363.17.003	Report ID:
Portland, OR 97232	Project Manager: Emily Hess	A4G1133 - 08 01 24 1405

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0637 - EPA 3546						Soil						
Blank (24G0637-BLK1)			Prepared: 07/19/24 10:18 Analyzed: 07/19/24 18:59						C-07			
<u>EPA 8082A</u>												
Aroclor 1016	ND	---	4.00	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1221	ND	---	4.00	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1232	ND	---	4.00	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1242	ND	---	4.00	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1248	ND	---	4.00	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1254	ND	---	4.00	ug/kg wet	1	---	---	---	---	---	---	
Aroclor 1260	ND	---	4.00	ug/kg wet	1	---	---	---	---	---	---	
<i>Surr: Decachlorobiphenyl (Surr)</i>		<i>Recovery: 98 %</i>		<i>Limits: 60-125 %</i>		<i>Dilution: 1x</i>						
LCS (24G0637-BS1)			Prepared: 07/19/24 10:18 Analyzed: 07/19/24 19:17						C-07			
<u>EPA 8082A</u>												
Aroclor 1016	195	---	4.00	ug/kg wet	1	250	---	78	47-134%	---	---	
Aroclor 1260	209	---	4.00	ug/kg wet	1	250	---	84	53-140%	---	---	
<i>Surr: Decachlorobiphenyl (Surr)</i>		<i>Recovery: 101 %</i>		<i>Limits: 60-125 %</i>		<i>Dilution: 1x</i>						
Duplicate (24G0637-DUP1)			Prepared: 07/19/24 10:18 Analyzed: 07/19/24 20:46						C-07			
<u>QC Source Sample: Non-SDG (A4G0917-35)</u>												
Aroclor 1016	ND	---	4.31	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1221	ND	---	4.31	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1232	ND	---	4.31	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1242	ND	---	4.31	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1248	ND	---	4.31	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1254	ND	---	4.31	ug/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1260	ND	---	4.31	ug/kg dry	1	---	ND	---	---	---	30%	
<i>Surr: Decachlorobiphenyl (Surr)</i>		<i>Recovery: 91 %</i>		<i>Limits: 60-125 %</i>		<i>Dilution: 1x</i>						
Matrix Spike (24G0637-MS1)			Prepared: 07/19/24 10:18 Analyzed: 07/19/24 21:57						C-07			
<u>QC Source Sample: Non-SDG (A4G0917-37)</u>												
<u>EPA 8082A</u>												
Aroclor 1016	202	---	4.37	ug/kg dry	1	273	ND	74	47-134%	---	---	
Aroclor 1260	218	---	4.37	ug/kg dry	1	273	8.11	77	53-140%	---	---	
<i>Surr: Decachlorobiphenyl (Surr)</i>		<i>Recovery: 92 %</i>		<i>Limits: 60-125 %</i>		<i>Dilution: 1x</i>						

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: OR100062

<u>Maul Foster & Alongi, INC.</u> 3140 NE Broadway Street Portland, OR 97232	Project: <u>Circle C Landfill</u> Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
---	---	---

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0637 - EPA 3546							Soil					

Apex Laboratories

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Portland, OR 97232	Project Manager: Emily Hess	A4G1133 - 08 01 24 1405

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0705 - EPA 3546						Soil						
Blank (24G0705-BLK2)						Prepared: 07/22/24 10:58 Analyzed: 07/22/24 19:57						
<u>EPA 8270E</u>												
Acenaphthene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
Acenaphthylene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
Anthracene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
Benz(a)anthracene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
Benzo(a)pyrene	ND	---	4.00	ug/kg wet	1	---	---	---	---	---	---	---
Benzo(b)fluoranthene	ND	---	4.00	ug/kg wet	1	---	---	---	---	---	---	---
Benzo(k)fluoranthene	ND	---	4.00	ug/kg wet	1	---	---	---	---	---	---	---
Benzo(g,h,i)perylene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
Chrysene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
Dibenz(a,h)anthracene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
Fluoranthene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
Fluorene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
Indeno(1,2,3-cd)pyrene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
1-Methylnaphthalene	ND	---	5.33	ug/kg wet	1	---	---	---	---	---	---	---
2-Methylnaphthalene	ND	---	5.33	ug/kg wet	1	---	---	---	---	---	---	---
Naphthalene	ND	---	5.33	ug/kg wet	1	---	---	---	---	---	---	---
Phenanthrene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
Pyrene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
Carbazole	ND	---	4.00	ug/kg wet	1	---	---	---	---	---	---	---
Dibenzofuran	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	---
2-Chlorophenol	ND	---	13.3	ug/kg wet	1	---	---	---	---	---	---	---
4-Chloro-3-methylphenol	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	---
2,4-Dichlorophenol	ND	---	13.3	ug/kg wet	1	---	---	---	---	---	---	---
2,4-Dimethylphenol	ND	---	13.3	ug/kg wet	1	---	---	---	---	---	---	---
2,4-Dinitrophenol	ND	---	66.7	ug/kg wet	1	---	---	---	---	---	---	---
4,6-Dinitro-2-methylphenol	ND	---	66.7	ug/kg wet	1	---	---	---	---	---	---	---
2-Methylphenol	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	---
3+4-Methylphenol(s)	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	---
2-Nitrophenol	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	---
4-Nitrophenol	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	---
Pentachlorophenol (PCP)	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	---
Phenol	ND	---	5.33	ug/kg wet	1	---	---	---	---	---	---	---
2,3,4,6-Tetrachlorophenol	ND	---	13.3	ug/kg wet	1	---	---	---	---	---	---	---

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

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 ORELAP ID: OR100062

Maul Foster & Alongi, INC.	Project: Circle C Landfill	
3140 NE Broadway Street	Project Number: M0363.17.003	Report ID:
Portland, OR 97232	Project Manager: Emily Hess	A4G1133 - 08 01 24 1405

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0705 - EPA 3546						Soil						
Blank (24G0705-BLK2)			Prepared: 07/22/24 10:58 Analyzed: 07/22/24 19:57									
2,3,5,6-Tetrachlorophenol	ND	---	13.3	ug/kg wet	1	---	---	---	---	---	---	
2,4,5-Trichlorophenol	ND	---	13.3	ug/kg wet	1	---	---	---	---	---	---	
2,4,6-Trichlorophenol	ND	---	13.3	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-ethylhexyl)phthalate	ND	---	40.0	ug/kg wet	1	---	---	---	---	---	---	
Butyl benzyl phthalate	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	
Diethylphthalate	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	
Dimethylphthalate	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	
Di-n-butylphthalate	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	
Di-n-octyl phthalate	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	
N-Nitrosodimethylamine	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
N-Nitroso-di-n-propylamine	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
N-Nitrosodiphenylamine	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethoxy) methane	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-Chloroethyl) ether	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
2,2'-Oxybis(1-Chloropropane)	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
Hexachlorobenzene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
Hexachlorocyclopentadiene	ND	---	13.3	ug/kg wet	1	---	---	---	---	---	---	
Hexachloroethane	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
2-Chloronaphthalene	ND	---	2.67	ug/kg wet	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
4-Bromophenyl phenyl ether	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
4-Chlorophenyl phenyl ether	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
Aniline	ND	---	13.3	ug/kg wet	1	---	---	---	---	---	---	
4-Chloroaniline	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
2-Nitroaniline	ND	---	53.3	ug/kg wet	1	---	---	---	---	---	---	
3-Nitroaniline	ND	---	53.3	ug/kg wet	1	---	---	---	---	---	---	
4-Nitroaniline	ND	---	53.3	ug/kg wet	1	---	---	---	---	---	---	
Nitrobenzene	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	
2,4-Dinitrotoluene	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	
2,6-Dinitrotoluene	ND	---	26.7	ug/kg wet	1	---	---	---	---	---	---	
Benzoic acid	ND	---	333	ug/kg wet	1	---	---	---	---	---	---	
Benzyl alcohol	ND	---	13.3	ug/kg wet	1	---	---	---	---	---	---	
Isophorone	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	

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3140 NE Broadway Street	Project Number: M0363.17.003	Report ID:
Portland, OR 97232	Project Manager: Emily Hess	A4G1133 - 08 01 24 1405

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0705 - EPA 3546						Soil						
Blank (24G0705-BLK2)			Prepared: 07/22/24 10:58			Analyzed: 07/22/24 19:57						
Azobenzene (1,2-DPH)	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
Bis(2-Ethylhexyl) adipate	ND	---	66.7	ug/kg wet	1	---	---	---	---	---	---	
3,3'-Dichlorobenzidine	ND	---	53.3	ug/kg wet	1	---	---	---	---	---	---	Q-52
1,2-Dinitrobenzene	ND	---	66.7	ug/kg wet	1	---	---	---	---	---	---	
1,3-Dinitrobenzene	ND	---	66.7	ug/kg wet	1	---	---	---	---	---	---	
1,4-Dinitrobenzene	ND	---	66.7	ug/kg wet	1	---	---	---	---	---	---	
Pyridine	ND	---	13.3	ug/kg wet	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	---	6.67	ug/kg wet	1	---	---	---	---	---	---	
<i>Surr: Nitrobenzene-d5 (Surr)</i>		<i>Recovery: 86 %</i>		<i>Limits: 37-122 %</i>		<i>Dilution: 1x</i>						
<i>2-Fluorobiphenyl (Surr)</i>		<i>89 %</i>		<i>44-120 %</i>		<i>"</i>						
<i>Phenol-d6 (Surr)</i>		<i>77 %</i>		<i>33-122 %</i>		<i>"</i>						
<i>p-Terphenyl-d14 (Surr)</i>		<i>91 %</i>		<i>54-127 %</i>		<i>"</i>						
<i>2-Fluorophenol (Surr)</i>		<i>76 %</i>		<i>35-120 %</i>		<i>"</i>						
<i>2,4,6-Tribromophenol (Surr)</i>		<i>94 %</i>		<i>39-132 %</i>		<i>"</i>						

LCS (24G0705-BS2)			Prepared: 07/22/24 10:58			Analyzed: 07/22/24 20:30						
EPA 8270E												
Acenaphthene	492	---	10.7	ug/kg wet	4	533	---	92	40-123%	---	---	
Acenaphthylene	521	---	10.7	ug/kg wet	4	533	---	98	32-132%	---	---	
Anthracene	535	---	10.7	ug/kg wet	4	533	---	100	47-123%	---	---	
Benz(a)anthracene	512	---	10.7	ug/kg wet	4	533	---	96	49-126%	---	---	
Benzo(a)pyrene	538	---	16.0	ug/kg wet	4	533	---	101	45-129%	---	---	
Benzo(b)fluoranthene	526	---	16.0	ug/kg wet	4	533	---	99	45-132%	---	---	
Benzo(k)fluoranthene	515	---	16.0	ug/kg wet	4	533	---	97	47-132%	---	---	
Benzo(g,h,i)perylene	535	---	10.7	ug/kg wet	4	533	---	100	43-134%	---	---	
Chrysene	504	---	10.7	ug/kg wet	4	533	---	95	50-124%	---	---	
Dibenz(a,h)anthracene	528	---	10.7	ug/kg wet	4	533	---	99	45-134%	---	---	
Fluoranthene	559	---	10.7	ug/kg wet	4	533	---	105	50-127%	---	---	
Fluorene	484	---	10.7	ug/kg wet	4	533	---	91	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	486	---	10.7	ug/kg wet	4	533	---	91	45-133%	---	---	
1-Methylnaphthalene	522	---	21.3	ug/kg wet	4	533	---	98	40-120%	---	---	
2-Methylnaphthalene	537	---	21.3	ug/kg wet	4	533	---	101	38-122%	---	---	

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3140 NE Broadway Street	Project Number: M0363.17.003	Report ID:
Portland, OR 97232	Project Manager: Emily Hess	A4G1133 - 08 01 24 1405

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0705 - EPA 3546						Soil						
LCS (24G0705-BS2)						Prepared: 07/22/24 10:58 Analyzed: 07/22/24 20:30						
Naphthalene	513	---	21.3	ug/kg wet	4	533	---	96	35-123%	---	---	
Phenanthrene	512	---	10.7	ug/kg wet	4	533	---	96	50-121%	---	---	
Pyrene	541	---	10.7	ug/kg wet	4	533	---	102	47-127%	---	---	
Carbazole	513	---	16.0	ug/kg wet	4	533	---	96	50-123%	---	---	
Dibenzofuran	512	---	10.7	ug/kg wet	4	533	---	96	44-120%	---	---	
2-Chlorophenol	524	---	53.2	ug/kg wet	4	533	---	98	34-121%	---	---	
4-Chloro-3-methylphenol	521	---	107	ug/kg wet	4	533	---	98	45-122%	---	---	
2,4-Dichlorophenol	556	---	53.2	ug/kg wet	4	533	---	104	40-122%	---	---	
2,4-Dimethylphenol	610	---	53.2	ug/kg wet	4	533	---	114	30-127%	---	---	Q-41
2,4-Dinitrophenol	411	---	267	ug/kg wet	4	533	---	77	10-137%	---	---	
4,6-Dinitro-2-methylphenol	487	---	267	ug/kg wet	4	533	---	91	29-132%	---	---	
2-Methylphenol	543	---	26.7	ug/kg wet	4	533	---	102	32-122%	---	---	
3+4-Methylphenol(s)	544	---	26.7	ug/kg wet	4	533	---	102	34-120%	---	---	Q-41
2-Nitrophenol	570	---	107	ug/kg wet	4	533	---	107	36-123%	---	---	Q-41
4-Nitrophenol	422	---	107	ug/kg wet	4	533	---	79	30-132%	---	---	
Pentachlorophenol (PCP)	428	---	107	ug/kg wet	4	533	---	80	25-133%	---	---	
Phenol	490	---	21.3	ug/kg wet	4	533	---	92	34-121%	---	---	
2,3,4,6-Tetrachlorophenol	541	---	53.2	ug/kg wet	4	533	---	101	44-125%	---	---	
2,3,5,6-Tetrachlorophenol	528	---	53.2	ug/kg wet	4	533	---	99	40-120%	---	---	
2,4,5-Trichlorophenol	519	---	53.2	ug/kg wet	4	533	---	97	41-124%	---	---	
2,4,6-Trichlorophenol	529	---	53.2	ug/kg wet	4	533	---	99	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	502	---	160	ug/kg wet	4	533	---	94	51-133%	---	---	
Butyl benzyl phthalate	512	---	107	ug/kg wet	4	533	---	96	48-132%	---	---	
Diethylphthalate	493	---	107	ug/kg wet	4	533	---	92	50-124%	---	---	
Dimethylphthalate	521	---	107	ug/kg wet	4	533	---	98	48-124%	---	---	
Di-n-butylphthalate	558	---	107	ug/kg wet	4	533	---	105	51-128%	---	---	
Di-n-octyl phthalate	523	---	107	ug/kg wet	4	533	---	98	45-140%	---	---	
N-Nitrosodimethylamine	384	---	26.7	ug/kg wet	4	533	---	72	23-120%	---	---	
N-Nitroso-di-n-propylamine	471	---	26.7	ug/kg wet	4	533	---	88	36-120%	---	---	
N-Nitrosodiphenylamine	505	---	26.7	ug/kg wet	4	533	---	95	38-127%	---	---	
Bis(2-Chloroethoxy) methane	514	---	26.7	ug/kg wet	4	533	---	96	36-121%	---	---	
Bis(2-Chloroethyl) ether	462	---	26.7	ug/kg wet	4	533	---	87	31-120%	---	---	Q-41
2,2'-Oxybis(1-Chloropropane)	377	---	26.7	ug/kg wet	4	533	---	71	39-120%	---	---	
Hexachlorobenzene	513	---	10.7	ug/kg wet	4	533	---	96	45-122%	---	---	

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC.	Project: Circle C Landfill	
3140 NE Broadway Street	Project Number: M0363.17.003	Report ID:
Portland, OR 97232	Project Manager: Emily Hess	A4G1133 - 08 01 24 1405

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0705 - EPA 3546						Soil						
LCS (24G0705-BS2)			Prepared: 07/22/24 10:58			Analyzed: 07/22/24 20:30						
Hexachlorobutadiene	510	---	26.7	ug/kg wet	4	533	---	96	32-123%	---	---	
Hexachlorocyclopentadiene	492	---	53.2	ug/kg wet	4	533	---	92	10-140%	---	---	
Hexachloroethane	484	---	26.7	ug/kg wet	4	533	---	91	28-120%	---	---	
2-Chloronaphthalene	546	---	10.7	ug/kg wet	4	533	---	102	41-120%	---	---	
1,2,4-Trichlorobenzene	514	---	26.7	ug/kg wet	4	533	---	96	34-120%	---	---	
4-Bromophenyl phenyl ether	519	---	26.7	ug/kg wet	4	533	---	97	46-124%	---	---	
4-Chlorophenyl phenyl ether	519	---	26.7	ug/kg wet	4	533	---	97	45-121%	---	---	
Aniline	309	---	53.2	ug/kg wet	4	533	---	58	10-120%	---	---	
4-Chloroaniline	325	---	26.7	ug/kg wet	4	533	---	61	17-120%	---	---	
2-Nitroaniline	488	---	213	ug/kg wet	4	533	---	92	44-127%	---	---	
3-Nitroaniline	374	---	213	ug/kg wet	4	533	---	70	33-120%	---	---	
4-Nitroaniline	501	---	213	ug/kg wet	4	533	---	94	51-125%	---	---	
Nitrobenzene	520	---	107	ug/kg wet	4	533	---	97	34-122%	---	---	Q-41
2,4-Dinitrotoluene	538	---	107	ug/kg wet	4	533	---	101	48-126%	---	---	
2,6-Dinitrotoluene	522	---	107	ug/kg wet	4	533	---	98	46-124%	---	---	
Benzoic acid	543	---	400	ug/kg wet	4	1070	---	51	10-140%	---	---	
Benzyl alcohol	515	---	53.2	ug/kg wet	4	533	---	97	29-122%	---	---	
Isophorone	465	---	26.7	ug/kg wet	4	533	---	87	30-122%	---	---	
Azobenzene (1,2-DPH)	462	---	26.7	ug/kg wet	4	533	---	87	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	520	---	267	ug/kg wet	4	533	---	97	61-121%	---	---	
3,3'-Dichlorobenzidine	2060	---	213	ug/kg wet	4	1070	---	193	22-121%	---	---	Q-29, Q-52
1,2-Dinitrobenzene	513	---	267	ug/kg wet	4	533	---	96	44-120%	---	---	
1,3-Dinitrobenzene	506	---	267	ug/kg wet	4	533	---	95	43-127%	---	---	
1,4-Dinitrobenzene	515	---	267	ug/kg wet	4	533	---	97	37-132%	---	---	
Pyridine	328	---	53.2	ug/kg wet	4	533	---	61	10-120%	---	---	
1,2-Dichlorobenzene	491	---	26.7	ug/kg wet	4	533	---	92	33-120%	---	---	
1,3-Dichlorobenzene	470	---	26.7	ug/kg wet	4	533	---	88	30-120%	---	---	
1,4-Dichlorobenzene	481	---	26.7	ug/kg wet	4	533	---	90	31-120%	---	---	
<i>Surr: Nitrobenzene-d5 (Surr)</i>		<i>Recovery: 90 %</i>		<i>Limits: 37-122 %</i>		<i>Dilution: 4x</i>						
<i>2-Fluorobiphenyl (Surr)</i>		<i>102 %</i>		<i>44-120 %</i>		<i>"</i>						
<i>Phenol-d6 (Surr)</i>		<i>94 %</i>		<i>33-122 %</i>		<i>"</i>						
<i>p-Terphenyl-d14 (Surr)</i>		<i>98 %</i>		<i>54-127 %</i>		<i>"</i>						
<i>2-Fluorophenol (Surr)</i>		<i>83 %</i>		<i>35-120 %</i>		<i>"</i>						
<i>2,4,6-Tribromophenol (Surr)</i>		<i>99 %</i>		<i>39-132 %</i>		<i>"</i>						

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	--

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0705 - EPA 3546						Soil						
Duplicate (24G0705-DUP2)						Prepared: 07/22/24 10:58 Analyzed: 07/23/24 23:09						PRO
QC Source Sample: CCLF-001-SS-0.5-A (A4G1133-02RE1)												
EPA 8270E												
Acenaphthene	ND	---	10.6	ug/kg dry	4	---	ND	---	---	---	30%	
Acenaphthylene	ND	---	10.6	ug/kg dry	4	---	ND	---	---	---	30%	
Anthracene	ND	---	10.6	ug/kg dry	4	---	ND	---	---	---	30%	
Benz(a)anthracene	ND	---	10.6	ug/kg dry	4	---	6.28	---	---	***	30%	
Benzo(a)pyrene	ND	---	15.8	ug/kg dry	4	---	11.2	---	---	***	30%	
Benzo(b)fluoranthene	ND	---	15.8	ug/kg dry	4	---	14.5	---	---	***	30%	
Benzo(k)fluoranthene	ND	---	15.8	ug/kg dry	4	---	ND	---	---	---	30%	Q-05
Benzo(g,h,i)perylene	ND	---	10.6	ug/kg dry	4	---	ND	---	---	---	30%	
Chrysene	ND	---	10.6	ug/kg dry	4	---	8.50	---	---	***	30%	
Dibenz(a,h)anthracene	ND	---	10.6	ug/kg dry	4	---	ND	---	---	---	30%	
Fluoranthene	15.8	---	10.6	ug/kg dry	4	---	15.6	---	---	1	30%	
Fluorene	ND	---	10.6	ug/kg dry	4	---	ND	---	---	---	30%	
Indeno(1,2,3-cd)pyrene	ND	---	10.6	ug/kg dry	4	---	ND	---	---	---	30%	
1-Methylnaphthalene	ND	---	21.1	ug/kg dry	4	---	ND	---	---	---	30%	
2-Methylnaphthalene	ND	---	21.1	ug/kg dry	4	---	ND	---	---	---	30%	
Naphthalene	ND	---	21.1	ug/kg dry	4	---	ND	---	---	---	30%	
Phenanthrene	ND	---	10.6	ug/kg dry	4	---	ND	---	---	---	30%	
Pyrene	12.5	---	10.6	ug/kg dry	4	---	12.3	---	---	2	30%	
Carbazole	ND	---	15.8	ug/kg dry	4	---	ND	---	---	---	30%	
Dibenzofuran	ND	---	10.6	ug/kg dry	4	---	ND	---	---	---	30%	
2-Chlorophenol	ND	---	52.6	ug/kg dry	4	---	ND	---	---	---	30%	
4-Chloro-3-methylphenol	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	
2,4-Dichlorophenol	ND	---	52.6	ug/kg dry	4	---	ND	---	---	---	30%	
2,4-Dimethylphenol	ND	---	52.6	ug/kg dry	4	---	ND	---	---	---	30%	
2,4-Dinitrophenol	ND	---	264	ug/kg dry	4	---	ND	---	---	---	30%	
4,6-Dinitro-2-methylphenol	ND	---	264	ug/kg dry	4	---	ND	---	---	---	30%	
2-Methylphenol	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
3+4-Methylphenol(s)	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
2-Nitrophenol	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	
4-Nitrophenol	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	
Pentachlorophenol (PCP)	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0705 - EPA 3546						Soil						
Duplicate (24G0705-DUP2)						Prepared: 07/22/24 10:58 Analyzed: 07/23/24 23:09						PRO
QC Source Sample: CCLF-001-SS-0.5-A (A4G1133-02RE1)												
Phenol	ND	---	21.1	ug/kg dry	4	---	ND	---	---	---	30%	
2,3,4,6-Tetrachlorophenol	ND	---	52.6	ug/kg dry	4	---	ND	---	---	---	30%	
2,3,5,6-Tetrachlorophenol	ND	---	52.6	ug/kg dry	4	---	ND	---	---	---	30%	
2,4,5-Trichlorophenol	ND	---	52.6	ug/kg dry	4	---	ND	---	---	---	30%	
2,4,6-Trichlorophenol	ND	---	52.6	ug/kg dry	4	---	ND	---	---	---	30%	
Bis(2-ethylhexyl)phthalate	ND	---	158	ug/kg dry	4	---	ND	---	---	---	30%	
Butyl benzyl phthalate	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	
Diethylphthalate	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	
Dimethylphthalate	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	
Di-n-butylphthalate	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	
Di-n-octyl phthalate	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	
N-Nitrosodimethylamine	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
N-Nitroso-di-n-propylamine	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
N-Nitrosodiphenylamine	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
Bis(2-Chloroethoxy) methane	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
Bis(2-Chloroethyl) ether	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
2,2'-Oxybis(1-Chloropropane)	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
Hexachlorobenzene	ND	---	10.6	ug/kg dry	4	---	ND	---	---	---	30%	
Hexachlorobutadiene	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
Hexachlorocyclopentadiene	ND	---	52.6	ug/kg dry	4	---	ND	---	---	---	30%	
Hexachloroethane	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
2-Chloronaphthalene	ND	---	10.6	ug/kg dry	4	---	ND	---	---	---	30%	
1,2,4-Trichlorobenzene	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
4-Bromophenyl phenyl ether	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
4-Chlorophenyl phenyl ether	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
Aniline	ND	---	52.6	ug/kg dry	4	---	ND	---	---	---	30%	
4-Chloroaniline	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
2-Nitroaniline	ND	---	211	ug/kg dry	4	---	ND	---	---	---	30%	
3-Nitroaniline	ND	---	211	ug/kg dry	4	---	ND	---	---	---	30%	
4-Nitroaniline	ND	---	211	ug/kg dry	4	---	ND	---	---	---	30%	
Nitrobenzene	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	
2,4-Dinitrotoluene	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	
2,6-Dinitrotoluene	ND	---	106	ug/kg dry	4	---	ND	---	---	---	30%	

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC.	Project: Circle C Landfill	
3140 NE Broadway Street	Project Number: M0363.17.003	Report ID:
Portland, OR 97232	Project Manager: Emily Hess	A4G1133 - 08 01 24 1405

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0705 - EPA 3546						Soil						
Duplicate (24G0705-DUP2)						Prepared: 07/22/24 10:58 Analyzed: 07/23/24 23:09						PRO
QC Source Sample: CCLF-001-SS-0.5-A (A4G1133-02RE1)												
Benzoic acid	ND	---	1320	ug/kg dry	4	---	ND	---	---	---	30%	
Benzyl alcohol	ND	---	52.6	ug/kg dry	4	---	ND	---	---	---	30%	Q-05
Isophorone	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
Azobenzene (1,2-DPH)	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
Bis(2-Ethylhexyl) adipate	ND	---	264	ug/kg dry	4	---	ND	---	---	---	30%	
3,3'-Dichlorobenzidine	ND	---	211	ug/kg dry	4	---	ND	---	---	---	30%	Q-52
1,2-Dinitrobenzene	ND	---	264	ug/kg dry	4	---	ND	---	---	---	30%	
1,3-Dinitrobenzene	ND	---	264	ug/kg dry	4	---	ND	---	---	---	30%	
1,4-Dinitrobenzene	ND	---	264	ug/kg dry	4	---	ND	---	---	---	30%	
Pyridine	ND	---	52.6	ug/kg dry	4	---	ND	---	---	---	30%	
1,2-Dichlorobenzene	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
1,3-Dichlorobenzene	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
1,4-Dichlorobenzene	ND	---	26.4	ug/kg dry	4	---	ND	---	---	---	30%	
<i>Surr: Nitrobenzene-d5 (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 37-122 %</i>		<i>Dilution: 4x</i>						
<i>2-Fluorobiphenyl (Surr)</i>		<i>82 %</i>		<i>44-120 %</i>		<i>"</i>						
<i>Phenol-d6 (Surr)</i>		<i>51 %</i>		<i>33-122 %</i>		<i>"</i>						
<i>p-Terphenyl-d14 (Surr)</i>		<i>84 %</i>		<i>54-127 %</i>		<i>"</i>						
<i>2-Fluorophenol (Surr)</i>		<i>45 %</i>		<i>35-120 %</i>		<i>"</i>						
<i>2,4,6-Tribromophenol (Surr)</i>		<i>62 %</i>		<i>39-132 %</i>		<i>"</i>						

Matrix Spike (24G0705-MS2)						Prepared: 07/22/24 10:58 Analyzed: 07/23/24 22:00						PRO
QC Source Sample: CCLF-001-SS-0.5-C (A4G1133-06)												
EPA 8270E												
Acenaphthene	447	---	10.5	ug/kg dry	4	526	ND	85	40-123%	---	---	
Acenaphthylene	466	---	10.5	ug/kg dry	4	526	ND	89	32-132%	---	---	
Anthracene	465	---	10.5	ug/kg dry	4	526	ND	88	47-123%	---	---	
Benz(a)anthracene	446	---	10.5	ug/kg dry	4	526	ND	85	49-126%	---	---	
Benzo(a)pyrene	451	---	15.8	ug/kg dry	4	526	10.5	84	45-129%	---	---	
Benzo(b)fluoranthene	505	---	15.8	ug/kg dry	4	526	13.1	94	45-132%	---	---	
Benzo(k)fluoranthene	480	---	15.8	ug/kg dry	4	526	8.37	90	47-132%	---	---	
Benzo(g,h,i)perylene	463	---	10.5	ug/kg dry	4	526	ND	88	43-134%	---	---	
Chrysene	451	---	10.5	ug/kg dry	4	526	9.29	84	50-124%	---	---	
Dibenz(a,h)anthracene	477	---	10.5	ug/kg dry	4	526	ND	91	45-134%	---	---	

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0705 - EPA 3546						Soil						
Matrix Spike (24G0705-MS2)						Prepared: 07/22/24 10:58 Analyzed: 07/23/24 22:00						PRO
QC Source Sample: CCLF-001-SS-0.5-C (A4G1133-06)												
Fluoranthene	503	---	10.5	ug/kg dry	4	526	22.6	91	50-127%	---	---	
Fluorene	441	---	10.5	ug/kg dry	4	526	ND	84	43-125%	---	---	
Indeno(1,2,3-cd)pyrene	422	---	10.5	ug/kg dry	4	526	ND	80	45-133%	---	---	
1-Methylnaphthalene	464	---	21.0	ug/kg dry	4	526	ND	88	40-120%	---	---	
2-Methylnaphthalene	475	---	21.0	ug/kg dry	4	526	ND	90	38-122%	---	---	
Naphthalene	464	---	21.0	ug/kg dry	4	526	ND	88	35-123%	---	---	
Phenanthrene	455	---	10.5	ug/kg dry	4	526	8.59	85	50-121%	---	---	
Pyrene	478	---	10.5	ug/kg dry	4	526	15.0	88	47-127%	---	---	
Carbazole	449	---	15.8	ug/kg dry	4	526	ND	85	50-123%	---	---	
Dibenzofuran	455	---	10.5	ug/kg dry	4	526	ND	87	44-120%	---	---	
2-Chlorophenol	380	---	52.4	ug/kg dry	4	526	ND	72	34-121%	---	---	
4-Chloro-3-methylphenol	336	---	105	ug/kg dry	4	526	ND	64	45-122%	---	---	
2,4-Dichlorophenol	349	---	52.4	ug/kg dry	4	526	ND	66	40-122%	---	---	
2,4-Dimethylphenol	95.9	---	52.4	ug/kg dry	4	526	ND	18	30-127%	---	---	Q-01
2,4-Dinitrophenol	ND	---	263	ug/kg dry	4	526	ND		10-137%	---	---	Q-01
4,6-Dinitro-2-methylphenol	ND	---	263	ug/kg dry	4	526	ND	33	29-132%	---	---	
2-Methylphenol	275	---	26.3	ug/kg dry	4	526	ND	52	32-122%	---	---	
3+4-Methylphenol(s)	282	---	26.3	ug/kg dry	4	526	ND	54	34-120%	---	---	
2-Nitrophenol	389	---	105	ug/kg dry	4	526	ND	74	36-123%	---	---	Q-41
4-Nitrophenol	ND	---	105	ug/kg dry	4	526	ND	19	30-132%	---	---	Q-01
Pentachlorophenol (PCP)	ND	---	105	ug/kg dry	4	526	ND	17	25-133%	---	---	Q-01
Phenol	293	---	21.0	ug/kg dry	4	526	ND	56	34-121%	---	---	
2,3,4,6-Tetrachlorophenol	223	---	52.4	ug/kg dry	4	526	ND	42	44-125%	---	---	Q-01
2,3,5,6-Tetrachlorophenol	161	---	52.4	ug/kg dry	4	526	ND	31	40-120%	---	---	Q-01
2,4,5-Trichlorophenol	240	---	52.4	ug/kg dry	4	526	ND	46	41-124%	---	---	
2,4,6-Trichlorophenol	314	---	52.4	ug/kg dry	4	526	ND	60	39-126%	---	---	
Bis(2-ethylhexyl)phthalate	487	---	158	ug/kg dry	4	526	ND	93	51-133%	---	---	
Butyl benzyl phthalate	481	---	105	ug/kg dry	4	526	ND	91	48-132%	---	---	
Diethylphthalate	430	---	105	ug/kg dry	4	526	ND	82	50-124%	---	---	
Dimethylphthalate	447	---	105	ug/kg dry	4	526	ND	85	48-124%	---	---	
Di-n-butylphthalate	487	---	105	ug/kg dry	4	526	ND	93	51-128%	---	---	
Di-n-octyl phthalate	546	---	105	ug/kg dry	4	526	ND	104	45-140%	---	---	
N-Nitrosodimethylamine	247	---	26.3	ug/kg dry	4	526	ND	47	23-120%	---	---	

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Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	--

QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0705 - EPA 3546						Soil						
Matrix Spike (24G0705-MS2)						Prepared: 07/22/24 10:58 Analyzed: 07/23/24 22:00						PRO
QC Source Sample: CCLF-001-SS-0.5-C (A4G1133-06)												
N-Nitroso-di-n-propylamine	399	---	26.3	ug/kg dry	4	526	ND	76	36-120%	---	---	
N-Nitrosodiphenylamine	174	---	26.3	ug/kg dry	4	526	ND	33	38-127%	---	---	Q-01
Bis(2-Chloroethoxy) methane	449	---	26.3	ug/kg dry	4	526	ND	85	36-121%	---	---	
Bis(2-Chloroethyl) ether	358	---	26.3	ug/kg dry	4	526	ND	68	31-120%	---	---	
2,2'-Oxybis(1-Chloropropane)	330	---	26.3	ug/kg dry	4	526	ND	63	39-120%	---	---	
Hexachlorobenzene	450	---	10.5	ug/kg dry	4	526	ND	86	45-122%	---	---	
Hexachlorobutadiene	460	---	26.3	ug/kg dry	4	526	ND	88	32-123%	---	---	
Hexachlorocyclopentadiene	521	---	52.4	ug/kg dry	4	526	ND	99	10-140%	---	---	
Hexachloroethane	456	---	26.3	ug/kg dry	4	526	ND	87	28-120%	---	---	
2-Chloronaphthalene	484	---	10.5	ug/kg dry	4	526	ND	92	41-120%	---	---	
1,2,4-Trichlorobenzene	464	---	26.3	ug/kg dry	4	526	ND	88	34-120%	---	---	
4-Bromophenyl phenyl ether	465	---	26.3	ug/kg dry	4	526	ND	88	46-124%	---	---	
4-Chlorophenyl phenyl ether	466	---	26.3	ug/kg dry	4	526	ND	89	45-121%	---	---	
Aniline	ND	---	52.4	ug/kg dry	4	526	ND		10-120%	---	---	Q-01
4-Chloroaniline	28.2	---	26.3	ug/kg dry	4	526	ND	5	17-120%	---	---	Q-01
2-Nitroaniline	422	---	210	ug/kg dry	4	526	ND	80	44-127%	---	---	
3-Nitroaniline	ND	---	210	ug/kg dry	4	526	ND	20	33-120%	---	---	Q-01
4-Nitroaniline	ND	---	210	ug/kg dry	4	526	ND	30	51-125%	---	---	Q-01
Nitrobenzene	450	---	105	ug/kg dry	4	526	ND	86	34-122%	---	---	
2,4-Dinitrotoluene	449	---	105	ug/kg dry	4	526	ND	85	48-126%	---	---	
2,6-Dinitrotoluene	455	---	105	ug/kg dry	4	526	ND	87	46-124%	---	---	
Benzoic acid	ND	---	1310	ug/kg dry	4	1050	ND		10-140%	---	---	Q-01
Benzyl alcohol	393	---	52.4	ug/kg dry	4	526	ND	75	29-122%	---	---	
Isophorone	378	---	26.3	ug/kg dry	4	526	ND	72	30-122%	---	---	
Azobenzene (1,2-DPH)	392	---	26.3	ug/kg dry	4	526	ND	75	39-125%	---	---	
Bis(2-Ethylhexyl) adipate	483	---	263	ug/kg dry	4	526	ND	92	61-121%	---	---	
3,3'-Dichlorobenzidine	ND	---	210	ug/kg dry	4	1050	ND		22-121%	---	---	Q-01, Q-52
1,2-Dinitrobenzene	442	---	263	ug/kg dry	4	526	ND	84	44-120%	---	---	
1,3-Dinitrobenzene	427	---	263	ug/kg dry	4	526	ND	81	43-127%	---	---	
1,4-Dinitrobenzene	445	---	263	ug/kg dry	4	526	ND	85	37-132%	---	---	
Pyridine	ND	---	52.4	ug/kg dry	4	526	ND		10-120%	---	---	Q-01
1,2-Dichlorobenzene	435	---	26.3	ug/kg dry	4	526	ND	83	33-120%	---	---	
1,3-Dichlorobenzene	426	---	26.3	ug/kg dry	4	526	ND	81	30-120%	---	---	

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
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QUALITY CONTROL (QC) SAMPLE RESULTS

Semivolatile Organic Compounds by EPA 8270E

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24G0705 - EPA 3546						Soil						
Matrix Spike (24G0705-MS2)						Prepared: 07/22/24 10:58 Analyzed: 07/23/24 22:00						PRO
QC Source Sample: CCLF-001-SS-0.5-C (A4G1133-06)												
1,4-Dichlorobenzene	435	---	26.3	ug/kg dry	4	526	ND	83	31-120%	---	---	
<i>Surr: Nitrobenzene-d5 (Surr) Recovery: 77 % Limits: 37-122 % Dilution: 4x</i>												
<i>2-Fluorobiphenyl (Surr) 90 % 44-120 % "</i>												
<i>Phenol-d6 (Surr) 60 % 33-122 % "</i>												
<i>p-Terphenyl-d14 (Surr) 91 % 54-127 % "</i>												
<i>2-Fluorophenol (Surr) 49 % 35-120 % "</i>												
<i>2,4,6-Tribromophenol (Surr) 66 % 39-132 % "</i>												

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ORELAP ID: OR100062

Maul Foster & Alongi, INC.	Project: Circle C Landfill	
3140 NE Broadway Street	Project Number: M0363.17.003	Report ID:
Portland, OR 97232	Project Manager: Emily Hess	A4G1133 - 08 01 24 1405

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 24G0541 - EPA 3051A						Soil						
Blank (24G0541-BLK1)						Prepared: 07/17/24 09:57 Analyzed: 07/17/24 14:50						
<u>EPA 6020B</u>												
Antimony	ND	---	1.00	mg/kg wet	10	---	---	---	---	---	---	---
Arsenic	ND	---	1.00	mg/kg wet	10	---	---	---	---	---	---	---
Beryllium	ND	---	0.200	mg/kg wet	10	---	---	---	---	---	---	---
Cadmium	ND	---	0.200	mg/kg wet	10	---	---	---	---	---	---	---
Chromium	ND	---	1.00	mg/kg wet	10	---	---	---	---	---	---	---
Copper	ND	---	2.00	mg/kg wet	10	---	---	---	---	---	---	---
Lead	ND	---	0.200	mg/kg wet	10	---	---	---	---	---	---	---
Mercury	ND	---	0.0800	mg/kg wet	10	---	---	---	---	---	---	---
Nickel	ND	---	2.00	mg/kg wet	10	---	---	---	---	---	---	---
Selenium	ND	---	1.00	mg/kg wet	10	---	---	---	---	---	---	---
Silver	ND	---	0.200	mg/kg wet	10	---	---	---	---	---	---	---
Thallium	ND	---	0.200	mg/kg wet	10	---	---	---	---	---	---	---
Zinc	ND	---	4.00	mg/kg wet	10	---	---	---	---	---	---	---

LCS (24G0541-BS1)						Prepared: 07/17/24 09:57 Analyzed: 07/17/24 15:01						
<u>EPA 6020B</u>												
Antimony	27.7	---	1.00	mg/kg wet	10	25.0	---	111	80-120%	---	---	---
Arsenic	54.2	---	1.00	mg/kg wet	10	50.0	---	108	80-120%	---	---	---
Beryllium	30.0	---	0.200	mg/kg wet	10	25.0	---	120	80-120%	---	---	---
Cadmium	54.3	---	0.200	mg/kg wet	10	50.0	---	109	80-120%	---	---	---
Chromium	54.9	---	1.00	mg/kg wet	10	50.0	---	110	80-120%	---	---	---
Copper	56.3	---	2.00	mg/kg wet	10	50.0	---	113	80-120%	---	---	---
Lead	57.6	---	0.200	mg/kg wet	10	50.0	---	115	80-120%	---	---	---
Mercury	1.08	---	0.0800	mg/kg wet	10	1.00	---	108	80-120%	---	---	---
Nickel	56.6	---	2.00	mg/kg wet	10	50.0	---	113	80-120%	---	---	---
Selenium	26.1	---	1.00	mg/kg wet	10	25.0	---	104	80-120%	---	---	---
Silver	27.1	---	0.200	mg/kg wet	10	25.0	---	108	80-120%	---	---	---
Thallium	27.5	---	0.200	mg/kg wet	10	25.0	---	110	80-120%	---	---	---
Zinc	54.1	---	4.00	mg/kg wet	10	50.0	---	108	80-120%	---	---	---

Duplicate (24G0541-DUP1)						Prepared: 07/17/24 09:57 Analyzed: 07/17/24 15:51						
<u>QC Source Sample: CCLF-001-SS-0.5-A (A4G1133-02)</u>												
<u>EPA 6020B</u>												

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
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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 24G0428 - Total Solids (Dry Weight) - 2022						Soil						
Duplicate (24G0428-DUP1)			Prepared: 07/15/24 09:46 Analyzed: 07/16/24 06:51									
<u>QC Source Sample: Non-SDG (A4G1159-01)</u>												
% Solids	91.2	---	1.00	%	1	---	92.3	---	---	1	10%	
Duplicate (24G0428-DUP2)			Prepared: 07/15/24 09:46 Analyzed: 07/16/24 06:51									
<u>QC Source Sample: Non-SDG (A4G1159-02)</u>												
% Solids	94.7	---	1.00	%	1	---	94.1	---	---	0.6	10%	
Duplicate (24G0428-DUP3)			Prepared: 07/15/24 09:46 Analyzed: 07/16/24 06:51									
<u>QC Source Sample: Non-SDG (A4G1159-03)</u>												
% Solids	93.4	---	1.00	%	1	---	92.5	---	---	1	10%	
Duplicate (24G0428-DUP4)			Prepared: 07/15/24 09:46 Analyzed: 07/16/24 06:51									
<u>QC Source Sample: Non-SDG (A4G1159-04)</u>												
% Solids	92.4	---	1.00	%	1	---	92.9	---	---	0.6	10%	
Duplicate (24G0428-DUP5)			Prepared: 07/15/24 20:51 Analyzed: 07/16/24 06:51									
<u>QC Source Sample: Non-SDG (A4G1205-01)</u>												
% Solids	83.0	---	1.00	%	1	---	82.8	---	---	0.2	10%	
Duplicate (24G0428-DUP6)			Prepared: 07/15/24 20:51 Analyzed: 07/16/24 06:51									
<u>QC Source Sample: Non-SDG (A4G1213-02)</u>												
% Solids	90.1	---	1.00	%	1	---	89.4	---	---	0.8	10%	

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

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SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3546 (Fuels)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 24G0735</u>							
A4G1133-02	Soil	NWTPH-Dx	07/10/24 12:25	07/23/24 07:13	11.07g/5mL	10g/5mL	0.90
A4G1133-04	Soil	NWTPH-Dx	07/10/24 14:10	07/23/24 07:13	11.17g/5mL	10g/5mL	0.90
A4G1133-06	Soil	NWTPH-Dx	07/10/24 15:05	07/23/24 07:13	11.55g/5mL	10g/5mL	0.87

Polychlorinated Biphenyls by EPA 8082A

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 24G0637</u>							
A4G1133-02	Soil	EPA 8082A	07/10/24 12:25	07/19/24 10:18	11.26g/5mL	10g/5mL	0.89
A4G1133-04	Soil	EPA 8082A	07/10/24 14:10	07/19/24 10:18	11.41g/5mL	10g/5mL	0.88
A4G1133-06	Soil	EPA 8082A	07/10/24 15:05	07/19/24 10:18	11.25g/5mL	10g/5mL	0.89

Semivolatile Organic Compounds by EPA 8270E

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 24G0705</u>							
A4G1133-02RE1	Soil	EPA 8270E	07/10/24 12:25	07/22/24 10:58	15.9g/2mL	15g/2mL	0.94
A4G1133-04	Soil	EPA 8270E	07/10/24 14:10	07/22/24 10:58	15.52g/2mL	15g/2mL	0.97
A4G1133-06	Soil	EPA 8270E	07/10/24 15:05	07/22/24 10:58	15.04g/2mL	15g/2mL	1.00

Total Metals by EPA 6020B (ICPMS)

Prep: EPA 3051A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 24G0541</u>							
A4G1133-02	Soil	EPA 6020B	07/10/24 12:25	07/17/24 09:57	0.504g/50mL	0.5g/50mL	0.99
A4G1133-04	Soil	EPA 6020B	07/10/24 14:10	07/17/24 09:57	0.482g/50mL	0.5g/50mL	1.04
A4G1133-06	Soil	EPA 6020B	07/10/24 15:05	07/17/24 09:57	0.492g/50mL	0.5g/50mL	1.02

Percent Dry Weight

Prep: Total Solids (Dry Weight) - 2022

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 24G0428</u>							

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

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503-718-2323
ORELAP ID: OR100062

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

SAMPLE PREPARATION INFORMATION

Percent Dry Weight

Prep: Total Solids (Dry Weight) - 2022

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A4G1133-02	Soil	EPA 8000D	07/10/24 12:25	07/15/24 09:46			NA
A4G1133-04	Soil	EPA 8000D	07/10/24 14:10	07/15/24 09:46			NA
A4G1133-06	Soil	EPA 8000D	07/10/24 15:05	07/15/24 09:46			NA

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: OR100062

Table with 3 columns: Client (Maul Foster & Alongi, INC.), Project (Circle C Landfill), and Report ID (A4G1133 - 08 01 24 1405)

QUALIFIER DEFINITIONS

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

Apex Laboratories

- C-07 Extract has undergone Sulfuric Acid Cleanup by EPA 3665A, Sulfur Cleanup by EPA 3660B, and Florisil Cleanup by EPA 3620B in order to minimize matrix interference.
F-17 No fuel pattern detected. The Diesel result represents carbon range C10 to C25, and the Oil result represents >C25 to C40.
PRO Sample has undergone sample processing prior to extraction and analysis.
Q-01 Spike recovery and/or RPD is outside acceptance limits.
Q-05 Analyses are not controlled on RPD values from sample and duplicate concentrations that are below 5 times the reporting level.
Q-29 Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high.
Q-37 Sample results are less than the Reporting Level (MDL and/or MRL) and Duplicate results exceed this level. See QC Section of the report for Duplicate results. Sample may be non-homogenous, or results may bracket the reporting level.
Q-41 Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
Q-42 Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)
Q-52 Due to known erratic recoveries, the result and reporting levels for this analyte are reported as Estimated Values. This analyte may not have passed all QC requirements for this method.
S-01 Surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interference.

Apex Laboratories

Philip Nerenberg (signature)

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<u>Maul Foster & Alongi, INC.</u> 3140 NE Broadway Street Portland, OR 97232	Project: <u>Circle C Landfill</u> Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

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

Reporting Limits: Limit of Quantitation (LOQ)

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

Reporting Conventions:

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
 - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.
 - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
 - " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.
- Results for Volatiles analyses on soils and sediments that are reported on a "dry weight" basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an "As Received" basis do not have the WMS correction applied, as dry weight was not performed.

QC Source:

- In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.
- Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Apex Laboratories

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

Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
--	--	---

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to one half of the Reporting Limit (RL). Blank results for gravimetric analyses are evaluated to the Reporting Level, not to half of the Reporting Level.

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

For further details, please request a copy of this document.

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

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

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

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

Soil and Sediment Samples:

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

Sampling and Preservation Notes:

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

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

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

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

Apex Laboratories

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Philip Nerenberg, Lab Director



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

Secondary Accreditations

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

Subcontract Laboratory Accreditations

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

Field Testing Parameters

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

Apex Laboratories

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Philip Nerenberg, Lab Director



ANALYTICAL REPORT

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: OR100062

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
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A4G1133

Page 1 of 1

Form #	Field Sample No./Sample Identification	Matrix Code	G/Grab C/Comp	Sample Date/Time	# of Containers	Comment	Analysis	DATE	TIME
1	CCF-001-S015-A	S	C	7/10/2024 13:25	1	ISM; (Sb; As; Be; Cd; Cr; Cu; Hg; Ni; Se; Ag; Tl; Zn)	<input checked="" type="checkbox"/> PCB Analyzers by 9092A <input checked="" type="checkbox"/> SVOCs by EPA 8270A <input checked="" type="checkbox"/> NMTPH-DX <input checked="" type="checkbox"/> Metals 13 pp by EPA 6020B <input checked="" type="checkbox"/> PFAS by EPA 1433	7/11/24	1117
2	CCF-001-S015-B	S	C	7/10/2025 14:10	1	ISM; (Sb; As; Be; Cd; Cr; Cu; Hg; Ni; Se; Ag; Tl; Zn)	<input checked="" type="checkbox"/> PCB Analyzers by 9092A <input checked="" type="checkbox"/> SVOCs by EPA 8270A <input checked="" type="checkbox"/> NMTPH-DX <input checked="" type="checkbox"/> Metals 13 pp by EPA 6020B <input checked="" type="checkbox"/> PFAS by EPA 1433	7/11/24	1117
3	CCF-001-S015-C	S	C	7/10/2026 15:05	1	ISM; (Sb; As; Be; Cd; Cr; Cu; Hg; Ni; Se; Ag; Tl; Zn)	<input checked="" type="checkbox"/> PCB Analyzers by 9092A <input checked="" type="checkbox"/> SVOCs by EPA 8270A <input checked="" type="checkbox"/> NMTPH-DX <input checked="" type="checkbox"/> Metals 13 pp by EPA 6020B <input checked="" type="checkbox"/> PFAS by EPA 1433	7/11/24	1117
4									
5									
6									
7									
8									
9									
10									

RECEIVED BY APPLIED: *[Signature]* 7/11/24

RECEIVED BY APPLIED: *[Signature]* 7/11/24

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Apex Laboratories, LLC

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

Maul Foster & Alongi, INC. 3140 NE Broadway Street Portland, OR 97232	Project: Circle C Landfill Project Number: M0363.17.003 Project Manager: Emily Hess	Report ID: A4G1133 - 08 01 24 1405
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APEX LABS COOLER RECEIPT FORM

Client: Maul Foster + Alongi Element WO#: A4G1133

Project/Project #: Circle C Landfill M0363.17.003
APL for ESS 7/11/24

Delivery Info:
 Date/time received: 7/11/24 @ 1117 By: EST
 Delivered by: Apex Client ESS FedEx UPS Radio Morgan SDS Evergreen Other
 From USDA Regulated Origin? Yes No

Cooler Inspection Date/time inspected: 7/11/24 @ 1315 By: EST
 Chain of Custody included? Yes No
 Signed/dated by client? Yes No
 Contains USDA Reg. Soils? Yes No Unsure (email RegSoils)

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>2.1</u>						
Custody seals? (Y/N)	<u>N</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>Y</u>						
Ice type: (Gel/Real/Other)	<u>Real</u>						
Condition (In/Out):	<u>In</u>						

Cooler out of temp? (Y/N) Possible reason why: _____
 Green dots applied to out of temperature samples? Yes No
 Out of temperature samples form initiated? Yes No

Sample Inspection: Date/time inspected: 7/11/24 @ 15:44 By: ZAM
11:47 ZAM 7/11

All samples intact? Yes No Comments: _____

Bottle labels/COCs agree? Yes No Comments: _____

COC/container discrepancies form initiated? Yes No

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

Do VOA vials have visible headspace? Yes No NA

Comments: _____

Water samples: pH checked: Yes No NA pH appropriate? Yes No NA pH ID: _____

Comments: _____

Labeled by: ZAM Witness: WMB Cooler Inspected by: ZAM

Form Y-003 R-02



Your Project #: A4G1133
Your C.O.C. #: N/A

Attention: Philip Nerenberg

Apex Laboratories
6700 SW Sandburg St.
Tigard, OR
USA 97223

Report Date: 2024/09/03
Report #: R8304680
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4M5009

Received: 2024/07/23, 12:15

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Moisture	3	N/A	2024/07/26	CAM SOP-00445	Carter 2nd ed 70.2 m
PFAS in Soil by SPE/LCMS (1)	3	2024/08/27	2024/08/29	CAM SOP-00981	EPA Draft 1633, 8/21
Total Solids	3	N/A	2024/07/27	CAM SOP-00428	SM 24 2540 G m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.

U = Undetected at the limit of quantitation.

J = Estimated concentration between the EDL & RDL.

B = Blank Contamination.

Q = One or more quality control criteria failed.

E = Analyte concentration exceeds the maximum concentration level.

K = Estimated maximum possible concentration due to ion abundance ratio failure.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:

Lori Dufour, Project Manager

Email: Lori.Dufour@bureauveritas.com

Phone# (905) 817-5700

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		ZUM936	ZUM937	ZUM938			
Sampling Date		2024/07/10 12:25	2024/07/10 14:10	2024/07/10 15:05			
	UNITS	CCLF-001-SS-0.5-A	CCLF-001-SS-0.5-B	CCLF-001-SS-0.5-C	RDL	MDL	QC Batch
Moisture	%	0.80 J	0.50 U	0.70 J	1.0	0.50	9539920
Total Solids	%	100	100	100	1	1	9533779
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							



BUREAU
VERITAS

Bureau Veritas Job #: C4M5009
Report Date: 2024/09/03

Apex Laboratories
Client Project #: A4G1133

PERFLUOROALKYL SUBSTANCES (SOIL)

Bureau Veritas ID		ZUM936		ZUM937		ZUM938			
Sampling Date		2024/07/10 12:25		2024/07/10 14:10		2024/07/10 15:05			
	UNITS	CCLF-001-SS-0.5-A	QC Batch	CCLF-001-SS-0.5-B	QC Batch	CCLF-001-SS-0.5-C	RDL	MDL	QC Batch
Perfluorobutanoic acid (PFBA)	ng/g	0.26 J	9602509	0.24 J	9602509	0.23 J	0.80	0.066	9602509
Perfluoropentanoic acid (PFPeA)	ng/g	0.15 J	9602509	0.14 J	9602509	0.13 J	0.40	0.031	9602509
Perfluorohexanoic acid (PFHxA)	ng/g	0.15 J	9602509	0.15 J	9602509	0.13 J	0.20	0.022	9602509
Perfluoroheptanoic acid (PFHpA)	ng/g	0.091 J	9602509	0.091 J	9602509	0.081 J	0.20	0.027	9602509
Perfluorooctanoic acid (PFOA)	ng/g	0.45	9602509	0.43	9602509	0.42	0.20	0.036	9602509
Perfluorononanoic acid (PFNA)	ng/g	0.068 J	9602509	0.061 J	9602509	0.064 J	0.20	0.049	9602509
Perfluorodecanoic acid (PFDA)	ng/g	0.030 U	9602509	0.030 U	9602509	0.030 U	0.20	0.030	9602509
Perfluoroundecanoic acid (PFUnA)	ng/g	0.031 U	9602509	0.031 U	9602509	0.031 U	0.20	0.031	9602509
Perfluorododecanoic acid (PFDoA)	ng/g	0.030 U	9602509	0.030 U	9602509	0.030 U	0.20	0.030	9602509
Perfluorotridecanoic acid (PFTrDA)	ng/g	0.040 U	9602509	0.040 U	9602509	0.040 U	0.20	0.040	9602509
Perfluorotetradecanoic acid (PFTeDA)	ng/g	0.025 U	9602509	0.025 U	9602509	0.025 U	0.20	0.025	9602509
Perfluorobutanesulfonic acid (PFBS)	ng/g	0.018 U	9602509	0.018 U	9602509	0.018 U	0.18	0.018	9602509
Perfluoropentanesulfonic acid PFPeS	ng/g	0.026 U	9602509	0.026 U	9602509	0.026 U	0.19	0.026	9602509
Perfluorohexanesulfonic acid(PFHxS)	ng/g	0.13 J	9602509	0.12 J	9602509	0.10 J	0.18	0.022	9602509
Perfluoroheptanesulfonic acid PFHpS	ng/g	0.045 U	9602509	0.045 U	9602509	0.045 U	0.19	0.045	9602509
Perfluorooctanesulfonic acid (PFOS)	ng/g	0.65	9602509	0.61	9602509	0.62	0.19	0.028	9602509
Perfluorononanesulfonic acid (PFNS)	ng/g	0.040 U	9602509	0.040 U	9602509	0.040 U	0.19	0.040	9602509
Perfluorodecanesulfonic acid (PFDS)	ng/g	0.020 U	9602509	0.020 U	9602509	0.020 U	0.19	0.020	9602509
Perfluorododecanesulfonic acid	ng/g	0.063 U	9602509	0.063 U	9602509	0.063 U	0.19	0.063	9602509
4:2 Fluorotelomer sulfonic acid	ng/g	0.094 U	9602509	0.094 U	9602509	0.094 U	0.75	0.094	9602509
6:2 Fluorotelomer sulfonic acid	ng/g	0.12 U	9602509	0.12 U	9612686	0.12 U	0.76	0.12	9612686
8:2 Fluorotelomer sulfonic acid	ng/g	0.15 U	9612686	0.15 U	9612686	0.15 U	0.77	0.15	9612686
Perfluorooctane Sulfonamide (PFOSA)	ng/g	0.018 U	9602509	0.018 U	9602509	0.018 U	0.20	0.018	9602509
MeFOSA	ng/g	0.030 U	9602509	0.030 U	9602509	0.030 U	0.20	0.030	9602509
EtFOSA	ng/g	0.013 U	9602509	0.013 U	9602509	0.013 U	0.20	0.013	9602509
MeFOSAA	ng/g	0.046 U	9602509	0.046 U	9602509	0.046 U	0.20	0.046	9612686
EtFOSAA	ng/g	0.059 U	9612686	0.059 U	9612686	0.059 U	0.20	0.059	9612686
MeFOSE	ng/g	0.26 U	9602509	0.26 U	9602509	0.26 U	2.0	0.26	9602509
EtFOSE	ng/g	0.59 U	9602509	0.59 U	9602509	0.59 U	2.0	0.59	9602509
Hexafluoropropyleneoxide dimer acid	ng/g	0.077 U	9602509	0.077 U	9602509	0.077 U	0.80	0.077	9602509
4,8-Dioxa-3H-perfluorononanoic acid	ng/g	0.077 U	9602509	0.077 U	9602509	0.077 U	0.76	0.077	9602509
Perfluoro-3-methoxypropanoic acid	ng/g	0.024 U	9602509	0.024 U	9602509	0.024 U	0.40	0.024	9602509
Perfluoro-4-methoxybutanoic acid	ng/g	0.050 U	9602509	0.050 U	9602509	0.050 U	0.40	0.050	9602509
Nonafluoro-3,6-dioxaheptanoic acid	ng/g	0.54 U	9602509	0.54 U	9602509	0.54 U	4.0	0.54	9602509
9Cl-PF3ONS (F-53B Major)	ng/g	0.082 U	9602509	0.082 U	9602509	0.082 U	0.75	0.082	9602509
11Cl-PF3OUdS (F-53B Minor)	ng/g	0.096 U	9602509	0.096 U	9602509	0.096 U	0.76	0.096	9602509
Perfluoro2ethoxyethanesulfonic acid	ng/g	0.063 U	9602509	0.063 U	9602509	0.063 U	0.36	0.063	9602509

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



BUREAU
VERITAS

Bureau Veritas Job #: C4M5009
Report Date: 2024/09/03

Apex Laboratories
Client Project #: A4G1133

PERFLUOROALKYL SUBSTANCES (SOIL)

Bureau Veritas ID		ZUM936		ZUM937		ZUM938			
Sampling Date		2024/07/10 12:25		2024/07/10 14:10		2024/07/10 15:05			
	UNITS	CCLF-001-SS-0.5-A	QC Batch	CCLF-001-SS-0.5-B	QC Batch	CCLF-001-SS-0.5-C	RDL	MDL	QC Batch
3-Perfluoropropylpropanoic acid	ng/g	0.26 U	9602509	0.26 U	9602509	0.26 U	1.0	0.26	9602509
2H2H3H3H-Perfluorooctanoic acid	ng/g	0.89 U	9602509	0.89 U	9602509	0.89 U	5.0	0.89	9602509
3-Perfluoroheptylpropanoic acid	ng/g	0.85 U	9602509	0.85 U	9602509	0.85 U	5.0	0.85	9602509
Surrogate Recovery (%)									
13C2-4:2-Fluorotelomersulfonic Acid	%	98	9602509	126	9602509	135	N/A	N/A	9602509
13C2-6:2-Fluorotelomersulfonic Acid	%	124	9602509	145	9612686	120	N/A	N/A	9612686
13C2-8:2-Fluorotelomersulfonic Acid	%	143	9612686	175 (1)	9612686	130	N/A	N/A	9612686
13C2-Perfluorodecanoic acid	%	146	9602509	140	9602509	133	N/A	N/A	9602509
13C2-Perfluorododecanoic acid	%	84	9602509	104	9602509	106	N/A	N/A	9602509
13C2-Perfluorohexanoic acid	%	120	9602509	128	9602509	118	N/A	N/A	9602509
13C2-Perfluorotetradecanoic acid	%	87	9602509	111	9602509	119	N/A	N/A	9602509
13C3-HFPO-DA	%	82	9602509	92	9602509	97	N/A	N/A	9602509
13C3-Perfluorobutanesulfonic acid	%	75	9602509	87	9602509	97	N/A	N/A	9602509
13C3-Perfluorobutanoic Acid	%	114	9602509	115	9602509	105	N/A	N/A	9602509
13C3-Perfluorohexanesulfonic Acid	%	81	9602509	91	9602509	104	N/A	N/A	9602509
13C4-Perfluorobutanoic acid	%	79	9602509	94	9602509	99	N/A	N/A	9602509
13C4-Perfluoroheptanoic acid	%	87	9602509	102	9602509	104	N/A	N/A	9602509
13C4-Perfluorooctanesulfonic acid	%	128	9602509	138	9602509	120	N/A	N/A	9602509
13C4-Perfluorooctanoic acid	%	139	9602509	137	9602509	122	N/A	N/A	9602509
13C5-Perfluorohexanoic Acid	%	82	9602509	93	9602509	95	N/A	N/A	9602509
13C5-Perfluorononanoic acid	%	134	9602509	141	9602509	130	N/A	N/A	9602509
13C5-Perfluoropentanoic acid	%	80	9602509	92	9602509	93	N/A	N/A	9602509
13C6-Perfluorodecanoic Acid	%	79	9602509	100	9602509	103	N/A	N/A	9602509
13C7-Perfluoroundecanoic Acid	%	84	9602509	112	9602509	103	N/A	N/A	9602509
13C8-Perfluorooctane Sulfonamide	%	99	9602509	113	9602509	126	N/A	N/A	9602509
13C8-Perfluorooctanesulfonic Acid	%	88	9602509	87	9602509	103	N/A	N/A	9602509
13C8-Perfluorooctanoic Acid	%	75	9602509	93	9602509	99	N/A	N/A	9602509
13C9-Perfluorononanoic Acid	%	80	9602509	93	9602509	97	N/A	N/A	9602509
18O2-Perfluorohexanesulfonic acid	%	132	9602509	137	9602509	120	N/A	N/A	9602509
D3-MeFOSA	%	46	9602509	45	9602509	57	N/A	N/A	9602509
D3-MeFOSAA	%	122	9602509	141	9602509	103	N/A	N/A	9612686
D5-EtFOSA	%	34	9602509	30	9602509	37	N/A	N/A	9602509
D5-EtFOSAA	%	150	9612686	173 (1)	9612686	134	N/A	N/A	9612686
D7-MeFOSE	%	49	9602509	46	9602509	61	N/A	N/A	9602509
D9-EtFOSE	%	54	9602509	50	9602509	61	N/A	N/A	9602509

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable

(1) Extracted internal standard analyte recovery exceeds control limits. This may result in increased variability of the associated native analyte result.



PERFLUOROALKYL SUBSTANCES (SOIL)

Bureau Veritas ID		ZUM938			
Sampling Date		2024/07/10 15:05			
	UNITS	CCLF-001-SS-0.5-C Lab-Dup	RDL	MDL	QC Batch
6:2 Fluorotelomer sulfonic acid	ng/g	0.12 U	0.76	0.12	9612686
8:2 Fluorotelomer sulfonic acid	ng/g	0.15 U	0.77	0.15	9612686
MeFOSAA	ng/g	0.046 U	0.20	0.046	9612686
EtFOSAA	ng/g	0.059 U	0.20	0.059	9612686
Surrogate Recovery (%)					
13C2-6:2-Fluorotelomersulfonic Acid	%	109	N/A	N/A	9612686
13C2-8:2-Fluorotelomersulfonic Acid	%	123	N/A	N/A	9612686
D3-MeFOSAA	%	84	N/A	N/A	9612686
D5-EtFOSAA	%	117	N/A	N/A	9612686
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable					



TEST SUMMARY

Bureau Veritas ID: ZUM936
Sample ID: CCLF-001-SS-0.5-A
Matrix: Soil

Collected: 2024/07/10
Shipped:
Received: 2024/07/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	9539920	N/A	2024/07/26	Joe Thomas
PFAS in Soil by SPE/LCMS	LCMS	9602509	2024/08/27	2024/08/29	Richard Dinh Pham
Total Solids		9533779	N/A	2024/07/27	Automated Statchk

Bureau Veritas ID: ZUM937
Sample ID: CCLF-001-SS-0.5-B
Matrix: Soil

Collected: 2024/07/10
Shipped:
Received: 2024/07/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	9539920	N/A	2024/07/26	Joe Thomas
PFAS in Soil by SPE/LCMS	LCMS	9602509	2024/08/27	2024/08/29	Richard Dinh Pham
Total Solids		9533779	N/A	2024/07/27	Automated Statchk

Bureau Veritas ID: ZUM938
Sample ID: CCLF-001-SS-0.5-C
Matrix: Soil

Collected: 2024/07/10
Shipped:
Received: 2024/07/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	9539920	N/A	2024/07/26	Joe Thomas
PFAS in Soil by SPE/LCMS	LCMS	9602509	2024/08/27	2024/08/29	Richard Dinh Pham
Total Solids		9533779	N/A	2024/07/27	Automated Statchk

Bureau Veritas ID: ZUM938 Dup
Sample ID: CCLF-001-SS-0.5-C
Matrix: Soil

Collected: 2024/07/10
Shipped:
Received: 2024/07/23

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in Soil by SPE/LCMS	LCMS	9612686	2024/09/01	2024/09/02	Parth Goswami



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.3°C
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Sample ZUM936, PFAS in Soil by SPE/LCMS: Test repeated.
Sample ZUM937, PFAS in Soil by SPE/LCMS: Test repeated.
Sample ZUM938, PFAS in Soil by SPE/LCMS: Test repeated.

Results relate only to the items tested.



BUREAU
VERITAS

Bureau Veritas Job #: C4M5009
Report Date: 2024/09/03

Apex Laboratories
Client Project #: A4G1133

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
9539920	JTS	RPD - Sample/Sample Dup	Moisture	2024/07/26	0.70		%	20
9602509	RPM	Matrix Spike	13C2-4:2-Fluorotelomersulfonic Acid	2024/08/29		85	%	20 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2024/08/29		89	%	20 - 150
			13C2-Perfluorodecanoic acid	2024/08/29		112	%	30 - 999
			13C2-Perfluorododecanoic acid	2024/08/29		95	%	20 - 150
			13C2-Perfluorohexanoic acid	2024/08/29		109	%	30 - 999
			13C2-Perfluorotetradecanoic acid	2024/08/29		92	%	20 - 150
			13C3-HFPO-DA	2024/08/29		94	%	20 - 150
			13C3-Perfluorobutanesulfonic acid	2024/08/29		89	%	20 - 150
			13C3-Perfluorobutanoic Acid	2024/08/29		103	%	30 - 999
			13C3-Perfluorohexanesulfonic Acid	2024/08/29		88	%	20 - 150
			13C4-Perfluorobutanoic acid	2024/08/29		95	%	20 - 150
			13C4-Perfluoroheptanoic acid	2024/08/29		96	%	20 - 150
			13C4-Perfluorooctanesulfonic acid	2024/08/29		110	%	30 - 999
			13C4-Perfluorooctanoic acid	2024/08/29		113	%	30 - 999
			13C5-Perfluorohexanoic Acid	2024/08/29		96	%	20 - 150
			13C5-Perfluorononanoic acid	2024/08/29		114	%	30 - 999
			13C5-Perfluoropentanoic acid	2024/08/29		94	%	20 - 150
			13C6-Perfluorodecanoic Acid	2024/08/29		99	%	20 - 150
			13C7-Perfluoroundecanoic Acid	2024/08/29		90	%	20 - 150
			13C8-Perfluorooctane Sulfonamide	2024/08/29		93	%	20 - 150
			13C8-Perfluorooctanesulfonic Acid	2024/08/29		90	%	20 - 150
			13C8-Perfluorooctanoic Acid	2024/08/29		94	%	20 - 150
			13C9-Perfluorononanoic Acid	2024/08/29		93	%	20 - 150
			18O2-Perfluorohexanesulfonic acid	2024/08/29		114	%	30 - 999
			D3-MeFOSA	2024/08/29		62	%	20 - 150
			D3-MeFOSAA	2024/08/29		103	%	20 - 150
			D5-EtFOSA	2024/08/29		50	%	20 - 150
			D7-MeFOSE	2024/08/29		56	%	20 - 150
			D9-EtFOSE	2024/08/29		51	%	20 - 150
			Perfluorobutanoic acid (PFBA)	2024/08/29		103	%	40 - 150
			Perfluoropentanoic acid (PFPeA)	2024/08/29		103	%	40 - 150
			Perfluorohexanoic acid (PFHxA)	2024/08/29		102	%	40 - 150
			Perfluoroheptanoic acid (PFHpA)	2024/08/29		101	%	40 - 150
			Perfluorooctanoic acid (PFOA)	2024/08/29		100	%	40 - 150
			Perfluorononanoic acid (PFNA)	2024/08/29		102	%	40 - 150
			Perfluorodecanoic acid (PFDA)	2024/08/29		97	%	40 - 150
			Perfluoroundecanoic acid (PFUnA)	2024/08/29		107	%	40 - 150
			Perfluorododecanoic acid (PFDoA)	2024/08/29		102	%	40 - 150
			Perfluorotridecanoic acid (PFTrDA)	2024/08/29		108	%	40 - 150
			Perfluorotetradecanoic acid(PFTeDA)	2024/08/29		107	%	40 - 150
			Perfluorobutanesulfonic acid (PFBS)	2024/08/29		103	%	40 - 150
			Perfluoropentanesulfonic acid PFPeS	2024/08/29		102	%	40 - 150
			Perfluorohexanesulfonic acid(PFHxS)	2024/08/29		104	%	40 - 150
			Perfluoroheptanesulfonic acid PFHpS	2024/08/29		109	%	40 - 150
			Perfluorooctanesulfonic acid (PFOS)	2024/08/29		107	%	40 - 150
			Perfluorononanesulfonic acid (PFNS)	2024/08/29		111	%	40 - 150
			Perfluorodecanesulfonic acid (PFDS)	2024/08/29		109	%	40 - 150
			Perfluorododecanesulfonic acid	2024/08/29		102	%	40 - 150
			4:2 Fluorotelomer sulfonic acid	2024/08/29		101	%	40 - 150
			6:2 Fluorotelomer sulfonic acid	2024/08/29		97	%	40 - 150
			Perfluorooctane Sulfonamide (PFOSA)	2024/08/29		102	%	40 - 150
			MeFOSA	2024/08/29		103	%	40 - 150



BUREAU
VERITAS

Bureau Veritas Job #: C4M5009
Report Date: 2024/09/03

Apex Laboratories
Client Project #: A4G1133

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			EtFOSA	2024/08/29		104	%	40 - 150
			MeFOSAA	2024/08/29		100	%	40 - 150
			MeFOSE	2024/08/29		104	%	40 - 150
			EtFOSE	2024/08/29		101	%	40 - 150
			Hexafluoropropyleneoxide dimer acid	2024/08/29		100	%	40 - 150
			4,8-Dioxa-3H-perfluorononanoic acid	2024/08/29		104	%	40 - 150
			Perfluoro-3-methoxypropanoic acid	2024/08/29		107	%	40 - 150
			Perfluoro-4-methoxybutanoic acid	2024/08/29		103	%	40 - 150
			Nonafluoro-3,6-dioxaheptanoic acid	2024/08/29		99	%	40 - 150
			9Cl-PF3ONS (F-53B Major)	2024/08/29		105	%	40 - 150
			11Cl-PF3OUdS (F-53B Minor)	2024/08/29		104	%	40 - 150
			Perfluoro2ethoxyethanesulfonic acid	2024/08/29		100	%	40 - 150
			3-Perfluoropropylpropanoic acid	2024/08/29		96	%	40 - 150
			2H2H3H3H-Perfluorooctanoic acid	2024/08/29		96	%	40 - 150
			3-Perfluoroheptylpropanoic acid	2024/08/29		97	%	40 - 150
9602509	RPM	Matrix Spike DUP	13C2-4:2-Fluorotelomersulfonic Acid	2024/08/29		85	%	20 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2024/08/29		89	%	20 - 150
			13C2-Perfluorodecanoic acid	2024/08/29		110	%	30 - 999
			13C2-Perfluorododecanoic acid	2024/08/29		97	%	20 - 150
			13C2-Perfluorohexanoic acid	2024/08/29		109	%	30 - 999
			13C2-Perfluorotetradecanoic acid	2024/08/29		101	%	20 - 150
			13C3-HFPO-DA	2024/08/29		94	%	20 - 150
			13C3-Perfluorobutanesulfonic acid	2024/08/29		90	%	20 - 150
			13C3-Perfluorobutanoic Acid	2024/08/29		102	%	30 - 999
			13C3-Perfluorohexanesulfonic Acid	2024/08/29		95	%	20 - 150
			13C4-Perfluorobutanoic acid	2024/08/29		96	%	20 - 150
			13C4-Perfluoroheptanoic acid	2024/08/29		96	%	20 - 150
			13C4-Perfluorooctanesulfonic acid	2024/08/29		112	%	30 - 999
			13C4-Perfluorooctanoic acid	2024/08/29		109	%	30 - 999
			13C5-Perfluorohexanoic Acid	2024/08/29		95	%	20 - 150
			13C5-Perfluorononanoic acid	2024/08/29		110	%	30 - 999
			13C5-Perfluoropentanoic acid	2024/08/29		94	%	20 - 150
			13C6-Perfluorodecanoic Acid	2024/08/29		95	%	20 - 150
			13C7-Perfluoroundecanoic Acid	2024/08/29		98	%	20 - 150
			13C8-Perfluorooctane Sulfonamide	2024/08/29		93	%	20 - 150
			13C8-Perfluorooctanesulfonic Acid	2024/08/29		93	%	20 - 150
			13C8-Perfluorooctanoic Acid	2024/08/29		96	%	20 - 150
			13C9-Perfluorononanoic Acid	2024/08/29		91	%	20 - 150
			18O2-Perfluorohexanesulfonic acid	2024/08/29		112	%	30 - 999
			D3-MeFOSA	2024/08/29		62	%	20 - 150
			D3-MeFOSAA	2024/08/29		98	%	20 - 150
			D5-EtFOSA	2024/08/29		57	%	20 - 150
			D7-MeFOSE	2024/08/29		62	%	20 - 150
			D9-EtFOSE	2024/08/29		57	%	20 - 150
			Perfluorobutanoic acid (PFBA)	2024/08/29		100	%	40 - 150
			Perfluoropentanoic acid (PFPeA)	2024/08/29		99	%	40 - 150
			Perfluorohexanoic acid (PFHxA)	2024/08/29		99	%	40 - 150
			Perfluoroheptanoic acid (PFHpA)	2024/08/29		100	%	40 - 150
			Perfluorooctanoic acid (PFOA)	2024/08/29		100	%	40 - 150
			Perfluorononanoic acid (PFNA)	2024/08/29		104	%	40 - 150
			Perfluorodecanoic acid (PFDA)	2024/08/29		98	%	40 - 150
			Perfluoroundecanoic acid (PFUnA)	2024/08/29		97	%	40 - 150
			Perfluorododecanoic acid (PFDoA)	2024/08/29		96	%	40 - 150



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VERITAS

Bureau Veritas Job #: C4M5009
Report Date: 2024/09/03

Apex Laboratories
Client Project #: A4G1133

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorotridecanoic acid (PFTTrDA)	2024/08/29		96	%	40 - 150
			Perfluorotetradecanoic acid(PFTTeDA)	2024/08/29		98	%	40 - 150
			Perfluorobutanesulfonic acid (PFBS)	2024/08/29		100	%	40 - 150
			Perfluoropentanesulfonic acid PFPeS	2024/08/29		96	%	40 - 150
			Perfluorohexanesulfonic acid(PFHxS)	2024/08/29		97	%	40 - 150
			Perfluoroheptanesulfonic acid PFHpS	2024/08/29		99	%	40 - 150
			Perfluorooctanesulfonic acid (PFOS)	2024/08/29		95	%	40 - 150
			Perfluorononanesulfonic acid (PFNS)	2024/08/29		99	%	40 - 150
			Perfluorodecanesulfonic acid (PFDS)	2024/08/29		99	%	40 - 150
			Perfluorododecanesulfonic acid	2024/08/29		96	%	40 - 150
			4:2 Fluorotelomer sulfonic acid	2024/08/29		98	%	40 - 150
			6:2 Fluorotelomer sulfonic acid	2024/08/29		96	%	40 - 150
			Perfluorooctane Sulfonamide (PFOSA)	2024/08/29		100	%	40 - 150
			MeFOSA	2024/08/29		102	%	40 - 150
			EtFOSA	2024/08/29		99	%	40 - 150
			MeFOSAA	2024/08/29		95	%	40 - 150
			MeFOSE	2024/08/29		102	%	40 - 150
			EtFOSE	2024/08/29		100	%	40 - 150
			Hexafluoropropyleneoxide dimer acid	2024/08/29		97	%	40 - 150
			4,8-Dioxa-3H-perfluorononanoic acid	2024/08/29		100	%	40 - 150
			Perfluoro-3-methoxypropanoic acid	2024/08/29		104	%	40 - 150
			Perfluoro-4-methoxybutanoic acid	2024/08/29		99	%	40 - 150
			Nonafluoro-3,6-dioxaheptanoic acid	2024/08/29		98	%	40 - 150
			9Cl-PF3ONS (F-53B Major)	2024/08/29		101	%	40 - 150
			11Cl-PF3OUdS (F-53B Minor)	2024/08/29		99	%	40 - 150
			Perfluoro2ethoxyethanesulfonic acid	2024/08/29		98	%	40 - 150
			3-Perfluoropropylpropanoic acid	2024/08/29		95	%	40 - 150
			2H2H3H3H-Perfluorooctanoic acid	2024/08/29		97	%	40 - 150
			3-Perfluoroheptylpropanoic acid	2024/08/29		103	%	40 - 150
9602509	RPM	MS/MSD RPD	Perfluorobutanoic acid (PFBA)	2024/08/29	2.8		%	30
			Perfluoropentanoic acid (PFPeA)	2024/08/29	3.7		%	30
			Perfluorohexanoic acid (PFHxA)	2024/08/29	2.3		%	30
			Perfluoroheptanoic acid (PFHpA)	2024/08/29	1.6		%	30
			Perfluorooctanoic acid (PFOA)	2024/08/29	0.40		%	30
			Perfluorononanoic acid (PFNA)	2024/08/29	2.2		%	30
			Perfluorodecanoic acid (PFDA)	2024/08/29	1.1		%	30
			Perfluoroundecanoic acid (PFUnA)	2024/08/29	9.6		%	30
			Perfluorododecanoic acid (PFDoA)	2024/08/29	6.4		%	30
			Perfluorotridecanoic acid (PFTTrDA)	2024/08/29	11		%	30
			Perfluorotetradecanoic acid(PFTTeDA)	2024/08/29	8.5		%	30
			Perfluorobutanesulfonic acid (PFBS)	2024/08/29	3.3		%	30
			Perfluoropentanesulfonic acid PFPeS	2024/08/29	6.8		%	30
			Perfluorohexanesulfonic acid(PFHxS)	2024/08/29	7.5		%	30
			Perfluoroheptanesulfonic acid PFHpS	2024/08/29	9.7		%	30
			Perfluorooctanesulfonic acid (PFOS)	2024/08/29	12		%	30
			Perfluorononanesulfonic acid (PFNS)	2024/08/29	12		%	30
			Perfluorodecanesulfonic acid (PFDS)	2024/08/29	9.3		%	30
			Perfluorododecanesulfonic acid	2024/08/29	6.3		%	0
			4:2 Fluorotelomer sulfonic acid	2024/08/29	3.1		%	30
			6:2 Fluorotelomer sulfonic acid	2024/08/29	1.5		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2024/08/29	2.6		%	30
			MeFOSA	2024/08/29	0.67		%	30
			EtFOSA	2024/08/29	5.0		%	30



BUREAU
VERITAS

Bureau Veritas Job #: C4M5009
Report Date: 2024/09/03

Apex Laboratories
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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			MeFOSAA	2024/08/29	5.4		%	30
			MeFOSE	2024/08/29	2.3		%	30
			EtFOSE	2024/08/29	0.62		%	30
			Hexafluoropropyleneoxide dimer acid	2024/08/29	3.6		%	30
			4,8-Dioxa-3H-perfluorononanoic acid	2024/08/29	3.5		%	30
			Perfluoro-3-methoxypropanoic acid	2024/08/29	2.9		%	0
			Perfluoro-4-methoxybutanoic acid	2024/08/29	3.9		%	0
			Nonafluoro-3,6-dioxaheptanoic acid	2024/08/29	0.63		%	0
			9Cl-PF3ONS (F-53B Major)	2024/08/29	3.1		%	30
			11Cl-PF3OUdS (F-53B Minor)	2024/08/29	4.5		%	30
			Perfluoro2ethoxyethanesulfonic acid	2024/08/29	1.9		%	0
			3-Perfluoropropylpropanoic acid	2024/08/29	0.98		%	30
			2H2H3H3H-Perfluorooctanoic acid	2024/08/29	0.49		%	30
			3-Perfluoroheptylpropanoic acid	2024/08/29	6.4		%	30
9602509	RPM	QC Standard	13C2-4:2-Fluorotelomersulfonic Acid	2024/08/29		116	%	20 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2024/08/29		105	%	20 - 150
			13C2-Perfluorodecanoic acid	2024/08/29		125	%	30 - 999
			13C2-Perfluorododecanoic acid	2024/08/29		97	%	20 - 150
			13C2-Perfluorohexanoic acid	2024/08/29		125	%	30 - 999
			13C2-Perfluorotetradecanoic acid	2024/08/29		95	%	20 - 150
			13C3-HFPO-DA	2024/08/29		104	%	20 - 150
			13C3-Perfluorobutanesulfonic acid	2024/08/29		102	%	20 - 150
			13C3-Perfluorobutanoic Acid	2024/08/29		125	%	30 - 999
			13C3-Perfluorohexanesulfonic Acid	2024/08/29		100	%	20 - 150
			13C4-Perfluorobutanoic acid	2024/08/29		101	%	20 - 150
			13C4-Perfluoroheptanoic acid	2024/08/29		100	%	20 - 150
			13C4-Perfluorooctanesulfonic acid	2024/08/29		119	%	30 - 999
			13C4-Perfluorooctanoic acid	2024/08/29		128	%	30 - 999
			13C5-Perfluorohexanoic Acid	2024/08/29		103	%	20 - 150
			13C5-Perfluorononanoic acid	2024/08/29		128	%	30 - 999
			13C5-Perfluoropentanoic acid	2024/08/29		102	%	20 - 150
			13C6-Perfluorodecanoic Acid	2024/08/29		96	%	20 - 150
			13C7-Perfluoroundecanoic Acid	2024/08/29		95	%	20 - 150
			13C8-Perfluorooctane Sulfonamide	2024/08/29		89	%	20 - 150
			13C8-Perfluorooctanesulfonic Acid	2024/08/29		112	%	20 - 150
			13C8-Perfluorooctanoic Acid	2024/08/29		98	%	20 - 150
			13C9-Perfluorononanoic Acid	2024/08/29		95	%	20 - 150
			18O2-Perfluorohexanesulfonic acid	2024/08/29		124	%	30 - 999
			D3-MeFOSA	2024/08/29		36	%	20 - 150
			D3-MeFOSAA	2024/08/29		103	%	20 - 150
			D5-EtFOSA	2024/08/29		24	%	20 - 150
			D7-MeFOSE	2024/08/29		58	%	20 - 150
			D9-EtFOSE	2024/08/29		51	%	20 - 150
			Perfluorobutanoic acid (PFBA)	2024/08/29		100	%	40 - 150
			Perfluoropentanoic acid (PFPeA)	2024/08/29		100	%	40 - 150
			Perfluorohexanoic acid (PFHxA)	2024/08/29		100	%	40 - 150
			Perfluoroheptanoic acid (PFHpA)	2024/08/29		100	%	40 - 150
			Perfluorooctanoic acid (PFOA)	2024/08/29		100	%	40 - 150
			Perfluorononanoic acid (PFNA)	2024/08/29		104	%	40 - 150
			Perfluorodecanoic acid (PFDA)	2024/08/29		107	%	40 - 150
			Perfluoroundecanoic acid (PFUnA)	2024/08/29		105	%	40 - 150
			Perfluorododecanoic acid (PFDoA)	2024/08/29		105	%	40 - 150
			Perfluorotridecanoic acid (PFTTrDA)	2024/08/29		105	%	40 - 150



BUREAU
VERITAS

Bureau Veritas Job #: C4M5009

Report Date: 2024/09/03

Apex Laboratories

Client Project #: A4G1133

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorotetradecanoic acid(PFTeDA)	2024/08/29		103	%	40 - 150
			Perfluorobutanesulfonic acid (PFBS)	2024/08/29		101	%	40 - 150
			Perfluoropentanesulfonic acid PFPeS	2024/08/29		97	%	40 - 150
			Perfluorohexanesulfonic acid(PFHxS)	2024/08/29		108	%	40 - 150
			Perfluoroheptanesulfonic acid PFHpS	2024/08/29		99	%	40 - 150
			Perfluorooctanesulfonic acid (PFOS)	2024/08/29		100	%	40 - 150
			Perfluorononanesulfonic acid (PFNS)	2024/08/29		91	%	40 - 150
			Perfluorodecanesulfonic acid (PFDS)	2024/08/29		94	%	40 - 150
			Perfluorododecanesulfonic acid	2024/08/29		88	%	40 - 150
			4:2 Fluorotelomer sulfonic acid	2024/08/29		102	%	40 - 150
			6:2 Fluorotelomer sulfonic acid	2024/08/29		110	%	40 - 150
			Perfluorooctane Sulfonamide (PFOSA)	2024/08/29		101	%	40 - 150
			MeFOSA	2024/08/29		99	%	40 - 150
			EtFOSA	2024/08/29		98	%	40 - 150
			MeFOSAA	2024/08/29		99	%	40 - 150
			MeFOSE	2024/08/29		100	%	40 - 150
			EtFOSE	2024/08/29		104	%	40 - 150
			Hexafluoropropyleneoxide dimer acid	2024/08/29		100	%	40 - 150
			4,8-Dioxa-3H-perfluorononanoic acid	2024/08/29		101	%	40 - 150
			Perfluoro-3-methoxypropanoic acid	2024/08/29		105	%	40 - 150
			Perfluoro-4-methoxybutanoic acid	2024/08/29		102	%	40 - 150
			Nonafluoro-3,6-dioxaheptanoic acid	2024/08/29		105	%	40 - 150
			9Cl-PF3ONS (F-53B Major)	2024/08/29		102	%	40 - 150
			11Cl-PF3OUdS (F-53B Minor)	2024/08/29		98	%	40 - 150
			Perfluoro2ethoxyethanesulfonic acid	2024/08/29		100	%	40 - 150
			3-Perfluoropropylpropanoic acid	2024/08/29		93	%	40 - 150
			2H2H3H3H-Perfluorooctanoic acid	2024/08/29		89	%	40 - 150
			3-Perfluoroheptylpropanoic acid	2024/08/29		78	%	40 - 150
9602509	RPM	Spiked Blank	13C2-4:2-Fluorotelomersulfonic Acid	2024/08/29		90	%	20 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2024/08/29		93	%	20 - 150
			13C2-Perfluorodecanoic acid	2024/08/29		118	%	30 - 999
			13C2-Perfluorododecanoic acid	2024/08/29		93	%	20 - 150
			13C2-Perfluorohexanoic acid	2024/08/29		118	%	30 - 999
			13C2-Perfluorotetradecanoic acid	2024/08/29		95	%	20 - 150
			13C3-HFPO-DA	2024/08/29		96	%	20 - 150
			13C3-Perfluorobutanesulfonic acid	2024/08/29		93	%	20 - 150
			13C3-Perfluorobutanoic Acid	2024/08/29		113	%	30 - 999
			13C3-Perfluorohexanesulfonic Acid	2024/08/29		91	%	20 - 150
			13C4-Perfluorobutanoic acid	2024/08/29		98	%	20 - 150
			13C4-Perfluoroheptanoic acid	2024/08/29		96	%	20 - 150
			13C4-Perfluorooctanesulfonic acid	2024/08/29		115	%	30 - 999
			13C4-Perfluorooctanoic acid	2024/08/29		121	%	30 - 999
			13C5-Perfluorohexanoic Acid	2024/08/29		100	%	20 - 150
			13C5-Perfluorononanoic acid	2024/08/29		118	%	30 - 999
			13C5-Perfluoropentanoic acid	2024/08/29		96	%	20 - 150
			13C6-Perfluorodecanoic Acid	2024/08/29		103	%	20 - 150
			13C7-Perfluoroundecanoic Acid	2024/08/29		94	%	20 - 150
			13C8-Perfluorooctane Sulfonamide	2024/08/29		96	%	20 - 150
			13C8-Perfluorooctanesulfonic Acid	2024/08/29		96	%	20 - 150
			13C8-Perfluorooctanoic Acid	2024/08/29		98	%	20 - 150
			13C9-Perfluorononanoic Acid	2024/08/29		98	%	20 - 150
			18O2-Perfluorohexanesulfonic acid	2024/08/29		121	%	30 - 999
			D3-MeFOSA	2024/08/29		57	%	20 - 150



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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			D3-MeFOSAA	2024/08/29		101	%	20 - 150
			D5-EtFOSA	2024/08/29		56	%	20 - 150
			D7-MeFOSE	2024/08/29		72	%	20 - 150
			D9-EtFOSE	2024/08/29		68	%	20 - 150
			Perfluorobutanoic acid (PFBA)	2024/08/29		101	%	40 - 150
			Perfluoropentanoic acid (PFPeA)	2024/08/29		101	%	40 - 150
			Perfluorohexanoic acid (PFHxA)	2024/08/29		99	%	40 - 150
			Perfluoroheptanoic acid (PFHpA)	2024/08/29		102	%	40 - 150
			Perfluorooctanoic acid (PFOA)	2024/08/29		100	%	40 - 150
			Perfluorononanoic acid (PFNA)	2024/08/29		101	%	40 - 150
			Perfluorodecanoic acid (PFDA)	2024/08/29		95	%	40 - 150
			Perfluoroundecanoic acid (PFUnA)	2024/08/29		104	%	40 - 150
			Perfluorododecanoic acid (PFDoA)	2024/08/29		101	%	40 - 150
			Perfluorotridecanoic acid (PFTTrDA)	2024/08/29		104	%	40 - 150
			Perfluorotetradecanoic acid(PFTeDA)	2024/08/29		104	%	40 - 150
			Perfluorobutanesulfonic acid (PFBS)	2024/08/29		101	%	40 - 150
			Perfluoropentanesulfonic acid PFPeS	2024/08/29		104	%	40 - 150
			Perfluorohexanesulfonic acid(PFHxS)	2024/08/29		104	%	40 - 150
			Perfluoroheptanesulfonic acid PFHpS	2024/08/29		102	%	40 - 150
			Perfluorooctanesulfonic acid (PFOS)	2024/08/29		99	%	40 - 150
			Perfluorononanesulfonic acid (PFNS)	2024/08/29		106	%	40 - 150
			Perfluorodecanesulfonic acid (PFDS)	2024/08/29		104	%	40 - 150
			Perfluorododecanesulfonic acid	2024/08/29		101	%	40 - 150
			4:2 Fluorotelomer sulfonic acid	2024/08/29		97	%	40 - 150
			6:2 Fluorotelomer sulfonic acid	2024/08/29		98	%	40 - 150
			Perfluorooctane Sulfonamide (PFOSA)	2024/08/29		100	%	40 - 150
			MeFOSA	2024/08/29		104	%	40 - 150
			EtFOSA	2024/08/29		97	%	40 - 150
			MeFOSAA	2024/08/29		101	%	40 - 150
			MeFOSE	2024/08/29		104	%	40 - 150
			EtFOSE	2024/08/29		101	%	40 - 150
			Hexafluoropropyleneoxide dimer acid	2024/08/29		99	%	40 - 150
			4,8-Dioxa-3H-perfluorononanoic acid	2024/08/29		103	%	40 - 150
			Perfluoro-3-methoxypropanoic acid	2024/08/29		105	%	40 - 150
			Perfluoro-4-methoxybutanoic acid	2024/08/29		102	%	40 - 150
			Nonafluoro-3,6-dioxaheptanoic acid	2024/08/29		92	%	40 - 150
			9Cl-PF3ONS (F-53B Major)	2024/08/29		99	%	40 - 150
			11Cl-PF3OUdS (F-53B Minor)	2024/08/29		98	%	40 - 150
			Perfluoro2ethoxyethanesulfonic acid	2024/08/29		97	%	40 - 150
			3-Perfluoropropylpropanoic acid	2024/08/29		100	%	40 - 150
			2H2H3H3H-Perfluorooctanoic acid	2024/08/29		99	%	40 - 150
			3-Perfluoroheptylpropanoic acid	2024/08/29		102	%	40 - 150
9602509	RPM	Method Blank	13C2-4:2-Fluorotelomersulfonic Acid	2024/08/29		118	%	20 - 150
			13C2-6:2-Fluorotelomersulfonic Acid	2024/08/29		110	%	20 - 150
			13C2-Perfluorodecanoic acid	2024/08/29		115	%	30 - 999
			13C2-Perfluorododecanoic acid	2024/08/29		97	%	20 - 150
			13C2-Perfluorohexanoic acid	2024/08/29		115	%	30 - 999
			13C2-Perfluorotetradecanoic acid	2024/08/29		97	%	20 - 150
			13C3-HFPO-DA	2024/08/29		101	%	20 - 150
			13C3-Perfluorobutanesulfonic acid	2024/08/29		107	%	20 - 150
			13C3-Perfluorobutanoic Acid	2024/08/29		116	%	30 - 999
			13C3-Perfluorohexanesulfonic Acid	2024/08/29		103	%	20 - 150
			13C4-Perfluorobutanoic acid	2024/08/29		100	%	20 - 150



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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C4-Perfluoroheptanoic acid	2024/08/29		98	%	20 - 150
			13C4-Perfluorooctanesulfonic acid	2024/08/29		114	%	30 - 999
			13C4-Perfluorooctanoic acid	2024/08/29		114	%	30 - 999
			13C5-Perfluorohexanoic Acid	2024/08/29		102	%	20 - 150
			13C5-Perfluorononanoic acid	2024/08/29		115	%	30 - 999
			13C5-Perfluoropentanoic acid	2024/08/29		101	%	20 - 150
			13C6-Perfluorodecanoic Acid	2024/08/29		101	%	20 - 150
			13C7-Perfluoroundecanoic Acid	2024/08/29		96	%	20 - 150
			13C8-Perfluorooctane Sulfonamide	2024/08/29		88	%	20 - 150
			13C8-Perfluorooctanesulfonic Acid	2024/08/29		99	%	20 - 150
			13C8-Perfluorooctanoic Acid	2024/08/29		102	%	20 - 150
			13C9-Perfluorononanoic Acid	2024/08/29		101	%	20 - 150
			18O2-Perfluorohexanesulfonic acid	2024/08/29		111	%	30 - 999
			D3-MeFOSA	2024/08/29		33	%	20 - 150
			D3-MeFOSAA	2024/08/29		106	%	20 - 150
			D5-EtFOSA	2024/08/29		24	%	20 - 150
			D7-MeFOSE	2024/08/29		62	%	20 - 150
			D9-EtFOSE	2024/08/29		57	%	20 - 150
			Perfluorobutanoic acid (PFBA)	2024/08/29	0.066 U, MDL=0.066		ng/g	
			Perfluoropentanoic acid (PFPeA)	2024/08/29	0.031 U, MDL=0.031		ng/g	
			Perfluorohexanoic acid (PFHxA)	2024/08/29	0.022 U, MDL=0.022		ng/g	
			Perfluoroheptanoic acid (PFHpA)	2024/08/29	0.027 U, MDL=0.027		ng/g	
			Perfluorooctanoic acid (PFOA)	2024/08/29	0.036 U, MDL=0.036		ng/g	
			Perfluorononanoic acid (PFNA)	2024/08/29	0.049 U, MDL=0.049		ng/g	
			Perfluorodecanoic acid (PFDA)	2024/08/29	0.030 U, MDL=0.030		ng/g	
			Perfluoroundecanoic acid (PFUnA)	2024/08/29	0.031 U, MDL=0.031		ng/g	
			Perfluorododecanoic acid (PFDoA)	2024/08/29	0.030 U, MDL=0.030		ng/g	
			Perfluorotridecanoic acid (PFTTrDA)	2024/08/29	0.040 U, MDL=0.040		ng/g	
			Perfluorotetradecanoic acid(PFTeDA)	2024/08/29	0.025 U, MDL=0.025		ng/g	
			Perfluorobutanesulfonic acid (PFBS)	2024/08/29	0.018 U, MDL=0.018		ng/g	
			Perfluoropentanesulfonic acid PFPeS	2024/08/29	0.026 U, MDL=0.026		ng/g	
			Perfluorohexanesulfonic acid(PFHxS)	2024/08/29	0.022 U, MDL=0.022		ng/g	
			Perfluoroheptanesulfonic acid PFHpS	2024/08/29	0.045 U, MDL=0.045		ng/g	
			Perfluorooctanesulfonic acid (PFOS)	2024/08/29	0.028 U, MDL=0.028		ng/g	
			Perfluorononanesulfonic acid (PFNS)	2024/08/29	0.040 U, MDL=0.040		ng/g	
			Perfluorodecanesulfonic acid (PFDS)	2024/08/29	0.020 U, MDL=0.020		ng/g	



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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Perfluorododecanesulfonic acid	2024/08/29	0.063 U, MDL=0.063		ng/g	
			4:2 Fluorotelomer sulfonic acid	2024/08/29	0.094 U, MDL=0.094		ng/g	
			6:2 Fluorotelomer sulfonic acid	2024/08/29	0.12 U, MDL=0.12		ng/g	
			Perfluorooctane Sulfonamide (PFOSA)	2024/08/29	0.018 U, MDL=0.018		ng/g	
			MeFOSA	2024/08/29	0.030 U, MDL=0.030		ng/g	
			EtFOSA	2024/08/29	0.013 U, MDL=0.013		ng/g	
			MeFOSAA	2024/08/29	0.046 U, MDL=0.046		ng/g	
			MeFOSE	2024/08/29	0.26 U, MDL=0.26		ng/g	
			EtFOSE	2024/08/29	0.59 U, MDL=0.59		ng/g	
			Hexafluoropropyleneoxide dimer acid	2024/08/29	0.077 U, MDL=0.077		ng/g	
			4,8-Dioxa-3H-perfluorononanoic acid	2024/08/29	0.077 U, MDL=0.077		ng/g	
			Perfluoro-3-methoxypropanoic acid	2024/08/29	0.024 U, MDL=0.024		ng/g	
			Perfluoro-4-methoxybutanoic acid	2024/08/29	0.050 U, MDL=0.050		ng/g	
			Nonafluoro-3,6-dioxaheptanoic acid	2024/08/29	0.54 U, MDL=0.54		ng/g	
			9Cl-PF3ONS (F-53B Major)	2024/08/29	0.082 U, MDL=0.082		ng/g	
			11Cl-PF3OUdS (F-53B Minor)	2024/08/29	0.096 U, MDL=0.096		ng/g	
			Perfluoro2ethoxyethanesulfonic acid	2024/08/29	0.063 U, MDL=0.063		ng/g	
			3-Perfluoropropylpropanoic acid	2024/08/29	0.26 U, MDL=0.26		ng/g	
			2H2H3H3H-Perfluorooctanoic acid	2024/08/29	0.89 U, MDL=0.89		ng/g	
			3-Perfluoroheptylpropanoic acid	2024/08/29	0.85 U, MDL=0.85		ng/g	
9612686	PGO	Matrix Spike(ZUM938)	13C2-6:2-Fluorotelomersulfonic Acid	2024/09/02		104	%	20 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2024/09/02		127	%	20 - 150
			D3-MeFOSAA	2024/09/02		88	%	20 - 150
			D5-EtFOSAA	2024/09/02		116	%	20 - 150
			6:2 Fluorotelomer sulfonic acid	2024/09/02		92	%	40 - 150
			8:2 Fluorotelomer sulfonic acid	2024/09/02		88	%	40 - 150
			MeFOSAA	2024/09/02		95	%	40 - 150
			EtFOSAA	2024/09/02		100	%	40 - 150
9612686	PGO	QC Standard	13C2-6:2-Fluorotelomersulfonic Acid	2024/09/02		90	%	20 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2024/09/02		96	%	20 - 150
			D3-MeFOSAA	2024/09/02		87	%	20 - 150
			D5-EtFOSAA	2024/09/02		81	%	20 - 150
			6:2 Fluorotelomer sulfonic acid	2024/09/02		110	%	40 - 150
			8:2 Fluorotelomer sulfonic acid	2024/09/02		99	%	40 - 150



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Bureau Veritas Job #: C4M5009

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Apex Laboratories

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits			
9612686	PGO	Spiked Blank	MeFOSAA	2024/09/02		103	%	40 - 150			
			EtFOSAA	2024/09/02		126	%	40 - 150			
			13C2-6:2-Fluorotelomersulfonic Acid	2024/09/02		91	%	20 - 150			
			13C2-8:2-Fluorotelomersulfonic Acid	2024/09/02		103	%	20 - 150			
			D3-MeFOSAA	2024/09/02		94	%	20 - 150			
			D5-EtFOSAA	2024/09/02		95	%	20 - 150			
			6:2 Fluorotelomer sulfonic acid	2024/09/02		105	%	40 - 150			
			8:2 Fluorotelomer sulfonic acid	2024/09/02		91	%	40 - 150			
			MeFOSAA	2024/09/02		104	%	40 - 150			
			EtFOSAA	2024/09/02		104	%	40 - 150			
9612686	PGO	Method Blank	13C2-6:2-Fluorotelomersulfonic Acid	2024/09/02		106	%	20 - 150			
			13C2-8:2-Fluorotelomersulfonic Acid	2024/09/02		93	%	20 - 150			
			D3-MeFOSAA	2024/09/02		94	%	20 - 150			
			D5-EtFOSAA	2024/09/02		90	%	20 - 150			
			6:2 Fluorotelomer sulfonic acid	2024/09/02	0.12 U, MDL=0.12		ng/g				
			8:2 Fluorotelomer sulfonic acid	2024/09/02	0.15 U, MDL=0.15		ng/g				
			MeFOSAA	2024/09/02	0.046 U, MDL=0.046		ng/g				
			EtFOSAA	2024/09/02	0.059 U, MDL=0.059		ng/g				
			9612686	PGO	RPD - Sample/Sample Dup	6:2 Fluorotelomer sulfonic acid	2024/09/02	NC		%	30
						8:2 Fluorotelomer sulfonic acid	2024/09/02	NC		%	30
MeFOSAA	2024/09/02	NC					%	30			
EtFOSAA	2024/09/02	NC					%	30			

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Colm McNamara, Senior Analyst, Liquid Chromatography

Cristina Carriere, Senior Scientific Specialist

Marian Godax, Senior Analyst

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Attachment C

Data Validation Memorandum



MAUL
FOSTER
ALONGI

Data Validation Memorandum

Project No. M0363.17.003 | August 5, 2024 | City of Vancouver

Maul Foster & Alongi, Inc. (MFA), conducted an independent Stage 2A review of the quality of analytical results for soil samples collected on July 10, 2024, at the Circle C Landfill property at 31313 NW Paradise Park Road, La Center, WA 98642.

Apex Laboratories, LLC (Apex) and Bureau Veritas (BV) performed the analyses. MFA reviewed Apex report number A4G1133 and BV report number C4M5009. The analyses performed, and the samples analyzed are listed in the following tables.

Analysis	Reference
Diesel- and oil-range hydrocarbons	NWTPH-Dx
Per- and polyfluoroalkyl substances	EPA 1633
Percent dry weight Percent Moisture	EPA 8000D Carter 2 nd ed 70.2 (modified)
Polychlorinated biphenyls as Aroclors	EPA 8082A
Semivolatile organic compounds	EPA 8270E
Total metals	EPA 6020B
Total solids	SM 2540G

Notes

EPA = U.S. Environmental Protection Agency.

NWTPH = Northwest Total Petroleum Hydrocarbons.

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

Samples Analyzed
Report A4G1133/C4M5009
CCLF-001-SS-0.5-A
CCLF-001-SS-0.5-B
CCLF-001-SS-0.5-C

Data Validation Procedures

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA 2020a, 2020b) and appropriate laboratory- and method-specific guidelines (Apex 2023, BV 2021, EPA 1986).

Data validation procedures were modified, as appropriate, to accommodate quality control requirements for methods that EPA data review guidelines do not specifically address (e.g., Northwest Total Petroleum Hydrocarbons [NWTPH]-Dx).

EPA Method 8000D percent dry-weight, Carter 2nd edition 70.2 percent moisture, and SM 2540G total solid results reported by the laboratory for dry-weight correction were reviewed for completeness but were not included in Stage 2A data validation.

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

Final data qualifiers:

- J = result is estimated.
- U = result is non-detect at the method reporting limit (MRL) or method detection limit (MDL).
- UJ = result is non-detect with an estimated MRL.

General Qualifications

Apex noted that, to minimize matrix interference, EPA Method 8082A samples and associated batch quality control samples were processed with sulfuric acid cleanup by EPA Method 3665A, sulfur cleanup by EPA Method 3660B, and Florisil cleanup by EPA Method 3620B. No qualification by the reviewer was required.

According to report A4G1133, the NWTPH-Dx oil-range hydrocarbons result for samples CCLF-001-SS-0.5-A, CCLF-001-SS-0.5-B, and CCLF-001-SS-0.5-C were flagged by the laboratory as having no fuel pattern detected. The results were reported as oil-range hydrocarbons instead of specific fuel products; thus, qualification was not required.

In report A4G1133, Apex flagged the EPA Method 8270E 3,3'-dichlorobenzidine results for all samples and associated batch quality control results as estimated due to known erratic recoveries. The reviewer qualified the associated sample results, as shown in the following table.

Report	Sample	Analyte	Original Result (ug/kg)	Qualified Result (ug/kg)
A4G1133	CCLF-001-SS-0.5-A	3,3'-Dichlorobenzidine	203 U	203 UJ
	CCLF-001-SS-0.5-B		209 U	209 UJ
	CCLF-001-SS-0.5-C		214 U	R ^(a)

Notes

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

U = result is non-detect at the method reporting limit.

ug/kg = micrograms per kilogram.

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

^(a)Result is rejected in the Matrix Spike and Matrix Spike Duplicate Section. Final qualification is displayed in the table above.

Sample Conditions

Sample Custody

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

Holding Times

Extractions and analyses were performed within the recommended holding times.

Preservation and Sample Storage

All samples submitted to Apex were incremental sampling methodology (ISM) samples that were collected and named according to decision units (DUs) and collection depths. The reviewer confirmed that Apex processed each ISM sample as follows: the entire sample was dried, passed through a 2 millimeter sieve, and the material retained on the sieve was milled to less than 2 millimeters. All sieved and milled sample material was recombined, ground, and mixed, and a representative sample taken for analysis.

The samples were preserved and stored appropriately.

Reporting Limits

Apex evaluated results to MRLs and BV evaluated results to MDLs. Samples that required dilutions because of high analyte concentrations, matrix interferences, and/or dilutions necessary for preparation and/or analysis were reported with raised MRLs.

Blank Results

Method Blanks

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

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

Equipment Rinsate Blanks

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

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

Laboratory Control Sample and Laboratory Control Sample Duplicate Results

Laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) results are used to evaluate laboratory precision and accuracy. BV reported LCS samples as "Spike Blank." Where LCSD results were not reported, laboratory precision was evaluated using laboratory duplicate or matrix spike (MS) and matrix spike duplicate (MSD) results. The LCS samples were prepared and analyzed at the required frequency, in accordance with laboratory- and method-specific requirements.

According to report A4G1133, the EPA Method 8270E batch 24G0705 LCS result for 3,3'-dichlorobenzidine was above the upper percent recovery acceptance limit of 121 percent, at 193 percent. Associated non-detect results did not require qualification, although the results were qualified in the General Qualification Section due to erratic recoveries.

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

Laboratory Duplicate Results

Laboratory duplicate results are used to evaluate laboratory precision and sample homogeneity. All laboratory duplicate samples were prepared and analyzed at the required frequency, in accordance with laboratory- and method-specific requirements.

Where laboratory duplicate results were not reported, laboratory precision was evaluated using MS and MSD RPD results.

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

All laboratory duplicate results met the acceptance criteria.

Matrix Spike and Matrix Spike Duplicate Results

MS and MSD results are used to evaluate laboratory precision, accuracy, and the effect of the sample matrix on sample preparation and target analyte recovery. Where MSD results were not reported, laboratory precision was evaluated using laboratory duplicate results. All MS samples were prepared and analyzed at the required frequency, in accordance with laboratory- and method-specific requirements.

When MS were prepared from samples with high concentrations of target analytes, associated MS percent recovery exceedances did not require qualification because spike concentrations could not be accurately quantified. High concentrations of target analytes are defined as four times the spike amount for all analyses.

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

According to report A4G1133, the EPA Method 8270E batch 24G0705 MS prepared with sample CCLF-001-SS-0.5-C had 2,4-dimethylphenol; 4-nitrophenol; pentachlorophenol; 2,3,4,6-tetrachlorophenol; 2,3,5,6-tetrachlorophenol; n-nitrosodiphenylamine; 4-chloroaniline; 3-nitroaniline; and 4-nitroaniline results below their respective lower percent recovery acceptance limits, ranging from 5 percent to 42 percent. Additionally, the MS results for 2,4-dinitrophenol, aniline; benzoic acid, 3,3'-dichlorobenzidine, and pyridine had a zero percent recovery. The MS analysis was performed using a dilution factor of four and the MS concentration was less than or near to the MRL benzoic acid, so the reviewer could not evaluate MS recovery for this analyte and qualification was not required. The laboratory also flagged the 3,3'-dichlorobenzidine result due to the known erratic recoveries. The reviewer qualified the associated 4-chloroaniline and 3,3'-dichlorobenzidine sample results with R, and the remaining results with UJ, as shown in the following table.

Report	Sample	Analyte	Original Result (ug/kg)	Qualified Result (ug/kg)
A4G1133	CCLF-001-SS-0.5-C	2,4-Dimethylphenol	53.4 U	53.4 UJ
		2,4-Dinitrophenol	268 U	268 UJ
		4-Nitrophenol	107 U	107 UJ
		Pentachlorophenol	107 U	107 UJ
		2,3,4,6-Tetrachlorophenol	53.4 U	53.4 UJ
		2,3,5,6-Tetrachlorophenol	53.4 U	53.4 UJ
		n-Nitrosodiphenylamine	26.8 U	26.8 UJ
		Aniline	53.4 U	53.4 UJ
		4-Chloroaniline	26.8 U	R
		3-Nitroaniline	214 U	214 UJ
		4-Nitroaniline	214 U	214 UJ
		3,3'-Dichlorobenzidine	214 U	R
		Pyridine	53.4 U	53.4 UJ

Notes

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

U = result is non-detect at the method reporting limit.

ug/kg= micrograms per kilogram.

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

According to report A4G1133, the EPA Method 6020B batch 24G0541 MS prepared with sample CCLF-001-SS-0.5-A had a zinc result that exceeded the upper percent recovery limit of 125 percent, at 147 percent. The associated sample result was qualified, as shown in the following table.

Report	Sample	Analyte	Original Result (mg/kg)	Qualified Result (mg/kg)
A4G1133	CCLF-001-SS-0.5-A	Zinc	61.6	61.6 J

Notes

J = result is estimated.

mg/kg = milligram per kilogram.

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

Surrogate Results

Surrogate results are used to evaluate laboratory performance of target organic compounds for individual samples.

When surrogate results were outside percent recovery acceptance limits because of dilutions necessary to quantify high concentrations of target analytes, qualification by the reviewer was not required because surrogate concentrations could not be accurately quantified.

When batch quality control samples had surrogate percent recovery exceedances, qualification by the reviewer was not required when batch quality control target analyte results were within percent recovery acceptance limits.

According to report C4M5009, the surrogate compound 13C2-8:2-fluorotelomersulfonic acid and D5-ETFOSAA exceeded the upper percent acceptance range of 150 percent, at 175 percent and 173 percent, respectively, in sample CCLF-001-SS-0.5-B. The associated 8:2 fluorotelomer sulfonic acid and ETFOSSAA results were non-detect; thus, qualifications were not necessary.

All remaining surrogate results were within percent recovery acceptance limits.

Incremental Sampling Methodology Results

According to report A4G1133, incremental sampling methodology (ISM) samples were collected and named according to decision units (DUs). Apex processed and composited ISM samples prior to analysis consistent with industry standard procedures. One ISM sample was collected in triplicate, and the replicate set included samples CCLF-001-SS-0.5-A, CCLF-001-SS-0.5-B, and CCLF-001-SS-0.5-C. Triplicate sets were compared to acceptance criteria of 35 percent relative standard deviation (RSD) for analytes with one or more detected results (DEQ 2020). When all analytical results in a replicate set were non-detect or detected below MRLs, RSD was not evaluated.

Calculated ISM results are shown in the following table.

Report	Analyte	Units	CCLF-001-SS-0.5-A Result	CCLF-001-SS-0.5-B Result	CCLF-001-SS-0.5-C Result	RSD
A4G1133	Oil-range hydrocarbons	mg/kg	39.7	36.5	42.3	7.4%
	Arsenic		3.64	4.09	3.95	5.9%
	Beryllium		0.59	0.695	0.693	9.1%

Report	Analyte	Units	CCLF-001-SS-0.5-A Result	CCLF-001-SS-0.5-B Result	CCLF-001-SS-0.5-C Result	RSD
	Chromium	ug/kg	16.6	19.7	17.8	8.7%
	Copper		12.5	14.6	13.2	8.0%
	Lead		12.3	13.5	13	4.7%
	Nickel		10.8	12.9	11.5	9.1%
	Zinc		61.6 J ^(a)	74.0	66.9	9.2%
	Fluoranthene		15.6	31.8	22.6	34.8%
	Pyrene		12.3	20.4	15	25.9%
C4M5009	Perfluorobutanoic acid (PFBA)	ng/g	0.26 J	0.24 J	0.23 J	6.3 %
	Perfluoroheptanoic acid (PFHpA)		0.091 J	0.091 J	0.081 J	6.6 %
	Perfluorohexanesulfonic acid (PFHxS)		0.13 J	0.12 J	0.10 J	13.1 %
	Perfluorohexanoic acid (PFHxA)		0.15 J	0.15 J	0.13 J	8.1 %
	Perfluorononanoic acid (PFNA)		0.068 J	0.061 J	0.064 J	5.5 %
	Perfluorooctanesulfonic acid (PFOS)		0.65	0.61	0.62	3.3 %
	Perfluorooctanoic acid (PFOA)		0.45	0.43	0.42	3.5 %
	Perfluoropentanoic acid (PFPeA)		0.15 J	0.14 J	0.13 J	7.1 %

Notes

- J = result is estimated.
- mg/kg = milligrams per kilogram.
- ng/g = nanogram per gram.
- RSD = relative standard deviation.
- ug/kg = micrograms per kilogram.
- ^(a)Result is qualified in the Matrix Spike and Matrix Spike Duplicate Section.

All triplicate ISM results met the RSD criterion.

Data Package

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

None were found.

References

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

BV. 2021. *Corporate Quality Manual*. Rev. 22. Bureau Veritas: Mississauga, ON, Canada. September 7.

DEQ. 2020. *Decision Unit Characterization*. Oregon Department of Environmental Quality, Land Quality Division Cleanup Program: Portland, OR. September 14.

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

EPA. 2020a. *National Functional Guidelines for Inorganic Superfund Methods Data Review*. EPA 542-R-20-006. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation: Washington, DC. November.

EPA. 2020b. *National Functional Guidelines for Organic Superfund Methods Data Review*. EPA 540-R-20-005. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation: Washington, DC. November.